



# Reference Document 2017 including the Annual Financial Report

In this Reference Document (the "Reference Document"), unless otherwise stated, the terms "**Company**" and "EDF" refer to Électricité de France SA, and the terms "**EDF group**" and "**Group**" refer to EDF and its subsidiaries and affiliates.

In addition to the information contained in this Reference Document, investors should carefully consider the risk factors described in Chapter 2 ("Risk factors and control framework"). These risks, or one of these risks, could negatively impact the Group's business, position, financial results or outlook. Furthermore, other risks not yet identified or considered as material by the Group, could have the same negative impact, and investors could consequently lose all or part of their investment in the Company.

This Reference Document also contains information relating to the markets in which the EDF group operates. This information has been taken from surveys carried out by external sources. Given the rapid changes affecting the energy sector in France and throughout the world, it is possible that this information could prove to be erroneous or no longer up-to-date on the filing date of this Reference Document or thereafter. The Group's activities may therefore evolve in a manner different to that described in this Reference Document, and the declarations or information presented in this document may prove to be erroneous.

Forward-looking statements in this Reference Document, specifically in section 1.3 ("Group Strategy"), could also be impacted by risks, uncertainties and other factors that may cause the future income, performance and achievements of the Group to differ significantly from the objectives expressed and suggested. These factors may include changes in the economic and commercial environment, in regulations, as well as factors set forth in Chapter 2 ("Risk factors and control framework").

Pursuant to French and European legislation, RTE and Enedis, regulated subsidiaries managed independently within the meaning of the French Energy Code, respectively responsible for the transmission and distribution of electricity within the EDF group, are not allowed to communicate certain information they gather while conducting their activities to other Group entities, including its Management. Similarly, certain data specific to generation and supply activities cannot be communicated to the entities responsible for transmission and distribution. This Reference Document has been prepared by the EDF group in compliance with these rules. For the sake of brevity, further references in this Reference Document made to RTE and Enedis will not always specify their independent nature as within the meaning of the French Energy Code.

A glossary of the main technical terms is provided at the end of this Reference Document.

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# REFERENCE DOCUMENT 2017

The present Reference Document contains all information required for the Annual Financial Report.

**35.1**  
million customer accounts

**580.8TWh**  
of electricity generated worldwide

**87%**  
carbon-free generation

EDF group is the world's leading electricity company and global leader for low-carbon energy production. Particularly well established in Europe, especially France, the United Kingdom, Italy and Belgium, as well as North and South America, the Group covers all businesses spanning the electricity value chain – from generation to distribution and including energy transmission and trading activities – to continuously balance supply and demand. A marked increase in the use of renewables is bringing change to its electricity generation operations, which are underpinned by a diversified and complementary energy mix founded on nuclear power capacity. EDF offers products and advice to help residential customers manage their electricity consumption, to support the energy and financial performance of its business customers, and to help local authorities find sustainable solutions.

**BECAUSE OUR FUTURE IS ELECTRIC  
AND IT'S ALREADY HERE.**



This Reference Document was filed with the Autorité des Marchés Financiers (French Financial Markets Authority or AMF) on 15 March, 2018, in accordance with Article 212-13 of its General Regulations. It may be used in connection with a financial transaction if accompanied by an offering memorandum approved by the AMF. This document has been prepared by the issuer and its signatories are liable for its content.

Pursuant to Article 18 of EC Regulation no. 809/2004 of the European Commission, the following information is included by reference in this Reference Document:

- EDF group's consolidated financial statements for fiscal year-ended 31 December 2016 (prepared in accordance with international accounting standards) and the related statutory auditors' report, respectively presented in Chapters 6, sections 6.1 (pages 319 to 436) and 6.2 (pages 437 to 438) of the EDF group 2016 Reference Document;
- EDF group's consolidated financial statements for fiscal year-ended 31 December 2015 (prepared in accordance with international accounting standards) and the related statutory auditors' report, respectively presented in Chapters 6, sections 6.1 (pages 306 to 412) and 6.2 (pages 413 to 414) of the EDF group 2015 Reference Document;
- the EDF group's operating and financial review for fiscal year-ended 31 December 2016, presented in Chapter 5 (pages 268 to 301) of the EDF group's 2016 Reference Document;
- the EDF group's operating and financial review for fiscal year-ended 31 December 2015, presented in Chapter 5 (pages 262 to 301) of the EDF group's 2015 Reference Document;

Copies of this Reference Document are available free-of-charge at EDF's registered office (22-30 avenue de Wagram – 75382 Paris Cedex 08) and on its website (<http://www.edf.fr>), as well as on the AMF website (<http://www.amf-france.org>).

# 2017

## KEY FIGURES

**35.1**  
million customer accounts

**80%**  
Disposal plan  
delivered halway

**7.8GW**  
EDF EN net  
installed capacity

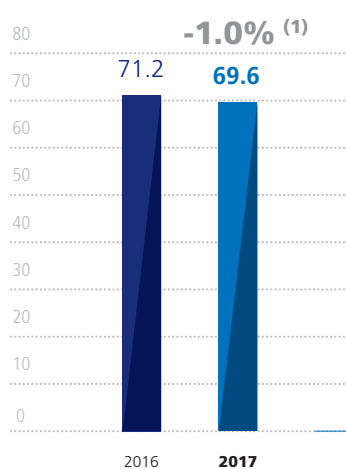
**22.5GW**  
EDF EN renewable  
project portfolio

**30GW**  
Solar Plan  
over 2020-2035

**580.8TWh**  
of electricity generated

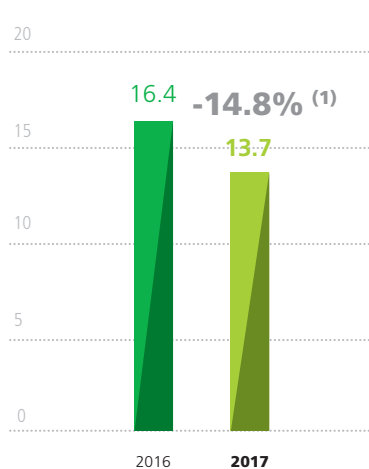
**€14bn**  
Framatome order book

### → Sales In billions of euros

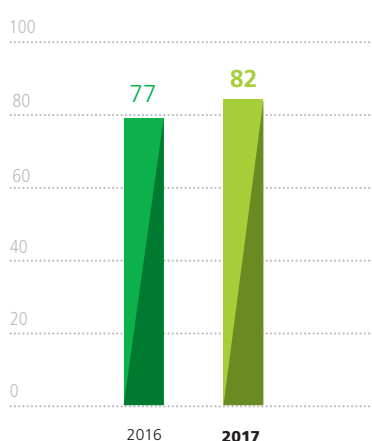


(1) Organic change at constant scope and exchange rates.

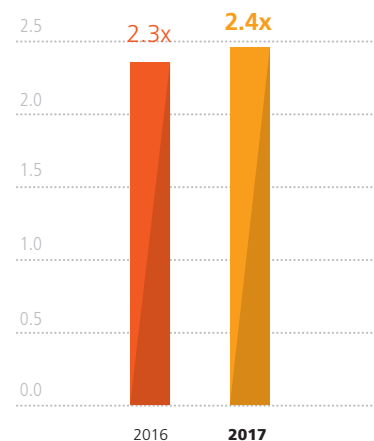
### → EBITDA In billions of euros



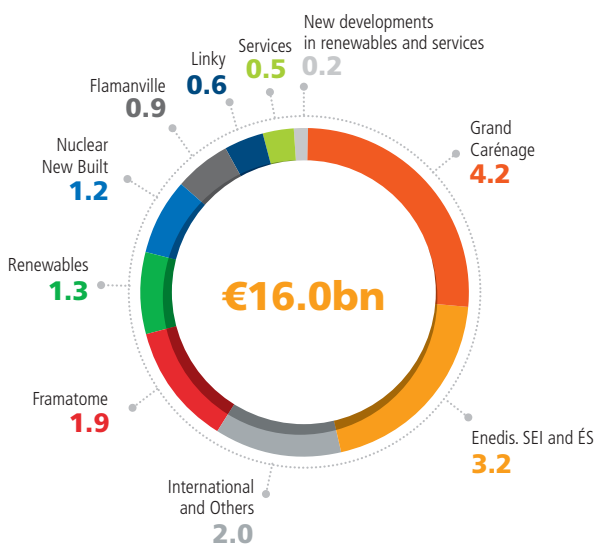
### → Group CO<sub>2</sub> emissions In g/KWh



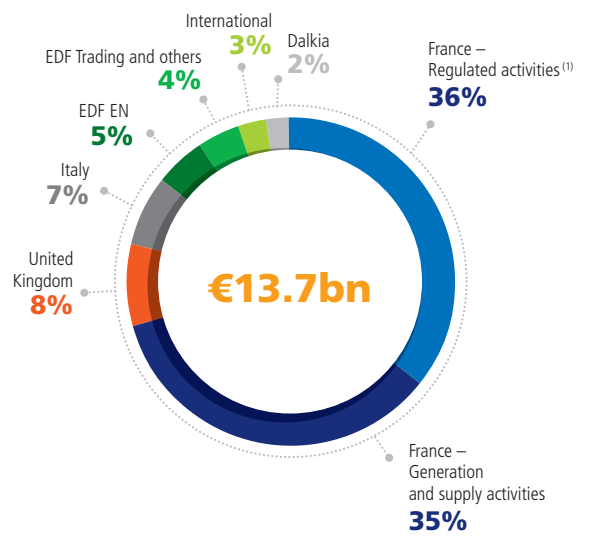
### → Net financial debt/EBITDA



➔ **Net investments excluding 2015-2020 disposal plan**

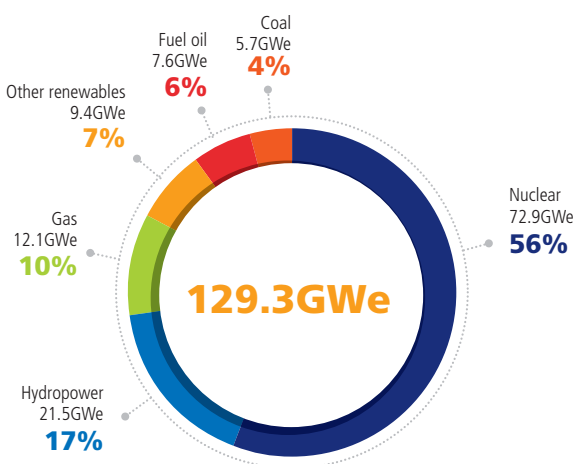


➔ **Breakdown of EBITDA**

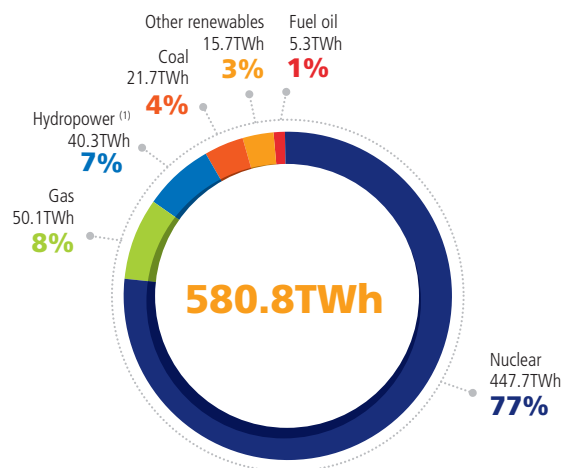


(1) Regulated activities: Enedis, ES and other activities. Enedis, an independent EDF subsidiary as defined in the French energy code.

➔ **Net installed capacity**



➔ **Net electricity generation**



# CORPORATE GOVERNANCE

## THE BOARD OF DIRECTORS

**18**  
directors

**11**  
directors appointed  
by the Shareholders'  
Meeting

**1**  
representative of  
the French State

**6**  
directors elected  
by the employees

**41.7%**  
of women

**41.7%**  
of independent  
directors

**90.9%**  
attendance rate

### → MEMBERS

Chaired by Jean-Bernard Lévy, the Board of Directors comprises

#### 11 DIRECTORS APPOINTED BY THE SHAREHOLDERS' MEETING

**Jean-Bernard LÉVY**,  
Chairman and Chief Executive Officer  
of EDF

**Olivier APPERT**,  
General representative of the National  
Academy of Technologies of France

**Philippe CROUZET**,  
Chairman of the Management Board  
of Vallourec

**Maurice GOURDAULT-MONTAGNE**,  
General Secretary at the Ministry  
for Foreign Affairs and International  
Development

**Bruno LAFONT**,  
Director, Lead independent director  
of ArcelorMittal

**Bruno LÉCHEVIN**,  
Deputy Chairman  
of Électriciens sans Frontières

**Marie-Christine LEPETIT**,  
Head of the Inspectorate General  
of Finance

**Colette LEWINER**,  
Professional Director

**Laurence PARISOT**,  
Associate Director of the Gradiva  
consulting firm

**Claire PEDINI**,  
Senior Vice-President in charge of  
Human Resources for the Saint Gobain  
Group

**Michèle ROUSSEAU**,  
Chair of the Bureau de Recherches  
Géologiques et Minières

#### ONE REPRESENTATIVE OF THE FRENCH STATE

**Martin VIAL**,  
Commissioner of the French State  
Shareholdings Agency

#### 6 DIRECTORS ELECTED BY THE EMPLOYEES

**Christine CHABAUTY**,  
sponsored by CGT

**Jacky CHORIN**,  
sponsored by FO

**Christophe CUVILLIEZ**,  
sponsored by CGT

**Marie-Hélène MEYLING**,  
sponsored by CFDT

**Jean-Paul RIGNAC**,  
sponsored by CGT

**Christian TAXIL**,  
sponsored by CFE-CGC

Furthermore, the Government Commissioner and Head of the French State General Economic and Financial Supervisory Mission to the Company and the Secretary of the Central Works Council attend the meetings of the Board of Directors.



# EXECUTIVE COMMITTEE

The Executive Committee is a decision-making body as well as a reflexion and consultation body on operational and strategic topics of the Group.

**Jean-Bernard LÉVY**  
Chairman and Chief Executive Officer



**Marc BENAYOUN**  
Group Senior Executive Vice President with responsibility for Gas and Italy. Chief Executive Officer of Edison.



**Antoine CAHUZAC**  
Group Senior Executive Vice President, Renewable Energies. Chairman and Chief Executive Officer of EDF Énergies Nouvelles.



**Henri LAFONTAINE**  
Group Senior Executive Vice President, Customers, Services and Regional Action.



**Xavier GIRRE**  
Group Senior Executive Vice President, Group Finance.



**Véronique LACOUR**  
Group Senior Executive Vice President, Transformation and Operational Effectiveness.



**Dominique MINIÈRE**  
Group Senior Executive Vice President, Nuclear and Thermal.



**Christophe CARVAL**  
Group Senior Executive Vice President, Human Resources.



**Marianne LAIGNEAU**  
Group Senior Executive Vice President, International Division.



**Pierre TODOROV**  
Group Senior Executive Vice President, Group General Secretary.



**Simone ROSSI**  
Group Senior Executive Vice President, Chief Executive Officer of EDF Energy.



**Cédric LEWANDOWSKI**  
Group Senior Executive Vice President, Innovation, Strategy and Planning.



**Xavier URSAT**  
Group Senior Executive Vice President, New Nuclear Projects and Engineering.



**Alexandre PERRA**  
Executive coordinator to the Chairman and Chief Executive Officer, Government Relations. He is Secretary of the Executive Committee.





# 1. PRESENTATION OF EDF GROUP

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## 1.1 HISTORY AND DEVELOPMENT OF THE COMPANY

In the context of nationalisation of gas and electricity sectors, the Act of 8 April 1946 created EDF as a State-owned industrial and commercial establishment (EPIC) and created a special status for the personnel of the electric and gas industries (IEG). The law nevertheless left in existence a certain number of non-nationalised distributors (DNN) and local distribution companies (ELD).

The years 1946 to 2000 were marked by the development of the Group's industrial base. Initially, there was a fleet of thermal generation facilities using coal and then fuel oil, as well as hydropower facilities, in particular with the construction of the dams at Tignes in 1952 and Serre-Ponçon in 1960. In 1963, EDF commissioned the first commercial-scale nuclear generation unit at Chinon (70MW), the first of a series of six generation units of the Uranium Natural Graphite Gas (UNGG) family, the construction of which continued until 1972. The oil crises of 1973 and 1979 led to accelerated replacement of thermal power with nuclear power. In 1969, the UNGG family was abandoned in favour of the Pressurised Water Reactor (PWR) family, which was used for new power plants.

In the beginning of the 1990s, EDF embarked on a significant expansion abroad in particular with the acquisition of London Electricity (which was renamed EDF Energy on 30 June 2003) in December 1998. This policy was pursued in 2001 with the acquisition of 20% of EnBW (a stake that was successively raised to 45.01% by 2005) and with the acquisition of equity interests in the Italian company Edison by the IEB consortium (63.8%), in which EDF holds a stake of 18.03%, and in 2002, with the acquisition of EPN Distribution Plc. and Seeboard Plc., two England-based distribution companies.

In France, the major development in recent years has been the liberalisation of the market pursuant to European regulations. In February 1999, sites where electricity consumption exceeded 100GWh per year, *i.e.* 20% of the market, became entitled to choose their supplier. The eligibility threshold was then progressively lowered, opening thus 30% of the market in May 2000, then 37% in February 2003, and 69% in July 2004, due to the liberalisation of all of the market for non-household customers. Since July 2007, the market has been fully liberalised, including for residential customers.

At the same time, the structures necessary for a competitive market to function effectively were set up. The French Electricity Regulation Commission, which became the Energy Regulation Commission (*Commission de régulation de l'énergie* or CRE) was created in May 2000. That same year, in order to guarantee non-discriminatory access to all operators in the market, EDF created Réseau de Transport d'Électricité (which became a subsidiary<sup>(1)</sup> of EDF in 2005 under the name RTE EDF Transport, and which has been renamed RTE Réseau de Transport d'Électricité), responsible for managing the high voltage and very high voltage public electricity transmission network. In 2000, the Group formed the trading company, EDF Trading, with the trading specialist Louis Dreyfus. It became a wholly-owned subsidiary of EDF in 2003. In 2001, Euronext and various industrial and financial operators in the electricity market, including EDF, created Powernext, the French electricity exchange. In 2001, as a condition for authorising EDF's acquisition of a stake in EnBW, the European Commission required EDF to set up a system of power supply capacity auctions (*Virtual Power Plants* or VPP) to facilitate access to the market for competitors. In 2003, the EDF group sold its stake in Compagnie Nationale du Rhône to Suez (now Engie).

On 20 November 2004, pursuant to the Act of 9 August 2004, EDF became a French limited company (*société anonyme*) with a Board of Directors.

In 2005, EDF and A2A SA (formerly AEM SpA) entered into agreements for a joint takeover of Edison following the launch of a tender offer. The EDF group has pursued a strategy of refocusing on Europe and sold its controlling interest in its subsidiaries Edenor and Light and its assets in Mexico.

EDF filed for an initial public offering in November 2005 through the issue of 196,371,090 new shares and the sale by the French State of over 34.5 million shares it held in the Company to employees and former employees of EDF and of certain EDF subsidiaries. Subsequently, on 3 December 2007, the French government sold an additional 45 million of its shares.

In late 2006, EDF Énergies Nouvelles, an EDF group's 50%-owned subsidiary, filed for an initial public offering.

Since 1 January 2008, EDF's distribution business has been conducted by Enedis<sup>(2)</sup> (previously ERDF), a subsidiary of EDF to which the distribution business was contributed pursuant to the Act of 7 December 2006 on the energy sector.

In 2008-2009, the EDF group became a major player in the revival of nuclear power internationally, by creating a joint venture with the Chinese utility CGN, acquiring British Energy, one of the largest energy companies in the United Kingdom, and acquiring nearly half of the nuclear assets of US-based Constellation Energy. EDF also acquired a 51% stake in the Belgian company EDF Luminus, and subsequently raised its stake in EDF Luminus to 63.5% in 2010.

EDF finalised in 2010 the sale of its British distribution networks to the Cheung Kong group of Hong Kong and, in 2011, it completed the sale of its interest in EnBW to the German state of Baden-Württemberg.

In 2011, EDF confirmed its positioning as a key player in the field of power generation using renewable energies by increasing its stake in EDF Énergies Nouvelles to 100% by way of a simplified alternative cash or exchange tender offer, followed by a squeeze-out of minority shareholders.

In 2012, after more than seven years of a strategic partnership with A2A, EDF took over Edison, one of the key players in the Italian electricity market, the fourth largest market in Europe. This transaction was carried out as part of the Group's gas strategy, which relies on Edison's expertise at all stages of the gas chain.

In 2014, EDF has delegated to Exelon, the leading American nuclear operator, the operational management of the five nuclear reactors owned by CENG, held by EDF (49.99%) and Exelon (50.01%). Furthermore, EDF took over all of Dalkia's lines of business in France, including the Citelum group, and Veolia took over the Dalkia group's international business. Finally, F2i, Edison and EDF Énergies Nouvelles created the third largest Italian operator in the renewable energy sector, owned by F2i (70%) and a holding company (30%) owned by Edison and EDF Énergies Nouvelles.

In 2015, EDF and China General Nuclear Power Corporation (CGN) entered into a non-binding strategic investment agreement relating to the construction and the operation of the Hinkley Point C nuclear power plant in Somerset. This partnership has been approved on 28 July 2016 by EDF's Board of Directors. The contractual documentation was signed on 29 September 2016.

(1) This entity is called indifferently "New NP" or "New AREVA NP" or Framatome in this Reference Document.

(2) Enedis is an independently managed subsidiary within the meaning of the provisions of the Energy Code. For the sake of readability, reference will simply be made in the rest of the document to Enedis, without systematically specifying that it is a fully independent subsidiary, within the meaning of the provisions of the Energy Code.

In 2015 and 2016, EDF and AREVA SA signed two non-binding memoranda of understanding for the acquisition by EDF of the exclusive control of AREVA NP, as well as an overall strategic and industrial partnership. In accordance with the terms of these memoranda, a contract setting out the terms of the acquisition by EDF of the exclusive control over an entity ("New NP"), a fully owned subsidiary of AREVA NP, was signed on 15 November 2016. The transaction was completed on 31 December 2017; New NP, renamed Framatome, is now 75.5% owned by EDF, together with Mitsubishi Heavy Industries (19.5%) and Assystem (5%). Framatome combines industrial, design and supply activities for nuclear reactors and equipment, fuel assemblies and installed base et services, and has around 14,000 employees. In addition, Edvance was created in June 2017, a dedicated company 80%-owned by EDF and 20% owned by Framatome, which combines the activities of the two

companies relating to design (basic and detailed design) and construction (supply, assembly and start-up) of the nuclear island and the instrumentation and control of new reactors in France and abroad.

Furthermore, EDF signed an agreement on 31 March 2017 for the transfer of a 49.9% indirect equity interest in RTE to Caisse des Dépôts and CNP Assurances.

On 30 March 2017, EDF completed a cash share issue with preferential subscription rights of a gross amount (including issue premium) of €4,018 million, *i.e.* the issue of 632,741,004 new shares with a par value of €6.35 each. The French State contributed €3 billion, *i.e.* 75% of the share issue. This share issue was a success, totalling around €4.9 billion. Market share was thus subscribed up to 185.9%.

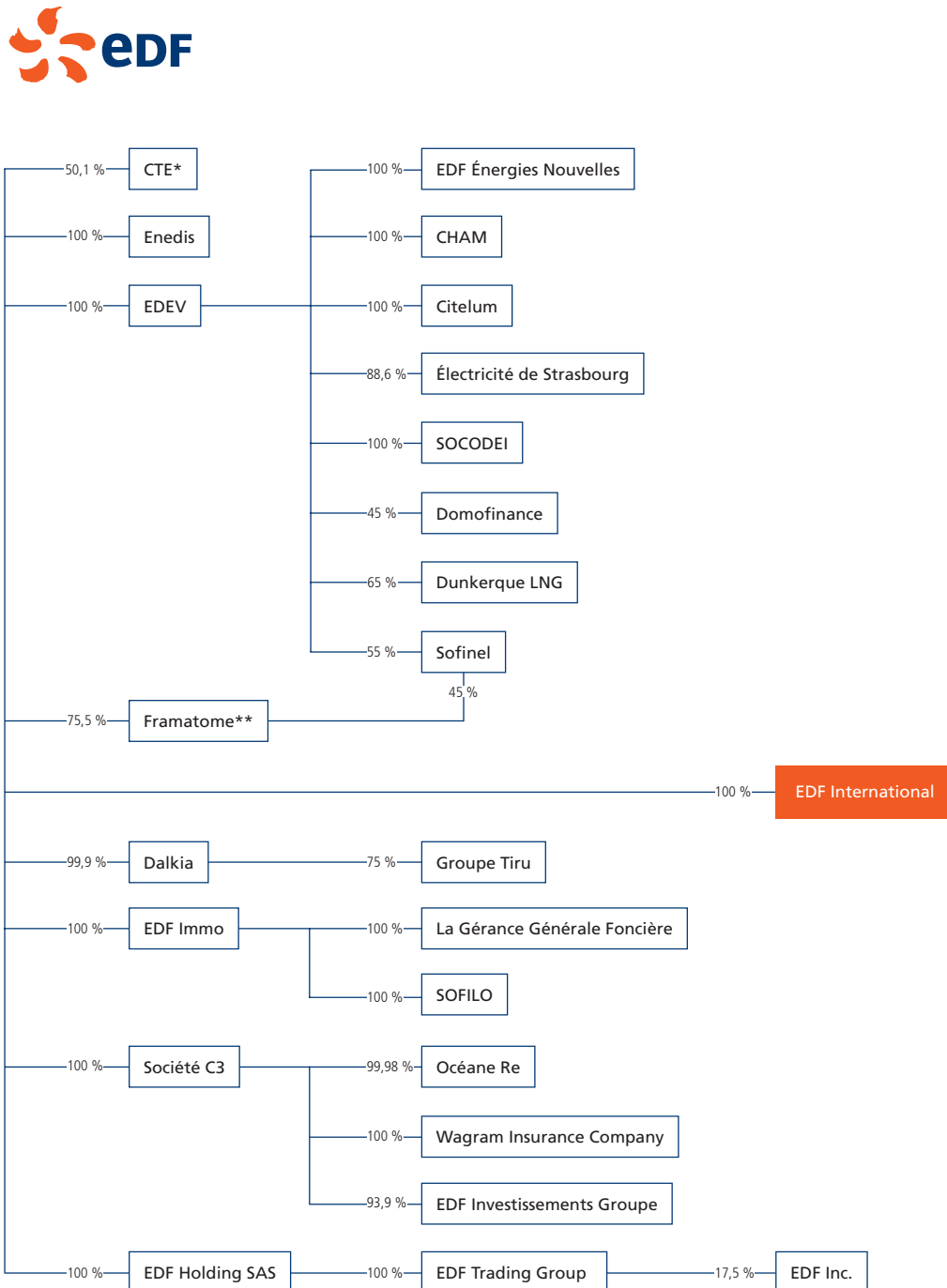
# 1. PRESENTATION OF EDF GROUP

## Organisation of the Group

## 1.2. ORGANISATION OF THE GROUP

### 1.2.1 EDF ORGANISATIONAL CHART

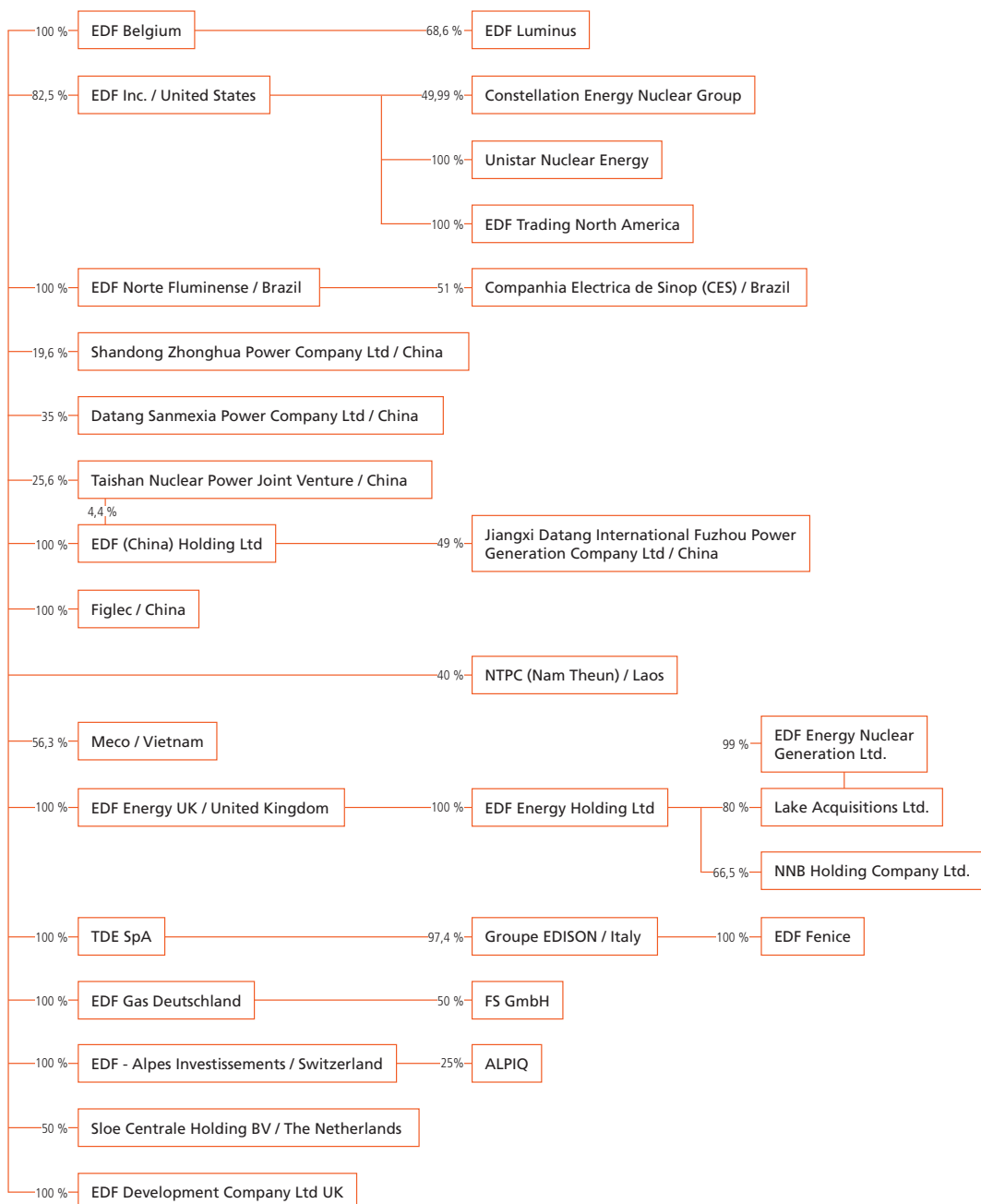
A simplified organisational chart for the Group, as of 31 December 2017, is presented below. The percentages for each entity correspond to the ownership interest in capital. The companies or groups of companies within the Group's scope of consolidation are indicated in Note 51 to the consolidated financial statements for the year ended 31 December 2017.



\* Coentreprise de Transport d'Électricité « CTE » (ex C25), company holding RTE shares.

\*\* Acquisition at 31/12/2017.

**EDF International**



# 1. PRESENTATION OF EDF GROUP

## Group strategy

### 1.2.2 INTRA-GROUP CONTRACTS

The information on the regulated agreements and commitments referred to in Article L. 225-38 of the French Commercial Code is stated in the Statutory Auditors' special report, which is reproduced in section 7.5.4 to this Reference Document.

#### Financial flows between EDF and its subsidiaries

In addition to the financial flows relating to the cash pooling agreements mentioned above, financial flows between EDF and its subsidiaries are also related to distributions of dividends within the Group. A substantial portion of the dividends is paid by EDF International. In 2017, EDF received a total of €1,763 million in dividends from its consolidated subsidiaries.

Other financial flows between EDF and its subsidiaries correspond mainly to loans, asset transfers and guarantees made by the parent company of the Group for the benefit of certain subsidiaries.

In the context of the Group's financing centralisation policy, decided on in 2006, EDF centralises part of the financing of its foreign subsidiaries, through a subsidiary located in Belgium, EDF Investissements group, which aims to grant medium- and long-term intra-group financing.

In addition, the nuclear fuel purchases are managed centrally by EDF SA, including the purchases intended to its subsidiary EDF Energy.

With regard to financial flows related to fees paid by subsidiaries, contracts for the supply of intra-group services have been concluded with the main subsidiaries under

the scope of consolidation since 2012. EDF may also be required to provide specific services to certain subsidiaries or entities outside the Group. In addition, following EDF brand development work, the Company has set up licensing agreements with subsidiaries that use the EDF brand.

#### Cash pooling agreements entered into between EDF and its subsidiaries

The cash pooling system set up by EDF centralises all the cash positions of its subsidiaries and thus optimises the group's liquidity. Cash pooling consists of grouping all the cash balances of subsidiaries at the level of the parent company. It includes certain French and international subsidiaries. It does not include RTE.

The cash pooling system in place for companies of the EDF group is defined under cash agreements. Bilateral agreements between EDF and each subsidiary define the specific conditions for each arrangement (remuneration of balances, etc.).

At international level, subsidiaries participating in the system enter into a framework agreement, whereby EDF serves as the Cash Centre.

EDF also centralises all the currency flows from its French subsidiaries.

#### Insurance

EDF and its subsidiaries have entered into accession protocols in order for the latter to benefit from the insurance coverage provided for by the group's insurance programs.

## 1.3 GROUP STRATEGY

### 1.3.1 ENVIRONMENT AND STRATEGIC CHALLENGES

The fight against climate change has entered a crucial phase with the objective of limiting global warming to +2 °C.

Today, energy accounts for most CO<sub>2</sub> emissions worldwide: lowering energy consumption by developing energy efficiency solutions is crucial for decarbonisation.

We must continue to step up the reduction of the carbon intensity of electricity generation and heating – which account for over 40% of CO<sub>2</sub> emissions worldwide, by driving the development of low carbon solutions: renewable, thermal, electric and nuclear energies.

In this respect, France – which already has low carbon intensity facilities – is a step ahead of its major European neighbours. This low carbon and competitive mix must be preserved in the long term, drawing on the complementary relationship between renewable and nuclear energy.

Electricity is a key factor for the direct reduction of CO<sub>2</sub>, as well as a substitute for fossil fuel in the mobility, building and industry sectors. In the forward-looking scenarios limiting global warming to +2°C, low carbon electricity should thus become the leading source of energy by 2040-2050: the use of electricity should therefore be stepped up and boost energy efficiency efforts, in order to bring down emissions to a quarter of current levels by 2050, and to aim at carbon neutrality.

However, the current business models of electricity producers are under pressure due to the market and European regulatory context, although significant investments are still required to maintain existing assets, and in the longer term, to renew generation facilities:

- in 2017, fuel prices (oil, gas, coal) confirmed the recovery that began at the end of 2016, but remained at levels much lower than those of the beginning of the decade, as a result of the abundance of resources, in particular shale gas;

- the price of CO<sub>2</sub>, despite a relative increase during the second half of 2017, remains very low, which is at odds with the decarbonisation and energy transition targets in Europe;

- such a low CO<sub>2</sub> price *de facto* supports the economic viability of coal and lignite generation means at a time when European electricity demand remains subdued (0.6% annual average increase between 2000 and 2016<sup>(1)</sup>) and when, nonetheless, significant subsidised energy capacity has been connected to the grid. Therefore, the over-capacity in the European generation sector, which could lead to additional massive decommissioning in Europe, explains the historically low electricity market prices: for instance, in France, whereas prices had settled at around €40/MWh in 2015, and below this level in 2016, France N+1 electricity market prices fluctuated between €33 and €44/MWh in 2017. These levels are lower than the development costs of new generation facilities, regardless of the sector.

By way of contrast, electricity consumption is rising fast in emerging markets, especially in Asia, benefiting the electricity producers in these regions with forecasts<sup>(1)</sup> of around +173TWh p.y. in China between 2016 and 2040 (+2.2% p.y. on average) and +52TWh p.y. in Africa (+4.0% p.y.), versus +11TWh p.y. in the European Union (+0.3% p.y.).

In Europe, France and the UK are developing low carbon energy independence policies, primarily built around a mix combining energy efficiency, renewable and nuclear energies. Thus, the UK, which must undertake a major renewal of its electricity generation facilities, has established a market model consistent with this policy (Carbon Price Floor, Contracts for Difference, capacity market, etc.). In France, electricity is also used as a driver towards low carbon, and the Law of 17 August 2015 on Energy Transition and Green Growth sets a ceiling of 63.2GW for the nuclear capacity installed in France, which given the evolution in demand and export capacities suits the development of renewable energies in the energy mix. Capacity markets are also being developed, in particular in France, the United Kingdom and Belgium.

(1) Source: AIE, *World Energy Outlook*, November 2017.



The agreement reached in Paris at the 21<sup>st</sup> session of the Conference of Parties (COP 21) confirms the effort being made to combat climate change and the ramping up of energy transitions beyond Europe. This agreement, which was ratified by 168 countries as well as the European Union, came into force on 4 November 2016. COP 22 and COP 23, held in Morocco and Germany, reconfirmed the roadmap approved in Paris, despite the withdrawal of the United States from the agreement. The *One Planet* summit organised in Paris in December 2017 helped to mobilise funds and resulted in commitments in favour of the fight against global climate change.

In France, the energy transition law for green growth adopted in August 2015 sets out several medium and long term objectives relating to greenhouse gas emissions, energy consumption and the energy mix in France. This law led to the drawing up of a national low carbon strategy and a multi-year energy programme (PPE) to manage these targets. The PPE defines the orientations and action priorities of public authorities for managing all the different energy forms for five-year periods. The current PPE covers the periods 2016-2018 and 2019-2023. In 2018, a new PPE will be drawn up for the periods 2019-2023 and 2024-2028 and will be subject to public debate.

Customers are looking to increasingly take ownership of their consumption, and local communities of their energy policy. These new expectations are forcing energy producers to come up with new solutions and new, more decentralised models, facilitated by innovations in telecommunications and digital technologies and the emergence of new uses, including electric vehicles.

The electricity sector is thus changing more than ever, at the centre of medium and long term societal and technological trends. Against this background and with this outlook, European electricity producers have scaled back their investments and focussed them on targeted segments, particularly renewable energy, low carbon solutions, international growth areas, networks, supply to customers and services.

EDF is thus addressing specific strategic challenges:

- to play a responsible role in the fight against climate change: to contribute to the achievement of the goals set out in the Energy Transition and Green Growth Law in France, in the Climate Change Act in the UK, and more broadly in the 2020 and 2030 Energy and Climate Change Packages in the European Union;
- to ensure the economic performance and safety of nuclear assets;
- to innovate in order to set itself apart and to have the technological and economic capabilities to renew and expand its generation and the services it offers to customers, in particular digital services, and thereby play a role in energy efficiency and supply security;
- to ensure that the EDF group is a consistently outstanding public service operator, in particular in terms of solidarity and the fight against energy poverty, respect for others, and responsibility and ethics in the way it runs its business;
- to put itself on a sustainable value creation path for all stakeholders;
- to create an environment that facilitates the involvement of all stakeholders in the Group's transformation.

Therefore, in a particularly difficult market context, the EDF group is working hard to pursue its CAP 2030 strategy in order to be able to finance its priority developments.

### 1.3.2 PRIORITIES OF THE CAP 2030 STRATEGY

To be a responsible and efficient electricity producer that champions low carbon growth: this is the goal of the EDF group, driven by the CAP 2030 strategy. This goal can be split into three priorities, which combine the search for growth drivers with the optimisation of existing assets:

- proximity to customers and local communities;

- low carbon generation, with a balanced mix of nuclear and renewable energy;
- international expansion.

More than 15 programmes have been launched since 2015, embodying each of these three strategic priorities.

This goal will also be achieved through a transformation programme based on the following four main areas: simplification, innovation and digital technology, human ambition and skills, accountability and performance management.

#### 1.3.2.1 Proximity to customers and local communities

In order to support customers and local communities in their energy transition, the EDF group offers them competitive low carbon energy solutions and has acquired industrial expertise in smart grids.

The EDF group's strong position in energy services *via* Dalkia, Citelum and other subsidiaries (Sodetrel, Edelia, Netseenergy) allows it to support its customers in achieving energy efficiency and developing decentralised local systems. In 2017, EDF launched the "EDF Solutions énergétiques" brand to promote this product offering to all its customers.

As for residential customers, the EDF group offers and continues to develop a range of digital energy services, marketed in France and in the "core European countries" (United Kingdom, Italy, Belgium). For example, the launch of Sowe in 2016 (a subsidiary offering innovative connected home products and solutions, that was further diversified in 2017) reflects the EDF group's commitment to meeting the new expectations of its customers, especially with regard to sustainable wellbeing in the home. Existing offerings and customer relations will also continue to be enriched by new digital technologies and features, facilitated in particular by smart meter systems deployed in several countries.

The EDF group is fully engaged in the energy transition:

- by proposing or developing energy efficiency solutions for its customers (insulation, high efficiency solutions, deployment of innovative digital tools);
- by working to replace fossil fuels with new efficient uses of electricity, which could represent dozens of additional TWh in France by 2030 (electric mobility, heat pumps, low carbon housing etc.);
- by developing carbon-free and decentralised electricity generation capacity such as the self-consumption offering "*Mon soleil et moi*" ("My sun and me");
- by developing and operating heating networks that use renewable and recovery energies;
- by creating *EDF Nouveaux Business*, an incubator of in-house and external projects aimed at testing and exploring new business sectors, creating new drivers of growth for the Group and bringing customers a new range of products and innovative services.

Lastly, the development of renewable energies, the deployment of the Linky smart meters<sup>(1)</sup> and the emergence of metropolitan areas are putting the distribution networks on the front line of the transformation of the electricity system. The distributor thus plays a key role as facilitator of the energy transition. In this respect, Enedis and EDF have established with the national federation of licensing authorities (FNCCR) and the association France Urbaine, a new draft concession contract for the public distribution of electricity and the supply of electricity at regulated tariffs, in order to modernise relations with the concession contracting authorities. This contract integrates regional changes and the energy transition, while retaining the principles of the French concessionary model: public service, regional solidarity and nationwide optimisation.

To support the energy transitions, the EDF group is intensifying research and development in storage, solar energy, electric mobility, smart electricity systems and sustainable local energy solutions (smart cities), like the signing of the Dijon Smart City contract, in consortium with the Bouygues group.

(1) Linky is a project led by Enedis, the distribution network operator. For the sake of brevity, all further mentions of Linky in the rest of the document do not specify that it is a project led by Enedis.

# 1. PRESENTATION OF EDF GROUP

## Group strategy

It is also increasing its innovation efforts to meet the expectations of its customers and offer solutions and services adapted to the new consumption patterns and based on increasingly digital means of communication.

Lastly, the EDF group, as a part of CAP 2030, has made a commitment to six corporate responsibility goals (see section 3.1.2 "Corporate social responsibility goals").

### 1.3.2.2 Very low carbon generation: nuclear and renewable energies

To remain the leader in very low carbon electricity generation, the EDF group is intensifying the development of renewable energies while ensuring the safety, performance and competitiveness of the existing nuclear facilities and new nuclear investments. In fact, EDF's nuclear facilities are already giving France a major lead compared to its neighbours in terms of curbing greenhouse gas emissions, while still ensuring lower electricity costs.

Achieving the very low carbon generation goal starts with the consolidation of the hydropower and nuclear asset base:

- EDF regularly invests in hydropower concessions in order to combine economic, energy and environmental performance, and will propose solutions to strengthen hydropower generation;
- EDF is investing in order to obtain approval to extend, under the highest safety conditions, the operating life of the French nuclear facilities beyond 40 years, now that its economic and carbon competitiveness has been demonstrated. In this context, EDF's Board of Directors approved the principle of the "*Grand Carénage*" on 22 January 2015 (see section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet" – "Investment programme for the existing nuclear installed base in France"). Furthermore, on 28 July 2016 the Board of Directors approved the extension to 50 years of the amortisation period of the PWR 900MW series (excluding Fessenheim) in France, without prejudice to the decisions authorising the continuation of the operation, which will be made on a unit-by-unit basis by the French Nuclear Safety Authority (ASN) after each ten-year inspection. These decisions are consistent with the multi-year energy plan; investments are also being made to extend the operating life of the entire UK nuclear fleet by an average of eight years compared with its initial service life;
- as a responsible electricity producer, the EDF group will also carry on investing in the preparations for the decommissioning of the nuclear fleet and for the waste management in France and the United Kingdom.

The EDF group will continue new developments, balanced between new nuclear projects and renewable energies. The main issues concerning new nuclear projects are:

- the commissioning of Flamanville 3 and Taishan;
- the building and operation of two EPR reactors at Hinkley Point, for which the final contracts were signed on 29 September 2016 by EDF, CGN and the British Government;
- the acquisition by EDF of the exclusive control of the activities of AREVA NP corresponding to the design and supply of nuclear boilers and fuel assemblies performed by the company now named Framatome, 75.5% owned by EDF (see section 1.1 "History and development of the Company");
- the preparation of the reactors of the future with the EPR 2 project (as a follow-up of the New Model EPR project), conducted jointly with Framatome;
- the development of the activities of Edvance (see section 1.4.1.2.3.4 "Creation of Edvance");
- the development of the EPR for the export market (with, in particular, decisions taken in India).

With regard to renewable energy, the new means developed will be essentially onshore and offshore wind power, solar energy and hydropower. In December 2017, EDF announced the Solar Plan: a development plan of solar energy, aimed at installing 30GW of solar power in France between 2020 and 2035. The development of these assets outside France is undertaken in line with the EDF group's international strategy. In this respect, the Group strengthened in 2017 its integration in the renewable energy industry by developing new projects, not only in France, but also in the United States, the UK, Germany, Middle East, Brazil, Chile, India and China (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

In line with the very low carbon generation priority, EDF supports the need to implement measures to increase the price of CO<sub>2</sub> in order to guarantee, if possible at the European level, a CO<sub>2</sub> price that is sufficient and consistent with the energy transition goals. The UK and the Netherlands have adopted these pricing measures and the French government supports the principle. EDF believes that such measures should be applied to all electricity generation sectors to be fully effective. They will constitute an incentive for economic and financial operators to invest in the cheapest ways to reduce carbon emissions and help give full value to non-polluting assets.

### 1.3.2.3 International expansion

The EDF group wants to be a key player in the energy market in France and in its core countries in Europe (United Kingdom, Italy, Belgium) by playing a role in energy security, the enhancing of economic competitiveness and the European economy low carbon transition, in line with public policies.

The Group is also expanding outside Europe, by pursuing three long-term objectives: to make some non-European countries core countries for the Group, to channel its investment choices to contribute to the global energy transition, and to triple (between 2015 and 2030) the share of the "Grand International" in the Group's business.

EDF is thus deploying a targeted approach in geographic terms and is giving priority to low carbon hydraulic, wind and solar generation projects as well as energy services and engineering activities.

Gas-to-power infrastructure projects are also being developed where they are a key component of the energy transition.

With respect to new nuclear, EDF will draw on the breadth of its experience and the expertise of Framatome to develop new opportunities in the international market (India, South Africa, etc.).

### 1.3.2.4 Transformation

Health and safety, digital and new work practices, responsibility and simplification, skills and the recognition model are the five major levers of the Group's transformation.

The Group adapts its managerial practices by streamlining its organisations and modus operandi. For example, in 2016, two labour agreements were signed by EDF SA concerning both the introduction of a fixed number of working days for managers and an "expertise" agreement aimed at boosting the careers of employees and promoting internal mobility and promotional training. The Group has streamlined and simplified its policies, bringing them down from 200 to 40 while making them simpler to apply.

Moreover, the promotion of innovation, based on experiments ("labs" and co-construction platforms with customers) and on an open innovation programme will contribute to this transformation. The creation of *EDF Nouveaux Business*, a department in charge of "new businesses", has complemented the skills EDF is gradually developing in order to meet the challenges in this field. It will use the levers of incubation, investment in external start-ups (through the Electranova funds) or technological partnerships (see section 1.4.6.1.3 "*EDF Nouveaux Business*").

The digital transformation involves employees and internal modus operandi, customer relations and the management and design of industrial assets. The creation at end 2016 of a Transformation and Operational Efficiency Department, which combines the Group's activities relating to information systems, purchasing, real estate and shared services, reflects the Group's desire to speed up in this field.

Performance improvement has always been a priority for the EDF group. The current economic and financial context further increases the urge for such improvement. The Group is strengthening control of its costs to bring them into line with its environment. The approach is adjusted depending on the scopes involved (cross-disciplinary functions, operating entities, etc.).

### 1.3.2.5 Sustainable development

As part of its CAP 2030 strategic plan, EDF has made a commitment to corporate responsibility, in connection with the UN's new sustainable development programme (2015-2030), through six Corporate Responsibility Goals (see section 3.1.2 "Corporate social responsibility goals"). The Group has committed to presenting annual results that lay down a roadmap for the Group's businesses and subsidiaries to serve a profitable and responsible development:

- climate change: going beyond the requirements of the +2°C goal set by COP 21 by further reducing the Group's CO<sub>2</sub> emissions, which are already at remarkably low levels compared to the Group's main European counterparts;
- human development: incorporating the best practices of industrial groups in the field of human development: health & safety, gender equality and internal promotions;
- energy poverty: offering all vulnerable populations information and solutions to support them in their energy consumption and help them assert their rights;
- energy efficiency: innovating through digital energy efficiency solutions so that customers can optimise their consumption;
- dialogue and consultation: organising systematically and worldwide an initiative of dialogue and consultation which is transparent and open for each new project;
- biodiversity: launching a positive approach to biodiversity, not merely being aware of or decreasing the impacts of our activities, in order to have a positive effect.

### 1.3.2.6 Research & Development to support the energy transition

Research & Development (R&D) has a crucial role to play in developing low carbon solutions, all the while reinforcing the safe and economically efficient operation of existing and future facilities. See section 1.6 "Research and development, patents and licences".

### 1.3.2.7 CAP 2030 success factors

CAP 2030 enables the Group to develop a portfolio of assets focused on low carbon, renewable and nuclear energy: services for customers, decentralised energy solutions.

The key success factors of CAP 2030 are:

- the expansion of the range of offers and exemplary customer relations;
- the management of major projects, in particular the new models for nuclear reactors, the "Grand Carénage" programme or the development of Nuclear New Build in the United Kingdom;
- the selectiveness of investments in projects, the transformation of the Group's modus operandi and the commitment of all;
- cost control.

In this context, the Group confirmed in 2017 the deployment of the performance plan announced on 22 April 2016 and updated the targets as shown below (see section 5.4 "Outlook"):

- a reduction in operating expenses <sup>(1)</sup> of €0.8 billion from 2015 to 2018; at end 2017, the cumulative reduction amounted to €0.7 billion compared with 2015, which means the initial target has been reached a year ahead of schedule;

- an asset disposal plan of approximately €10 billion between 2015 and 2020 that should be almost completed by the end of 2018. At end 2017, the completed transactions represented approximately €8.1 billion;
- a €1.8 billion working capital requirement optimisation plan from 2015 to 2018; the target has been exceeded at end 2017, with a cumulative contribution of €1.9 billion over the period 2015-2017.

The Group is also continuing its efforts to control net investments (excluding Linky, new developments and assets disposals), with a target of approximately €11 billion in 2018.

On 28 March 2017, EDF announced that it had successfully completed its €4 billion capital increase, to which the French government has committed €3 billion, in line with its commitment, representing c.75% of the capital increase. The proceeds of the capital increase will be used mainly to finance the Group's development operation between 2017 and 2020, in accordance with the CAP 2030 strategy, as well as to strengthen the Group's financial flexibility.

Moreover, in 2017, the Group also worked on its modus operandi around three focus points of its transformation programme: "accountability, simplification and innovation/digital technology":

- structuring into 20 business units, and overhauling of management indicators;
- professionalisation of project managers, with the setting up of an external certification programme;
- simplification of some processes: purchasing, training, reporting, etc.;
- development of innovation, with the creation of new services in start-up mode: Sowee, EDF S&F, Zinium, Agregio, as well as support for participative innovation, with more than 30 innovation venues throughout the Group;
- deployment of a digital strategy: cultural transformation with a group of 30 young people ("Y Project"), increasing use of collaborative tools and structuring to harness data at the service of customers, as well as the optimisation of maintenance and operating costs.

## 1.3.3 INVESTMENT POLICY

### 1.3.3.1 Investments in 2017

The Group continued its programme of gross operating investments for a total amount of €14.7 billion in 2017, versus €14.4 billion in 2016. Some of these investments are considered as development investments that will generate cash flows in a longer term (see also section 5.1.5.1.2 "Net cash flow used in investing activities").

Total net investments excluding disposals amounted to €16.0 billion including Framatome, compared with €12.8 billion in 2016, representing a €3.2 billion increase. These net investments include the new developments items for €4 billion (mainly Linky for €0.6 billion, the British Nuclear New Build for €1.2 billion and the acquisition of a 75.5% stake in New NP, which has since become Framatome, for €1.9 billion).

Aside from new developments, net investments excluding strategic disposals amounted to €12.0 billion in 2017, against €11.8 billion in 2016. They correspond mainly to nuclear maintenance for €4.7 billion, new nuclear (Flamanville 3, Taishan) for € 1.1 billion, regulated activities in France and island systems (excluding Linky) for €3.2 billion (connections, modernisation of the continental and island network), and lastly to renewables (€1.3 billion) and services (€0.5 billion).

Asset disposals represented €6.2 billion in 2017 and included the disposal of a 49.9% stake in CTE for €4.1 billion and the assets of EDF Polska for €1.0 billion.

### 1.3.3.2 Investment programme

In the short and medium term, the Group aims to:

- complete major industrial projects such as the Flamanville 3 EPR in France as well as the smart meters in France (Linky), representing capital expenditure of respectively €10.5 billion <sup>(2)</sup> and €4.5 billion <sup>(3)</sup> (see respectively sections 1.4.1.2.2 "Update on the Flamanville EPR project" and 1.4.4.2.4 "Future challenges");

(1) At comparable scope and exchange rates. At constant pension discount rates. Excluding change in operating expenses of service activities.

(2) 2015 euro cost of the construction of Flamanville 3, excluding interim interest.

(3) Over the 2014-2021 deployment period.

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## Description of the Group's activities

- continue investing in Nuclear New Build in the UK in order to complete the Hinkley Point C project with £19.6 billion<sup>(1)</sup> for 100% of the project (see section 1.4.5.1.2.5 "Nuclear New Build Division");
- continue its "Grand Carénage" industrial programme for nuclear power in France for an investment of €<sub>2013</sub>45 billion (see section 1.4.1.1.2 "Operation and technical performance of the nuclear installed base");
- intensify its investments in renewable energies in France and internationally, with a gross investment in renewables above €2 billion per year over the 2017-2020 period, and develop its installed capacities in solar power with the launch on 11 December 2017 of the Solar Plan, planning the installation of 30GW of photovoltaic solar capacities between 2020 and 2035, which should be mainly financed through partnerships.

With respect to the here above Flamanville 3, Linky, Hinkley Point C and "Grand Carénage" projects, as well as the investments in renewable energies, the firm commitments made by the Group on the acquisitions of tangible and intangible assets are set out in note 44.1.2.1 of the notes to the consolidated financial statements as at 31 December 2017. Moreover, in 2017, firm commitments in connection with the acquisition of tangible assets for the building of Hinkley Point C have been formalised under contractual agreements for an amount of €2.7 billion.

Lastly, in line with both its integrated electricity generator strategy and the CAP 2030 strategic principles, the Group will selectively target new development projects in addition to those already initiated, in line with its policy and financial constraints: EPR 2 projects, new nuclear projects in the UK, new projects in renewable energy, as well as international equity investments.

Given its financial constraints, the Group will whenever possible, use partnerships to finance its new projects.

## 1.4 DESCRIPTION OF THE GROUP'S ACTIVITIES

The EDF group is an integrated energy company active in all electricity businesses: nuclear, renewable and thermal generation, transmission (through RTE<sup>(2)</sup>, an entity accounted for using the equity method), distribution (through Enedis), sales and marketing, efficiency and energy services, and energy trading. It is the leading player in the French electricity market and holds strong positions in Europe (mainly in the United Kingdom (UK), Italy and Belgium), which makes it one of the world's leading electric energy companies and a renowned gas player.

With a global installed net generation capacity of 129.3GWe<sup>(3)</sup> as at 31 December 2017, generating 580.8TWh, the Group has one of the largest generation fleets in the world. Among the ten largest global power suppliers, it produces the smallest amount of CO<sub>2</sub> per kilowatt-hour generated<sup>(4)</sup> thanks to the share of nuclear, hydro and other renewable energies in its generation mix.

The EDF group supplies electricity, gas and related services to 35.1 million customer<sup>(5)</sup> accounts worldwide (of which 26.5 million in France).

The Group is thus implementing an integrated model for the joint operational management of its portfolio of assets upstream (generation and procurement of energy and fuels) and downstream (wholesale and retail) to guarantee supply of energy to its customers through the best possible management of operational and market risks and with a view to maximising gross margin.

In addition, the Group is present in the regulated electricity transmission and distribution sectors, in particular via RTE and Enedis, respectively, which are fully independent subsidiaries as defined by the French Energy Code (see section 1.4.4 "Transmission and distribution activities in France").

### 1.4.1 ELECTRICITY GENERATION ACTIVITY

In mainland France, the electricity generation activities are split across the Nuclear and Thermal Fleet Department and the Renewable Energy Division. In addition to these two departments, the Engineering and New Nuclear Project Department is responsible for the development projects for the Group's new nuclear generation assets, in France and abroad. Each of these three departments has all the expertise and performance drivers required to operate the leading European electricity generation fleet and ensure its development and sustainability, and offer their technical and industrial expertise to the whole Group in these three areas (also see section 1.4.5 "International activities").

### Strengths of the generation fleet

The Group's generation fleet has significant strengths:

- a competitive generation mix with low variable generation costs<sup>(6)</sup> and limited exposure to hydrocarbon and carbon market fluctuations due to nuclear and hydropower facilities;
- a variety of means of generation, which enable adequate coverage of EDF's downstream portfolio needs (end users, sales to alternative suppliers, sales on the wholesale markets, etc.). Use of the fleet's various components is managed by giving priority, at any given time, to the generation type offering the lowest variable costs: run-of-river hydropower plants are used for base generation; nuclear plants, because of their low variable generation costs, are used for base and mid-merit generation; adjustable hydropower generation (coming from dams) and thermal fleet are used for mid-merit and peak generation;
- a significant standardised fleet of nuclear facilities, for which EDF provides full control over their entire life cycle. Moreover, EDF is working towards extending the operating lifespan of its power plants and improving their technical performance;
- a fleet generating at 87% without CO<sub>2</sub> emissions due to the predominance of nuclear and hydropower generation facilities, in an increasingly restrictive environmental regulatory context;
- a geographical position at the junction of electricity exchanges between the continental platform and the electric peninsulas (Italy, Spain and the UK).

### Composition and specifications of the installed fleet

With a total installed generation capacity of 92.3GW in mainland France<sup>(7)</sup> at 31 December 2017, EDF has the largest generation fleet in Europe, accounting for nearly 9% of the total installed capacity in the main European countries (the 35 member areas of ENTSO-E – *European Network Transmission System Operators for Electricity* – that includes Germany, Italy and Spain<sup>(8)</sup>).

(1) Excluding interim interest and the currency effect compared with a benchmark project exchange rate of £1 = €1.23.

(2) Transmission network operator, independently managed within the meaning of the French Energy Code.

(3) Source: EDF. Figures calculated according to consolidation accounting rules.

(4) Source: comparison based on data published by these ten groups.

(5) One customer can have two customer accounts: one for electricity and another for gas.

(6) Variable generation costs correspond to all the costs that vary directly with the amount of energy generated. Variable costs for electricity generation are mainly fuel costs.

(7) For Corsica and the French overseas departments, see section 1.4.4.3 "Island Energy Systems".

(8) Calculation based on the ENTSO-E statistics for the year 2015, as the statistics for the year are only available on 30 April of the following year.

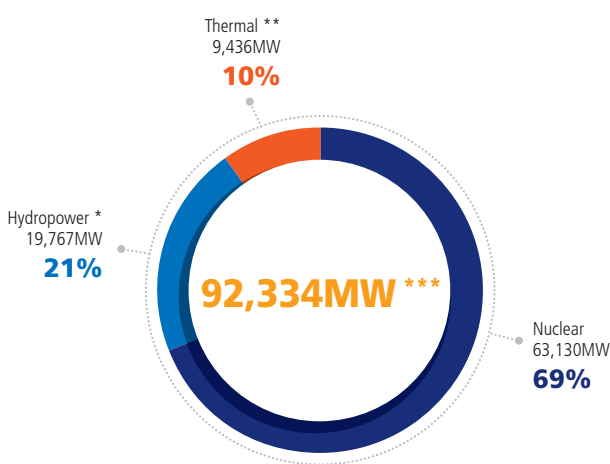
In 2017 in France, EDF's generation fleet produced 425.2TWh excluding pumped storage hydropower, and 432.0TWh including pumped storage hydropower.

At 31 December 2017, the capacity of EDF's generation fleet in mainland France was composed of:

- 58 nuclear units based on pressurised water reactors (PWR) (a unit is defined as a generation unit including a reactor, steam generator, a turbine, a generator, the related equipment and the buildings that house them). These units have electrical power capacities varying from 900MW to 1,500MW and are spread out over 19 sites, with an average age of 32 years;

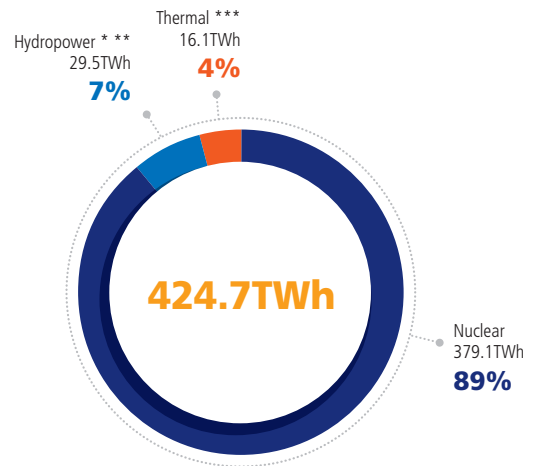
- 21 functioning thermal units, with an average age of around 16 years;
- 433 hydropower plants, with an average age of 73 years <sup>(1)</sup> (see section 1.4.1.5.1 "Hydropower generation in France");
- the wind and solar power generation capacities of EDF Énergies Nouvelles in France (see section 1.4.1.5.3 "EDF Énergies Nouvelles") and the incineration plants of the Tiru group in France (see section 1.4.6.1.1 "Dalkia" – "Tiru");
- 84 hydropower plants owned by Group subsidiaries: SHEMA group (100%) and CERGA (owned 50/50 with the German electricity company EnBW). These plants represent a total of approximately 140MW of installed capacity in 2017.

➔ **2017 installed capacity and output in mainland France**



**Installed capacity**

Expressed in megawatts of maximum capacity linked to the network.  
 \* Excluding Corsica and overseas departments, 440MW in 2017.  
 \*\* Excluding Corsica and overseas departments, 1,629MW in 2017.  
 \*\*\* Excluding Wind generation capacity of 12MW and including tidal generation capacity of 240MW.



**Output**

\* Excluding Corsica and overseas departments, representing 1.3TWh in 2017.  
 \*\* Net pumped storage generation: the electricity consumption needed for the operation of pumped storage power plants (STEP) amounted to 7TWh in 2017, resulting in hydropower generation (including pumped storage consumption) of 36.5TWh, including generation from the tidal power on the Rance river of 0.6TWh.  
 \*\*\* Excluding Corsica and overseas departments, 4.7TWh in 2017.

(1) Arithmetic mean.

### 1.4.1.1 Nuclear power generation in France

The electricity generated by EDF in France from its fleet of nuclear power plants represented 89.1% of its total electricity generation in 2017 excluding pumped storage hydropower.

#### 1.4.1.1.1 EDF's nuclear fleet in France

EDF's PWR model is divided into three series of available electrical power:

- a 900MW series consisting of 34 units of approximately 900MW (for a total power capacity of 30,770MW) with an average age of 36 years;

- a 1,300MW series consisting of 20 units of approximately 1,300MW (for a total power capacity of 26,370MW) with an average age of 29 years;
- the N4 series, which is the most recent with an average age of 17 years, consisting of 4 units of approximately 1,500MW (for a total power capacity of 5,990MW);

for a total of 58 units spread over 19 sites owned by EDF, and constituting a total authorised capacity of 63,130MW as at 31 December 2017. With an average age of approximately 32 years for an estimated technical operating lifespan of over 40 years, EDF's nuclear fleet is about average compared to the fleets installed worldwide.

The commissioning and most recent ten-year inspection (VD) dates for these units as of end-2017 are as follows:

Units	Year of industrial commissioning	Most recent ten-year inspection	Next ten-year inspection	Units	Year of industrial commissioning	Most recent ten-year inspection	Next ten-year inspection
Fessenheim 1	1978	2009	VD4	Gravelines 6	1985	2007	VD3
Fessenheim 2	1978	2011	VD4	Cruas 3	1984	2014	VD4
Bugey 2	1979	2010	VD4	Cruas 4	1985	2016	VD3
Bugey 3	1979	2013	VD4	Chinon B3	1987	2009	VD3
Bugey 4	1979	2011	VD4	Chinon B4	1988	2010	VD3
Bugey 5	1980	2011	VD4	Paluel 1	1985	2016	VD4
Dampierre 1	1980	2011	VD4	Paluel 2*	1985	2005	VD3
Gravelines 1	1980	2011	VD4	Paluel 3	1986	2017	VD4
Gravelines 2	1980	2013	VD4	Paluel 4	1986	2008	VD3
Tricastin 1	1980	2009	VD4	Saint-Alban 1	1986	2017	VD4
Tricastin 2	1980	2011	VD4	Flamanville 1	1986	2008	VD3
Dampierre 2	1981	2012	VD4	Saint-Alban 2	1987	2008	VD3
Dampierre 3	1981	2013	VD4	Flamanville 2	1987	2008	VD3
Dampierre 4	1981	2014	VD4	Cattenom 1	1987	2016	VD4
Tricastin 3	1981	2012	VD4	Cattenom 2	1988	2008	VD3
Tricastin 4	1981	2014	VD4	Nogent 1	1988	2009	VD3
Gravelines 3	1981	2012	VD4	Belleville 1	1988	2010	VD3
Gravelines 4	1981	2014	VD4	Belleville 2	1989	2009	VD3
Blayais 1	1981	2012	VD4	Nogent 2	1989	2010	VD3
Blayais 2	1983	2013	VD4	Penly 1	1990	2011	VD3
Blayais 3	1983	2015	VD4	Cattenom 3	1991	2011	VD3
Blayais 4	1983	2015	VD4	Golfech 1	1991	2012	VD3
Saint-Laurent 1	1983	2015	VD4	Cattenom 4	1992	2013	VD3
Saint-Laurent 2	1983	2013	VD4	Penly 2	1992	2014	VD3
Chinon B1	1984	2013	VD4	Golfech 2	1994	2014	VD3
Cruas 1	1984	2015	VD4	Chooz B1	2000	2010	VD2
Chinon B2	1984	2016	VD4	Chooz B2	2000	2009	VD2
Cruas 2**	1984	2017	VD4	Civaux 1	2002	2011	VD2
Gravelines 5	1985	2017	VD4	Civaux 2	2002	2012	VD2

\* The third ten-year inspections are ongoing at Paluel unit 2.

\*\* The third ten-year inspections are ongoing at Cruas unit 2.

EDF first-generation design plants have been gradually shut down and are currently being decommissioned (see section 1.4.1.1.6 "Decommissioning of nuclear power plants").

#### Generation allocation contracts

In the 1970-80's, EDF developed, industrial cooperation with European operators in the nuclear industry, in the form of generation allocation contracts backed by units of the EDF French nuclear fleet.

In its fleet, EDF has ten generating units participating in the contracts (up to 1.5GW) with the following European energy companies:

- Fessenheim 1-2: EnBW (17.5%) and the Swiss electricity group CNP (15%) (this contract ended on 31 December 2017);
- Cattenom 1-2: EnBW (5%);
- Bugey 2-3: Électricité de Laufenbourg <sup>(1)</sup> (17.5%);
- Tricastin 1 to 4: Electrabel <sup>(2)</sup> (12.5%);
- Chooz B1-B2: EDF Luminus, EDF subsidiary in Belgium (3.3%).

(1) Axpo group.

(2) Engie group.

The purpose of these generation allocation contracts is to make available to each partner the proportion of energy generated actually due to him, based on the share of the capacity allocated to him – in return for payment of their share of the construction costs, annual operating costs (including upstream and downstream fuel costs), local taxes and taxes specific to nuclear energy, and the costs relating to decommissioning. In these transactions, the partners have shared with EDF the industrial risks in the development of the fleet (three series heads are concerned) and assume the risks on performance linked to the current operation of the power plants. On the other hand, they have no operational role.

Furthermore, EDF signed a second type of generation allocation contract relating to a pool of power plants (totalling approximately 2GW) under which EDF makes available to its partners a share of the electricity determined by the level of availability of all or part of a standard fleet, applied to the capacity share reserved to the partners for the units concerned. These contracts mainly concern the following power plants:

- Chooz B1-B2 (N4 initial series unit): Electrabel (21.7%);
- Cattenom 3-4: Électricité de Laufenbourg (7.8%) and CNP (21.8%).

#### 1.4.1.1.2 Operation and technical performance of the nuclear fleet

Nuclear power is a means of generation whose variable cost, mainly fuel-related costs, is low since it represents less than 30% of operating costs<sup>(1)</sup>. The main competitive levers of the nuclear fleet in its operating phase are thus the amount of generated energy and the optimisation of fixed operating and maintenance costs. The levers relating to the fuel cycle are further discussed in section 1.4.1.1.4 "The nuclear fuel cycle and related issues".

#### Operation methods of the nuclear fleet

##### Generation cycle and planned outages

To reconcile the challenges linked to the strong variations in seasonal consumption in France, due to its strong temperature sensitivity, the availability of maintenance resources and the efficient use of reactor fuel, EDF has now adopted generation cycles of 12 and 18 months for its fleet. At the end of 2017, this breakdown was as follows:

- 28 units of the 900MW series have an operating cycle of approximately 12 months;
- 6 units of the 900MW series, 20 units of the 1,300MW series and 4 units of the N4 (1,450MW) series have an operating cycle of approximately 18 months.

At the end of these operating cycles, shutdown periods are programmed in order to replace a fraction of the fuel loaded in the core and perform maintenance work.

Two types of planned outages are alternated at the end of each generation cycle:

- an ordinary shutdown for refuelling, for a standard period of approximately 35 days, during which unloading spent fuel and reloading new fuel is the main operation performed; although light maintenance or periodic testing may also take place during this type of outage;
- a partial inspection for refuelling and maintenance for which the standard period<sup>(2)</sup> lasts approximately 70 days.

Every ten years, the power plant is shut down for a standard period of approximately 110 days in order to carry out a ten-year inspection. This length of time varies according to the works and maintenance programme, as well as the series concerned. The programme for a ten-year inspection includes the following:

- unloading of spent fuel and reloading of fresh fuel, as at each outage;
- hydropower tests of the primary coolant system, a leak test of the containment, and inspection work of the reactor's pressure vessel;
- modification work, associated with ten-year safety re-evaluations;

- other specific maintenance operations, in particular renovation or replacement of major components.

At the end of the ten-year inspection, the ASN decides whether to approve the restart of the reactor and then issues technical prescriptions setting the conditions for continuing operation.

#### Operation of EDF's nuclear fleet

Nuclear generation resources, owing to their low variable cost are first used for base-load generation, immediately after run-of-river hydropower and other unavoidable renewable energies, as well as the energy purchased under buying obligations from decentralised energy producers. Variations in energy consumption over one year (summer-winter, day-night) and the currently restricted fluidity of wholesale markets due to limited interconnections on the borders lead nuclear energy to be used also for mid-merit generation. High variations in seasonal consumption in France and its major variation during winter months require that planned nuclear fleet outages be concentrated between April and October. The 2003 heat wave highlighted the consequences of very strong warming of rivers, especially on the conditions for operating "riverside" units. The scheduling of unit outages was therefore reviewed to reduce the number of outages of "riverside" units in July and August to encourage these units to continue operating as much as possible since cooling capacities are less dependent on weather conditions.

#### Generation and technical performance

The nuclear fleet produced 379.1TWh in 2017, down 4.8TWh compared to that of 2016.

Nuclear generation expressed in annual energy corresponds to a load factor rate referred to as "Kp" for the French nuclear fleet (defined as the ratio of energy generated to the maximum theoretical energy, or the energy generated if the installed capacity were operated year-round). This rate is obtained by multiplying two coefficients ( $K_p = K_d \times K_u$ ):

- the availability factor ("Kd") (the available energy<sup>(3)</sup> as a percentage of the theoretical maximum energy, or the energy generated if the installed capacity were operated year-round). The Kd depends on outage durations, and is therefore impacted by standard durations and the work programme to be performed;
- a utilisation factor, "Ku" (energy generated compared to energy available). The Ku factor reflects environmental, regulatory and social constraints, supply of system services and optimisation implemented by EDF (fuel and modulation).

In 2017 the Kp factor reached 68.55%, little changed from 69.2% in 2016. This results from a Kd of 77.1%, down from 2016 (79.6%) and a Ku of 88.92%, up 1.9 points from 2016 (87%).

Generation in 2017 was affected by several significant factors, including:

- continuing controls to better show that the steam generator potentially affected by the phenomenon of carbon segregation are able to perform their function safely. The analyses and controls performed made it possible to obtain approval from the ASN to restart all of the affected reactors, thus confirming that the reactors are able to operate safely;
- continuing to investigate quality discrepancies in some of the manufacturing records for forged parts (the records are said to be "crossed" or "uncrossed") at AREVA NP's Creusot Forge plant. By end 2017, all roughly 1,600 records had been inspected, of which a little over 1,100 had undergone a technical review. The results of the technical reviews showed that none of the parts in question presented any safety concerns. In the second half of 2017, the analysis summaries for 12 reactors were sent to the ASN which passed the reactors and issued Test Certificates at over 110°C. In early July 2017, a comprehensive analysis of Fessenheim 2 was sent to the ASN with the results of the additional tests carried out in the autumn of 2016 on the steam generator in question which confirmed the integrity of the steam generator and its operational safety. The expert Committee met on 27 February and issued a favourable opinion on returning the Fessenheim 2 steam generator in question to operation. On 12 March 2018, ASN lifted its suspension of the pressure test certificate of a steam generator installed on Fessenheim reactor 2, considering that the anomaly did not compromise its serviceability and that its compliance with the regulations

(1) Operating costs are defined as follows: fuel costs (including downstream expenses in the fuel cycle), operating expenses (purchases and external services, employee expenses) and maintenance costs (expenses and investments). They do not include investments related to construction or decommissioning expenses.

(2) Standard durations represent optimised and realistic reference durations by outage types. They take into account the feedback from past outages. Outage planned durations fluctuate around these standard durations, depending on the work programme to be performed.

(3) Available energy is equal to the maximum theoretical energy less generation losses due to technical reasons inherent to power plants, such as planned outages, unplanned outages due to failure or safety requirements, and performance of regulatory tests.

was thus demonstrated. The Group therefore plans to reconnect Fessenheim reactor 2 to the grid at the end of March 2018. The exhaustive audit of the Creusot Forge manufacturing records will continue in 2018 according to a schedule sent to the ASN based on the outages of the 58 units over 2018. At end 2017, the analysis of the parts of 12 fleet units was finalised with the ASN;

- continuing to analyse and deal with the fallout in late March 2016 of a worn-out steam generator in the Paluel 2 reactor building, when it was being replaced during the reactor's third ten-year inspection. The steam generator was successfully lifted and removed. The damaged pool was repaired in the summer of 2017. Replacement of the steam generators began in late October 2017 and work to restart the Paluel 2 reactor will continue in early 2018. The order extending the duration of the Paluel 2 nuclear facility outages by two years was issued on 26 January 2017 and published in the *Journal Officiel* on 4 February 2017;
- finalising the examination of repairs to the Bugey 5 reactor containment with the IRSN and the ASN in order to reconnect Bugey 5 to the network by the end of July 2017. The reactor was shut down on 27 August 2015 to reload fuel and carry out maintenance work. The outage was extended after a tiny leak in the lower section of the reactor containment was detected. On 7 April 2016 the findings of the leak analysis were sent to the ASN which on 3 April 2017 approved EDF's proposed fix; repair work duly began in the spring of 2017. After these repairs successful containment building pressure tests were carried out on the Reactor Building 5 wall and the Bugey 5 reactor was restarted and connected to the network in late July 2017;
- the successful "sleeving" of the Gravelines 5 reactor steam generators which enabled the reconnection of the reactor to the grid in late July 2017. The reactor had been shut down on 9 April 2016 for its third ten-year inspection. The replacement of the three steam generators had been scheduled to take place during the shutdown but had to be postponed after the new parts failed to obtain a Safety Certificate from the ASN. Studies by EDF at the time showed that the original steam generators were still completely safe to use provided certain tubes were fixed by means of "sleeving". The proposed fix was approved by the ASN on 2 February 2017 and carried out in the spring of 2017.
- detecting and promptly dealing with several anomalies relating to generic defects in the earthquake resistance of various equipment:
  - the anchors of the auxiliary systems of the 1300 backup diesel generators and CPO (dating from when the units in question were built),
  - rusting and thinning pipes installed in the pumping stations with the potential risk of internal flooding in the event of a Safe Shutdown Earthquake which could result in a breach and thus trigger the failure of the cooling system (related to unsuitable maintenance programmes),
  - the undemonstrated resistance to a Safe Shutdown Earthquake of part of the Tricastin dike with the ASN ordering a temporary shutdown of the four reactors to give EDF time to carry out the reinforcements it had proposed. Although it did not share the view that the four reactors need to be shut down during the repairs, EDF implemented the ASN's decision. The reactor shutdown resulted in 6TWh of lost production.

Furthermore, Generation was also interrupted by exceptional damages (costing around 4TWh) and longer-than-expected outages (costing around 6TWh). The performance losses related to unplanned outages rose from a rate of 2% in 2016 to 3.26% in 2017 because of three exceptional damages. Without these, the rate of unplanned outages in 2017 would have been 2.0%, not far from the 2016 figure. These figures do not undermine the maintenance strategy implemented in 2007 to renovate and replace major components which has brought the overall rate of unplanned outages down to 30% since 2009. The outages extensions experienced in 2017 were caused in equal measure by maintenance and operational quality issues, technical failures and project management deficiencies.

### Investment programme for the existing nuclear fleet in France

EDF's industrial strategy is to operate the existing nuclear fleet well beyond 40 years under the best conditions of nuclear safety (integrating, in particular, post-Fukushima modifications), of environmental safety and protection, which requires to keep on performing significant maintenance operations over the 2014-2025 period. To overcome this challenge, involving all of the nuclear power sector on the short term, the "Grand Carénage" programme was implemented, in order to be able to integrate, with the Group's industrial partners, the significant amount of work to be done on the fleet.

On 22 January 2015, EDF's Board of Directors approved in principle a major overhaul programme (the "Grand Carénage") aimed at refurbishing the French nuclear fleet, enhancing reactor safety and, if conditions allow, continuing their operation which was estimated to cost up to €<sub>2013</sub>55 billion (€60 billion in current euros) in total over the 2014-2025 period for the 58 reactors currently operating<sup>(1)</sup>.

The optimisation work undertaken since (reductions and postponements) led to a downward revision of the overall cost of the programme to €<sub>2013</sub>45 billion (or €48 billion in current euros) over the 2014-2025 period. This revision is largely a result of continued optimisation efforts regarding the adopted technical solutions and component replacement strategies and greater precision in their application by integrating the capacities of the industrial base, which enabled certain expenses to be postponed, and taking into account the early closure of the Fessenheim plant on 31 December 2018. By dint of these measures, around €<sub>2013</sub>7 billion (or €8.5 billion in current euros) in costs was reduced and around €<sub>2013</sub>3 billion (or €3.6 billion in current euros) of spending was postponed to after 2025 for total savings of €<sub>2013</sub>10 billion (or €12 billion in current euros) from initial estimates, of which €<sub>2013</sub>5.6 billion (or 6.5 billion in current euros) in ten-year visits and applied feedback from Fukushima, €<sub>2013</sub>2.8 billion (or €3.3 billion in current euros) in replaced steam generators and large parts and €<sub>2013</sub>1.5 billion (or €2.3 billion in current euros) in other engineering projects and ongoing maintenance.

For the existing nuclear fleet, the programme covers both usual maintenance spending and investments required to extend the lifespan of equipment (replacement of the, VD4 900 and VD4 1300, steam generators). It is estimated to cost an average of about €4 billion annually until 2025 before decreasing towards about €3 billion annually.

In 2014 and 2015, asset acquisitions in the existing nuclear fleet ("Grand Carénage") amounted to €3.6 billion before reaching €3.8 billion in 2016 and €4.2 billion in 2017.

In order to complete the programme, a separate entity was created, the "Grand Carénage". The programme's sponsor is the Nuclear and Thermal Fleet Department (DPNT) which approves the programme's scope, currently broken down into 22 projects, and financial trajectory. The programme's supervision is taken care of by the Nuclear Generation Division, which defines the content of the activities. Project management is handled by the Programme Director assisted by the project managers over the life of the project in all areas: deadlines, quality control, financial trajectory. The Board of Directors examines the main investments for each major category of projects whose chief characteristics are presented to it, approves contracts or deals above a predefined amount, and conducts the annual review of the programme's implementation on the basis of indicators showing the extent of its physical and financial progress, what remains to be completed and the final costs.

This industrial programme is being gradually implemented in compliance with the objectives of Energy transition for green growth Law, multi-year energy plans and the opinions and orders of the ASN as well as the procedures for authorisation for reactors to run for more than 40 years (see section 1.4.1.1.5 "Preparing for the future of the nuclear fleet in France").

(1) The figures presented by the French Cour des comptes in its report of 10 February 2016 cover a longer time horizon, up to 2030, and included, beyond the investment, operating and maintenance expenses. Both assessments are consistent, as stated by the Cour des comptes in its report. Indeed, among the overall estimates calculated by the Cour des comptes and amounting to close to €<sub>2013</sub>100 billion for the 2014-2030 period, the investment -expenditures estimated at €<sub>2013</sub>74.73 billion should be distinguished from the operating expenditures estimated at €<sub>2013</sub>25.16 billion. Within the €<sub>2013</sub>74.73 billion of investment expenses between 2014 and 2030, €<sub>2013</sub>55 billion are dedicated to the 2014-2025 period, which allows the two estimates established by the EDF group and the Cour des comptes to be connected.



Under this programme, the planned renovation or replacement of major components of power stations such as generators, transformers or steam generators will continue. At end 2017:

- the alternator generators were renovated on 45 units, for a total of 49 units to renovate;
- the programme for preventive replacement of the poles in the main transformers is ongoing. 116 main transformer poles out of 173 were replaced, *i.e.* approximately 66.5% of the programme;
- the steam generators of 28 out of the 34 units of the 900MW series were replaced.

Industrial work will continue beyond 2025 on the occasion of the third and fourth series of ten-year inspections of 1300MW units, the fourth series of ten-year inspections of 900MW units and the second and third series of ten-year inspections of N4 units. This programme will provide the opportunity to incorporate additional safety improvements identified following the Fukushima accident as well as modifications allowing the operation of facilities to be extended significantly beyond 40 years (see section 1.4.1.1.5 "Preparing for the future of the nuclear fleet in France").

### 1.4.1.1.3 Environment, nuclear safety, radiation protection

#### Environmental protection

EDF bases its environmental procedure on an ISO 4001-certified management system (see section 3.1.8.2 "Management and prevention of environmental risks" – "The environmental management system (SME)"), rolled out in 2002 at a number of sites and then extended to all nuclear generation units.

In terms of radioactive waste management, Very Low-Level Waste (VLLW) has been removed to the Morvilliers storage facility in the Aube since 2004. Concerning Low- and Intermediate-Level operating Waste (LILW), EDF is continuing to take steps to limit its intermediate storage on all nuclear sites and relies on the Centraco factory (SOCODEI, a subsidiary of the EDF group), where the melting oven was restarted in 2015 and which is now operating normally.

For a description of radioactive waste processing downstream of the fuel cycle as well as decommissioning, see sections 1.4.1.1.4 "The nuclear fuel cycle and related issues" and 1.4.1.1.6 "Decommissioning of nuclear power plants".

#### An ever-present nuclear safety procedure

EDF, in its capacity as a nuclear operator, takes responsibility for nuclear safety and, in a rapidly-changing context (market competition, environmental issues, etc.), reaffirms as its absolute priority the protection of the human and environmental health, among other things, through the prevention of accidents and the limiting of their consequences as regards nuclear safety. Moreover, the Codified Law of 13 June 2006 on nuclear transparency and safety (see section 1.5 "Legislative and regulatory environment") grants public access to information regarding in particular the nuclear safety measures taken by the operator and establishes a formal basis for transparency on nuclear safety.

The implementation of the French nuclear power programme led EDF to establish a safety procedure that:

- takes into account, from the design stage, the risks that might arise during the operation of the power plants, whether relating to the actual operation of the facilities or to internal or external attacks;
- is based both on the application of strict rules of operation, and on the cautious and inquiring attitude of the technical teams by means of the establishment of a true safety culture;

- is based on the cumulative experience of a standardised fleet of 58 reactors (*i.e.*, more than 1,700 reactor-years of operation, the arithmetic sum of years of operation of EDF's pressurized water reactor (PWR));
- incorporates a continuous improvement approach that is notably embodied by the ongoing efforts to decrease the number of automatic reactor trips;
- benefits from integrated nuclear engineering and Research & Development within the Group in order to anticipate the correction of failures, maintain the facilities in good working order, develop equipment on an ongoing basis, reassess safety margins and monitor technology advances, as well as the implementation of more effective new technologies and the management of sites being decommissioned;
- relies strongly on the development of skills; with this objective in mind, each nuclear generation site is equipped with a simulator used for training to cope with any type of situation.

Nuclear safety is subject to numerous controls, both internal and external.

- EDF has implemented internal control procedures. For example, every three to four years, EDF performs overall safety assessments for each nuclear power plant, which take place over a three-week period and involve approximately 30 inspectors. In addition, the General Inspector for nuclear safety and radiation protection, reporting to and appointed by EDF's Chairman and CEO, performs annual audits, issues an opinion on the overall safety of the nuclear fleet and suggests improvement actions to the Company's management. Efforts by EDF, notably to improve human performance, have resulted in a halving over ten years of the annual average number of automatic reactor trips. In 2017, they totalled 22 throughout the fleet.
- The external control of the safety of nuclear facilities in France is carried out by the ASN, at the national level, there are two types of audits:
  - scheduled or unannounced inspections carried out by the ASN (473 inspections in 2017 over all EDF nuclear facilities);
  - a periodic (ten-year) review process designed to improve the compliance of nuclear plants with applicable rules and update assessments of the risks facilities pose to the environment and public health, taking into account the state of the facilities, the experience gained during their operation, new developments in nuclear science, and rules applying to similar facilities. The targets are established by the ASN which monitors compliance; EDF proposes solutions to meet these targets and implements them after obtaining the approval of the ASN (see section 1.4.1.1.1 "EDF's nuclear fleet"). The periodic review is an important step in continuing the operation of power plants (see sections 1.4.1.1.5 "Preparing for the future of the nuclear fleet in France" and 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities").

At the international level, regular inspections are held making it possible to share the experience gained worldwide:

- the OSART (Operational Safety Review Team) of the IAEA (International Atomic Energy Agency) performs reviews at the request of the French government with the objective of formulating recommendations and promoting best practices. In particular, EDF's first Corporate OSART was held in 2014 and concluded that EDF is fully compliant with the standards defined by the IAEA; the Follow Up Corporate OSART took place at the end of 2016;
- the international "peer review" inspections carried out by the WANO (World Association of Nuclear Operators) are organised at the request of EDF to assess safety performance compared to best international working practices. A Corporate Peer Review took place in 2017 aimed at assessing the mode of governance and relations between corporate HQ and the facilities. At the end of the Corporate Peer Review WANO identified two best practices to do with applying the Nuclear Rapid Action Force (FARN) under the Post-Fukushima resilience programme and with using digital technology to train maintenance workers. WANO also issued four recommendations (two relating to Corporate Leadership and Governance, one dealing with Monitoring and Oversight of Contractors and one to do with Completeness of Independent Oversight) which will lead to an action plan.

#### Whistleblowing system

In the event of an accident, a crisis plan is in place to limit impacts on the environment and people, and to ensure the safety of the facility. This crisis system is based on two closely coordinated plans, designed for both local and national use. These are:

- the Internal Emergency Plan for each nuclear site, developed by EDF;
- the Special Intervention Plan, prepared by French prefectures in collaboration with the French government and EDF.

In order to provide greater effectiveness and thus improved protection of populations, these plans in particular take into account external risks (flooding, etc.) and internal risks (fire, etc.). The relevance of the system for warning, informing and protecting people is regularly assessed through accident simulation exercises. Each year, approximately 100 exercises are organised for the entire French nuclear fleet, *i.e.*, approximately one drill every three days. Approximately ten exercises are on a national level, under the management of the ASN and involve EDF and the public authorities, in particular the prefectures. In 2017, three national-scale exercises were organised, one of which pertained to the physical protection of facilities (security crisis).

After its initial analyses following the Fukushima accident in March 2011, EDF supplemented its crisis management organisation with a national team capable of quickly delivering material and human assistance to a site in great difficulty. This system, called the Nuclear Rapid Action Force (FARN), has had many simulation exercises from regional bases located at Civaux, Paluel, Dampierre and Bugey and can be sent to a unit at any site in difficulty. The FARN is capable of a simultaneous response at six units on a single site.

#### Significant events regarding safety

The operational safety of nuclear facilities is taken into consideration from the initial design stage, and is regularly monitored, together with the implementation of an employee motivation policy and large-scale investment programmes. The Group's nuclear safety policy is incorporated into training for both EDF employees and subcontractors.

#### Control and surveillance

Nuclear safety is subject to internal controls (annual reviews, internal control plans and nuclear inspection audits in France) and external controls (peer reviews between corporate members of WANO and OSART audits conducted by experts from the IAEA).

In France, the safety of nuclear facilities is controlled by the ASN. Events are classified on a scale from one to seven, with seven being the most serious (INES scale <sup>(1)</sup>). Incidents of no consequence for nuclear safety are called "level 0 events". Since the establishment of a scale of this kind in France in 1987, no level 3 event (serious incident – very low external emission, and exposure of the public representing a fraction of regulatory limits) or above has occurred in the French nuclear fleet.

The ASN also approved the creation of an additional crisis management system, the Nuclear Rapid Action Force (FARN) following additional safety evaluations carried out by EDF after the Fukushima accident.

#### Events in 2017

As in 2016, no major safety or radiation protection event was recorded in France.

In 2017 the EDF group declared 4 significant safety events (ESS) classified at INES 2. These events had to do with anomalies relating to generic defects in the earthquake resistance of various equipment.

As a whole the results for 2017 evolved in comparison with 2015 and 2016, with an average number of unclassified events (level 0) increasing to 10.38 ESS per reactor (602 events) compared with 8.75 in 2016 and 8.88 in 2015 and a stable average number of level 1 events per reactor of 1.13 (66 events) versus 0.94 in 2016 and 1.16 in 2015.

The number of automatic reactor trips fell to 0.38 per reactor (0.48 in 2016 and 0.66 in 2015).

The 2017 detailed results on nuclear safety are published in the annual report created by the General Inspector for Nuclear Safety and are available on the Internet.

#### Radiation protection

Work by field operatives has enabled continuous improvement of performance in terms of protection of employees against the effects of ionising radiation. Thus, the average annual collective dose of all workers, both employees of EDF and outside companies intervening in power plants, has been halved in less than ten years. In 2017 the average collective dose was 0.61 man-Sievert per reactor (or a collective annual dose of 35.38 man-Sieverts). The collective dosimetry in 2017 is down compared to 2016 (44.2 man-Sieverts). EDF is proactively implementing an ALARA (As Low as Reasonably Achievable) policy to limit the collective dose with a view to the workload involved in the industrial project on the fleet in operation over the coming years.

EDF is furthermore committed to continuing to lower exposure to radiation below the regulatory limit of 20mSv over 12 rolling months for the whole body. Accordingly, throughout 2017 and over 12 rolling months, none of the participants (neither EDF employees nor contractors) was exposed to an individual dose of higher than 14mSv.

In the coming years, given the levels already achieved, efforts will have to be focused on power plants with the poorest dosimetric results, in particular by cleaning their circuits.

#### 1.4.1.1.4 The nuclear fuel cycle and related issues

The average annual normative volume for nuclear fuel used by reactors in the EDF fleet in France is approximately 1,200 tonnes (of heavy metals: natural enriched uranium, enriched reprocessed uranium, plutonium) of which approximately 1,080 tonnes corresponds to ENU fuel (enriched natural uranium), 110 tonnes to MO<sub>x</sub> fuel (produced from reprocessed plutonium) and 10 tonnes to ERU fuel (enriched reprocessed uranium).

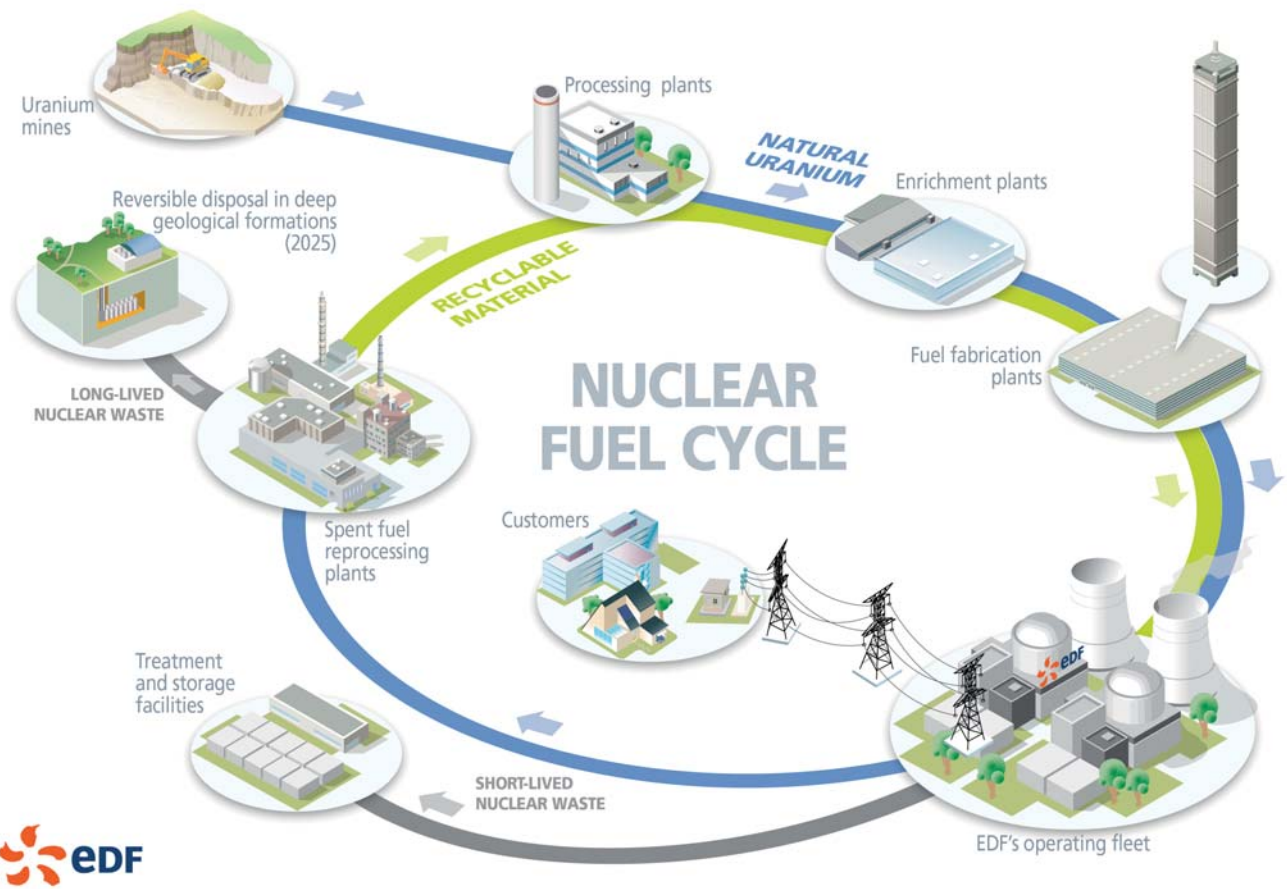
The nuclear fuel cycle encompasses all industrial operations in France and abroad involved in the supply of fuel for energy generation in reactors, as well as removal and processing of the fuel. The cycle can be broken down into three stages:

- front-end (upstream) the purchase of concentrates from uranium ore, fluorination (or conversion), enrichment and production of fuel;
- the core cycle, corresponding to the use of fuel in the reactor: receipt, loading, operation and unloading; the fuel stays four to five years in the reactor;
- back-end (downstream), for the reactor fleet in France: interim pool storage, reprocessing of spent fuel, conditioning of radioactive waste and recycling of reusable materials, the intermediate storage of treated waste prior to storage, as required by the French Law of 28 June 2006 on the sustainable management of radioactive materials and waste.

EDF coordinates all the operations in the fuel cycle. Generally speaking, upstream and downstream operations are carried out by subcontractors or suppliers, generally on the basis of multi-year contracts. EDF acquires most of the raw materials as uranium concentrates (U<sub>3</sub>O<sub>8</sub>), with transformation into more processed products carried out by industrial operators through service contracts (fluorination, enrichment and manufacture), and provides core cycle operations. EDF is the owner in most cases and is responsible for the fuel and materials it uses throughout all different stages of the cycle.

(1) International Nuclear Event Scale.

**STAGES OF THE NUCLEAR FUEL CYCLE IN FRANCE:**



**Upstream**

To ensure the continuity and security of the supply of its reactors in France and the UK, EDF retains overall control of all operations at each stage of the cycle, through a portfolio of contacts and by stockpiling at different stages of the front-end stage of the fuel cycle (natural uranium, fluorinated enriched or unenriched uranium, and warehousing of new assemblies).

AREVA-Orano is in this respect an important supplier (see section 2.3 "Dependency factors").

Where necessary, the Group implements a strategy of currency hedging for its uranium supplies.

**Natural uranium supply**

EDF's uranium supplies are guaranteed by long-term contracts for periods of 7 to 20 years with a policy of diversification in terms of sources and suppliers.

In 2017, EDF continued the securing of its long-term supplies with a number of major market suppliers, including AREVA Mines-Orano.

Indexation formulas for portfolio contracts of natural uranium supply include fixed prices (base prices whether inflated or not) and variable prices (indexed according to market price indexes) and are sometimes limited by floor and ceiling prices. Consequently, the effects of fluctuations in market prices of natural uranium on supply costs are limited.

With manufacturers in the nuclear industry meeting within the World Nuclear Association (WNA), which brings together among others companies representing 90% of worldwide uranium production, EDF is making sure to implement best practices in mineral extraction so as to contribute to making overall progress in this sector. Since 2011, EDF has been periodically conducting mine audits based on a method drawn in collaboration with the WNA, which constitutes a standardised framework recognised by all stakeholders in the sector. Recommendations may be made, together with an improvement plan if necessary.

These principles defined by the WNA aim to perpetuate the best practices observed on the field and share them with all sector stakeholders; they notably reassert the principles defined by the International Council on Mining and Metals for sustainable extraction and use of uranium<sup>(1)</sup>. The clauses listing EDF's expectations in terms of enforcement of the fundamental rights and main international standards by suppliers and sub-contractors have progressively been inserted in contracts signed by EDF. In particular, they stress transparency and EDF's faculty to come and audit the supplier.

**Fluorination (or conversion)**

EDF's needs are covered by the AREVA NC-Orano group, as well as other international producers such as Cameco in Canada, Converdyn in the United States and Tenex in Russia.

In 2016 EDF signed a conversion services supply contract with AREVA-Orano to enhance coverage of its long-term needs.

*(1) These ten principles concern the health of workers and local populations (safety and protection against radiation and emissions); environmental preservation (waste management and protection of drinking water resources); the need for a legal framework in accordance with current legislation and international standards (AIEA) to monitor and manage radiation, health and safety for stakeholders and the general public, waste management and environmental protection; information, transparency and dialogue with stakeholders; responsible management of hazardous waste and contaminated materials by using the best available technologies; the development of a quality management system upstream of the project (Environmental impact study) including risk analysis; accident management preparation; transport of hazardous waste in complete safety and security; regular staff training.*

#### Enriching natural uranium into uranium 235

EDF meets its enrichment needs through global enrichers AREVA NC-Orano (Georges Besse II plant on the Tricastin site in France), Urenco (UK, Germany, the Netherlands, United States) and Tenex (Russia), primarily through fixed-price contracts decreasing on a constant currency basis.

#### Enriched reprocessed uranium

Since the 1990s, reprocessing has made it possible to recycle within the reactors uranium from processing spent fuel, which represents approximately 95% of the spent fuel mass.

This reprocessing was suspended in 2013, given the lack of economic incentive in light of the significant oversupply of natural uranium and pending the availability of a new industrial scheme. EDF is pursuing its examination of the conditions for restarting reprocessing in the next decade.

Reprocessed uranium is stored in a stable form to be used at a later stage.

#### Fuel assembly manufacturing

Contracts with the fuel assembly manufacturers AREVA NP-Framatome and Westinghouse, covering most of EDF's needs, were renewed in 2014 to secure provisions at least until 2020.

#### Downstream

EDF is responsible for what happens to its spent fuel and how it is processed and for the related waste, without any possibility of transfer of responsibility or limitation in time. AREVA-Orano is responsible for processing spent fuel and ANDRA for the management of the long-term storage of final waste, in accordance with the Codified Law of 28 June 2006 on the long-term management of radioactive materials and waste.

EDF's current strategy for the nuclear fuel cycle, in agreement with the French government, is to process spent fuel and wherever possible recycle substances such as plutonium separated in this process in the form of  $MO_x$  fuel. The quantities handled are determined by the amount of recycled plutonium in reactors allowed to load  $MO_x$  fuel ("equal flows" principle). The recycling capacity of nuclear units in the French fleet has allowed the processing of around 1,100 tonnes of spent fuel per year.

In addition, and in anticipation of the storage needs of the nuclear generation fleet, EDF is currently working on the design of a large spent fuel storage pool. It will make possible the long-term storage (around 100 years) of spent  $MO_x$  and ERU fuel from PWRs and from fuel assemblies of the Superphénix fast-neutron reactors currently stored in the spent fuel storage pool at the Creys-Malville power station until the advent of Generation IV reactors (Gen IV).

In line with the National Plan for the Management of Radioactive Materials and Waste for 2016-2018, EDF plans to apply for permission to build the pool by 2020.

#### Processing of spent fuel from EDF's nuclear power stations

Spent fuel awaiting processing is temporarily stored underwater in cooling pools, first in pools at the plants and subsequently in those of AREVA-Orano's reprocessing plant at La Hague. The storage conditions are recognised as being safe over a century-scale period of time. Approximately ten years after the spent enriched natural uranium fuel has been unloaded from the reactor, it is processed to separate the recyclable products from waste. The waste is subsequently conditioned and temporarily stored at the La Hague site in specific premises.

The relationship between EDF and AREVA-Orano concerning the transport, processing and recycling of spent fuel was formalised for the 2008-2040 period by a framework agreement signed on 19 December 2008.

In February 2016, EDF and AREVA-Orano signed an implementation agreement covering the 2016-2023 period as well as the associated supply contracts for the  $MO_x$  assemblies.

#### The fuel supply of the two EDF reactors at Hinkley Point (United Kingdom)

In September 2016, EDF and AREVA entered into an agreement providing for the supply of uranium, conversion and enrichment services, and assembly manufacturing for the fuel supply of the Hinkley Point C reactors.

#### Storing conditioned ultimate waste

Radioactive waste, depending on its nature, level of radioactivity and the lifespan of its radionuclide components, has been classified into different categories: from High-Level Waste (HLW), to Very Low-Level Waste (VLLW) passing by Low-Level Waste (LLW) and Intermediate-Level Waste (ILW). It is called Long-Lived (LL) when it remains active for more than 30 years.

#### Long-Lived High-Level Waste (HLW-LL)

The processing of spent fuel enables the vitrification of HLW-LL, which provides very high-quality conditioning with a reduced volume. The waste is then temporarily stored at La Hague in specific facilities. For example, all of the Long-Lived High-Level Waste produced in this way, corresponding to the operation of the early Natural Uranium Gas Graphite plants (NUGG) and to 50 years of operation of the current PWR facilities, would represent a volume of approximately 9,300 cubic metres.

#### Long-Lived Intermediate-Level Waste (ILW-LL)

The structures of the assemblies (shells and nozzles, clad pieces, etc.) separated during the processing of spent fuel, constitute ILW-LL. They are currently compacted and conditioned in stainless steel containers. ILW-LL waste also results from certain maintenance and dismantling operations. For example, the total volume of ILW-LL waste, including in particular the waste from the operation and decommissioning of generation fleet 1 with Uranium Natural Graphite Gas reactors and the waste from the current PWR facilities, taking into account the 50-year operating life of the power plants and the decommissioning operations, would represent about 37,000 cubic metres. Unlike HLW-LL, it does not generate heat and thus is suitable for faster storage than HLW-LL because it does not require cooling.

HLW-LL and ILW-LL from the reprocessing of spent fuel is temporarily stored in dedicated facilities in La Hague, pending the implementation of the storage in deep geological layers, as is currently envisaged as part of ANDRA's *Centre industriel de stockage géologique* (Cigéo) project.

Cigéo is the French deep geological storage facility project for radioactive waste. It is designed to store highly radioactive and long-lived waste produced by all current French nuclear facilities until their decommissioning, and by the processing of spent fuel used in nuclear power plants. After 15 years of research, evaluation and public debate, the principle of deep geological storage was adopted by the French Law no. 2006-739 of 28 June 2006 on the sustainable management of radioactive materials and waste as a safe long-term solution to manage this type of waste without shifting the burden onto future generations.

The centre is to be located in the east of France at the border of the Meuse and Haute-Marne departments. Cigéo will consist of surface facilities that will be used to receive and prepare waste packages as well as to excavate and build the necessary underground structures. The waste will be stored in underground facilities some 500 metres below ground in an impermeable argillaceous rock formation able to contain radioactivity over very long periods. Cigéo is designed to operate for at least 100 years and provide flexibility in order to give future generations a maximum number of possibilities to adapt it as needed.

The French Law of 11 July 2016, which specifies the details of the creation of a reversible deep storage facility, represents the fulfilment of an important prerequisite before obtaining approval of the Cigéo project for the management of long-lived high and intermediate level radioactive waste (HLW-LL, ILW-LL). ANDRA is continuing its design studies with a view to applying for permission to build the facility by 2019 (change of schedule following the updated planning of preliminary works and design optimisation works).

ANDRA is working on obtaining the building permit in 2022, launching a pilot industrial phase in 2026 and beginning to take delivery of the first waste in 2031. On 15 January 2018 the ASN gave its opinion on the DOS (list of safety options) submitted by Cigéo in which it considered the project had on the whole reached a satisfactory technological maturity at that stage. The ASN's draft opinion requires that alternatives to storing bituminous waste untreated at Cigéo be studied.

### Long-Lived Low-Level Waste (LLW-LL)

LLW-LL comes from the decommissioning of the old NUGG reactors (graphite, processing waste – see section 1.4.1.1.6 “Decommissioning of nuclear power plants”). Given its lifespan, this waste cannot be stored in existing surface facilities (see below), but due to its lower level of activity than that of Long-Lived High- and Intermediate-Level Waste, the Law of 28 June 2006 provides for special subsurface storage. In July 2015, ANDRA transmitted a report on the feasibility of a storage centre on a site located in the Soulaines region (Aube) in France. This report was submitted to the ASN for its opinion. At this stage, uncertainties remain about the site's capacity to accommodate all of the waste foreseen in the baseline inventory of the LLW-LL storage facility and its availability date. Further studies are planned under the National Plan for the Management of Radioactive Materials and Waste.

### Short-Lived Low- and Intermediate-Level Waste (LILW-SL) and Very-Low-Level Waste (VLLW)

Short-Lived Very Low-, Low- and Intermediate-Level Waste comes from the operation of nuclear facilities (gloves, filters, resins, etc.) and their decommissioning (concrete, scrap, lagging, piping, etc.). They are stored above ground in the Soulaines and Morvilliers storage facilities run by ANDRA in the Aube département.

In order to minimise volumes, some waste is treated beforehand by melting or incineration at the Centraco plant owned by SOCODEI, a subsidiary of EDF. In 2016, following the acquisition of the English and Swedish assets of Studsvik, the holding company “Cyclife” was created to bring together all the newly acquired assets and centralise the Group's internal and external activities in regard to waste treatment. In September 2017 SOCODEI was brought under Cyclife holding.

### Consideration of future charges relating to the management of spent fuel and long-term management of radioactive waste

Each year, EDF makes provisions for the downstream side of the nuclear fuel cycle in France (see note 29 to the consolidated financial statements for the year ended 31 December 2017 in section 6.1).

#### 1.4.1.1.5 Preparing for the future of the nuclear fleet in France

EDF's industrial goal for the preparation for the future of the nuclear fleet rests primarily on the following strategic areas:

- the implementation of technical conditions allowing the extension of the operational life of nuclear power plants beyond 40 years. In the first half of 2016, all technical, economic and governance conditions required to align the accounting amortisation period of the 900MW power plants in the French nuclear fleet with the Group's industrial strategy were fulfilled; EDF's Board of Directors therefore approved on 28 July 2016 the extension of the accounting amortisation periods of the power plants of the PWR 900MW series in France (excluding Fessenheim) from 40 to 50 years from 1 January 2016, without prejudice to the approvals for continued operation, granted on a unit-by-unit basis by the ASN after each ten-year inspection;
- continued safety improvements, primarily by integrating lessons learned from the Fukushima accident in Japan;
- implementation of a preventive policy with respect to ageing or obsolete equipment.

### Continued operation of the operating units well after 40 years

#### Additional Safety Assessments (ASA) following the Fukushima accident

On 15 September 2011 and in light of the accident at the Fukushima nuclear plant in Japan, EDF submitted 19 Additional Safety Assessment reports to the ASN, one for each of its nuclear sites, encompassing all its existing reactors and all those under construction.

These assessments consisted of re-examining the defences of existing power plants and those under construction, in light of the events in Japan, taking into account issues set out in the specifications drafted by the safety authorities. Thus, the safety margins were reassessed against the risks of earthquakes and flooding, when

dealing with situations of simultaneous loss of the cooling source and power supplies and the consequences of severe accidents. These assessments also led to inquire whether certain changes to the scenarios planned beyond situations used for the sizing of the protection systems, would lead to a worsening of the consequences in terms of safety (“cliff effects”) and finally to deterministically consider the extreme situations that substantially exceed those used in the design of nuclear installations and subsequent safety reviews. The safety of EDF's nuclear fleet is based on the principle of continuous improvement: existing and new facilities continuously benefit from feedback from all power plants, and lessons are learnt from incidents and accidents that may occur in the world.

Finally, the ASAs also re-examined the rules applied in outsourcing.

These analyses confirmed first and foremost the adequate level of security throughout the EDF nuclear power fleet, particularly because of the periodic safety reviews carried out in France since the end of the 1980s and codified by the Law on nuclear transparency and safety (the TSN Law) in June 2006, and codified later in the French Environmental Code. EDF also proposed additional measures to the ASN that exceed those considered for sizing safety systems, to contribute to further improving the current safety level of power plants.

In its opinion to the government published on 3 January 2012, the ASN states, on the basis of the analyses of its technical support, that “after the additional safety assessments on priority nuclear facilities, the ASN considers that the facilities examined show an adequate level of safety, and that it will not thus request the immediate shutdown of any of them”. At the same time, the ASN considers that “continuing to operate these facilities requires increasing their robustness, as soon as possible, to an extent beyond existing safety margins, to handle extreme situations”.

The ASN also recommended the “hard core” concept and the FARN system (see section 1.4.1.1.3 “Environment, nuclear safety, radiation protection”). The “hard core” will be made up of the plant's structures, systems and components that can withstand situations studied in connection with ASAs. On 26 June 2012, the ASN made 19 decisions requiring EDF to follow over 600 technical requirements, which set regulatory requirements according to the post-Fukushima action plan. These technical rules require that all nuclear sites must have an organisation and local crisis centres resistant to the occurrence of a large-scale event affecting several facilities. For EDF power plants, the prescribed “hard core” must in particular have “bunkerised” electrical resources in each unit, which must be installed before the end of 2018. In the meantime, a temporary back-up diesel generator was installed at each of the 58 units in 2013. The complete definition of the “hard core” was covered in technical rules issued by the ASN in January 2014.

#### Operating life of EDF's PWR fleet

The provisions of the French Environmental Code do not set a limit on operating life but require a review of facilities every ten years in light of applicable rules and updates of assessments of the risks facilities pose to protected interests, taking into account the state of the facilities, the experience gained during their operation, new developments in nuclear science, and rules applying to similar facilities (safety standards).

As part of the studies related to the third ten-year inspections of the 900MW series, in early July 2009 the ASN publicly stated that it had not identified a generic problem that called into question EDF's ability to control the safety of its 900MW reactors for up to 40 years. The ASN's general opinion is supplemented by a decision on each reactor.

EDF's industrial strategy is to operate the fleet beyond 40 years in the best conditions of safety and performance, particularly in view of the significant investment linked to the third ten-year inspections on the one hand and to post-Fukushima improvements on the other, but also to the energy needs of France. This target is consistent with trends observed around the world for reactors using similar technologies. To this end, EDF has implemented industrial and R&D action plans. Actions have been launched to renew the major components that can be renewed (see section 1.4.1.1.2. “Operation and technical performance of the nuclear fleet”), and solutions are being studied to demonstrate the capacity of non-replaceable equipment such as the confinement containment building and reactor vessels, to ensure their operation up to 60 years.

Concerning safety improvements required to extend the operating life of certain units beyond 40 years, the ASN indicated that following the meeting of the Expert Committee in April 2015 it would issue an initial position on the major strategic decisions of the safety review relating to the fourth series of ten-year inspections of the 900MW reactors and a final position in 2018-2019 on the "generic" phase of this review, the final authorisation for use beyond 40 years being made on a reactor-by-reactor basis. On 20 April 2016, the ASN sent a letter to EDF in which it defines its expectations to allow a potential operational extension of the 900MW French nuclear reactors. After reviewing the report submitted by EDF presenting its approach and its methodology to extend the use of the 34 reactors in question beyond 40 years, the ASN considered that EDF had adequately responded to safety issues and that its programme did not call for any comments in principle. However, the ASN asked EDF to complete its programme regarding several aspects, including the scope of control programme and the goals relating to improving investigations.

At a hearing on 8 November 2017 of the French National Assembly Committee on sustainable development, the President of the ASN confirmed that it would give its generic opinion in 2020 (not 2019) and issue its requirements opposable by and applicable to EDF in 2021.

An extension to the life of the current nuclear fleet would enable, whilst respecting the absolute priority of nuclear safety and as part of the multi-year energy programme (see section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet"), better use of the industrial base it represents and the spreading of the commissioning of new plants over time.

The decision on 1 January 2016 to extend the useful lives of the 900MW PWR series of power plants (excluding Fessenheim) from 40 to 50 years, enacted in June 2016 once all the relevant technical, economic and governance conditions had been met, forms part of the Group's industrial strategy to extend the operating life of the nuclear fleet in France to beyond 40 years. It is based on the technical capacity of the PWR 900MW fleet facilities to operate for at least 50 years, supported by international benchmarks, as well as by the investments made progressively under the Grand Carénage programme. These investments will enable the PWR 900MW series to reach a level of safety as close as possible to that of the EPR, and one of the highest internationally, after its fourth ten-year inspection (VD4). The content of the VD4 inspections is currently being progressively aligned in regard to the topics selected and commitments made by the Company, as indicated by the ASN's response regarding the guidelines for the review, addressed to EDF in April 2016. The ASN is expected to give a generic opinion in 2020. EDF is also taking into account additional ASN requests in terms of studies, inspections and works to be completed.

Moreover, the extension of the operating life of the 900MW units is compatible with the objectives of the multi-year energy programme, submitted for review on 30 June 2016 and adopted by the Decree published in the *Journal officiel* on 27 October 2016.

The accounting impacts of this decision are explained in section 6.1 "Consolidated financial statements at 31 December 2017", note 3.1 to the consolidated financial statements for the year ended 31 December 2017.

The accounting period of the other series of France's nuclear fleet (1,300MW and 1,450MW), which are more recent, currently remains at 40 years, because the conditions for an extension have not been met. The subsequent extension of the most recently installed reactors in the French nuclear fleet is at the heart of the Group's industrial strategy.

At end 2017, 30 of the 34 900MW units had passed their third ten-year inspections and one 900MW unit (Cruas 2) was to be shut down in preparation for its third ten-year inspection. Of these 11 (Fessenheim 1 & 2, Bugey 2, 4 & 5, Tricastin 1, 2 & 3, Dampierre 1 & 2 and Gravelines 1), completed the exchange of information with the ASN and received its opinions and requirements. For all reactors, EDF has or will carry out the work required by the ASN pursuant to these prescriptions.

#### 1.4.1.1.6 Decommissioning of nuclear power plants

EDF takes full regulatory, financial and technical responsibility for the decommissioning of its plants, the challenge being to demonstrate, through the decommissioning process, its control of the entire life cycle of the means of nuclear power generation.

The reference scenario adopted by EDF since 2001 is for decommissioning without a waiting period, consistent with French regulations, which provide for decommissioning "in as short a time as possible on acceptable economic terms and in line with the principles set out in Article L. 1333-2 of the French Public Health Code and Article L. 110-1 II of this Code" (see Article L. 593-25 of the French Environment Code).

The regulatory process for decommissioning is governed by the French Environment Code and Decree no. 2007-1557 of 2 November 2007 (see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities"). It is characterised, for a given site, by:

- a shutdown declaration at least two years prior to the planned shutdown date;
- a decommissioning request resulting, following examination by the authorities and a public inquiry, in a decree allowing for decommissioning;
- key progress reviews with the ASN, included in a safety reference system relative to dismantling;
- finally, once the work has been completed, the declassification of the facility to remove it from the legal regime governing basic nuclear facilities.

#### Decommissioning of shut down power plants

Concerning power plants that have been shut down (a pressurised water reactor (PWR), Chooz A; a heavy water reactor (HWR), Brennilis; a fast-neutron reactor (FNR), Creys-Malville; and six graphite-gas-moderated reactors (NUGG) in Bugey, Saint-Laurent and Chinon), EDF has chosen to fully decommission them as soon as possible in line with the principles of the French Public Health Code and the French Environment Code while ensuring that the technical risks associated with these activities are managed.

The sequencing of the dismantling of the NUGG reactors was thoroughly reviewed at the end of 2015 to reflect the results of the 2013-2015 pre-project studies, which show a significant prolongation of the operations to dismantle the caisson (about 25 years instead of 10 as originally planned), and the need to make the operation less risky by completely dismantling an initial series unit before dismantling the other 5 units. The new dismantling strategy was presented to the ASN's Audit Council in March 2016 and June 2017. At the ASN's request, a group of independent experts was commissioned to assess the robustness of the proposed dismantling whose chief features were not called into question. The update of the industrial scenario for the dismantling of first generation plants, in particular in regards to the NUGG reactors, had led to an increase in the provision of €590 million on 31 December 2015 (see note 29.1 to the consolidated financial statements at 31 December 2015).

The sites remain the property of EDF, and they will remain under its responsibility and monitoring.

Given its role as responsible operator, EDF will act as the contracting authority for the decommissioning.

The decommissioning of EDF's nine first-generation units in final shutdown will produce approximately one million tonnes of primary waste materials, of which 80% is standard waste material and none is High-Level Waste. The remaining 20% comprises Very-Low to Intermediate-Level Waste including about 2% Long-Lived Waste requiring the availability of a storage facility for ILW-LL and long-lived LLW-LL (Cigéo deep geological storage plan).

Existing means for removal of short-lived VLLW and LILW will be supplemented by:

- the project to build a packaging and intermediate storage facility for radioactive waste (*Installation de conditionnement et d'entreposage des déchets activés* – ICEDA), almost completed at the Bugey site. Industrial operations are expected to start in 2019;
- the LLW-LL storage centre provided for by the Law of 28 June 2006 concerning the long-term sustainable management of radioactive materials and waste. Following an unsuccessful initial site search by ANDRA in 2008, and the sending of a report to the government at end-2012, in 2013 ANDRA restarted the search and in July 2015 submitted a report on the feasibility of a storage facility on a site located in the Soulaines region in France (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues"). Moreover, the new dismantling schedule of the

NUGG plants foresees the construction of a storage facility for the LLW-LL liners of the silos at Saint-Laurent, pending the availability of a definitive disposal route.

The decommissioning of the Chooz A and Creys-Malville plants is still under way with the filling of the Chooz reactor pool and the first underwater cutting of the internal components of the reactor vessel, on schedule, and the filling of the Creys-Malville reactor vessel. Chooz A is a pressurised water reactor using a technology similar to the 58 units in operation, but of an older design. It was commissioned in 1967 and operated until 1991 (final ending date for power generation). The reactor location in a rocky cave in a hillside means that access conditions and entry and exit of materials are more difficult than those of the rest of the existing PWR fleet. After EDF chose to opt from 2001 for a strategy of decommissioning as quickly as possible (i.e. without any period of dedicated waiting time for radioactive decrease) and following adoption in 2007 of the Decree for complete decommissioning, such decommissioning was launched and is expected to come to an end by 2022, that is to say 15 years after it was authorised. This duration is the one prudently chosen by EDF for the decommissioning of the Pressurized Water Reactors.

Regarding Brennilis, pursuant to a 2008 agreement<sup>(1)</sup> with the CEA, EDF has become fully responsible for the decommissioning of this facility. The decommissioning work included in the scope of the original Decree is in progress with the demolition of the last section of the apron of the waste treatment plant. However, the final and complete dismantling work should be allowed by an additional decree that EDF applied for on 29 December 2011. In accordance with the opinion that the ASN had expressed, the Mission for Nuclear Security and Radiation Protection notified EDF in December 2012 that the request for authorisation for full decommissioning of Brennilis could not be pursued in its current state due to the cancellation of the ICEDA building permit (see section 2.4.1 "Legal proceedings concerning EDF"). The decision of the Administrative Court of Appeal in Lyon of 4 December 2014, by restoring the validity of the ICEDA building permit, led EDF to relaunch the study of a file on the complete dismantling of Brennilis, taking into consideration any new regulations arising since the creation of the previous file, in particular the application of the BNF regulations.

Regarding the six NUGG reactors, the updating of their dismantling schedule has yielded the following sequencing:

- implementation of a "de-risking" period before the "in-air" dismantling of the first caisson to address the risks identified in studies (additional characterisations, machinery tests based on models);
- realisation of an "in-air" dismantling of an initial series unit, followed by the realisation of a complete feedback procedure before engaging in the industrial dismantling of the other NUGG reactors;
- for the other caissons, work to develop a secure configuration after electromechanical dismantling and the dismantling of the peripheral buildings and structures (reactor buildings, pool hall, etc.) will be carried out for some in advance in regards to the previous scenario.

This new scenario forecasts an initial removal of the graphite from the first NUGG reactor by 2044 and pushes back the need for a disposal route for the other graphite waste to after 2070.

After the first hearing of the ASN's Audit Council in March 2016, the ASN in its follow-up letter of 29 July 2016 suggested an exchange of ideas around the matter. At the ASN's request, a Group of independent experts was appointed in the first quarter of 2017 to examine the solutions chosen by EDF to decommission its six NUGG reactors; EDF's measures were not called into question. A new hearing of the ASN's Audit Council was held in June 2017 on the basis of these conclusions and arguments submitted by EDF in March of that year. It concluded with a suggestion to hold another hearing, once EDF submits a detailed schedule of operations to be undertaken in the next 15 years as well as the results of numerous studies on the resistance of reactor structures over time.

EDF submitted documentation on strategy and secured configuration safety options as well as a detailed schedule of operations covering the 2017-2032 period in late December 2017. As a reminder, the industrial scenario for dismantling first-generation plants (in particular the NUGG reactors above) and the schedule for dismantling NUGG reactors were updated and modified respectively in 2015.

### Closure project of the Fessenheim plant

Article L. 311-5-5 of the French Energy Code introduced by Law 2015-992 ("energy transition law") caps the nuclear installed capacity in France at 63.2GW. The commissioning of the Flamanville EPR can therefore not take place before the closure of the two Fessenheim reactors in order to comply with that ceiling.

The early closure of the Fessenheim plant would give EDF the right to compensation, as recalled by the Constitutional Council in its decision of 13 August 2015, on the occasion of the review of the constitutionality of Energy transition for green growth Law of 17 August 2015.

Talks between EDF and the French government led to a draft memorandum setting out compensation principles that was approved by the European Commission under State aid rules.

At its meeting of 6 April 2017, EDF's Board of Directors took note of the irreversible and unavoidable closure of Fessenheim provided that:

- the revocation of the Fessenheim plant's operating permit takes effect only once the Flamanville 3 EPR comes into service;
- the closure of the Fessenheim plant is necessary to comply with the legal cap of 63.2GW with regard to both the revocation request and the commissioning date of the Flamanville 3 EPR.

In accordance with the law, the Board instructed EDF's Chairman & CEO to make the revocation request in line with the above conditions within the six months before the commissioning of the Flamanville 3 EPR. It also authorised the Chairman to sign the compensation memorandum negotiated with the French government and approved by the European Commission no later than the date on which the request is made.

The Board's decision, taken in accordance with Law 2015-992 of 17 August 2015 ("energy transition law"), secures EDF's corporate interests and will enable the firm to continue its business at the service of its customers in all circumstances.

The protocol provides for the following compensation for EDF:

- an initial fixed portion covering the advance costs to be committed after operation (expenses for personnel retraining, decommissioning, the Basic Nuclear Facilities (BNF) tax and for "post-operation"). This fixed portion is currently estimated at approximately €490 million, 20% of which would be paid in 2019 and 80% in 2021;
- a further, variable portion giving rise, where applicable, to subsequent payments reflecting EDF's shortfall up to 2041. This will be determined on the basis of market prices and EDF's 900MW generation volumes, without Fessenheim, as established over that period. EnBW, EDF's partner in the plant, will under certain conditions be entitled to a share of lost earnings in proportion to its contractual rights to the plant's generation capacity. For its part CNP decided to end its involvement in the partnership. Once EDF took note of CNP's decision the contract between the two firms ended on 31 December 2017. The additional variable portion will be paid where applicable in 2041 at the latest with interim payments payable to EDF between 2021 and 2041 at its request or at the French government's initiative;
- the Amended Budget Law no. 2016-1918 of 29 December 2016 opened a specific account in order to finance the compensation procedure between the French government and EDF relative to the early closure of the Fessenheim plant.

As a consequence, the Group's nuclear generation in 2019 will take the closure of Fessenheim into account.

(1) With this agreement the CEA has become fully responsible for the decommissioning of Phénix.

## Decommissioning costs

### EDF nuclear power plants

Since the beginning of operations at its power plants, EDF has made provisions to cover decommissioning operations, engineering, monitoring and maintenance of facilities, and site security (see section 6.1 "Consolidated financial statements at 31 December 2017", notes 29.1.3 and 29.1.5 to the consolidated financial statements for the year ended 31 December 2017). The aim of decommissioning is to return sites and land to a state suitable for industrial use.

EDF continues to reinforce its analyses through international intercomparisons while making sure to take account of certain elements that could distort direct comparisons such as differences in the estimate scopes or national and regulatory contexts.

The cost estimate for the dismantling of second-generation power plants (Gen II – PWR plants in operation) was revised in 2016 to take into account both the recommendations of the audit mandated by the DGEC (the French government's department for energy and climate change) on the decommissioning costs of PWRs, conducted between July 2014 and August 2015 on the basis of the "DA09" model, and the feedback gathered from the decommissioning of first-generation power plants (Gen I – in particular the Chooz A plant).

Reviewing these cost estimates consisted in implementing a detailed analytical process, identifying all the engineering, work, operation and waste treatment costs linked to future decommissioning of units currently operated. It resulted in figures based on detailed plant decommissioning feedbacks. This implemented process allowed to deepen the assessment of the costs specific to leading models and of the series and pooling impacts, those costs and impacts being indeed inherent to the size and the design of the fleet. The financial impact is described in note 29.1 to the consolidated financial statements at 31 December 2017.

The nature of main pooling and series effects selected when calculating the estimates are presented hereafter.

There are different types of pooling effects:

- some of them are linked to the affectation of common buildings and facilities to the operation of several reactors on a same location, and therefore these buildings and facilities will not have to be dismantled twice. Thus, structurally, the dismantling of a couple of reactors on a same location costs less than the dismantling of two single reactors on two different sites. In France, unlike in the other countries, there is no isolated reactor but locations with two, four and in one case six reactors;
- some costs are not higher if you dismantle 2 or 4 reactors on a same site. It is usually the case for surveillance costs and costs incurred by keeping the site in safe operating conditions;
- waste processing in centralised facilities (for example for the cutting of major components) is cheaper than multiple processing facilities on the dismantling sites.

There are mainly two types of series effects:

- a first effect comes from the fact that on a fleet driven by a single technology, a large amount of the studies does not need to be performed again each time;
- a second effect comes from the fact that on a fleet driven by a single technology, robots and tooling can be largely reused from one site to another.

Such series effects have the same nature than those observed during the construction of the fleet, in terms of studies or of components manufacturing plants.

As an example, for the 900MW fleet, a series effect of approximately 20% is expected on an average 2 units reactor in comparison to a 2 units leading model.

Due to series and pooling series effects in particular, a simple comparison of the average dismantling cost by reactor between the French fleet and other countries' nuclear fleet is not relevant.

However, figures include only very marginally the evolution of productivity and series effect. External audit conducted by the DGEC on the dismantling cost of the operating fleet had considered that series effect taken into account in the estimate was conservative.

The estimate also includes, by caution, an assessment on risks and uncertainties.

### Third-party facilities: La Hague (AREVA-Orano) and Phénix (CEA)

As the responsibility for the decommissioning of facilities is incumbent on their operator, EDF wished to free itself financially from these operations.

As such, the agreements signed with AREVA-Orano in July 2010 and the CEA in late 2008 clarified the financial responsibilities of the parties. Following a cash payment, EDF was released from any obligation to finance the decommissioning of the Phénix facilities, which have been shut down, and the La Hague plant.

#### 1.4.1.1.7 Assets available to cover long-term nuclear commitments (outside the operating cycle)

Dedicated assets have been gradually established 1999 to cover long-term nuclear commitments (see section 6.1 "EDF's "Consolidated financial statements", note 47.2 "Content and evaluation of dedicated assets" to the consolidated financial statements for the year ended 31 December 2017). Article L. 594 of the French Environment Code and its implementing regulation specified which liabilities are not associated with the operating cycle and must therefore be covered by dedicated assets (see section 6.1 "Consolidated financial statements at 31 December 2017", note 47.5 "Updated cost of long-term nuclear commitments" to the consolidated financial statements for the year ended 31 December 2017).

#### 1.4.1.2 New Nuclear projects

See also section 2.1.5 "Specific risks related to the Group's nuclear activities – Construction of EPRs may encounter problems meeting the implementation schedule or the budgetary envelope or not be completed".

##### 1.4.1.2.1 Organisation

EDF's DIPNN (New Nuclear Projects and Engineering Department) was reorganised in the second half of 2017 to clarify its engineering services.

Today the DIPNN consists of three project departments (Flamanville 3, EPR 2 and Ingénierie Hinkley Point C), an engineering centre (CNEPE), an engineering firm (Edvance) and four operating departments overseeing development, industry, project support and digital transformation, and technology. Engineering activities relating to new nuclear islands fall under Edvance, a subsidiary of EDF and Framatome, under the supervision of the DIPNN. These entities provide consulting services, project ownership engineering support services and project management engineering services to the Group and its partners in the nuclear industry.

Restructuring of the DIPNN is continuing in the interests of opening up to industrial partners and is speeding up in the area of digitization with a second restructuring cycle following on from the first.

##### 1.4.1.2.2 Update on the Flamanville EPR project

EDF SA is both the owner and manager of the Flamanville 3 EPR project (European Pressurized water Reactor) on the basis of its in-house engineering expertise.

#### Commissioning schedule and budget

The schedule announced in September 2015 and the interim dates announced in October 2017 were adhered to.

The next milestones are:

- "hot functional" testing: July 2018 target. It consists of testing equipment under similar temperature and pressure (300°C & 150 bars) as in operating conditions;
- fuel loading: target set at the end of the fourth quarter of 2018, then start-up of the reactor.

The connection of the Flamanville 3 EPR to the grid is then scheduled for the second quarter of 2019, and generation at full capacity, after a gradual ramping-up phase, for the fourth quarter of 2019.



In view of the measures taken by the project management team, construction costs have been kept to the budgeted €10.5 billion <sup>(1)</sup> excluding interim interest.

These tight budget and schedule are subject to the ASN administrative authorisation timeframe outlined below.

### **Interactions with the Nuclear Safety Authority (ASN)**

The examination of the application for the commissioning, submitted in March 2015, continues with the ASN. The three expert Committees mandated by the ASN help bring together all of the technical requirements the EPR must satisfy. At end 2017, 94% of the commissioning application had been examined. A group of permanent experts is scheduled to meet at the end of the first half of 2018 to give its opinion on whether or not to allow the commissioning of the facility.

The request for authorisation for a partial commissioning in order to allow the hot functional tests and the reception of fuel on site, are also being examined by the ASN.

In March 2017 EDF obtained another delay in commissioning Flamanville 3; this delay is now scheduled for April 2020. The permission to build Decree of 10 April 2007 had initially set the delay at 10 years.

### **Quality equipment manufacturing**

At the end of 2017, most of the equipment of the nuclear section, such as the conventional island, has been delivered and installed on site. Changes in the equipment quality situation for the primary cooling system manufactured by AREVA NP - Framatome are described below.

In the first half of 2017 the ASN examined higher-than expected carbon levels in the vessel head and bottom on the basis of documentation submitted by AREVA NP under the supervision of EDF. The documentation drew on more than 1,600 tests and measurements and was sent to the ASN at the end of 2016. Based on the opinion on 11 October 2017 of a group of experts appointed by it, the ASN considered the mechanical features of the vessel head and bottom to be up to requirements including in the event of an accident.

After the regulatory hydropower tests of the primary coolant system, scheduled to take place around the end of the first half of 2018, the ASN will decide on:

- the commissioning of the vessel bottom (contingent on appropriate checks);
- the commissioning of the vessel head whose lifespan will be limited to 2024 due to the current technical infeasibility of checks similar to the vessel bottom.

EDF is already working on developing new vessel head checks that meet the ASN's requirements and has given itself two years to study and demonstrate their industrial feasibility before going back to the ASN and asking it to look at keeping the current vessel head under the new checks.

The last of the Flamanville 3 equipment made at the Creusot forge was inspected in 2017:

- the positional deviation in the forging ingot used for the manufacture of a ferrule for a steam generator called for a series of tests on a sacrificial part. The tests began in early October 2017 under the supervision of a body appointed by the ASN and ended with results deemed satisfactory by AREVA NP, EDF and the ASN;
- the remaining cases – 95 instances of an anomaly (noncompliance of a part with contractual or regulatory requirements) and 16 instances of noncompliance (noncompliance of a contract with internal manufacturing requirements) – were definitively closed once AREVA NP provided technical evidence for the parts were fit for service which was validated in turn by EDF and independent bodies appointed by the ASN.

The technical evidence was collected during assembling and testing which did not lead to any delays in the overall schedule of the project.

Furthermore, on 30 November 2017, EDF declared a significant event to the Nuclear Safety Authority regarding the detection of a deviation in the quality of the welding in the pipes that transfer the steam from steam generators to the turbine at Flamanville 3 EPR.

The circuit that transfers the steam from the steam generators to the turbine of the Flamanville 3 EPR (main steam line) was designed and manufactured according to the "break preclusion concept". This approach consists in strengthening requirements for design, manufacture and monitoring in service. These strengthened requirements, requested by EDF, also involve a "high quality" requirement in the building of these circuits <sup>(2)</sup>.

However, these requirements were applied during the design phase but were not correctly specified to the suppliers. Consequently, the welding of the main steam lines was not completed in compliance with this high quality requirement, which led EDF to declare a significant event to the ASN. These pipes are nevertheless compliant with the nuclear pressure equipment regulations.

Following this declaration, the ASN wrote to EDF to initiate the inquiry into this deviation. EDF confirms that it has already initiated analyses and mechanical tests that have yielded satisfactory results, and that it has drafted the briefing memo needed for the inquiry into this deviation by the ASN. Finally, EDF is reviewing all additional measures that may be implemented to offset past deviations. All these items will be provided to the ASN within two months.

At the same time, the work on the facility is continuing in accordance with the schedule, but the inquiry into this matter by the ASN, along with other expected validations, may nevertheless affect the schedule.

(1) In 2015 euros.

(2) Once these requirements had been laid out, the assumption of a break in the piping during the safety demonstration did not need to be examined. The safety demonstration proves that accidents are physically impossible or extremely unlikely, or that the consequences are limited under acceptable economic conditions and with a high degree of confidence.

#### Progress of on site implementation

Work has entered the final phase. In 2017 new stages were reached:

- at end 2017 94% of electromechanical equipment was assembled. The last of the equipment will be assembled in the first half of 2018 after which it will be a matter of finishing off installations as the tests unfold;
- the testing milestones announced in September 2015 were reached on schedule followed by interim milestones announced in October 2017:
  - nuclear circuit cleaning, which consists of thoroughly rinsing the primary coolant system and marks the beginning of the system performance testing period. The flushing ran from 15 March 2017 to 2 August 2017,
  - "cold functional" testing which consists of running several tests including testing for leaks in the primary coolant system at a pressure of over 240 bars, higher than its operating pressure. These tests began on 18 December 2017 and ended on 6 January 2018 with the hydro testing of the primary coolant system.

Work is now focused on finishing off installations and speeding up testing. Finishing off the basic systems now consists of completing final assemblies, checks and unit tests before entering the hot functional testing phase. Finishing off the buildings consists of meeting the construction standards of power plants in operation (painting, filling, cleaning) before handing over to the EPR operational teams.

The second priority is to speed up testing in line with safety and quality standards and on schedule so as to be ready by the start date. EDF is optimising the series of system performance tests by means of an innovative project to digitize procedures and test data management first launched in early 2017 and now fully operational. The project draws on links with other EPRs being built around the world, in particular by sharing test results and by having test providers on temporary assignment operate between sites.

#### 1.4.1.2.3 Progress on other "New Nuclear" projects

##### 1.4.1.2.3.1 Hinkley Point C EPR

The final contracts regarding Hinkley Point C were signed on 29 September 2016 after the Final Investment Decision authorised by the EDF SA Board of Directors on 28 July 2016. HPC is owned by EDF (66.5%) and CGN (33.5%).

EDF also signed two other agreements with CGN concerning studies on two nuclear construction projects in the UK, Sizewell C and Bradwell B.

Nuclear New Build (NNB) will be the project owner.

See section 1.4.5.1.2.5 "Nuclear New Build Division".

##### 1.4.1.2.3.2 Taishan EPR

EDF owns 30% of TNPJVC (Taishan Nuclear Power Joint Venture Company Limited), which was set up to build and operate two EPR nuclear reactors in Taishan, in the province of Guangdong in China. CGN holds a 51% stake and Yudean a 19% stake.

In 2017, unit 1 passed several important milestones in the commissioning schedule, while multiple mass assemblies continued on unit 2. EDF continued to provide technical support to the Taishan project, while simultaneously incorporating feedback from these activities.

For unit 1, the main achievements in 2017 were as follows:

- in January 2017 the source changeover tests (excluding specific tests during hot functional testing) were completed;
- in March-August 2017, all tests required to validate hot functional testing were carried out;
- in April 2017, fuel was delivered on site and the containment building leak test was successfully carried out with the help of the General Technical Division ("DTG");

- in July 2017, the first turbine (nonnuclear steam) was launched during hot functional testing;
- in October 2017, the first fuel assemblies were put into the spent fuel pool;
- in the beginning of 2018, attention will turn to receiving permission to load the fuel from the Chinese nuclear safety regulator.

For unit 2, leak tests and the passivation of the reactor building pool took place in February 2017.

The Taishan EPR project will continue in 2018 with the end of startup testing for unit 1 and the last of the assemblies for unit 2 with the aim of completing all system performance testing before the end of the year.

CGN, the majority shareholder, announced on 9 March 2018 that the commercial operations of Taishan first reactor were not expected to start before the end of 2018.

##### 1.4.1.2.3.3 New Model EPR

In 2017 the work undertaken by EDF and AREVA NP-Framatome on the New Model EPR project led to the finalising of the technical configuration intended to play a role in the renewal of the nuclear fleet currently operating in France and ultimately to expand the French nuclear industry's export offers.

This "EPR2" technical configuration integrated feedback from EPR projects currently underway, especially in terms of constructability and industrialisation. It was drawn up with the aim of reducing the risk profile of the first pair of units (FOAK or "First Of A Kind" risk). It will also benefit from exchanges with nuclear safety regulators as part of the ASN's examination of the Security Options File ("Dossier d'options de sûreté") submitted to it in 2017.

It confirms three aspects of the model's competitiveness:

- the incorporation, long before the reactor development phase, of industrial aspects to take full advantage of the nuclear sector's industrial base;
- the transformation of the methods and tools to enhance the effectiveness of the engineering teams and the control of the management of the technical configuration of the reactor during the different phases of its development;
- the optimisation of some of the EPR's technical options.

##### 1.4.1.2.3.4 Creation of Edvance

In accordance with the memorandum signed by EDF and AREVA SA on 30 July 2015, a dedicated company owned 80% by EDF and 20% by AREVA NP (now Framatome) grouping together the activities of EDF and Framatome in the field of new nuclear islands was set up to optimise the design and construction of nuclear islands and the command-control of new projects in France and abroad.

Edvance seeks to set a global standard in nuclear engineering, to help improve the French nuclear industry competitiveness, to make new nuclear build projects more efficient and more tightly executed and thereby safer, to keep up the critical expertise of the New Nuclear industry, and to support the international development of the nuclear industry and the domestic renewal of the French nuclear fleet.

Since its operational launch on 1 July 2017, Edvance has contributed to the design of the new EPR2 reactor that will replace existing reactors in France, and in 2018 it will contribute to Flamanville 3, HPC and international projects.

Edvance's development strategy is divided into two main phases: in 2018 take over the activities from certain business lines under EDF (CNEN (National Nuclear Equipment Centre), SEPTEN (Thermal and Nuclear Studies and Projects Service) and CEIDRE (Centre for Expertise and Inspection in the Areas of Construction and Operation)), Sofinel and Framatome (with staff made available), and over two years embark on a transforming in order to live up to its ambition and build its own unique corporate culture.

##### 1.4.1.2.4 SWITCH (the digital transformation of nuclear engineering)

Launched in July 2017, the four-year programme feeds into EDF's CAP 2030 strategy, under sections related to managing current new nuclear projects, extending the operating life of the fleet in operation, expanding abroad and embracing digital transformation. It is a multifunctional programme involving EDF's engineering expertise and the UK arm of Nuclear New Build as well as Framatome.

The programme seeks to mark a turning point in engineering by:

- transform and simplify processes and methods to better grasp the complexity of big industrial projects throughout their life cycle by applying systems engineering standards, among other methods;
- digitize processes using a data-centric approach based on an integrated, collaborative and industrial high-performance information system within an extended enterprise model.

Accordingly a call for tenders was issued at the end of 2017 to find a digital partner (software publisher and systems integrator) able to work on PLM (Plant Life Management) tools from 2018 and thereby support the digital transformation.

### 1.4.1.3 Framatome

In accordance with the non-binding memorandum of understanding signed between EDF and AREVA SA on 30 July 2015 and updated on 28 July 2016, on 31 December 2017 EDF acquired 75.5% of the capital and voting rights of New NP, an entity spun out of the AREVA group and combining activities relating to nuclear reactor and equipment design and manufacturing, fuel assemblies and installed base services.

The adjusted value of 100% of New NP equity was €2.47 billion excluding debt, equivalent to a forecast EBITDA multiple of 8x<sup>(1)</sup>. This figure may be adjusted upwards or downwards depending on the definitive financial statements at 31 December 2017 on which date the transaction will come into effect. Depending on whether certain performance targets measured after the effective transaction date are reached, a potential price earn-out of up to €245 million may also come into play.

The contracts for the EPR Olkiluoto 3 project and the resources required to complete the project, as well as certain contracts relating to components forged in Le Creusot plant, will stay within AREVA NP, in AREVA SA's scope.

This signature took place following the positive opinion issued by the ASN on the commissioning of the Flamanville 3 EPR vessel. This follows on from the implementation and satisfactory conclusions of the quality audits carried out in the plants at Le Creusot, Saint-Marcel and Jeumont concerning contracts taken over by Framatome. For these contracts, in any case, EDF remains guaranteed by AREVA SA against residual risk resulting from these audits.

Mitsubishi Heavy Industries LTD (MHI) and Assystem took equity stakes of 19.5% and 5% respectively on the effective date of the transaction between EDF and AREVA, i.e. 31 December 2017.

#### **New NP renamed Framatome in January 2018.**

Framatome is an SAS (simplified limited company) with a Management Board (comprising the Executive Chairman and the General Director of Framatome) and a Supervisory Board (comprising in view of the current shareholding of eight members nominated by EDF including the Board's Chairman, three Framatome employee representatives, two independent members, one representative of MHI, and one representative of the French government). Within and subject to the powers assigned to the partners, the Supervisory Board oversees the running of Framatome by the Management Board and its Executive Committee. Decisions by the Supervisory Board are taken by a simple majority of its members except for certain decisions requiring the affirmative vote of at least one EDF member, one MHI member and one independent member.

### Framatome's activities

The main activities of the newly constituted Framatome group are:

- an industrial business consisting of designing, manufacturing and installing nuclear power plant components for the existing fleet, for instance as part of managing large new reactor projects;
- a service business aimed at improving the availability and competitiveness of nuclear facilities while enhancing the safety conditions of boilers by means among other things of instrumentation and control systems;
- a fuel assembly manufacturing business serving electricity companies and some research reactors.

These businesses are run *via* six business units located in France, Germany and the United States:

- the Engineering Design Authority unit develops, designs, certifies and licenses boilers and provides related services;
- the Large Projects unit manages and undertakes the building of new nuclear reactors from engineering to commissioning;
- the Installed Base unit provides maintenance and engineering services to existing nuclear fleets and those under construction;
- the Fuel unit develops, designs, licenses and manufactures fuel assemblies and components for PWRs, BWRs and research reactors and makes zirconium products;
- the Components unit designs and manufactures heavy and mobile nuclear power plant components;
- the Instrumentation & Control unit designs and manufactures systems for the safety of boilers in operation and new reactors.

EDF was a big customer of Framatome before the acquisition that took effect on 31 December 2017 and will remain so afterwards.

The EDF group turns to Framatome to manufacture its fuel assemblies and to maintain its power plants and purchase and install relevant equipment such as steam generators.

Framatome also supplies boilers and instrumentation and control systems to EDF, from study to commissioning, for new reactors under construction, namely the Flamanville 3 and Hinkley Point C EPRs.

### 1.4.1.4 Thermal generation in mainland France

EDF's electricity generation from its thermal power plants in mainland France represented approximately 3.8% of its total electricity generation in 2017. During the same period, this fleet had a total installed operating capacity of 6,210MW.

Thermal generation assets have a number of advantages: they are very responsive and flexible (quick to start up and power can be modulated), and they have relatively low investment costs and short construction times.

Thermal generation assets are one of the key components of the energy mix to ensure the balance of generation and consumption in real time by accommodating fluctuations in electricity consumption and renewable energy generation (sun and wind power in particular). Together with some hydropower facilities (lakes, pumped storage plants), they are used to meet mid-merit and peak demand electricity requirements. They also help to regulate the system and thereby contribute to maintaining suitable voltage and frequency levels across the grid.

(1) Normalised pro forma EBITDA for the acquired activities, excluding major projects.

#### 1.4.1.4.1 EDF's thermal generation

At 31 December 2017, the thermal generation facilities operated by EDF were of different types, both in terms of fuel and power:

Fuel	Unit capacity (in MW)	Number of units in operation at 31/12/2017	Total capacity (in MW)	Year commissioned	Output (in TWh)	
					At 31/12/2017	At 31/12/2016
Coal	580	3	1,740	1983 and 1984	6.1	4.1
Fuel oil	685	1	685	1976	0.5	0.3
	85	4	340	1980 and 1981		
Fuel oil and dual-fuel combustion turbines (gas and fuel oil)	203	1	203	1992		
	134	1	134	1996		
	125-129	2	254	1998 and 2007		
	185	2	370	2010		
	179-182	3	542	2008 and 2009	0.5	0.5
	427	1	427	2011		
Combined Cycle Gas Turbine	465	2	930	2012 and 2013		
	585*	1	585	2016	9.0	7.0

\* Following capacity increase tests conducted with General Electric, the capacity is now 585MW in line with the prefectural order in force.

#### 1.4.1.4.2 Issues relating to thermal generation

##### A renovated coal fleet to meet mid-merit demand and a cofiring study to reduce the share of coal

After having closed, between 2013 and 2015, ten coal-fired units, EDF retains one coal power plant, consisting of three generation plants based on recent technology and located in Le Havre (1 unit) and Cordemais (2 units). A renovation programme for these coal-fired units was completed between 2014 and 2016 in order to improve their reliability and efficiency.

The power and flexibility of the coal units are essential advantages. They are equipped with flue gas desulphurisation and denitrification systems (90% reduction in sulphur dioxide emissions and 80% reduction in nitrogen oxide emissions) as well as dust collectors that trap virtually all the dust. These treatments allow the units to meet environmental regulatory requirements in force since 2016.

A coal and green biomass cofiring project was also initiated in 2016. A coal and biomass cofiring test carried out at Cordemais in February 2016 demonstrated the technical capacity of a boiler to grind, pulverize and burn biomass (20%) with lowering its technical performance. Studies continued in 2017 and a plant residue densification pilot is being set up. It will carry out its first tests in 2018.

EDF advocates a minimum CO<sub>2</sub> price to limit the use of existing coal-fired power plants and is continuing its efforts to replace some of its coal-fired power plants with biomass. More generally, the Group is working to optimise the performance of all of its thermal fleet.

##### Winding down of the oil-fired fleet

EDF decided to permanently shut down the Aramon thermal plant on 1 April 2016 and the Porcheville and Cordemais unit 2 thermal plants in the spring of 2017 as they had been scarcely used over the past number of years.

EDF also decided to permanently shut down the last oil-fired unit (Cordemais 3) in the spring of 2018.

##### Modernising the thermal generation fleet with natural gas combined cycle turbines

EDF commissioned the first Combined Cycle Gas Turbine (CCGT) plant in France at Blénod in 2011, then two CCGT plants at Martigues in 2012 and 2013 followed by a next-generation CCGT plant at Bouchain in 2016 in partnership with General Electric. This modernisation of the thermal generation fleet reduces its atmospheric emissions of CO<sub>2</sub>, nitrogen oxides and sulphur oxides.

The CCGTs in Martigues are the result of the repowering of former oil-fired units, a part of whose facilities, such as the steam turbine, the condenser and the water treatment facilities, were reused. The repowering of a unit of this capacity is a first in Europe. The installed capacity of the Martigues site is 930MW and the return is over 50%, markedly higher than the return from coal-fired thermal units, for example.

The CCGT plant at Bouchain is equipped with General Electric's new high-capacity "9HA" turbine. The innovative 9HA CCGT delivers improved capacity (600MW achievable in under 30 minutes) and return (over 60%, versus an average return for a standard CCGT of 57-58%) and offers good environmental performance with CO<sub>2</sub> emissions of around 360g/KWh on average, one-third of those of the old neighbouring coal-fired plant shut down in 2015. Under specific operating conditions it generated a record return of 62.22%. As a prototype it underwent testing from when it was commissioned in the spring of 2016 to when ownership was transferred from General Electric to EDF in December 2017.

##### Evolution of the environmental regulatory framework

Today, EDF's thermal power plants are operated within the context of regulations that apply to installations classified for environmental protection purposes (*Installations classées pour la protection de l'environnement* – ICPE), as well as regulations relating to greenhouse gas emissions and a specific regulation for air quality (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety"). EDF set itself the goal of cutting CO<sub>2</sub> emissions in mainland France by 30% (measured in tonnes) between 1990 and 2020 and to maintain SO<sub>x</sub>, NO<sub>x</sub> and dust emissions at 2016 levels (one-tenth, one-third and one-seventeenth of 2005 levels) (see section 1.5 "Legislative and regulatory environment").

Thanks to the shutdown of the oldest thermal power plants, the updating of the most recent plants, the setup of pollution-reducing procedures, the use of low sulphur fuel<sup>(1)</sup> and the commissioning of natural gas combined cycle turbines, the environmental performance of the thermal fleet in mainland France has improved significantly:

- total CO<sub>2</sub> emissions of the EDF SA fleet in mainland France in 2017 came to 9.5 million tonnes<sup>(2)</sup>, thereby confirming the alleviation of the carbon footprint with CO<sub>2</sub> emissions down by over 50% since 1990 despite more intensive operations than in the past three years. The amount of CO<sub>2</sub> per thermal kWh has fallen by over 30% since 1990;

(1) The oil-fired units use fuel with an ultra-low sulphur content (less than 0.4% sulphur).

(2) Within the Company's scope (EDF SA – including IES excluding PEI), total emissions amounted to 10.7 million tonnes in 2017.

- the 2020 target reductions of NO<sub>x</sub>, SO<sub>x</sub> and dust emissions have already been reached thanks to the closure of the oldest coal-fired units (finalised in 2015), the closure of most oil-fired units and the growing share of CCGT plants in thermal generation.

#### 1.4.1.4.3 Generation and technical performance

Thermal generation in 2017 amounted to 16.1TWh with a sustained operation and by late October had exceeded generation for the whole of 2016.

In 2017, coal units supplied 6.1TWh, CCGT plants supplied 9.0TWh, oil-fired units 462GWh and combustion turbines 530GWh. In its first full operating year the Bouchain CCGT plant generated 3.0TWh and beat the Blénod CCGT plant's 2016 record with more than 6,500 operating hours. Several units broke their 2016 operating records: for instance Montereau cofiring turbine no. 5 reached 113 operating hours and the two Martigues CCG turbines generated 4.1TWh. Minimising unplanned outages is the essential aim for facilities such as thermal plants, used for mid-merit and peak generation. Minimising unplanned outages is the essential aim for facilities such as thermal plants, used for mid-merit and peak generation. The priority for these means of generation required on a variable basis all year round is to ensure system security by ensuring maximum reliability and availability.

The reliability of the thermal fleet was confirmed in 2017 and meets European standards. The fleet's adaptability to a substantially higher level of operation than initially planned was demonstrated. During the cold snap of January 2017 the thermal fleet came through. It reached record levels of 7,630MW on the morning of 20 January and 7,780MW on the evening of 25 January with a maximum potential generation of 8,590MW and all means of generation on the grid. The response rate achieved by combustion turbines to requests from optimisation services and from RTE was very good. In a tense balance between supply and demand, the combustion turbines fully played their role in maintaining the system's safety.

#### Decommissioning of shutdown units

EDF has planned all of the decommissioning operations on its thermal fleet units which were shut down or whose shutdown is scheduled. The provisions for these

operations have been made in an amount that corresponds to the cost of decommissioning all of the units being operated and the clean-up of the sites (see section 6.1 "Consolidated financial statements at 31 December 2017", note 30 to the consolidated financial statements for the year ended 31 December 2017).

In 2017, EDF continued the decommissioning work on sites that have been definitively shut down. In particular Richemont units 1, 2 and 3 (blast furnace gas) were successfully demolished by semi-caving in June.

#### 1.4.1.5 Renewable energy generation

Renewable energy<sup>(1)</sup> (hydropower, wind, solar, biomass, geothermal, marine etc.) has seen robust growth worldwide.

Hydropower is the number one renewable energy in the world, with an estimated combined installed capacity of 1.26TW in 2017<sup>(2)</sup>. It has significant prospects for development in certain regions, even though it is close to its maximum operating potential in many developed countries. According to the IEA, from 2018 to 2022, hydropower is expected to account for about 13% of new capacity.

The combined installed onshore wind capacity is expected to be 500GW worldwide at the end of 2017, with more than 170GW in China. In 2017, it is estimated that 48GW of wind energy was commissioned worldwide including around 19GW in China<sup>(3)</sup>.

In solar photovoltaic power, total global installed capacity is expected to be 380GWc at the end of 2017, of which around 78GWc from new capacity built in 2017<sup>(4)</sup>. Today, it is largely wind, solar and biomass that are driving growth in renewable energy.

The EDF group is now the leading producer of renewable energies in Europe and specifically the leading supplier of hydropower in the European Union; hydropower generation represents the Group's most important renewable energy, with an installed capacity of 23GW and 301<sup>(5)</sup> large dams in the world. The Group plays a role in the rise of competitive sectors, particularly wind and solar.

(1) Renewable, or "green" energies, are derived from natural resources that are replenished quickly enough to be considered non-depletable in human terms.

(2) Source: International Renewable Energy Agency (IRENA), Capacity Statistics 2017.

(3) Source: Bloomberg New Energy Finance.

(4) Source: Bloomberg New Energy Finance.

(5) Regarding the French classification (décret 2015-526) relating to class A and B dams (with an height exceeding 10 meters). Number of dams in gross, regardless of the equity interest of EDF group in these dams. Number of dams in net: 270.

# 1. PRESENTATION OF EDF GROUP

## Description of the Group's activities

Since 2015, the Renewable Energy Division manages and promotes the EDF group's renewable energy activities, namely hydropower and the renewable generation activities. This Division also oversees all renewable projects (wind, solar, marine etc.) undertaken by the Group, including those run by the foreign subsidiaries.

The EDF group's commitments in terms of developing renewable energy are described in section 3.1.2 "Corporate Social Responsibility Goals".

### NET GROUP CAPACITY\* IN RENEWABLE ENERGY AT END 2017

<i>(in MW)</i>	Hydropower	Wind	Photovoltaic	Biomass	Geothermal	Marine	Total
France	20,319	1,130	239	232	8	240	22,169
Europe excl. France	2,055	2,387	99	10	-	-	4,551
America	-	3,551	646	40	-	-	4,237
Asia	428	168	81	-	-	-	677
Africa	-	372	99	-	-	-	471
<b>TOTAL NET CAPACITY</b>	<b>22,802</b>	<b>7,609</b>	<b>1,164</b>	<b>282</b>	<b>8</b>	<b>240</b>	<b>32,105</b>

\* Power generation capacity, in proportion of the share the EDF group held in each asset.

#### 1.4.1.5.1 Hydropower generation in France

The electricity generated by EDF from its fleet of hydropower plants in mainland France in 2017 (including pumped storage) totalled 37.1TWh, 8.5% of its total electricity output.

##### 1.4.1.5.1.1 EDF's hydropower generation fleet

EDF's hydropower fleet in mainland France comprised 433 plants at the end of 2017 with an average age of 73 years <sup>(1)</sup>:

- approximately 11% of these plants have a unit capacity above 100MW. They account for around 63% of total generation;
- approximately 51% of these plants have a unit capacity under 12MW. They account for around 6% of total generation.

	31/12/2017	31/12/2016
<b>Hydropower plants with capacity lower than or equal to 12MW</b>		
Maximum capacity <i>(in MW)</i>	989.7	990.2
Net pumping output <i>(in TWh)</i>	2.1	2.5
Consumption by pumping operations <i>(in GWh)</i>	23.5	48.5
Output including pumping <i>(in TWh)</i>	2.1	2.6
<b>Hydropower plants with capacity greater than 12MW</b>		
Maximum capacity <i>(in MW)</i>	19,017.0	18,965.8
Net pumping output <i>(in TWh)</i>	28.0	33.3
Consumption by pumping operations <i>(in TWh)</i>	7.0	6.6
Output including pumping <i>(in TWh)</i>	35.0	39.9
<b>TOTAL MAXIMUM CAPACITY <i>(in GW)</i></b>	<b>20.0</b>	<b>20.0</b>
<b>TOTAL NET PUMPING OUTPUT * <i>(in TWh)</i></b>	<b>30.1</b>	<b>35.8</b>
<b>TOTAL OUTPUT INCLUDING PUMPING * <i>(in TWh)</i></b>	<b>37.1</b>	<b>42.4</b>

\* Corresponds to the sum of the exact values rounded to one decimal place.

Within mainland France, hydropower plants are mainly located in mountainous areas in the Pyrenees, the Alps, the Massif Central and the Jura, as well as on the Rhine. In all, they represent an installed capacity of approximately 20GW (excluding French overseas departments and Corsica), or 21% of EDF's fleet, for an annual generation capability of around 40TWh.

The various hydropower facilities are designed to optimise the use of water resources in the valleys where they are situated. Given the size and variety of its fleet, EDF has facilities able to respond to all types of desired uses, from base to peak generation, and which also offer levers for optimisation due to their flexibility: "run-of-river" plants, like the ones on the Rhine, which have no storage capacity and generate electricity depending on the available water flow; plants with

pondage, thus accessing average-sized reservoirs (smaller than lakes) for occasional use during the week or during the day, to cover peaks in demand; lake plants (seasonal reservoirs) located in mountainous areas (Alps, Massif Central and Pyrenees); pumped-storage plants (commonly known in France as STEPs, from their French acronym), which pump water from a lower reservoir to an upper reservoir during periods of low demand when electricity is also lower in cost, in order to build up reserves used to generate energy at peak times (by releasing the stored water through turbines from the upper reservoir to the lower reservoir); and a tidal power plant on the river Rance which, using the up and down movement of the tides, provides a very regular supply of electricity.

(1) Arithmetic mean.

Category	Capacity	Average generation capability over 50 years
Run-of-river	3.6GW	17.2TWh
Lake-supplied	8.9GW	15.8TWh
Pondage	3.1GW	8.8TWh
Pumped-storage	4.2GW	1.1TWh
Tidal	240MW	0.5TWh

#### 1.4.1.5.1.2 Hydropower safety

Hydropower safety comprises all the measures taken when designing and operating hydropower plants to reduce risks and hazards to people and property associated with water and the presence or operation of facilities. Hydropower safety is a constant concern of the highest priority for plant operators (see section 2.2.2.4.2 "The hydropower field"). It involves three main activities:

- the management of operational risks, by providing information to users (communication campaigns, information of the employees operating on waterways, hiring "hydro-guides" during the summer months) about changes to water levels or flow fluctuations in downstream waterways;
- the management of facilities during periods of exceptionally high water levels, in order to ensure safety at the facilities and for the surrounding communities;
- measures to address the major risk associated with dam or reservoir failures, through the regular monitoring and maintenance of facilities under the supervision of public authorities, mainly the French regional environment, land use and housing authorities (*Directions Régionales de l'Environnement, de l'Aménagement et du Logement – DREAL*). Among the largest dams, 68 are subject to a specific administrative procedure (*plan particulier d'intervention – PPI*) implemented by the relevant prefectural authority.

EDF performs regular monitoring and maintenance of dams, in particular by means of continuous structural health assessments.

In addition, a safety review is carried out every ten years on each of the 150 large dams, which includes a complete assessment made using underwater equipment or by emptying the reservoir. These operations are carried out under the supervision of public authorities (the DREAL office at the regional level as well as the *Service technique de l'énergie électrique des grands barrages et de l'hydraulique*, and STEEGBH, the central French government agency specifically responsible for large dams and hydropower facilities).

Moreover, comprehensive safety studies are a statutory requirement for the owner or operator of a dam: as such EDF, which has 240 hazard studies covering all works subject to this requirement, delivered in 2017 to the Control Department of the French Government the update of five hazard studies and conducted 145 of the 156 safety reviews scheduled by 2018. They consolidate a satisfactory<sup>(1)</sup> overview of the structures and associated countermeasures.

In 2017, the hydropower safety of EDF's fleet remained satisfactory with one hydropower safety incident (EISH) classified as "orange" (an incident that placed people in danger within the meaning of the Decree dated 21 May 2010). 11 EISH classified as "yellow" (incidents reflecting non-compliance without putting anyone in danger) were recorded this year. The key indicators are still at good levels:

- detection of significant (nonserious) events (ESSH level 0) by the local teams increased with 3,613 events detected (vs 3,391 in 2016);
- the number of incidents with external effects (ESSH level ≥ 1) is low: 32 incidents took place;
- the number of sites downstream of facilities with high sensitivity to risks related to variations in water flow fell from 114 in 2005 to 12 in 2016 and 2017;
- the management of hydropower facilities was properly handled during the floods that occurred this year.

Control of risks associated with the facilities ageing is a major concern in hydropower safety and has been strengthened, and the long-term maintenance policy was updated in 2012. With close to €600 million invested in hydropower

safety between 2012 and 2017, EDF devoted a significant portion of its maintenance budget thereto.

Since 2006, the engineering programmes for the safety and performance components of the hydropower fleet in operation have continued with a high level of investment, ensuring the careful management of major safety-related activities and providing them with national visibility. The goal is the technical updating and improved maintenance of the facilities, in order to maintain a high level of hydropower safety and preserve the technical performance of the fleet over the long-term. At the end of 2017, 486 specific systems and measures<sup>(2)</sup> were being carried out, down from 2016, and were being monitored in five priority facility groups, namely galleries, pipes, dams, penstocks and floodgates.

#### 1.4.1.5.1.3 Performance of the hydropower generation fleet

##### A highly-automated and remotely-managed fleet

In order to take advantage of the flexibility of its hydropower generation facilities, for some years now EDF has been initiating ambitious programmes involving automation, remote control of hydropower plants and centralised management of the valleys. Currently, the largest plants in EDF's hydropower fleet, representing over 15GW (around 75% of its installed hydropower capacity) are remote-controlled from four control centres able to make adjustments to the plants' operating programmes at any time in order to respond to the needs of the electrical system and to economic opportunities arising on the electricity market.

In order to improve their reliability EDF connected the largest power plants to five regional operating centres in charge of overseeing the physical settings of machines, such as temperature and vibration, allowing any deviations to be detected as early as possible and thus avoid incidents.

##### Technical performance of the fleet and hydropower conditions in 2017

Hydropower generation may witness substantial variations from one year to the next, depending on climatic fluctuations in water resources. Hydropower generation in 2017 fell due to highly unfavourable hydrological conditions with some of the driest months on record.

Hydropower electricity generation before the deduction of the power needed to operate pumped-storage plants was 37.1TWh in mainland France and 30.1TWh net of consumption by pumped storage.

The 2017 generation indicators show a highly satisfactory level of performance with a historically low rate of internal loss<sup>(3)</sup> of 3.5% (4.5% in 2016). The overall availability of the hydropower fleet, i.e. the percentage of time over the year during which the power plants are available at full capacity, was 99.31% in 2016 compared with 99.32% in 2016. Unavailability of EDF's hydropower fleet is 15.1% for servicing and maintenance work on the assets (planned unavailability) done during maintenance of facilities, and 2.3% for extensions of work and breakdowns (unplanned unavailability).

In 2011 EDF also began an ambitious modernisation project to improve the industrial performance of its hydropower fleet for an overall amount of €<sub>2016</sub>840 million by 2021. This project, known as "RenouvEau", aims to modernise the maintenance and operation of the hydropower fleet, specifically via the renovation of electrical facilities, control monitoring and computerised management, maintenance and operating tools, in order to improve the security, operating performance and competitiveness of the hydropower fleet. The full roll-out of the project will end before 2020.

(1) For further details, see the 2016 report of the Inspector of Hydropower Safety, available on EDF's website.

(2) A specific system or measure is a temporary measure to prepare an acceptable level of security, performance and individual safety.

(3) Internal loss is the energy from flows that do not pass through turbines which were not stored. The rate of internal loss is obtained by dividing the internal loss by the generation performed during the year, and then adding the internal loss.

#### 1.5.1.4.1.4 Hydropower generation issues

The hydropower segment is currently working on implementing Law 2015-992 ("energy transition law"), managing access to water and development.

##### Concessions renewal

Hydropower generation facilities are operated through concessions granted by the State for facilities exceeding or equal to 4.5MW and under prefectural authorisation for facilities under 4.5MW (see section 1.5.6.2.4 "Regulations applicable to hydropower facilities").

EDF currently holds the majority of the hydropower concessions in France. Concessions have an initial term of 75 years, pursuant to the French Law of 16 October 1919 relating to hydropower use. The majority of concessions expired before 2012 were renewed for terms of 30 to 50 years. The French government has however not yet renewed 12 concessions that have expired. Since their expiry these concessions have fallen under the "rolling delay" situation defined by Article L. 521-16 par. 3 of the French Energy Code as when a concession that has expired but not been renewed *is extended under its former conditions until such time as a new concession is granted* so as to ensure the continuity of operations in the meantime.

The Law on the Energy Transition for Green Growth of 17 August 2015 and the Decree of 27 April 2016 concerning hydropower concessions set down a new statutory and regulatory framework in which hydropower is included.

A set of legal texts supplements this framework concerning the attribution and/or performance of hydropower concession contracts: for example, the Order of 29 January 2016 relating to concession contracts and its implementing Decree of 1 February 2016, which define together the general framework for competitive bidding, the Decree of 27 May 2016 relating to purchase obligations and additional compensation, which may apply to certain hydropower facilities, the Orders of 3 August 2016 relating to the environmental assessment of projects and procedures for information of the public and public participation, the Law of 7 October 2016 for a Digital Republic, etc. (see section 1.5 "Legislative and regulatory environment").

Under the current regulation, the former concession holder does not receive any compensation if an expiring concession is not renewed. Article L. 521-15 of the French Energy Code enacted by the amended Finance Act for 2006 provides for the reimbursement of unamortised expenses related to modernisation works or to works that enable the expansion of generation capability, provided that these works were carried out during the second half of the term of the concession. However, if a concession is terminated by anticipation by the French government, the operator receives compensation. This compensation from the government is intended to offset the shortfall for the outgoing operator due to the early termination of the operation of the concession, as provided by the concession specifications.

In this context, for some years EDF has prepared itself to submit its best offer for each concession, combining improved energy efficiency, attention to aquatic environments, compensation of the government and municipalities through fees and regional development, while ensuring the safety and security of operations.

The European Commission (EC) initiated proceedings against the French State regarding hydropower concessions in France, based on Article 106 § 1 of the Treaty on the Functioning of the European Union (TFEU) read in conjunction with Article 102 of the same treaty. The European Commission therefore sent a formal notice to the French State on 22 October 2015, stating that it considered the fact that most hydropower concessions in France are attributed to and reserved for EDF as a violation of the above articles, since these measures reinforce EDF's dominant position on the French retail electricity markets. The State replied to this notice, which marked the beginning of an adversarial exchange of positions between the State and the EC, without prejudice to the final outcome. As the chief interested party, EDF received a copy of the formal notice and sent its observations to the EC on 4 January 2016, firmly contesting the EC's analysis and the grounds for this analysis. EDF has since been involved in certain exchanges between the French State and the EC, particularly to provide technical details on the operation of the French

market, and thus advance towards an agreement. These exchanges should continue in 2018 until the EC closes the file. There is a risk that an agreement will be reached to set up a competitive tender process (see section 2.1.2 "Risks associated with the Group's activities").

In accordance with Article L. 521-16-3 of the French Energy Code introduced by Law 2015-992 ("energy transition law"), the French government submitted an energy transition investment package to the European Commission in exchange for the extension of certain concessions held by EDF. The European Commission is due to rule on the compatibility of such an extension with European law, in particular Article 43 of Directive 2014/23/EU of 26 February 2014 on the award of concession contracts which limits the extent to which an active concession can be modified.

##### Managing access to water

Water reservoirs held by EDF's 239 large dams in France enable the storage of 7.5 billion cubic metres of water, corresponding to 75% of national surface storage reserves.

The hydropower facilities have positive effects on both economic development and the environment, and EDF applies a proactive management policy in relation to water resources, in liaison with various water stakeholders. Agreements are entered into with local elected officials, farmers, fishermen, managers of tourist sites and manufacturers (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety").

The Law of 30 December 2006 on Water and Aquatic Environments contains provisions relating to the management of water resources (in particular, the benefits of reserved flows<sup>(1)</sup> and the flexibility of hydropower plant operations). These provisions were supplemented by the statute on the reconquest of biodiversity, nature and landscapes of 8 August 2016. The EDF group nevertheless remains vigilant concerning the local implementation procedures and forthcoming developments of this regulation, and calls for more coherent public policies on water, energy and the environment.

##### Development

Currently, 95% of France's hydropower potential is being used. EDF is committed to developing its hydropower activities, through the study and realisation of new profitable projects, in particular:

- developing reserved-flow turbines. The purpose is to equip a certain number of dams in order to recover part of the energy associated with these minimum regulatory flows:
  - in 2017 two turbine sets were being installed at the facilities at Mancières (scheduled to come into operation on 01/12/2017) and La Ravière (scheduled to come into operation on 01/06/2018), thus adding 0.7MW of power in total to the 3.8MW already installed in 2015 and 2016,
  - new projects are being studied with phased commissioning before 2020;
- increasing the potential of energy transfer by pumped-storage hydropower plants in France (STEPs). The Decree of 17 June 2013 authorised EDF to build a new 240MW turbine generator set on the STEP site at La Coche in Savoie. This Pelton set, construction of which began in 2017, will increase the capacity of the existing facility by 20% and will generate approximately an additional 100GWh every year;
- looking into the possibilities for increasing the capacity of existing hydropower plants, in particular those detailed in Article L. 511-6 of the French Energy Code enacted by the Law of 13 July 2005 setting out the guidelines for the energy policy, to contribute to the development of leading-edge means.

This provision having been repealed with effect on 1 April 2017 by Order no. 2017-65 of 29 January 2017 on concession contracts, several projects were submitted before this date, in order to preserve EDF's option to increase the capacity of the relevant power plants, in particular for the facilities in Saussaz-Hermillon, Salettes, Vinon, Manosque Sainte-Tulle II, Peyrat le Château.

(1) Minimum flow maintained downstream of dams to protect aquatic life.



Excess output is in the process of being achieved for the La Bâthie plant to replace the six generation sets for an additional capacity of 50MW. At end-2017, works were carried out on three sets. The works consists of:

- adapting existing facilities (modernisation, optimising generation, etc.) as part of concession renewals. Accordingly, in the context of renewing the Middle Romanche concession and in line with the decrees published on 31 December 2010, EDF has begun work to replace the six small existing plants with the construction of a new subterranean plant (Romanche-Gavet plant) with a capacity of 93MW and generation capability of 560GWh, or 155GWh more than the existing plants;
- developing "small-scale" hydropower plants (with capacity under 12MW). One of the aims is to develop small-scale hydropower by:
  - forging partnerships for project development,
  - optimising and increasing the generation capacity of the existing fleet with the return to service in 2017 of several facilities after an important programme of renovations like La Prêtière, Ambialet and Brides-les-Bains,
  - answering calls for tenders to build and/or operate microscale and small-scale hydropower projects. Three projects proposed by SHEMA and Électricité de Strasbourg won a call for tender issued on 26 April 2016 for an installed capacity of 3MW. These plants must come into operation by 2021,
  - a new call for tender was issued by the DGEC for a capacity of 105MW spread over three years. The EDF group submitted three offers in January 2018. The winners will be announced in the first half of 2018 and must commission their facilities within four to five years.

EDF has also strengthened the range of initiatives pursued by its entities in support of regional and local development. This approach is reflected in the establishment of the "One River, One Territory" development programme, which had opened seven agencies around France by the end of 2017.

### **1.4.1.5.2 New renewable energies**

#### **1.4.1.5.2.1 Wind power**

A wind turbine uses the action of the wind to drive rotor blades connected to an electrical generator. There are various categories:

- onshore wind power, a proven and increasingly competitive sector which is now close to competing with, if not matching, traditional sectors in certain areas. It benefits from economic incentives in various countries, although an increasing number of projects are developed without a financial support mechanism (see section 1.5.3 "Electricity market legislation"). On average, the rated capacity of onshore wind turbines installed worldwide is more than 2MW, a figure which is increasing steadily. The subsidiary responsible for developing wind power within the Group is EDF Énergies Nouvelles. The subsidiaries EDF Luminus, Edison and EDF Energy also have wind farms in service;
- offshore wind power, a less mature, high-growth sector which currently requires a higher initial investment and is more expensive to connect to the grid than onshore wind power and whose operation and maintenance are more difficult. The advantages of this sector are the higher rated capacity of each wind turbine (typically over 5MW) and increased productivity due to more reliable winds. The sector is on a learning curve that will enable it to reduce the cost differential with onshore wind generation. The EDF group has decided to ramp up its investment in offshore wind generation which offers interesting development prospects in some of the Group's key countries including France and the United Kingdom.

#### **1.4.1.5.2.2 Solar photovoltaic power**

The operating principle of solar photovoltaic power is to convert sunlight directly into electricity. Photovoltaic solar power is used in two ways: it can either be connected to the grid, or it can generate electricity at isolated sites. Grid-connected photovoltaic systems have witnessed steady growth around the world in two markets: ground-based solar farms and rooftop installations on buildings and homes.

The cost of generating solar power has fallen considerably in recent years. However, there is still considerable room for improvement, especially in the field of innovation and enhanced industrial processes. EDF R&D also conducts research on photovoltaic technology at its Chatou site, under the aegis of the French Institute for Photovoltaic Power Research and Development (IRDEP), established in partnership with CNRS (National Centre for Scientific Research) and ENSCP (Paris National School of Chemistry).

#### **1.4.1.5.2.3 Biomass and biogas**

Technologies based on biomass mainly consists of burning certain types of waste, particularly from the timber and farming industries, or exploiting woodfuel forests, to produce heat or electricity.

Biofuels can come from a wide range of sources. There are three different energy streams: combustion plants for plant matter (wood, agricultural waste) or animal matter; biogas generation plants (gas generated from the fermentation of organic animal or plant matter); household waste incineration plants.

Lastly, through its holdings, the Group owns shares in France (notably through its subsidiary Dalkia, see section 1.4.6.1.1 "Dalkia"), and abroad in several dozen heating networks and small-scale, mainly wood-fired generating plants.

#### **1.4.1.5.2.4 Geothermal energy**

The temperature of the rocks in the earth's crust increases with depth (3°C on average every 100 metres). In some regions, geothermal energy reaches the surface in the form of hot springs, water or steam. The hot water is used directly in the form of heat: central heating in homes or heating of greenhouses.

Steam extracted from the ground is also used to generate electricity: as in a classic thermal power station, it drives a turbine. It is also possible to use hot and dry rocks as a source of electricity production from steam. To develop this type of energy, EDF has joined forces with several partners (including ÉS and German energy companies) as part of a European consortium that develops and operates a prototype geothermal power plant in the hot, naturally fractured crystalline rock around Soultz in Alsace.

France also has high-temperature resources located in its overseas territories. The EDF group is present in this activity mainly through its minority stake in the Company Géothermie Bouillante in Guadeloupe.

#### **1.4.1.5.2.5 Other technologies**

Renewable energies cover a wide range of sectors and technologies. To prepare for the future, EDF Énergies Nouvelles is responsible within the EDF group for identifying promising sectors and, with the support of the Group's R&D teams or industrial partners, contributes to the emergence of new technologies. Along with so-called concentrated solar power (see section 1.4.1.5.2.2 "Solar photovoltaic power") and energy storage, marine energy is another area the Group is exploring in depth.

Two marine energy projects are currently under development:

- tidal turbines, which are underwater turbines harnessing the energy of tidal currents. This technology is still at the development stage. EDF drew some useful lessons from its experiments with tidal turbines built by Open Hydro (Naval Group) at Paimpol-Bréhat in the Côtes-d'Armor département in Brittany. EDF Énergies Nouvelles, in partnership with Naval group, is working on the "Normandie Hydro" project, a larger-capacity tidal current turbine farm in the Raz Blanchard off the Cotentin peninsula in Normandy.
- floating offshore wind turbines: the Provence Grand Large project, led by EDF Énergies Nouvelles, won the "Floating Wind Farms" call for projects initiated by the ADEME in August 2015. The project, located 17 kilometres off Napoleon Beach at Port-Saint-Louis-du-Rhône, foresees the construction of three 8MW Siemens turbines.

#### **1.4.1.5.3 EDF Énergies Nouvelles**

Apart from hydropower, the EDF group's involvement in renewable energy is undertaken mainly by EDF Énergies Nouvelles (EDF EN), a wholly-owned subsidiary. The companies in the EDF EN group had a combined 3,482 employees at 31 December 2017.

EDF EN has the expertise required to ensure EDF's development in renewable energies, particularly in the fields of wind and photovoltaic solar power and electricity storage. At the end of 2017 the project portfolio had a capacity of 22.4GW of which 20.6GW under construction. EDF EN is a major player in renewable electricity generation, particularly in its biggest markets, namely North America and Europe.

EDF EN generates electricity from renewable energy sources and is involved in every stage of the value chain. It operates upstream, in project development, as well as in the construction of power plants and their operation and maintenance. Each of these activities may be conducted on its own account or on behalf of third parties.

As part of its project development activities, the Group is also involved in the Development and Sale of Structured Assets (an activity referred to as "DSSA"), which consists of selling projects it has built, in whole or in part, to third parties interested in such infrastructure assets. With regard to DSSA, the net capacity sold in 2017 amounted to 255.2MW.

Alongside development focussing on wind and photovoltaic solar power (which represent around 97.6% of its net installed capacity), EDF EN is also present in other renewable energy segments, primarily marine energy and electricity storage. Lastly,

EDF EN is also present in the decentralised renewable energy sector (rooftop solar power) targeting individuals and corporate customers.

Around 85% of revenues generated by assets consolidated under the full consolidation method are not exposed to the market risk, thanks to long-term contracts or other supporting mechanisms to renewable energies. Long-term contracts have an average remaining term of approximately 13 years<sup>(1)</sup>. Seventy-seven percent (in MW) of EDF EN's fully consolidated assets across all segments and countries are covered by contracts with a purchase obligation.

Historically, EDF EN primarily developed in two geographical regions: Europe and North America (USA, Canada and Mexico).

Since 2012, the Group has also become established in new countries with significant potential for renewables development such as Brazil, Chile, India, China, the Gulf states, Israel and South Africa.

Continuing its growth, EDF EN explored new perspectives in 2017 with its entry into the United Arab Emirates and Egypt.

At 31 December 2017, EDF EN had a gross installed capacity (2017) of 11,787.1MW, a net installed capacity of 7,819.1MW and a gross capacity under construction of 1,875.6MW.

(1) According to estimates in the 2018 budget on fully consolidated assets.

**INSTALLED CAPACITY BY SEGMENT AND COUNTRY:**

<i>(in MW)</i>	At 31/12/2017		At 31/12/2016	
	Gross <sup>(1)</sup>	Net <sup>(2)</sup>	Gross <sup>(1)</sup>	Net <sup>(2)</sup>
<b>Wind power</b>				
United States	3,589.5	2,667.5	3,235.5	2,426.0
France	1,449.2	1,118.2	1,104.3	817.9
United Kingdom <sup>(3)</sup>	731.8	262.5	656.4	241.5
Turkey	661.6	267.4	649.8	264.5
Portugal	534.7	199.1	534.7	186.7
Canada	724.7	588.4	500.2	476.2
Mexico	391.5	229.5	391.5	229.5
Italy	424.2	290.1	384.4	264.9
Belgium <sup>(4)</sup>	325.2	26.9	325.2	26.9
Greece	264.5	238.2	264.5	238.2
China	198.4	85.9	174.0	66.4
South Africa	107.6	54.2	107.6	54.2
Morocco	50.4	50.4	-	-
Poland	106.0	106.0	106.0	106.0
India	164.0	82.0	52.0	26.0
Brazil	66.0	66.0	-	-
Denmark	6.0	6.0	6.0	6.0
Germany	151.3	149.3	3.0	3.0
<b>TOTAL WIND POWER <sup>(5)</sup></b>	<b>9,946.4</b>	<b>6,487.7</b>	<b>8,495.1</b>	<b>5,433.8</b>
<b>Solar power</b>				
France	233.1	177.0	209.2	153.1
United States	394.0	322.4	160.3	88.7
Decentralised energy (France)	78.3	51.8	81.9	53.8
Israel	193.5	99.2	158.5	108.7
India	207.0	81.3	120	60
Italy	76.9	74.3	76.9	74.3
Spain	-	-	57.4	46.9
Canada	23.4	23.4	23.4	23.4
Greece	12.1	12.1	12.1	12.1
Brazil	283.6	226.9	-	-
Chile	146.0	73.0	-	-
<b>TOTAL SOLAR POWER <sup>(5)</sup></b>	<b>1,647.9</b>	<b>1,141.5</b>	<b>899.7</b>	<b>620.9</b>
<b>Other segments</b>				
Hydropower	62.8	60.0	62.8	60.0
Biogas	70.0	70.0	70.0	70.0
Biomass	40.0	40.0	66.0	58.2
Storage	20.0	20.0	20.0	20.0
<b>TOTAL OTHER SEGMENTS <sup>(5)</sup></b>	<b>192.8</b>	<b>190</b>	<b>218.8</b>	<b>208.2</b>
<b>TOTAL <sup>(5)</sup></b>	<b>11,787.1</b>	<b>7,819.1</b>	<b>9,613.5</b>	<b>6,262.9</b>

(1) Gross capacity: total capacity of the facilities in which EDF EN has a stake.

(2) Net capacity: capacity corresponding to EDF EN's stake.

(3) EDF EN owns 50% of EDF Energy Renewables (the other 50% is owned by EDF Energy).

(4) MW in offshore wind exclusively.

(5) Corresponds to the sum of the exact values rounded to one decimal place.

In 2017 the electricity production of EDF Énergies Nouvelles' fully consolidated fleet across all segments and countries was 12,560GWh. The load factor reached at end 2017 31% in onshore wind power generation and 16% in solar power generation.

**Wind power**

**Onshore wind power**

In 2017 EDF EN continued its growth in onshore wind power with the acquisition of a majority stake in Futuren, an onshore wind power firm active in France, Germany, Morocco and Italy focused on building new wind farms (over 188MW of projects in

2017), operating its own wind farms (390.3MW of gross capacity) and operating wind farms on behalf of third parties (357MW of capacity under management).

EDF EN increased its gross wind power capacity by 1,409.8MW, bringing its total gross onshore wind power generation to 9,511.7MW at end 2017.

Onshore wind farms with a gross capacity of 1,018.6MW were commissioned in 2017, onshore wind farms under construction represented a gross capacity of 884.1MW at 31 December 2017.

1.

#### France

In 2017 the Montagne Ardéchoise wind farm – the most powerful wind farm in the Auvergne-Rhône-Alpes region covering six communes in the Ardèche département – was commissioned with an installed capacity of 66.5MW of which 57.5MW is owned by EDF EN.

Several other wind farms also came into operation during the year, namely 4 Vallées 3 (16MW), Belfays (20MW), Carnoye (19.8MW) and Champagne Picarde (72.6MW).

Several wind farms are under construction, namely Espiers (18MW), Guilleville (17.7MW), Les Taillades (27.2MW), Clanlieu (18MW) and the last unit of Montagne Ardéchoise (7.1MW).

EDF EN and Arkolia, a firm specializing in biomethanation and solar and wind energy, entered into a partnership to develop, build and run two wind farms in France's Occitanie region (where Arkolia is based) with a total capacity of 84MW. Under this partnership EDF EN and Arkolia acquired an equal share of IDEX's stake in the Haut Dourdou wind farm (57MW) in the Aveyron département and the Croix de Bor wind farm (27MW) in the Lozère département which are at an advanced stage of development.

For its part Futuren began construction of the Demange wind farm (19.8MW) in the commune of Demange-aux-Eaux in the Meuse département as well as the Courant-Nachamps wind farm (21MW) under construction at the time of acquisition.

Futuren's wind power capacity brought EDF EN's gross installed wind power capacity in France to 1,449.2MW at 31 December 2017 with another 128.8MW of onshore wind power under construction.

#### UK

EDF Energy Renewables (50/50 joint venture with EDF Energy) operated a total gross wind power capacity of 628.3MW at end 2017 (a net capacity of 190MW).

In 2017 EDF Energy Renewable commissioned the Beckburn wind farm (31.1MW) and continued construction of the Dorenell wind farm (177MW) in Scotland.

Moreover EDF Energy Renewable acquired 11 wind farm projects under development in Scotland with a potential capacity of 600MW.

EDF Energy Renewable also sold 80% of two subsidiaries that own the Bicker (10.4MW) and Fenlands (27.2MW) wind farms.

#### Germany

With the acquisition of Futuren and its installed capacity, the Group reached a gross installed wind power capacity of 151.3MW in Germany at 31 December 2017.

EDF EN also activated the repowering of the Eckölstadt wind farm (34.5MW).

#### Italy

With the acquisition of Futuren and its installed capacity, the Group reached a gross installed wind power capacity of 424.2MW in Italy at 31 December 2017.

#### Portugal

The extension of phase 2 of the Arada wind farm (11.8MW) began in 2017. The Group currently operates 534.7MW of wind power capacity in Italy.

#### Turkey

In 2017 EDF EN commissioned the Samurlu 3 (9.4MW) and Kozbeyli 3 (2.4MW) wind farms. To date, EDF EN has installed 661.6MW in gross capacity in the country.

#### South Africa

In South Africa EDF EN runs three wind farms following its successful bid in the government's call for tenders representing a total gross installed capacity of 107.6MW.

#### United States

The Group operates in the United States through EDF Renewable Energy (EDF RE), an independent renewable energy producer that is wholly owned by EDF EN.

At the end of 2017, EDF RE reached an installed capacity of 3,589.5MW gross (or 2,667.5MW net) in onshore wind.

In the year EDF RE commissioned the Red Pine (200MW) wind farm and the Rock Falls (154MW) wind farm for which it signed a "virtual" electricity supply contract

with Kimberly Clark Corporation for 120MW of the 154MW. It also began construction of the Copenhagen (80MW) and Stoneray (100MW) wind farms. Moreover EDF RE signed a contract with Google, a subsidiary of Alphabet, to supply 200MW of installed capacity generated by the Glacier Edge wind farm to be built in Iowa.

With the sale of 50% of the Great Western wind farm went 112.5MW of capacity.

#### Canada

At end-2017, the Group's total gross installed wind power capacity in Canada was 724.7MW (or 588.4MW net).

The Nicolas Riou (224.5MW) wind farm, located in Quebec in the Lower St. Lawrence region, awarded following a call for tenders in 2013, came into operation. It is jointly held by EDF EN Canada (50%), Régie Intermunicipale de l'Énergie du Bas-Saint-Laurent (33%) (an entity belonging to the regional county municipalities of the Bas-Saint-Laurent region and the Maliseet First Nation of Viger) and Régie Intermunicipale de l'Énergie Gaspésie-Îles-de-la-Madeleine (17%).

#### Mexico

At end-2017, the Group's total gross installed wind power capacity in Mexico was 391.5MW (or 229.5MW net).

#### China

In 2017 UPC AWM, a subsidiary of EDF EN, began construction of the Kangping II and III wind farms (96MW). Part of the Feicheng I wind farm came into operation (24.4MW) with the remaining 25.1MW under construction.

At end-2017, the Group's total gross installed wind power capacity in China was 198.4MW (or 85.9MW net).

#### India

In 2017 SITAC Wind Management and Development, a firm specializing in wind energy jointly held in equal share by EDF EN and SITAC, brought three wind farms in Gujarat into operation – G1.2 Sukavala (64MW), G2 Pipartoda (26MW) and G4 Raipar (22MW) – bringing the Group's gross installed capacity to 164MW (82MW net).

#### Brazil

In 2017 EDF EN Do Brasil commissioned the Ventos de Bahia I wind farm (66MW) in the state of Bahia.

Moreover, the Company began construction of its Ventos de Bahia II project, for which a long-term electricity supply contract of 116MW over 20 years was won in late 2015 as part of a federal reserve auction.

#### Chile

EDF EN Chile's first wind farm, Cabo Leones 1, is under construction and will have a gross installed capacity of 115MW.

#### Morocco

EDF EN is continuing to develop the Taza wind farm (150MW).

With the acquisition of Futuren the Group's total gross installed capacity in Morocco reached 50.4MW.

#### Offshore wind power

Offshore wind power will be a growth driver for EDF EN over the next few years. In France it won three projects in 2012 under the call for tenders issued by the French government, namely the offshore wind farms in Fécamp, Saint-Nazaire and Calvados. Together they make up a total capacity of 1,428MW and cost around €6 billion. All relevant permits for the three wind farms were granted. However, appeals were filed on each of the three wind farms, pushing back the initially planned dates for the investment decision. In 2016 a partnership with the Canadian producer Enbridge (replacing DONG Energy) was signed to develop, build and operate the three jointly-owned (50/50) wind farms. In 2017 EDF EN continued to develop the three wind farms.

In the UK in 2017 EDF EN commissioned the Blyth pilot offshore wind farm (41.5MW) in the north-east of England. The innovative project was an opportunity to test and for the first time use new offshore wind farm methods and technology such as 8.3MW MHI Vestas turbines (among the most powerful used on an offshore wind farm), "float and submerge" gravity-based foundations and 66kV underwater interconnecting cables.

## Photovoltaic solar power

EDF EN pursued growth in solar photovoltaics, its second area of growth. At end 2017 gross installed solar capacity was 1,647.9MWp (1,141.5MWp net), up by 520.6MWp net (almost 85%) from end 2016. EDF EN also has a portfolio of solar projects under construction comprising 712.4MWp gross.

### France

In 2017 EDF EN commissioned the Fossette photovoltaic plant (12MWp) built on land owned by ArcelorMittal in the port-industrial complex of Fos-Sur-Mer in the Provence-Alpes-Côte d'Azur region.

EDF EN also commissioned the Fouilloux photovoltaic plant(11.9MWp).

At the end of 2017 the Group launched the Solar Plan to develop and build 30GWp of photovoltaic solar plants in France between 2020 and 2035 as part of its development of renewable sources in France and abroad.

### Spain

After selling photovoltaic plants with a total net capacity of 46.9MW and the Lucena biomass plant with a net capacity of 18.2MW in 2017, the Group no longer owns any installed solar capacity in Spain.

### North America (USA and Canada)

In 2017 EDF RE began construction of the Pecan (111.3MWp) and Gutenberg (118.8MWp) photovoltaic plants.

It also commissioned the Switch photovoltaic plant (234MWp) in California.

In addition it signed a power purchase agreement (PPA) with Marin Clean Energy (MCE) for the Desert Harvest (150MWac) photovoltaic plant in southern California.

In North America the Group has a total gross installed photovoltaic solar power capacity of 417.4MWp.

### India

In 2017 EDEN, the common subsidiary formed in 2016 by EDF Énergies Nouvelles and EREN Renewable Energy to run their photovoltaic solar power business in India, brought three photovoltaic plants into operation with a combined capacity of 87MWp – UTT1 and UTT 2 with a unit capacity of 36MWp in Uttarakhand and Semli Avengers with a capacity of 15MWp in Madhya Pradesh – bringing EDF EN's gross operating photovoltaic power in India to 207MWp.

### Israel

EDF EN Israel began construction of six photovoltaic plants, namely Mashabai Sadeh (60MWp), Melfasim 2 (13MWp), Pedyim (13MWp), Kfar Maimon (6.5MWp), Bitcha (6.5MWp) and Geffen (6MWp). The company also brought the Ashalim (35MWp) photovoltaic plant into operation. EDF EN Israel also sold minority stakes in the Mitzpe Ramon, Zmorot and Ketura photovoltaic plants for a total capacity of 27MW. The Group now has 193.5MWp of gross installed solar capacity in Israel.

### Chile

In 2017 EDF EN Chile commissioned the Bolero (Laberinto) photovoltaic plant in the Atacama Desert with a capacity of 146MWp. The EDF group also continued building the Santiago Solar photovoltaic plant (115MWp) north of the Chilean capital.

### Brazil

EDF Énergies Nouvelles has invested in solar energy in Brazil through the acquisition of 80% of the Pirapora I project (191MWp) in the south-east of the country, from Canadian Solar Inc., a developer and manufacturer of photovoltaic panels.

En 2017 EDF EN do Brasil extended its footprint in Brazil with the acquisition of 80% of the Pirapora II (114.9MWp) and Pirapora III (92.6MWp) photovoltaic plants from Canadian Solar Inc which will retain a 20% stake and will manufacture the photovoltaic modules at its local factory. These three plants are located in the same area and will make up the most powerful photovoltaic facility in South America with

a total capacity of around 400MWp. More than half of the Pirapora photovoltaic complex came into service in 2017 (283.6MWp). Pirapora II is under construction.

### Mexico

In Mexico in 2016 the Group entered the solar power market by winning the Bluemex project with a capacity of 111MWp as part of a national tender. Located in the state of Sonora the future plant, which began construction in 2017, is made up of bifacial photovoltaic cells and its output will be sold at a fixed rate over a period of 15 years.

### United Arab Emirates (Dubai)

In 2017 EDF EN joined the consortium led by Masdar to develop the third phase of the Mohammed bin Rashid Al Maktoum solar park in Dubai with a capacity of 800MWac (over 1GWp) in partnership with Dubai Electricity and Water Authority (DEWA).

Covering an area of 16 Sq. km the park will be the largest photovoltaic plant of its kind in the world and will generate around 2.5 million MWh of electricity a year. It will come into service in three stages with Stage A (266MWp) currently under construction. The project is being financed through a sophisticated vehicle involving seven institutions and Islamic financing.

### Egypt

EDF EN entered the Egyptian market by joining forces with Elsewedy Electric to develop, build and operate two photovoltaic plants with a total installed capacity of 100MWac. Located in the south of the country the two plants form part of the Benban solar complex (1.8GWac) and come with a 25-year power purchase agreement (PPA) with the Egyptian Electricity Transmission Company (EETC).

## Operating & Maintenance

As an integrated operator, EDF EN operates and maintains most of its own wind and solar facilities. Dedicated first and foremost to EDF group assets the activity has grown significantly and is also carried out on behalf of third parties. Worldwide EDF EN operated 14GW at end December 2017 with close to 1,300 experts, engineers and technicians in 11 countries and expects O&M activities to grow by approximately 30% by 2020. EDF EN has long been active in the operation-maintenance field in North America where it manages close to 10GW. It has grown in Europe and the rest of the world (e.g. launching in Chile) with a total capacity of over 4GW at end 2017.

Growth in this activity is driven by commissioning new plants and choosing which facilities to operate on a case-by-case basis according to technology and region. The aim is to achieve maximum efficiency in every facility in conjunction with manufacturers throughout the expected or extended useful life of equipment.

Accordingly EDF EN recently set up a predictive maintenance oversight centre (e-Diagnostic Center) drawing on specific in-house expertise centralized and coordinated with the EDF group's R&D Department. It complements the facility remote monitoring and control system made up of three real-time oversight centres in Colombiers (France), Emden (Germany) and San Diego (California).

In 2017 EDF EN via its German subsidiary REETEC acquired Off-shore Wind Solutions GmbH (OWS), a German firm specialising in the operation and maintenance of offshore wind farms. OWS operates and maintains the BARD Offshore 1 wind farm (400MW) 95km off the German coast in the North Sea. With the acquisition came a renewal of the maintenance contract for a period of 10 years with Ocean Breeze Energy, the owner of the facility.

EDF EN set up several European maintenance centres in 2017 in Italy, Poland, Belgium, Germany and France. These operation-maintenance units are designed to place technical teams as close to wind or solar farms as possible to ensure faster response times and thus operational performance.

#### Decentralised Energy

EDF Énergies Nouvelles Réparties (EDF ENR) is wholly owned by EDF EN. EDF ENR is now an integrated player in decentralised photovoltaic solar power generation, involved in the design, build, operation and maintenance of rooftop installations. EDF ENR Solaire, a wholly-owned subsidiary, markets and installs photovoltaic solar power solutions in France for residential and business customers and local authorities.

One year after embracing self-consumption with the "Mon soleil et moi" ("My sun and me") service aimed at residential households, in 2017 EDF ENR Solaire launched the "Notre soleil et nous" ("Our sun and us") service aimed at co-owners, social housing providers and all operators of apartment buildings wanting to generate and consume their own electricity.

In addition, EDF ENR is present in the upstream segment. It owns 100% of EDF ENR PWT (Photowatt) which designs and manufactures photovoltaic modules using crystalline silicon technology with various applications ranging from residential equipment to land-based solar farms. In early 2018 Photowatt announced a development project based on a new industrial model on the one hand and its applied R&D on the other hand. The new industrial model entails setting up a new firm called Photowatt Crystal Advanced specialising in the low-carbon production of high-tech silicon ingots and wafers which would be 60% owned by Photowatt, 30% by Canadian Solar Inc – a world leader in the manufacture of solar panels – and 10% by ECM Greentech, a French firm based in Grenoble that has developed an innovative silicon crystallization technology with the INES (the French solar energy research centre). The new firm's generation capacity would gradually reach over 500MWp a year versus the current capacity of 50MWp of Photowatt's existing facility at Bourgoin-Jallieu (38) in the Auvergne-Rhône-Alpes region in France. Alongside this joint project Photowatt would concentrate on its R&D activities, renamed Photowatt Lab, in conjunction with the EDF group's R&D Department and solar energy research centres such as INES or the Photovoltaic Institute of Ile-de-France region with a view to fostering the emergence of new technology in the field of photovoltaic cells and modules and testing it in preindustrial conditions.

#### Storage sector

EDF ENR is the controlling shareholder of EDF Store & Forecast, a wholly-owned Group subsidiary. EDF Store & Forecast, founded in March 2014, markets software solutions to forecast, plan and optimise automatic control of renewable energy generation and storage.

In a context marked by the strong growth of renewable energy generation and by the closure of large-scale electrical facilities, battery storage technology helps smooth out the generation of electricity of the national grid. The storage system can be activated on the grid in order to respond quickly to fluctuations. In this context, through its subsidiaries, EDF EN develops innovative storage systems in the US, the United Kingdom and France.

In 2015, EDF EN announced the commissioning by its North American subsidiary EDF RE of an innovative storage system that combines an energy storage battery and monitoring software. The McHenry facility provides nearly 20MW of capacity (40MW of dynamic capacity) and helps monitor an energy reserve to stabilise the frequency of the electricity grid at a local level.

In 2017 EDF EN began construction of a battery storage system with a capacity of 49MW at West Burton in Nottinghamshire in the UK for which it had won a tender in 2016. This facility will be part of the frequency control system, with a total capacity of 200MW, which will be deployed throughout the country. The objective is to improve the stability of the national electricity grid.

Lastly, in addition to the Toucan photovoltaic plant with battery storage (5MWp) in French Guiana in operation since 2015, the proposed Toucan 2 photovoltaic plant (5MWp) was chosen in 2017 under the CRE II call for tenders to build and operate photovoltaic facilities with a capacity of more than 100 kWp with battery storage systems located in zones that are not interconnected.

Boasting more than one hundred thousand photovoltaic modules, the future Toucan 2 plant will feature an electrical equipment remote control system developed by EDF Store & Forecast and EDF EN.

## 1.4.2 SALES AND SUPPLY ACTIVITIES

### 1.4.2.1 Presentation of the market in France

#### 1.4.2.1.1 Demand

Domestic electricity consumption in France (including Corsica) for the 2017 fiscal year stood at 482TWh<sup>(1)</sup>, down by 0.3% in comparison with 2016. After adjustment of the weather impact, it was stable.

#### 1.4.2.1.2 Competition

Since 1 July 2007 the French market for electricity and gas has fully opened up with each customer able to choose their energy supplier. They may opt at any time, and without advance notice, for an offer at market price from the supplier of their choice.

Among the electricity suppliers on the French market, the main competitors of EDF are Engie, E.ON (Uniper, SNET), Enel and Direct Énergie. In the gas market and in the corporate and local authority customer segment, the other major gas suppliers are Tegaz, Eni, Gaz Natural, Gazprom, E.ON (Uniper, SNET) and Antargaz. Lastly, on the gas market and in the retail customer segment, one also finds the suppliers Engie, Direct Énergie and Eni.

As of 30 September 2017, according to the CRE<sup>(2)</sup>, the electricity market shares in terms of sites of alternative suppliers, i.e. excluding historical suppliers, were 16.8% in the residential market, and 19.7% in the non-residential market, and a gas market share, in number of sites, respectively of 25.3% and 40.5%.

The 2010 NOME Law established certain rules for the supply of electricity and gas, the main provisions of which, codified today in the Energy Code, are the following:

- regulated electricity and gas tariffs remained partially unchanged under the conditions described for electricity in section 1.4.2.1.3 "Regulated electricity sales tariff contracts" below;
- regulated access to historic nuclear power (ARENH) was put into place to the benefit of EDF's competing electricity suppliers and distribution and transmission network operators (see section 1.4.3.3 "Regulated access to historic nuclear power (Accès Régulé à l'Énergie Nucléaire Historique, or ARENH)").

In order to supply their customers, the electricity alternative suppliers of EDF gained access in 2017 to their own generation capacities as well as to the wholesale electricity market and the ARENH for around 82TWh. During the November 2017 application process alternative providers purchased 94.6TWh for 2018.

### 1.4.2.1.3 Regulated electricity sales tariff contracts

#### Access to regulated electricity tariffs

Since the NOME Law entered into force in 2010, the situation for electricity, by category of customer, is as follows:

- domestic and non-domestic final consumers who have subscribed power for their site(s) not exceeding 36kVA: these customers benefit from regulated sales tariffs. They can freely switch back and forth between regulated tariffs and market offers;
- domestic and non-domestic final consumers who have subscribed power for their site(s) exceeding 36kVA: since 1 January 2016 these sites can no longer subscribe to regulated sales tariff products which were cancelled on 31 December 2015;
- domestic and non-domestic final consumers for their site(s) located in areas not connected to the continental metropolitan network: these customers have the right to regulated sales tariffs;

(1) Source: 2017 Electricity report published by RTE.

(2) Source: Energy Regulation Commission (CRE), data at 30 September 2017.

- on 1 January 2018 the basic necessity tariff offered since 1 January 2005 was replaced with the energy cheque which came into effect after trials in 2016 and 2017 in the Ardèche, Aveyron, Côtes d'Armor and Pas-de-Calais départements.

### **Changes to the method of setting the regulated tariffs for electricity**

Since 8 December 2015, in accordance with Articles L. 337-4 and L. 337-13 of the French Energy Code ("NOME law"), the CRE has been responsible for notifying the ministries in charge of the economy and energy of its justified proposals for regulated sales tariffs for electricity. If there is no opposition to the latter before a deadline of three months, such proposals are deemed to have been approved.

In the summer (Jun-Aug) of 2017 changes in the tariff structure took the form of a 1.7% increase (excl. tax) in the regulated residential and nonresidential "Blue Tariffs" effective from 1 August 2017 following a decision on 27 July 2017 (published in the *Journal Officiel* on July 28, 2017) at confirming the CRE's resolution of 6 July 2017. Furthermore, tariffs also increased on 1 February 2018 with the Residential "Blue" tariff going up by 0.7% and the non-Residential "Blue" tariff by +1.6%.

#### **1.4.2.1.4 Electricity supply contracts**

In France, customers are free to leave the regulated sales tariffs at any time and without advance notice for an offer proposed by any other supplier.

With the exception of customers directly connected to the transmission network, who must sign separate supply and delivery contracts, all other customers may enter into a single contract with the supplier of their choice for their electricity supply and transit.

### **Decision by the Court of Appeal of Paris (gas) and the Council of State (electricity)**

The Paris Appeal court, in a decision dated 2 June 2016, ruled that the company GRDF (gas distributor) has to "bear, at least in part, the cost of management of the services provided by the suppliers" of gas. It also enjoined GRDF to conclude an amendment to the contract for access to the distribution network (CAD) providing for the payment to Direct Énergie and ENI, the plaintiff companies, of an "equitable and proportionate remuneration with regard to the costs avoided by the public distribution network operator (GRD)". In addition, it enjoined GRDF to pay, on a retroactive basis, to Direct Énergie, a remuneration with effect from the date of signature of the CAD, i.e. 21 June 2005.

On the basis of this decision and in accordance with the principle of non-discrimination, EDF pursued GRDF to obtain remuneration for the services carried out on behalf of the gas network operator, with effect from the signature of the CAD.

This decision covering gas was accompanied, on 13 July 2016, in the area of electricity by the cancellation by the Council of State of the deliberation by the CRE dated 10 December 2014, which rejected the request by Engie to withdraw the deliberation of the CRE dated 26 July 2012 relating to the management of customers with a single joint contract, and which had put in place an asymmetric regulation mechanism.

The Council of State considered that the remuneration of the suppliers for the customer management tasks carried out on behalf of the network operators of the electricity or gas distribution networks could not legally be transitional and limited to certain suppliers.

On 23 December 2016 Engie issued proceedings against Enedis with the Commercial Court in Paris in relation to supplier remuneration for management costs for customers holding a single contract. These proceedings are pending.

After initiating an external study at the end of 2016 to assess the costs related to the customer administration services performed by the suppliers on behalf of GRD for clients under a single contract, on 12 January 2017 the CRE published a resolution repealing the resolutions of 26 July 2012 and 3 May 2016 on the management of clients under a single contract as well as the final report of the study. After a consultation held in the first half of 2017, the CRE published a set of final resolutions on 26 October 2017 defining the terms of supplier commissioning and the related costs borne by TURPE. The resolutions confirm the principle of equal commissioning for all suppliers selling single contracts. Only regulated tariffs will have a slight difference in commissioning of around €2 less per point of delivery which will be gradually phased out over five years.

In its resolution the CRE also capped the compensation of past customer management costs incurred before 1 January 2017 at an amount which can be factored into the TURPE tariff.

Law n°2017-1839 of 30 December 2017 on hydrocarbons, energy and the environment amends the French Energy Code to validate (subject to court rulings with prejudice) network access agreements between distribution network operators and gas & electricity providers to the extent that these agreements are contested for imposing the cost of customer management on suppliers on behalf of network operators or making suppliers liable for all or part of the costs borne by them for services provided before the law came into effect. This is meant to prevent suppliers from obtaining compensation from network operators for past customer management services provided.

See section 2.4.2 "Legal proceedings concerning EDF's subsidiaries and holdings".

### **1.4.2.2 The Customer Division**

EDF's sales and supply activities in France (excluding overseas departments and Corsica) are managed by the Customer Division.

#### **1.4.2.2.1 Presentation and supply strategy**

In France, EDF markets energy and services to nearly 25.4 million customer accounts (excluding overseas departments and Corsica), or almost 30.9 million sites.

On the electricity market, EDF's sales in 2017 were close to 310TWh, which represents a market share of 68%.

EDF provides gas supply to all types of customers. In 2017, EDF marketed 30.1TWh of gas (compared with 27.7TWh in 2016), which represented a market share of 6.1%, to more than 1.4 million customers. At the end of 2017, EDF was supplying gas to more than 1.3 million residential customers (in comparison with 1.2 million at end-2016).

In addition to supplying electricity and gas EDF serves its customers by offering energy efficiency products by among other things answering calls for tenders on self-consumption issued on a regular basis by the CRE. Furthermore, in order to meet the expectations of its customers and assist them with the digital revolution in progress, EDF is continuing to digitize its products and customer relationship management. These efforts are being channeled through EDF Pulse Studio, the Group's innovation accelerator, which supports initiatives by means of an internal ecosystem and a network of external partners. EDF also has its Smart Lab dedicated to innovative applications, for example in artificial intelligence.

The Group continues to lead the way in energy innovation and customer service. It also intends, in relation to its residential customers, to combine "sustainable well-being at home" with an economic and societal promise.

For example, residential customers can sign up for "e.equilibre" and receive assistance with reducing their energy consumption.

Products offered by Sowee, a Group subsidiary that is the only French firm to link the sale of energy to a connected station, have expanded the range of options available to residential customers. For its business and municipal customers, the Group is continuing to expand its range of offers related to remote monitoring and analysis of consumption through to managing energy use.

Implemented in 2006, the energy savings certificates (CEEs) scheme evolved on 1 January 2015 in order, in particular, to contribute to the achievement of the objectives fixed by the Directive of 25 October 2012 relating to energy efficiency: the national obligation for the third period (2015-2017) was fixed at 700TWhc, doubled in comparison with the second period. In 2017 it was decided to reinforce the system with the aim of saving around 1,600TWhc nationwide between 2018 and 2020, of which 400TWhc in favour of households in a situation of energy poverty.

Moreover, EDF is positioning itself as a major player in energy transition by its visible and sustainable territorial action. It is promoting future smart electrical systems and experimenting with service offers by participating in the design and operation of innovative electrical solution demonstrators, alongside the principal players, local authorities, equipment manufacturers, telecommunication operators, industrialists and academics in various territories.

The EDF group wants to be the reference partner for territories in the energy transition, and accompany them with their energy efficiency projects for the production of local renewable energies as well as the eco-district development projects. It is also involved in the development of electric mobility *via* its subsidiary Sodetrel.

#### 1.4.2.2.2 Activity by customer category

##### 1.4.2.2.2.1 Residential customers

At the end of December 2017, EDF had 25.6 million residential electricity sites and more than 1.3 million gas customers in France. For fiscal year 2017, the volume of its sales totalled 127.7TWh of electricity and 13TWh of natural gas.

EDF is innovating to become the partner of sustainable well-being at home for its customers. This positioning reflects the importance for EDF of assisting them with their comfort and energy savings. After contacting EDF, close to nine out of ten customers are satisfied with the response, whatever the channel through which or the reason why they contacted the Company. The customer experience offered, underpinned by ongoing innovation, is both digital and very human. There are now nearly 13.5 million active customer accounts with close to 5,000 advisers all based in France to serve them.

##### Energy supply

EDF supplies electricity at regulated sales tariffs. EDF also launched *Vert Electrique*, a new range of renewable "green electricity" products, and products adapted to new uses of electricity. Two products have been on offer since 16 October 2017, namely *Vert Electrique* (electricity from renewable sources with a high service quality) and *Vert Electrique* Week-end (energy savings by shifting weekly consumption to the weekend). Other innovative products are set to be added to the mix.

EDF also supplies 1.3 million customers with natural gas as part of market offerings. In addition to *Avantage Gaz* which offers a fixed price per kWh (excl. taxes) for four years with possible reductions depending on the price of the regulated sales tariff for gas (up to 7% of reduction over four years), two new products were launched in 2017. *Avantage Gaz Durable* not only comes with all the benefits of *Avantage Gaz* but also offsets the carbon emissions of gas consumed (on the basis of estimated annual consumption) and provides support to a biogas research programme in France. *Avantage Gaz Connecté* lets customers manage their heating remotely and enhance their comfort with the purchase of a connected thermostat.

##### Functionality and services

In 2017 EDF partnered with AXA to bolster its range of support services with three rapid repair options applying to external electricity and gas installations (electricity & gas option), electricity, gas & water installations and plumbing/locksmith problems (home option) and equipment (equipment option). Also in partnership with AXA, EDF offers *Assurénergie* which allows customers to benefit from a flat rate reimbursement to enable them to pay their energy bills in the event of difficulties (loss of employment, inability to work, hospitalisation, invalidity or death).

In 2017 "e.équilibre", a digital solution available to all customers with a customer account or who have downloaded the "EDF & Moi" application, was improved with new functionalities to better understand and control energy consumption.

Since 1<sup>st</sup> March 2017, thanks to "*le Fil d'Actu*" (newsflow), customers with Linky meters can get daily and personal news regarding their energy consumption, like their real consumption in TWh and in Euros, adapted actions to save energy or comparisons with similar households. They can from now on set a consumption target in euros and thus be alerted if it is exceeded. Last, they can track their monthly data (already available) and daily electricity consumption in euros *via* a graph. Customers must agree to give access to their data in order to benefit from this service.

More than 145 million visits were made on the website dedicated to the Residential customers and to the EDF & Moi app in 2017. About 5 million EDF & Moi apps have been downloaded.

In addition to these personalized digital tools, EDF offers energy saving tips on its website (edf.fr) and runs a network of "EDF Home Solutions Partners" to help residential customers renovate their home energy use. Customers also have access to loan solutions from Domofinance, EDF's finance partner, to renovate their home energy use.

Electricore, an online platform, helps Internet users choose household appliances that minimize electricity consumption.

Lastly, EDF is investing in open innovation with EDF Pulse&You, a digital collaborative platform for co-construction with customers and startups. Since its launch in March 2016, 6,000 Internet users have taken part in the development of innovative projects by testing new products.

##### Earning of energy savings certificates (CEE)

Where Residential customers are concerned, the production of the CEE results from the energy renovation of the home, essentially based on a network of "EDF Home Solutions Partners" (see also section 1.5.6.1 "General regulations that are applicable to the environment, health, safety and security"). All residential customers who made energy efficiency alterations to their home qualify for a direct cash bonus from EDF by visiting [www.prime-energie.edf.fr](http://www.prime-energie.edf.fr) and providing the information and documents required. This complements the CEEs issued by EDF with a first-ever direct model in addition to partnerships.

##### Solidarity policy

Solidarity is a core value of EDF, which has been pursuing a policy dedicated to economically disadvantaged customers for close to 30 years (see section 3.5.4 "Fight against energy poverty contribution").

##### 1.4.2.2.2.2 Business customers

Together EDF Entreprises and EDF Collectivités have 1.6 million customers. Electricity sales in 2017 came to 172.7 at regulated sales tariffs or market prices and natural gas sales came to 17.1.

##### EDF and business customers

EDF Entreprises supports businesses and professionals so as to contribute to their energy performance, in particular by helping them reduce their energy bills and participate in the energy transition. This action is at the core of the EDF group's strategy, which favours in particular the development of energy services.

##### EDF Entreprises' products

EDF Entreprises provides businesses and professionals with competitive tailor-made electricity and gas supply offers. Offers are varied depending on customer expectations and consumption patterns.

The electricity offers provided by EDF Entreprises enable small businesses, very small businesses and professionals to optimise their energy supply through simple contractual arrangements. They allow customers that consume more to choose the length of their commitment at the offered prices, depending on their needs in terms of budget visibility. Lastly, EDF Entreprises is able to tailor solutions for the heaviest users depending on the structure of their consumption. EDF Entreprises also offers its business customers guaranteed prices over three-year periods to enable them to plan ahead.

EDF Entreprises structures its products to encourage its customers to optimise consumption according to generation costs by offering different prices at peak and off-peak hours and even summer and winter prices for heavier users during these times of year.

EDF Entreprises offers all its customers across all its products the option to choose electricity from renewable sources to cover their consumption. For small and medium sized enterprises and professionals, it involves a specific offer, the renewable energy contract, which guarantees that 100% of their consumption will come from electricity generated from renewable energy sources and facilitates their communication with their own customers regarding their commitment. In addition, for every megawatt-hour billed, EDF will contribute one euro to fund renewable energy research projects or to develop new renewable energy electricity generation units. For larger customers, it involves an option that allows them to decide themselves what proportion of their consumption will come from guaranteed sources, between 20% and 100%.



EDF Entreprises has a diversified range of products intended for all its electricity and gas customers, whether small companies or large industrial customers: online consumption monitoring, electronic invoices, assistance and troubleshooting, advice (optimisation of subscribed power, efficiency and reduction of energy expenses, etc.), in particular for customers who want to use an energy management system.

In order to always be as close as possible to the various expectations of its customers, EDF has put into place offers dedicated to large customers, not only with tailor-made electricity and gas supply offers and offers that reward customers that can shed load, but also support controlling their energy consumption and their CO<sub>2</sub> emissions as well as CO<sub>2</sub> trading for businesses subject to the national quota allocation plan (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety").

Lastly, in order to assist its customers with the energy transition, EDF Entreprises gets involved into the promotion of eco-gestures by means of awareness-raising campaigns. In addition, EDF Entreprises carries out energy audits for its customers in order to help them better identify the possible energy savings. The EDF Entreprises's certified teams assist their customers with the implementation of energy management systems (ISO 50001).

### **Customer satisfaction**

EDF Entreprises prioritizes the satisfaction of its customers to whom it listens and whom it surveys every time they contact it both in terms of how offers match needs, the monitoring of requests and the information and advice offered. In 2017, 88.7% of all customers were very or fairly satisfied on average, almost 10 points more than the previous year.

### **EDF and regional authorities, social housing landlords, local distribution companies ELDs and public service providers**

Against the background of regional reform and the energy transition, EDF offers customised solutions for local authorities and public institutions with decentralised decision-making powers (hospitals, universities and major graduate schools, chambers of commerce and industry, CROUS student service centres, ports and airports).

The EDF group is active for these customers in five areas:

- as a competitive market operator:
  - the supply of electricity and gas at market price, responding to their energy problems (proposal of offers and solutions adapted to the needs described in calls for tender),
  - the development of offers and services in terms of energy transition: local climate plans, eco-districts, local generation, street lighting, electric mobility, energy efficiency of buildings, etc.;
- with respect to its public service missions:
  - the conclusion of concessions agreements to supply electricity at the regulated sales tariff,
  - the supply of electricity at the regulated sales tariff,
  - the fight against energy poverty.

In 2017, 92% of all EDF Collectivités customers were very or fairly satisfied, 5 points more than the previous year.

### **Managing energy consumption with local authorities**

Agreements have been signed with local governments, covering the implementation of the energy transition in their regions. In addition, local authorities with the power to make decisions in the area of energy arrange specific actions in their region in matters concerning control of energy demand and renewable energies. A "Load Amount" device for social-housing lessors aims to improve the energy efficiency of social housing, and makes it possible for EDF to issue energy savings certificates. In 2017, more than 133,150 of which were for renovation work.

### **1.4.2.2.3 For sustainable cities and regions**

Energy developments for cities and regions are now naturally associated with sustainable development objectives: environmental impact, local economic activity and poverty constitute major preoccupations for local.

### **1.4.2.2.4 Customer data protection**

The protection of data belonging to EDF customers is a major component of the Customer Department's action plan to secure assets/goods and information systems.

Measures taken under the plan are presented every year to suppliers' governance bodies.

Special care is taken to make data processing compliant with regulations, such as the EU General Data Protection Regulation (GDPR), and to raise awareness among employees in general and entity managers in particular. For example 12 awareness initiatives were conducted in 2017 and 19 executives in the Customer Department received personal assistance.

Over a dozen vulnerability reviews were carried out in 2017 and security acceptance tests were regularly conducted to test for critical vulnerabilities in customer applications. Outsourced services likewise underwent a specific risk analysis.

Customer data are protected by means of specific measures. Advisers are regularly given instructions on how to keep data safe. Every year an internal audit on the capacity of the information systems to securely host customer data is conducted. It ensures that only employees in charge of customer relations have access to customer data. Particular and deliberate care has also been taken to implement measures to reduce the number of customer complaints relating to data protection. Examples include "unsubscribe from all" links and regular analyses of customer feedback to identify areas of improvement and customer preferences.

### **1.4.2.2.5 Public electricity distribution concessions at regulated tariffs**

Concessions hereby referred to cover two distinct public service missions:

- the development and operation of public distribution networks, which are the responsibility of Enedis in mainland France, excluding Local Distribution Companies (ELD) (see section 1.4.4.2 "Distribution – Enedis") and of EDF in the non-interconnected areas (ZNI);
- the supply of electricity to customers benefiting from regulated sales tariffs connected to the public distribution networks, under the responsibility of EDF for mainland France (excluding ELDs) and ZNIs. This mission is carried out in compliance with the commitments of the concession specifications and general terms and conditions of sale (subscription terms, payment and delivery terms, contractualisation, etc.).

Each concession contract in continental metropolitan France is co-signed by EDF, Enedis and the licensing authority, and concerns a municipality or a grouping of municipalities. These public service missions are executed in the framework of 509 concession agreements of which 50 are at departmental level.

Over the 2014-2017 period many concession agreements were negotiated and signed, in particular with the Seine-et-Marne and Vaucluse energy consortia, the Douaisis municipal association and the cities of Melun, Tours and Toulon. An amendment to its concession contract was signed on 14 April 2016 with the Sipperec syndicate, which gathers more than 100 local authorities in the greater Paris area, which notably extends the concession by 10 years. Several contractual negotiations were concluded in 2017, including with the Nice Côte d'Azur metropolis, the Grand Poitiers urban community, the Cher département (*via* its energy syndicate) and the town of Draguignan (Var département).

# 1. PRESENTATION OF EDF GROUP

## Description of the Group's activities

Work relating to drafting a new national concession agreement model carried out with the national representative organisations of the granting authorities continued and was finalized in 2017. On 21 December 2017 EDF, Enedis, the FNCCR (national federation of licensing authorities) and France Urbaine agreed to the new concession agreement model. Business in 2018 will be marked by negotiations with France's regions to renew concession agreements in general and the 20 concessions expiring by the end of the year in particular. An organisation and tools have been put into place, particularly in order to renew the concession contracts, mobilise both national and regional competences, develop the expertise of EDF's contacts in the contracting authorities, draw up each year the concession activity reports (CRAC) and respond to inspection requests from the granting authorities.

### 1.4.3 OPTIMISATION AND TRADING ACTIVITIES

#### 1.4.3.1 Role and activities of the Upstream/Downstream Optimisation & Trading Division (DOAAT)

The DOAAT is responsible for managing the balance of EDF's upstream/downstream electricity portfolio, optimising and securing the electricity gross margin created by this portfolio, as well as managing the associated physical and financial risks.

Management of electricity supply/demand can be broken down to real-time, within the framework set by the policies of extreme risk (volume risks) and of price risks, developed pursuant to the directives of the Group Risk Control Department, and validated by its Executive Committee (see section 2.1.2 "Risks related to the competitive and general context"). Climate variations affect this management. Hence, a fall in temperature of 1°C in winter leads to a rise in electricity consumption in France of the order of 2,400MW<sup>(1)</sup> and EDF's portfolio bears a large part of this thermosensitivity. In addition, depending on the run-off, the amplitude of hydraulic generation in the EDF scope, between one extreme year and another, can amount to around 20TW hours. The DOAAT ensures that it has, in all time-frames, sufficient power margins in order to enable it to meet its commitments in nearly all situations. To do this, it manages a set of leveraged actions: scheduling of maintenance operations of generation means (in particular nuclear), management of inventory (fossil fuels, hydro-electric reserves and customer load shedding), purchases and sales in wholesale markets via EDF Trading, which is in charge of market access on behalf of DOAAT (see section 1.4.6.3 "Optimisation and trading: EDF Trading"). DOAAT also manages the exposure of EDF's upstream/downstream portfolio to price variations in the energy wholesale markets (electricity, gas, coal, petroleum products) and in the CO<sub>2</sub> emissions licensing market, with the assistance of EDF Trading.

With respect to RTE, DOAAT plays the role of "balance responsible entity" on EDF's perimeter in mainland France. In this regard, EDF is committed to financially compensate RTE in the case of a deviation onto its balance group. The optimisation consists of offering RTE an offer schedule that is balanced with the demand, which makes it possible to minimise the supply cost of EDF's contractual commitments.

#### 1.4.3.2 Long-term electricity purchase and sales contracts

EDF maintains commercial relations through energy purchase or sales contracts with European operators.

These contracts are of many types, and confer:

- rights to the energy generated by facilities, primarily nuclear, in which the counterparties hold a participating interest over the duration of the exploitation of the facility (see section 1.4.1.1.1 "EDF's nuclear fleet in France");
- drawing rights for totally or partially guaranteed electrical power, for a duration generally comprised between 15 and 25 years.

#### 1.4.3.3 Regulated Access to Historic Nuclear Power (Accès Régulé à l'Énergie Nucléaire Historique, or ARENH)

Operational since 1 July 2011, the ARENH mechanism entitles alternative suppliers to buy electricity from EDF to supply their customers, once they have signed a framework agreement, at a regulated price and at volumes determined by the Energy Regulation Commission (CRE). This mechanism can also be accessed by network operators for their losses. The CRE is responsible for managing the mechanism and for calculating entitlements of which it notifies the co-contracting parties. Thus, suppliers wishing to exercise their right to access the ARENH submit a request to the CRE, sending it forecasts of their customers' consumption. The detailed forecasts, along with the entitlements calculated for each supplier, are only known to the CRE and the supplier. The payments are managed by the Caisse des Dépôts.

The price of the ARENH, determined by the Minister of Energy and the Minister for the Economy, upon proposal by the Energy Regulation Commission (CRE), has been maintained at €42/MWh since 17 May 2011. It is deemed to include the capacity certificates introduced in 2017.

The order of 14 November 2016 is amending the ARENH framework agreement, particularly in order to incorporate provisions related to the implementation of the capacity mechanism and to frame the conditions for early termination by suppliers. The revised framework agreement restricts the use of such unilateral termination faculty by making it applicable only in cases when the price of the ARENH is modified by more than 2%, when the framework-agreement is substantially modified or when changes in the regulations relating to the ARENH substantially and unfavourably affect the balance of the procurement terms for the Buyer.

In addition, Decree No. 2017-369 of 21 March 2017 relating to regulated access to historic nuclear power amended some of the provisions of the regulatory section of the French Energy Code on ARENH, in order to define the terms and conditions for implementing the "monotony clause". It thus addresses cases not provided for in the earlier wording of the French Energy Code, namely situations where there is no framework agreement or request for ARENH in the period before the current period. The lack of subscription or agreement is now considered as a zero volume subscription.

In 2017, EDF supplied around 82TWh to its competitors under the terms of the ARENH.

#### 1.4.3.4 Balance group dedicated to Purchase Obligations and selling on the wholesale market

EDF is a mandatory purchaser of the electricity generated by the generation facilities the government wishes to support and develop (renewable energy sources and energy efficient cogeneration). By law (Article L. 121-7 of the French Energy Code), the additional costs stemming from this obligation are offset for EDF on the basis of an electricity market benchmark price (concept of "avoided cost"). From 1 January 2017, the costs of managing these contracts have also been offset.

At its meeting of 9 October 2012 concerning the costs for 2011, the CRE indicated that: "In theory, the avoided cost should be reduced by the imbalance costs borne by EDF due to the unpredictable nature of a portion of the generation covered by the purchase obligation. Such imbalances, which were negligible in past years compared with consumption-related imbalances, are becoming more significant."

With the development of renewable energies, the cost generated by the difference between anticipated generation and actual generation has become significant. As a result, at its meeting of 16 December 2014, the CRE changed the formula for calculating EDF's avoided costs to include such imbalance costs. In order to make objective and independently identify such imbalances, the CRE asked EDF to establish a dedicated balance group.

A balance perimeter dedicated to the facilities subject to a Purchase Obligation contract was put in place on 1 July 2015. The DOAAT now organises the sale of the energy produced by the installations under Purchase Obligation contracts directly on the energy markets, which makes the management of this perimeter completely independent of that of the EDF portfolio. Thus, since 4 November 2015, electricity volumes under Purchase Obligations that can be forecast over the short-term (one day for the next, known as the "random component of the Purchase Obligations") are sold on EPEX Spot. As for the volumes which are foreseeable over the long term (share of the Purchase Obligations referred to as "quasi certain"), since

(1) Source: RTE.

January 2016 they have been sold *via* transparent and non-discriminatory requests for bids.

### 1.4.3.5 Capacity mechanism

Articles L. 335-1 et seq of the French Energy Code, originating from the NOME Law, institute the obligation for each electricity supplier to contribute in mainland France to the security of electricity supply, in compliance with a default criterion set by the government. For this purpose, each supplier must acquire capacity guarantees corresponding to its obligation, calculated by reference to the power and energy consumption of its customers during a peak period defined by RTE.

To comply with this obligation, each supplier must therefore get capacity guarantees from producers, which must certify all their means of generation, or from demand response managers.

On 8 November 2016, the European Commission gave its authorisation for the implementation, on 1 January 2017, of the French mechanism.

An initial market session, managed by EPEX Spot, took place on 15 December 2016 in order to exchange capacity relating to 2017. The price stood at €10/kW which constitutes the market reference price for 2017. A second EPEX Spot auction was held on 27 April 2017 which also related to the capacity for 2017 with the price set at €10.42/kW.

The first auctions of capacity guarantees on the European Power Exchange (EPEX Spot) took place on 9 November and 14 December 2017. The clearing prices stood at €9.31/kW and €9.38/kW respectively, resulting in a market reference price for 2018 capacity of €9.34/kW (arithmetic mean of two auction prices).

The first auction making it possible to exchange capacity relating to 2019 also took place on 14 December 2017: the clearing price amounted to €13/kW. The reference price for 2019 capacity, however, will not be known until the end of 2018.

Once up and running, a number of other auctions to exchange capacity will be held beginning four years before the delivery year and ending three years thereafter. Thus, auctions will thus take place in 2018 to exchange capacity for 2019 to 2022 as well as for 2017 and 2018.

Over-the-counter transactions remain possible. Similarly, for integrated players such as EDF, which possess capacities as producers and have an obligation as vendors, internal capacity transfers are authorised in order to cover their obligations. They will be made at the market price.

The DOAAT, in charge of the management of this new system, proceeded with the certification of all the EDF means of production in France for the next few years and the contractual demand response capacities with the customers. If necessary, these certifications will be the subject to regular rebalancing, either upwards or downwards. Similarly, the DOAAT will proceed with the certification and the necessary rebalancing of the means of generation subject to purchase obligations (OA) and sale obligations on the market for associated capacity guarantees.

As on the Energy market, the sales/purchases of capacity organised by EPEX Spot managed by the DOAAT on behalf of EDF, are carried out *via* EDF Trading.

## 1.4.4 TRANSMISSION AND DISTRIBUTION ACTIVITIES IN FRANCE

The transmission and distribution of electricity in mainland France are regulated activities. They are carried out by RTE and by Enedis, subsidiaries which are managed with complete independence, within the meaning of the provisions of the French Energy Code.

### 1.4.4.1 Transmission – Réseau de Transport d'Électricité (RTE)

Created on 1 July 2000 and a subsidiary since 1 September 2005, the Electricity Transmission Network (RTE) is the owner and operator of the French electricity transmission network, which it operates, maintains and develops. With over 100,000 kilometres of high and extra high voltage circuits and 50 cross-border lines, this is Europe's largest network. Its geographical location places it at the core of the European electricity market. RTE guarantees the correct operation and safety of the electricity system, and provides free and fair access to all the network users. The company also pays special attention to supporting the development of renewable

sources of energy in France and their integration into the electricity system, which requires the development of the transmission network and interconnections.

On 31 March 2017, EDF, Caisse des Dépôts et Consignations and CNP Assurances finalised the sale to Caisse des Dépôts and CNP Assurances of a 49.9% stake in Co-entreprise Transport d'Électricité (CTE), a holding company which has held 100% of RTE's share capital since 23 December 2016.

RTE is indirectly owned (50.1%) by EDF at 31 December 2017, and due to its specific conditions of governance (see section 1.4.4.1.1 "Organisation of CET and RTE"), RTE was not fully consolidated by the Group, but rather consolidated using the equity method.

#### 1.4.4.1.1 Organisation of CTE and RTE

CTE is a public limited company (*société anonyme*) with a Board of Directors, owned by EDF (50.1%), Caisse des Dépôts (29.9%) and CNP Assurances (20%). CTE holds 100% of the capital of RTE, a public limited company (*société anonyme*) with both an Executive Board and a Supervisory Board.

In accordance with its articles of association, the sole purpose of CTE is the acquisition and holding of RTE shares, and more generally, all commercial, financial, intangible and tangible property transactions relating directly or indirectly to its corporate purpose or which might facilitate its achievement or stimulate business growth.

The eight members of CTE's Board of Directors include four EDF representatives, two Caisse des Dépôts et Consignations representatives and two CNP Assurances representatives. They are appointed for six years. RTE's compliance auditor also attends meetings of CTE's Board of Directors.

RTE's Supervisory Board is comprised of twelve members appointed for five years:

- eight members appointed by the Shareholders' Meeting:
  - two State representatives, including the State as a legal entity, represented by an individual,
  - six representatives of the shareholder;
- four members elected by the staff.

As the composition of the Supervisory Board was modified by the acquisition of holdings by CdC and CNP Assurances, the CRE conducted a review to determine whether the requirements which enabled RTE to maintain its status as an independent transmission network operator (the so-called "ITO" model) had indeed been met. More specifically, the CRE examined the internal organisation and governance rules of the Transmission Network Operator (TNO). After taking into account the opinion of the European Commission, this review led the CRE to adopt the decision of 11 January 2018 to maintain RTE's certification.

A Government Commissioner was also appointed and attends Supervisory Board meetings in a consultative capacity.

RTE's Executive Board is made up of five members, who perform their work under the supervision of the Supervisory Board, within the limits fixed by the French Energy Code and RTE's articles of association. After the consent of the Energy Minister, the Supervisory Board appoints the Chairman of the Executive Board and upon the latter's proposal, it appoints the other members of the Executive Board.

#### 1.4.4.1.2 RTE's activities

In France, RTE manages the public transmission network and carries out its missions under the conditions set out in model specifications approved by applicable decree until 2051. In accordance with the French Energy Code, transmission network operators must be certified according to a process associating the CRE and the European Commission, which aims to ensure that the entity concerned fulfils the conditions of independence set out by this Code. RTE obtained certification from the CRE in 2012 as an ITO (Independent Transmission Operator). Following the change in its share ownership, RTE applied to the CRE in 2017 to reexamine its certification and thereby maintained its certified status following a CRE decision dated 11 January 2018.

Thus RTE manages the transmission infrastructure, guarantees access to the transmission network and manages energy flows.

RTE has had to face a variety of challenges in its mission as an electricity transmission network operator: integration of the European market, extensive restructuring of the generation fleet, societal changes reinforcing the constraints of integrating new infrastructure of general interest and maintenance of its industrial facilities to meet the requirements of customers and the community at large.

# 1. PRESENTATION OF EDF GROUP

## Description of the Group's activities

As part of the transparency sought by RTE, the *éCO<sub>2</sub>mix* application, launched in 2011 and publishing data relating to the consumption and generation of electricity over the whole of France, is experiencing increasing success, with 10 million consultations per annum and direct access to 15 million data-points, which bears witness to the general public's interest in energy issues. This application contributes to better informing all citizens and to raising their awareness of the challenges of the new energy policies.

### 1.4.4.1.2.1 Energy balance

#### 2017 Summary

In 2017, gross consumption stood at 482TWh, *i.e.* -0.3% compared to the previous year. Temperatures in 2017 were higher than those recorded last year (+0.6°C), which accounts for part of this decrease. During the cold wave on 20 January, electricity consumption peaked at 7 p.m., with power output of 94GW. This represents the third highest peak ever recorded in France. Although the 2012

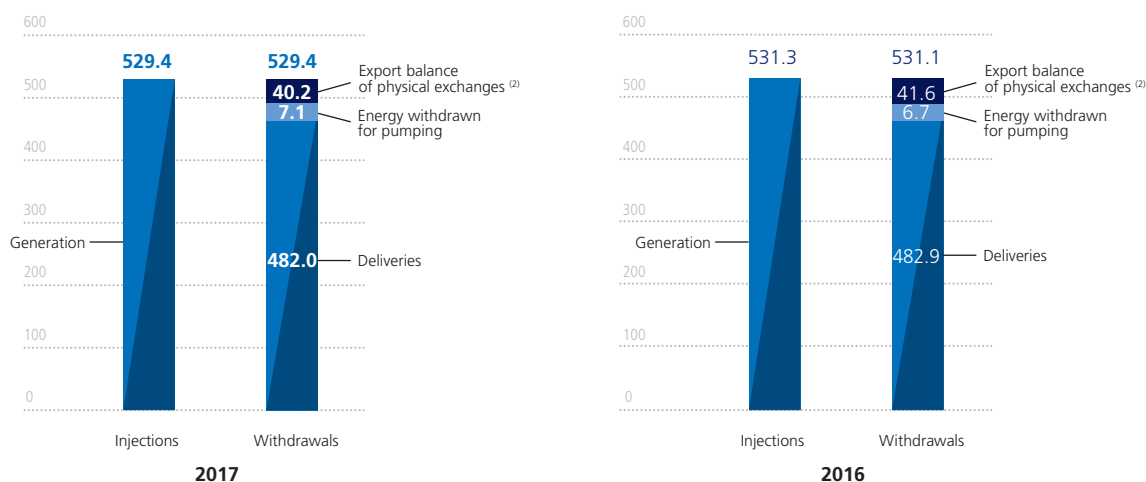
thermal regulations will moderate future temperature sensitivity, the sensitivity of consumption to temperature remains around 2,400MW/C in winter.

Excluding the energy sector, adjusted consumption reached 475TWh in 2017. For the seventh consecutive year, annual electricity consumption remained stable in France.

Consumption of major industrial customers directly connected to the public transmission network amounted to 68.2TWh in 2017. This represents an increase of more than 3.5% compared to 2016. An increase in the consumption patterns of major industrial customers has been noted since May 2016, reflecting the sector's renewed business activity.

Equivalent outage time is an indicator used to measure the quality of supply of electricity by RTE. In 2017, equivalent outage time was 1mn 27s excluding exceptional events. This result, coming in below the 2mn 48s threshold set by regulatory incentives, confirms the measures put in place by RTE to improve the quality of supply of electricity to its customers.

#### → Simplified energy flows on the RTE network <sup>(1)</sup> In TWh



<sup>(1)</sup> 2017 provisional data (the final data on electricity generation for 2017 will be available on RTE's website in July 2018: [www.ret-france.com](http://www.ret-france.com)).  
<sup>(2)</sup> Including water rights and exchanges via distribution network.

### Renewable energies continue to grow in order to foster the energy transition

The installed wind turbine capacity amounted to 13,559MW at 31 December 2017. Wind power generation saw a sharp increase of 14.8% compared to 2016. Driven by the increase in installed capacity, wind power generation benefited from favourable weather conditions at the end of the summer and especially in December. A new maximum wind turbine production rate was recorded on 30 December at 1:30 p.m. with power output of 11,075MW. The associated load factor reached 81.8%.

With 887MW of new solar capacity connected in mainland France, installed solar capacity reached 7,660MW. Solar generation increased 9.2% compared to 2016, in line with the increase in installed net capacity. Benefiting from the hours of sunshine during the spring months, monthly electricity generated by the solar power segment exceeded 1TWh for more than five consecutive months, setting a new record.

### The French balance of trade showed lower exports at the end of the year

The French balance of trade amounted to 38TWh in 2017. This is an even lower level than in 2016 which was already remarkably low. The results for January and November even showed imports, with -0.95 and -0.83TWh respectively. Such monthly commercial balances had never previously been reached, even in February 2012 (-0.72TWh).

The position of cross-border contractual exchanges in 2017 is as follows:

- France's trade surplus with Spain was up sharply, reaching 12.5TWh, a record level;
- as in the previous year, France was a net importer from the Central West Europe region, with a trade deficit of 10.9TWh: this is explained by the reduced availability of the French nuclear fleet and the abundance of wind power generation in Germany;
- France continues to have a trade surplus with Switzerland (10.3TWh);
- the trade surplus was 18.2TWh with Italy and 7.9TWh with Great Britain. New interconnection projects are in particular being planned on these two borders.

### 1.4.4.1.2.2 Maintenance of the transmission infrastructure

RTE manages the assets of the transmission network through daily maintenance, emergency repairs and replacement of structures that are at the end of their useful life or are damaged.

Implementation of a mechanical safety programme in response to extreme weather events to make the electricity grid more robust and more resilient was completed at the end of 2017, in accordance with the commitments made with the relevant Ministry following the storms of 1999. This programme cost close to €2.8 billion. The low impact of these latest storms proves the programme's effectiveness, especially regarding the role played by anti-cascading safety towers. At the end of 2017, 100% of target connections were automatically secured. Starting in 2018, RTE will ensure the continued existence of this secure network.

#### **1.4.4.1.2.3 Development and completion of new capital investments**

Furthermore, RTE continues to develop and renew the network. The projects studied and implemented fall within the dynamics of the growing need to meet the challenges of energy transition. RTE draws up an annual investment programme that is submitted to the CRE. In 2017, RTE's total investments within the scope regulated by the CRE amounted to €1,393 million. The principal investments included: the safety net in central Brittany and the "2 Loires" project to rebuild the 225kV line between Auvergne, the Rhône Valley and the Massif Central; the continuation of construction work on the French side of the direct current line between France and Italy passing through the Fréjus safety tunnel; the restructuring of the 225kV network in Haute Durance; and the start of construction work on "IFA 2", the new direct current line between France and the UK.

Out of a concern to best optimise the existing assets and to limit the impact of its construction works in the regions as much as possible, RTE dedicates approximately two thirds of its capital investments to the adaptation of existing structures.

RTE's 2018 investment programme approved by the regulator amounts to €1,492 million. The 2018 investment programme concerns the continuation of significant investment in developing and renewing the network, as well as developing and updating the IT systems, in particular in light of the changing environment associated with energy transition and European market integration.

RTE's investments are also made in a context of growing needs for meeting the challenges of maintaining the power supply security level, acceptance of new generation means (including intermittent renewable sources of energy), integration of European electricity markets and gradual increase in the need to renew infrastructures.

In 2017, the Regulated Assets Base (RAB) increased by €522 million, up from €13,598 million as at 1<sup>st</sup> January 2017 to €14,119 million as at 1<sup>st</sup> January 2018 <sup>(1)</sup>. As a reminder, RAB is remunerated by the tariff at the weighted average cost of capital of 6.125% before tax on the TURPE 5. It represents RTE's industrial assets, net of investment subsidies, and is calculated excluding property, plant and equipment in progress (which until the end of 2012 were remunerated at 4.8% by the TURPE 3 tariff, then at 4.6% for the period from 2013 to 2016 in accordance

with the CRE's pricing decision of April 2013, and which will be remunerated at 3.7% since 2017 in accordance with the TURPE 5 decision of 17 November 2016).

#### **1.4.4.1.2.4 Operation of the electricity system**

##### **Management of the electricity system**

RTE manages the flows on the transmission network in real time, and makes use of the resources available to it through the adjustment mechanism to ensure the balance between supply and demand in real time. The cost corresponding to the adjustments made by RTE and due to the negative differences between the projected flows and those already realised is passed on to the "Balance responsible entities" (producers, traders, suppliers, etc.) in proportion to their difference. In the case of a positive difference, RTE compensates the balance responsible entities financially.

##### **Management of the interconnections**

RTE manages access to international interconnections in collaboration with the neighbouring European transmission network operators. These interconnections make it possible to ensure the transit of energy from one country to another and the operating safety of the electricity transmission networks, to develop the European electricity market, by enabling an electricity supplier to sell its energy to a customer in another European Union country, by taking advantage of the differences in the timing of peak load on either side of the border, and to better pool the means of generation at the European level.

##### **Network coordination in Europe**

In December 2008, RTE and ELIA <sup>(2)</sup> created a common company named Coreso, which aims to coordinate the operation of electricity networks comprising France and Belgium. The creation of Coreso fulfils the need of reinforcing the operational coordination between transmission network operators (TNO) expressed both by the European Commission and by the players of the electricity market. Coreso must allow better integration at the regional level of generation from renewable sources and guarantee secure management of rising cross-border flows.

National Grid, the British network operator, Terna and 50 hertz, transmission network operators in Italy and Northern and Eastern Germany, REN, the Portuguese network operator, and recently REE, the Spanish network operator, joined Coreso.

1.

(1) Amounts still to be confirmed by the CRE, calculated on the basis of what has been realised.

(2) Elia is the Belgian electricity transmission network operator for high voltage (from 30,000 to 380,000 Volts).

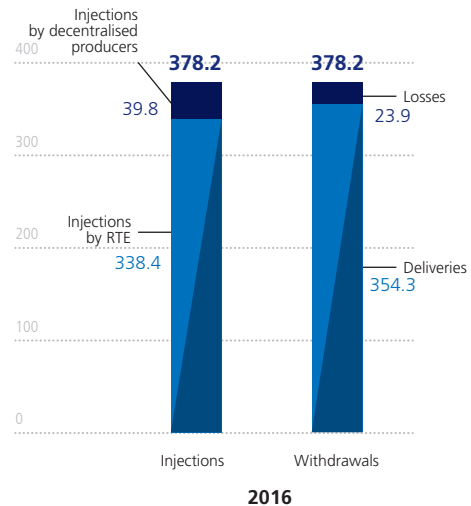
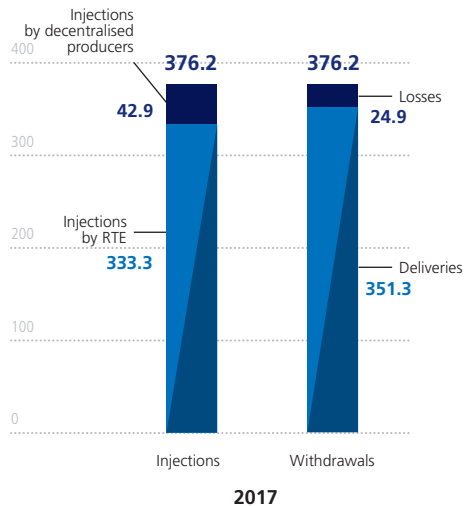
#### 1.4.4.2 Distribution – Enedis

Enedis' main objective is to operate and develop the public electricity distribution network, guaranteeing its security and safety, and overseeing the balance of electricity flows at all times. Enedis has been in operation since 1 January 2008. Initially called ERDF, it changed its name to Enedis on 1 June 2016. Enedis services around 95% of the population in mainland France. The remaining 5% are provided by Local Distribution Companies (LDCs).

In 2017, Enedis distributed electricity to more than 36.2 million customers (points of delivery) and provided for the injection from 376,941 production sites in mainland France, thanks to a network of around 1.36 million kilometres.

At 31 December 2017, Enedis employed 38,888 people.

#### Electricity volumes on the Enedis network In TWh



Electrical losses are inherent to the functioning of the distribution network and mainly result from physical effects which are directly dependent on the amount of electricity delivered. Enedis must compensate these losses to complete the amount of energy delivered to the final customers. In 2017, losses amounted to 24.9TWh, i.e. a rate of 6.6% of electricity injected into the network. The cost for Enedis of the compensation of the losses was €1,066 million in 2017. To compensate these losses, Enedis buys the corresponding electricity from the wholesale market, either through organised market platforms, or through calls for tender open to around 20 qualified suppliers. Since 2014, Enedis can benefit from ARENH deliveries for its electricity purchases to offset its losses. For 2017, no ARENH product was delivered to offset its losses, given the price levels of standard products, which proved to be more favourable than ARENH.

Technical specifications: the distribution network for which Enedis is the concession holder (see section 1.4.4.2.2 "Distribution activities") is, at 31 December 2017, made up of around:

- 640,688 kilometres of A-type high-voltage (HVA) lines of 20,000 volts;
- 717,090 kilometres of low-voltage (LV) lines of 400 volts;
- 2,262 HVB/HVA source substations;
- 783,262 HVA/LV transformer stations.

##### 1.4.4.2.1 Organisation of Enedis

Distribution activities on French soil are, pursuant to the legal framework, almost exclusively conducted by Enedis, a French public limited company (*société anonyme*) with an Executive Board and a Supervisory Board responsible for the management of the public electricity distribution network.

Pursuant to Directive No. 2003/54/EC, the principles of which are applied in Directive No. 2009/72/EC of 13 July 2009, when the public distribution network operator is part of a vertically integrated company, its organisation and decision-making must be legally independent from other activities not related to distribution. Within this framework, the principle adopted by EDF and Gaz de France, now Engie, led them to spin out their distribution network. Enedis and GRDF

share a "common service" pursuant to the legal framework (see section 1.4.4.2.3 "Service shared by Enedis and GRDF").

Pursuant to the Law of 9 August 2004, the business of public electricity distribution network operator was turned into a subsidiary in 2007.

The Supervisory Board of Enedis comprises fifteen members, of which eight are appointed by the Ordinary Shareholders' Meeting, five are representatives of the employees elected in accordance with the conditions set out in Law no. 83-675 dated 26 July 1983 relating to the democratisation of the public sector, one member is appointed by the French State by virtue of Articles 4 or 6 of Ordinance no. 2014-948 dated 20 August 2014, and one, representing the organising authorities for the public electricity distribution network, is appointed by decree in application of Article 153 of Law No. 2015-992 relating to energy transition for green growth. In 2017, the Enedis Executive Board was made up of five members who performed their work under the supervision of the Supervisory Board. With effect from 11 January 2018, a new Enedis Executive Board was set up and is composed of two members.

In application of the possibility offered by Ordinance No. 2014-948 dated 20 August 2014 (Article 15) and in compliance with Decree No. 2015-38 dated 19 January 2015, the French State appointed by a Decree dated 4 February 2015 a Government Commissioner for the purposes of attending the meetings of the Supervisory Board of Enedis.

On 1 June 2016, the business name of the public distribution network operator was changed to Enedis, as a replacement for ERDF. This new name reflects the Company's strong commitment to the energy transition in the wake of COP 21. It will also perform the profile of the network operator and clarify its purpose, as the CRE recommended.

##### Enedis' missions in France

Enedis, pursuant to the conditions set by law and the concession contracts signed with each of the public electricity distribution contracting authorities (see section 1.4.4.2.2 "Distribution activities"), performs its missions as the public distribution network operator in mainland France.

These missions are:

- define and implement operational, investment and development policies in relation to the electricity distribution network;
- provide connection and access for users to these networks under objective, transparent and non-discriminatory conditions, as well as inter-connection with other networks;
- provide users with the information needed to access the network efficiently (information protected by regulations or law excepted);
- oversee relations with the energy regulation authorities (Ministry of Energy, the Energy Regulation Commission (CRE), public distribution contracting authorities) in line with its activities;
- oversee relations with local authorities;
- negotiate, conclude and manage concession contracts;
- operate, service and repair the electricity distribution networks;
- design and build infrastructure, as well as manage work on the networks;
- carry out metering activities for users connected to the networks, particularly as regards supply, installation, meter inspection, maintenance and renewal of metering devices, as well as managing data activities and any other missions relating to its work as a whole;

- implement energy efficiency actions and promote the insertion of renewable energies onto the network;
- ensure the monitoring of the load sharing perimeters;
- be the guarantor for the distribution and accounting for the energy flows between the network user players, and the fair compensation of losses on these networks;
- provide services for the LDCs, distributors and organising authorities mentioned respectively in sections III and IV of Article L.2224-31 of the French Local Authorities Code.

#### 1.4.4.2.2 Distribution activities

Enedis' business is based on a number of activities: manage, in its capacity as the concession holder, the assets under concession; run and maintain the network in such a way as to ensure the continuity of supply; carry out work on the network (in particular, network connection, reinforcement and renewal work); provide access to the network to all users in the framework of contractual provisions in force; and manage the meter fleet, as well as obtaining, processing and transmitting data on network user consumption.

#### Change in investments

In 2017, Enedis invested €3,767 billion, of which €1,411 billion were mainly devoted to connections for new customers and producers, as well as to the reinforcement of the network. In addition, the contracting authorities invested €721 million in 2017. In all, almost €4.5 billion were invested on the distribution networks in 2017 in mainland France.

#### GROSS INVESTMENTS MADE BY ENEDIS:

(in € millions)	2017	2016
Connections and reinforcement	1,411	1,408
Regulatory, safety and transmission channel obligations	402	387
Network modernisation <sup>(1)</sup>	1,591	1,316
Work instruments and operational resources	363	351
<b>TOTAL INVESTMENTS OF ENEDIS</b>	<b>3,767</b>	<b>3,462</b>
<b>WORK ALLOWANCES BY THIRD PARTIES AND LOCAL AUTHORITIES <sup>(2)</sup></b>	<b>721</b>	<b>703</b>
<b>TOTAL NETWORK INVESTMENTS</b>	<b>4,488</b>	<b>4,165</b>

(1) Of which Linky: €612 million in 2017 and €318 million in 2016 (generalisation costs and those related to post experimentation).

(2) After deducting PCT <sup>(a)</sup> and Article 8 <sup>(b)</sup>.

(a) PCT (portion covered by the tariff): portion paid to project manager contractors from the contributions to the delivery tariff for financing a connection.

(b) Article 8 of Annex 1 of the concession specifications relating to the integration of works into the environment (for example, the work to bury lines).

The additional resources thereby committed are dedicated to the quality of the service, to securing the networks, to the security and preservation of the environment, areas where the identified expectations of customers, local authorities and concession authorities are particularly strong.

This level of investment allows Enedis to carry out asset renewal programmes.

To complement these investments, Enedis continues its efforts in the preventative maintenance of networks, in particular for work relating to tree topping. This came to €327 million in 2017 (compared to €332 million in 2016).

#### Quality of service

Quality of service is one of Enedis' main objectives. In 2017, the average outage time excluding transmission incidents and excluding exceptional incidents was 65 minutes which is a good result for a year marked by climate variations. The quality of service provided is also reflected by maintaining steady voltage levels, kept as close as possible to the level set by regulations, and by minimising the number of outages.

To respond to large-scale incidents, Enedis relies on an Electricity Rapid Intervention Force (FIRE), which allows it to mobilise, at any time, in an affected region, the teams and resources from other regions in order to restore customers' electricity as rapidly as possible. In 2017, FIRE was deployed on four occasions: in January, when Cyclone Egon lashed both Normandy and Picardy; in early February, when three successive windstorms, named Kurt, Leiv and Marcel, impacted the Nouvelle-Aquitaine region in southwestern France; in early March, when Storm Zeus

battered a large portion of France, from Brittany to the Côte d'Azur; and in December, when Storm Anna struck the regions of Pays de la Loire, Brittany and Hauts de France.

Enedis support teams were also sent to Ireland as well as to the French West Indies (Guadeloupe, Saint-Martin and Saint Barthélemy) when Hurricanes Irma and Maria struck.

As regards insurance cover for the protection of the overhead distribution network against the effects of large scale storms, see section 2.5.5.3 "Storm cover".

#### Development of renewable energies

Over the Enedis perimeter, the number of solar panel generation installations connected to the network grew again: in 2017, an upswing in photovoltaic connections was observed with 755MW of new photovoltaic facilities connected (compared to 540MW at the end of 2016), the increase in wind power generation connected to the public distribution network has also continued, with 1,300MW connected in 2017 (compared to 1,200MW in 2016).

At the end of 2017, a total of around 18.2GW in photovoltaic and wind power generation was connected to the Enedis grid, made up of 6.5GW from photovoltaic plants and 11.7GW from wind power generation. To the power thus generated are added other sources of power generation, in particular "historical" hydropower plants (1.5GW), cogeneration (2.2GW), biogas, biomass and dispatchable fossil-fuel thermal. In all, at the end of 2017, the generation fleet connected to Enedis was around 23.7GW.

In 2017, more than 11,000 photovoltaic self-consumption facilities were also connected, representing close to 60% of the year's connections for small producers.

In addition, Enedis has continued its efforts to develop capacities for accepting renewable energies, by implementing construction work on sources as part of the regulatory framework in the regional plans for the grid connection of renewable energies.

#### Electricity market

The French electricity sales market has been open to competition for all customers since 1 July 2007.

54 electricity suppliers, operating on the French market, signed a contract with Enedis. This contract establishes the terms and conditions for the supplier and the distributor in the event that a customer subscribes to a single contract covering the supply and delivery of electricity.

The supply market is facing sharply increased levels of competition. This is especially the case for subscribed power supply greater than 36kVA, for which the elimination of regulated sales tariffs at the end of 2016 resulted in a sharp acceleration. The same is the case for subscribed power supply below 36kVA, which is also facing growing competition.

#### Concessions

At 31 December 2017, Enedis and EDF were co-concession holders of 509 concessions contracts, covering around 95% of the population. The concession contracts are generally concluded for a period of 20 to 30 years.

In France, public electricity distribution is operated under a concession plan that derogates from common law on local public service concessions. Enedis is thus designated by the law (Article L. 121-4 of the French Energy Code) to carry out the development and operation of the public distribution networks (rational service of French territory by public distribution networks, connection and access in accordance with non-discriminatory conditions to the public distribution networks). The company carries out this role over the majority of French territory, with the exception of the zones which are not interconnected to mainland France, in which this same role is the responsibility of EDF, and of the exclusive service zone of the LDCs (Local Distribution Companies).

On 21 December 2017, FNCCR, France Urbaine, EDF and Enedis signed a framework agreement based on a new concession agreement model. Twenty-five years after the 1992 agreement with FNCCR, this new agreement provides an opportunity to modernise the relationship between Enedis and contracting authorities over the long term. This new standard agreement embodies the principles of the French concession model: public service, regional solidarity and national optimisation, while at the same time taking into account issues involving energy transition. The framework agreement includes France Urbaine which represents municipalities, large urban inter-municipalities and cities of which the majority of the members have contracting authority status for the public distribution of electricity.

Pursuant to Article L. 334-3 of the French Energy Code, ongoing concession contracts are considered as jointly signed by the contracting authority (local authority or public cooperation institution), by EDF (or territorially competent LDC) for the "regulated tariff supply" portion, and by Enedis (or territorially competent LDC) for the "distribution network" portion. When concession contracts are renewed or amended, they are co-signed according to these terms.

Within the limits fixed by the law and by the jurisprudence, the contracting authorities are the owners of the distribution networks which constitute returnable assets<sup>(1)</sup>.

See also sections 1.5.2.2.5 "Public electricity distribution concessions at regulated tariffs" and 1.5.6.2.7 "Regulations applicable to public procurements".

#### 1.4.4.2.3 Service shared by Enedis and GRDF

The service shared by Enedis and GRDF, defined by Article L. 111-71 of the French Energy Code, sets out, in the electricity and gas distribution sector, to build

installations, manage works projects, operate and provide maintenance for the networks, and conduct metering operations. It does not have the status of a legal entity.

Enedis and GRDF are related through an agreement that sets out their relations in the framework of this common service, the scope of said service and the sharing of costs resulting from it. Concluded for an open-ended period, it can be revoked at any time, provided a prior notice of 18 months is given, during which the parties commit to renegotiating. It is updated regularly.

In July 2014, Enedis and GRDF signed a joint communiqué taking note of the scheduled disappearance of the joint activities of meter reading and interventions on meter panels. To date, Enedis has favoured organisation through the regional directorates integrating all its operational missions at local level. A more detailed fabric is reserved for local activities.

On 23 October 2017, Enedis and GRDF made a decision to examine the issue in order to improve the organisation of support and logistical activities.

#### 1.4.4.2.4 Future challenges

##### Smart grids and smart meters (Linky)

Enedis, guarantor of the electricity distribution public service, invests at all times to develop, modernise and secure the electrical network. The adaptation of the electricity grid to the new needs of society is a major strategic challenge. To achieve this, Enedis has started the industrial deployment of the Linky system, based on a new generation of meters, called "smart meters" that can receive orders and send data without the physical involvement of a technician. This system represents the first stage of smart grid implementation or "Smart networks". It involves equipping the distribution network with connected objects, including the Linky meters, in order to integrate renewable energy electricity generation, which has undergone a significant expansion, further ensuring the balance between generation and consumption at all points of the electricity grid, and enabling suppliers to offer new energy solutions to their customers.

Following a successful experiment, approved by the public authorities, on 1 December 2015, Enedis launched the first phase of the generalised deployment of the Linky meters. Having successfully installed 3 million smart meters, the first stage of the deployment was completed on 6 March 2017. At the end of December 2017, more than 8 million points of delivery were thus equipped with a Linky electricity meter. As a reminder, the initiation of the second phase of deployment was approved by the Enedis Supervisory Board in June 2016, with the objective of replacing 90% of the old meters, or around 34 million units, by the end of 2021.

The amount of capital investment approved by the Supervisory Board of Enedis in June 2016 amounted to €4,455 million<sup>(2)</sup> over the period 2014-2021. At the end of 2017, the cumulative investment already carried out amounted to €1,119 million for the full deployment.

The rate of fitting Linky meters went from less than 3,000 meters per day at the beginning of 2016 to around 27,000 meters per day at the end of 2017, reaching the expected rate and enabling phase 2 of the deployment to be started with confidence in 2018, during which 7.9 million meters are expected to be fitted.

See also section 1.5.3.2 "French legislation: the French Energy Code".

##### Foster energy transition

Concurrently, Enedis is conducting large scale testing of a number of solutions to provide a greatly modernised network to consumers and companies. This work covers the operation of low- and medium-voltage networks, the integration of renewable energies and electric vehicles, storage management, voltage stability, etc. The challenge for the distributor is to support energy transition while developing the networks at the lowest cost for society. Thanks to new technologies, a more detailed and responsive oversight is possible, based on a better understanding of consumption, generation and the state of the network. This "intelligence" makes it possible to avoid over-investment by adjusting it to consumption peaks, while guaranteeing the reliability of the network, pursuant to Enedis' double public service objective of performance and security.

(1) Returnable assets are those that must imperatively be returned to the granting authority at the end of the concession. Such property is deemed to belong to this local authority from the outset. They are defined by the concession contract or even by the law. By default, generally qualified as such are the assets that are indispensable to the performance of the concession service.

(2) The 5.7 billion Euros amount mentioned by the Cour des Comptes in its annual report published on 8 February 2018 corresponds to estimates made by the Cour des Comptes on a scope that is different from the one taken into account by Enedis and the CRE for the deployment of Linky: this amount covers for example a period beyond 2021 and includes future investments which will be made by the Local Distribution Companies to deploy their own smart meters.



The projects already completed have yielded results in areas such as innovation for the network, flexibility and the integration of renewable energies. In 2017, Enedis also proposed technical solutions for individual and collective self-consumption tested under real conditions in multi-family housing and commercial buildings, storage, data management and economic models.

### Industrialising technical solutions

Enedis has continued the industrialisation of cutting-edge solutions in smart grids and is engaged in a roadmap for the implementation of a "foundation network" by 2018. This concerns all the components of the network with digital technologies in the source control stations (PCCNs, or Digital Command and Control Stations, which provide central management of the network's transmission automation and FARs, or Functions for Automation of the Network, which facilitate management of the insertion of electricity from renewable sources), the distribution stations (HVA/LV Smart stations), the sensors on the network and all the information system tools (forecast, management, planning management, Linky network, etc).

This roadmap aims to pursue the modernisation of the network, to facilitate the insertion of renewable energies and to assist all the players in the electricity system.

### Carry out the digital switch-over and the management of the data

Enedis is participating in the digital transformation of the electricity system by modernising the networks in order to assist with the energy transition and innovating in order to make use of mass data. For this purpose, a digital programme has been undertaken by Enedis since 2014, based on four vectors: the management of the infrastructure (remote management, predictive management, etc.), dialogue with outside parties, the management of data from electricity meters and sensors and the social and cultural transformation of the Company, which is providing its employees with new tools connected to the Information Systems in order to deliver better services to the customers. Enedis has organised itself to process, exploit and accumulate the collected data and provide it to the various players in the electricity system (suppliers, transmission network operators, local authorities, new entrants) in compliance with the confidentiality and security regulations.

### Acting for the "cities of the future" or smart cities

Self-consumption, self-supply, electric mobility, smart meters, data management and the optimisation in real time of networks - these are the new challenges facing electricity distributors in relation to regions as a whole, and especially cities. This has now become a reality.

Enedis is promoting the emergence of DSOs (distribution system operators), facilitators of energy transition for all uses at every level, including local (cities,

neighbourhoods, etc), not only in terms of the networks but also the associated data, necessary for regional players and cities aiming to become smart cities.

The Open Innovation policy developed by Enedis has become particularly popular in local communities which have organised many energy, technological and environmental initiatives. As a result, these communities will be able to contribute their shared knowledge (start-ups) that Enedis could then use for its own research and innovation, especially in the areas of smart grids and data.

### Focus on international expansion

In the field of smart grids, Enedis has gone from a simple concept to demonstrators, then to industrialisation with a high level of maturity in just a few short years. In addition to the smart meters being deployed, the objective is a large-scale deployment of smart grid solutions on the networks in major geographic regions.

Enedis has structured the French industrial sector for smart electricity grids with other French players in this sector through the "Thinksmartgrids" association which now numbers around one hundred members (major industrial players, start-ups, universities, research institutes, etc.).

The goal of the French smart grids team is to now become the European leader and one of the global leaders. Based on projects completed in France which showcase French industrial excellence, Enedis promotes French savoir-faire across borders.

### 1.4.4.3 Island Energy Systems

Island Energy Systems (IES) brings together the electricity systems operated by EDF which are not interconnected, or only slightly connected, to the mainland: mainly Corsica, the overseas departments (except Mayotte) and the overseas territories of Saint-Barthélemy, Saint-Martin and Saint-Pierre-et-Miquelon.

EDF's organisation in each of these regions is therefore based on maintaining an integrated structure, providing both part of the generation and the entire range of functions of supply and demand balance manager, of network manager (HVB, HVA and LV) and of supplier.

The additional generation costs in these territories compared with equivalent costs on the mainland, which the legislator considers as a public service expense, are offset by the Contribution to the Public Electricity Service (see section 1.5.2 "Public service in France").

Tariffs for Using the Public Transmission and Distribution Networks (TURPE) apply to users connected to the distribution networks (See also section 1.5.3.2 "French legislation: the French Energy Code").

### IES KEY ELEMENTS IN 2017:

	Data at end-2017	
	Total	of which Corsica
Headcount <sup>(1)</sup>	3,425	762
Number of customers	1,153,052	256,563
Network length (in km)	36,834	11,791
Net installed capacity of the EDF fleet (in MW)	2,062	559
of which hydropower fleet and other renewable energy sources	440	189
of which thermal fleet <sup>(1)</sup>	1,622	369
Output <sup>(1)</sup> (in GWh)	5,907	1,346
of which hydropower output	1,305	339
Purchases of energy from third parties (in GWh)	3,947	937
of which renewable energies, including bagasse	1,346	257
of which other energies	2,601	680
<b>TOTAL ENERGY GENERATED BY EDF AND PURCHASED FROM THIRD PARTIES</b>	<b>9,854</b>	<b>2,283</b>

(1) Data including EDF Production Électrique Insulaire (PEI), a wholly-owned subsidiary of the EDF group, which is in charge of renewing the thermal power plants in Corsica and overseas departments. Thermal installed capacity remained stable between 2016 and 2017.

In view of the difference within these systems between the megawatt-hour generation costs and the sale price at the equalised tariff, EDF's sales activities look to implement, alone or in partnership with the Agency for Environment and Energy

Management (Agence de l'environnement et de la maîtrise de l'énergie or ADEME) and local institutions, energy efficiency actions.

## Changes and outlook

### Investments to modernise and reinforce the electricity generation fleet with guaranteed capacity

In accordance with the 2009 Multi-year Investment Programme, the EDF group has undertaken to replace the main power plants which are at the end of their useful lives. The new power plants will be constructed and operated by the EDF subsidiary PEI (Production Électrique Insulaire).

The construction sites for four diesel power plants were completed successfully between 2012 and 2015, for a total net capacity of close to 746MW: Port-Est in La Réunion, Bellefontaine B in Martinique, Pointe-Jarry in Guadeloupe and Luciana B in Haute-Corse. These new generation resources, equipped with innovative technologies, allow the Group to deliver better industrial and environmental results and contribute to satisfying a part of the emerging electricity demands in these regions.

The extension of the Saint-Barthélemy power plant (two new generators of 16MW) and the renewal of the power plant on Saint-Pierre-et-Miquelon (21MW) have respectively been operational since 2014 and 2015.

The Saint-Martin power plant was delivered in end June 2016 for an installed capacity of 40MW.

In total, EDF invested €80 million in IES electricity generation in 2017.

### Investments in electricity networks

The continued growth in consumption in these regions despite the energy efficiency actions undertaken, as well as the development of renewable energies, have led the EDF group to continue the reinforcement of the electricity networks. In Corsica as in the overseas departments with natural fleets, some of the new high-voltage connections will be built using underground or underwater techniques.

EDF thus invested €200 million in networks in 2017.

### A commitment to projects devoted to a better integration of renewable energies in the electricity generation mix and to optimising the management of electrical systems

The energy transition Law stipulates that France's overseas territories must be energy self-sufficient by 2030.

The EDF group supports the emergence and development of electricity generation methods based on renewable energies adapted to IES. The methods favoured are those that provide abundant and guaranteed energy at competitive generation costs, but also sustainable in the long term, in such a way as to position them as credible alternatives to thermal generation: biomass, marine and river energies, waste recovery, biogas. Studies are also underway on the use of LNG to substitute fuel oil.

EDF also contributes to making advances in technical capacities relating to the insertion of intermittent renewable energies into IES and is committed to experimental projects on smart grids in partnership with other industry actors, research laboratories and the ADEME.

Work is also ongoing to create micro-networks 100% powered by renewable energies in certain isolated zones. In 2017, an innovative system combining photovoltaic, digital monitoring and storage was installed on the island of Sein, allowing for a 100% renewable electrical supply several hours each day.

## Extreme weather events in 2017

### Hurricanes Irma and Maria

Hurricane Irma struck the islands of Saint-Martin and Saint-Barthélemy on 6 September 2017. To deal with the aftermath of Hurricane Irma, IES teams, which received substantial reinforcement from the entire Group (including the Nuclear Generation Department (DPN), Thermal Generation and Engineering Department (DPIT) and Enedis), were mobilised and deployed exceptional measures to meet the challenge. Power was restored after five weeks.

Separately, Hurricane Maria swept through Guadeloupe and Martinique to a lesser extent ten days later.

## Reconstruction phase

The means of generation were relatively spared. Reconstruction of the electricity grids began in 2018 and will take a long time. This work should improve the resilience of the grids and structures to extreme weather events.

In addition, the deployment of digital meters on both islands will maximise efforts to manage the demand for energy and insert renewable energies onto the network.

### 1.4.4.4 Électricité de Strasbourg

Électricité de Strasbourg (ÉS) is an Alsatian energy producer which is committed to the long-term energy and economic performance of its territory *via* its four activities: the distribution of electricity, supply of energies, energy services and the production of renewable energies. This portfolio of activities makes it possible for the ÉS group to better provide support to its customers in the energy transition.

ÉS also provides services to Local Distribution Companies (Entreprises Locales de Distribution, or LDCs) in eastern France.

The ÉS group is 88.64% owned by EDF, and the remaining shares are owned by the public and its employees. Its shares are traded on Euronext Paris.

#### 1.4.4.4.1 Distribution

Strasbourg Electricité Réseaux is responsible for public electricity distribution network management. Strasbourg Electricité Réseaux operates, maintains, develops and renews an electricity network of over 14,000 kilometres in the 400 Alsatian municipalities that chose ESR to operate their electricity distribution grids under concession agreement. These concession agreements were renewed between 1993 and 2001 for a term of 40 years. The territory serviced covers three quarters of the Bas-Rhin department and includes more than 520,000 points of delivery for low- and high-voltage (A and B) power, as well as connections with the Enedis network and two other downstream network operators.

In order to comply with recent developments in the French Energy Code, ÉS engaged in a process to create subsidiaries for its distribution activities at 1<sup>st</sup> May 2017.

#### 1.4.4.4.2 Sales and marketing

ÉS Énergies Strasbourg is the sales and marketing subsidiary of the ÉS group.

ÉS Énergies Strasbourg provides energy to nearly 500,000 electricity customers (including renewable), and 110,000 gas customers, to both residential and business customers (services and industrial sectors) or to communities.

In addition to supplying electricity and gas, ÉS Énergies Strasbourg offers related services such as electricity, gas and plumbing corrective maintenance and digital services designed to help customers better understand their electricity bill and better manage their consumption. Separately, for its residential customers, ÉS Énergies Strasbourg has continued the implementation of support services in renovation and construction of the home, *via* a portal enabling customers to be in direct contact with a network of local partners.

Following the end of the regulated sales tariffs for over 36 kVA in electricity and over 30MWh in gas, ÉS sells 50% of its electricity volumes and 75% of its gas volumes based on the market offering. Competitive offers and its strong local base have enabled ÉS to retain a significant market share.

#### 1.4.4.4.3 Energy services

ÉS Services Énergétiques was born out of the association between Écotral, the energy services subsidiary of ÉS, and Dalkia Bas-Rhin, on 1 January 2016.

The entity produces and operates energy services installations intended for local governments, homes, healthcare, the tertiary sector and industry. In 2016, in partnership with another operator, ÉS Services Énergétiques took over the public service delegation of the heating network for the districts of Haute-pierre and Poteries de l'Eurométropole in Strasbourg, providing heating to around 16,000 homes.

In addition, ÉS Services Énergétiques operates and maintains the Strasbourg biomass electricity power plant in Port du Rhin; provides assembly services for the Safran group on its Molsheim site; produces, operates and maintains thermal plants in the new Saint Urbain development zone; and is entrusted with the lighting of the church of Saint Thomas, a historical building in Strasbourg listed as a World Heritage site by UNESCO.

**1.4.4.4 Renewable energy generation**

**Deep geothermal energy**

The ÉS group is one of the leading players in deep geothermal energy in France. It holds a 40% equity stake in the ECOGI (Exploitation of geothermal heat for industry) project, which built, in partnership with the Roquette company and the Caisse des Dépôts, the first deep geothermal energy power plant for industrial use at Rittershoffen, with the support of the ADEME, the Grand-Est Region and SAF-Environnement. This power plant has been producing 24MW of thermal renewable superheated water using a geothermal resource located at a depth of more than 2,500 metres since September 2016.

In addition to the projects under review, the ÉS Group has also transformed, with its partner EnBW, the deep geothermal energy research site at Soultz-sous-Forêts into an industrial installation for the production of electricity. This geothermal power plant has been producing 1.7MW of electricity since July 2016.

In 2017, ÉS also launched the Illkirch Graffenstaden geothermal project, designed to supply power to the future heating network which will supply the innovation park and surrounding areas. This project is being carried out by the wholly-owned subsidiary, ÉS Illkirch Géothermie. The investment amounts to €37 million. This power plant with a thermal input of 26MW is a cogeneration plant (thermal and electricity generation).

**Biomass**

In the area of biomass, the ÉS group commissioned at the end of 2016, through its majority ownership in the ÉS Biomasse company, a biomass cogeneration plant. This power plant produces 70GWh of electricity from renewable sources and 112GWh of heat from renewable sources per year, which feed two of the three principal heat networks for the city of Strasbourg.

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**1.4.5 INTERNATIONAL ACTIVITIES**

**1.4.5.1 United Kingdom**

EDF group activity in the United Kingdom (UK) is led by EDF Energy focusing on energy supply and electricity generation. The Group is also active in oil and gas exploration and production in the North Sea via EDF Production UK, a subsidiary of Edison (see sections 1.4.5.2.3.2 "Hydrocarbon business" and 1.4.6.2.2.3 "Exploration and Production (E&P)").

EDF Energy is principally active in the generation of electricity in the UK, the supply of electricity to domestic and business customers, the supply of gas to domestic customers and in the construction of new nuclear generation and renewable generation. Total electricity generated in the UK in 2017 was c.335TWh and total electricity supplied was c.296TWh (the difference principally reflecting losses on the transmission and distribution networks). Total gas supplied to UK domestic customers in 2017 was 295TWh. EDF Energy is one of the UK's largest energy companies and the largest producer of low-carbon electricity, producing around

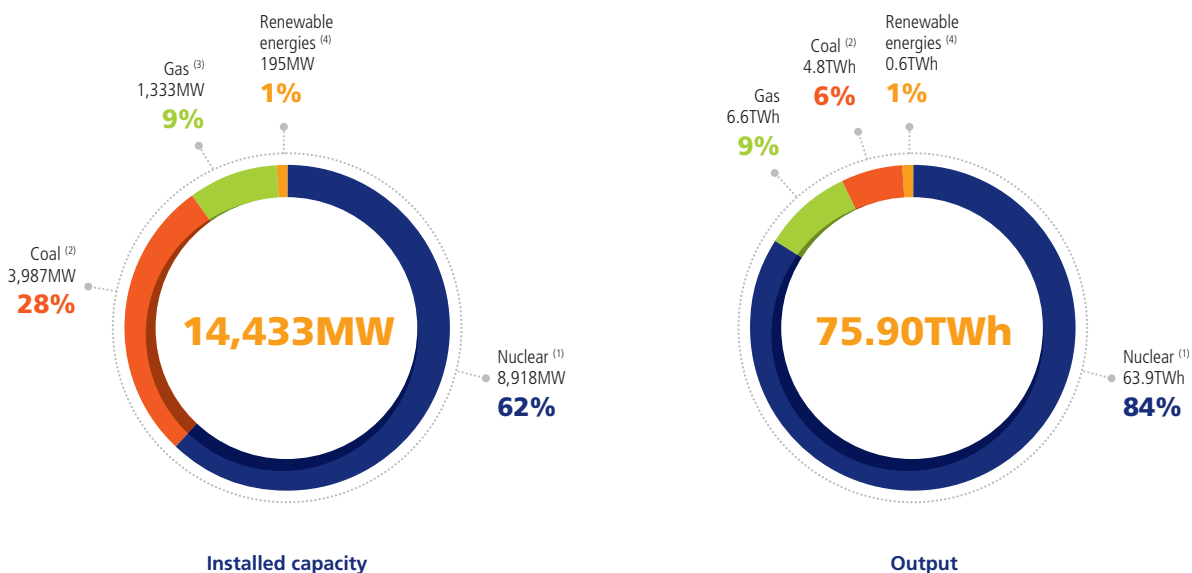
one-fifth of the nation's electricity from its nuclear power stations, wind farms, coal and gas power stations and combined heat and power plants.

The company supplies gas and electricity to 5.5 million business and residential customer accounts and is the biggest supplier of electricity by volume in Great Britain.

EDF Energy is leading the UK's nuclear renaissance. In partnership with China General Nuclear Corporation (CGN) it begun construction of the Hinkley Point C power station in Somerset and is developing further new nuclear projects at Sizewell, in Suffolk, and Bradwell, in Essex.

It employs over 12,500 people at sites throughout the country. The workforce is highly engaged with 82% taking part in the annual employee survey with an engagement index score of 75%. 78% would recommend EDF Energy as a good place to work and 79% are proud to tell people where they work. 91% of employees go the 'extra mile' to ensure the success of EDF Energy.

**→ 2017 installed capacity and output in the United Kingdom**



(1) The figures shown represent 100% of Nuclear capacity and generation output, shared 80%/20% by EDF and Centrica.  
 (2) Coal capacity represents transmission entry capacity. Not power including biomass.  
 (3) Including 1.35MW of Barkantine CHP.  
 (4) When EDF Energy holds more than 50% of assets, the capacities shown are 100% of the installed capacity and generation output. Renewables output excluding biomass.

	31/12/2017	31/12/2016
Electricity supplied <sup>(1)</sup> (GWh)	43,769	46,242
Gas supplied (GWh)	27,879	28,307
Number of residential customer accounts (thousands)	5,160	5,221
Number of employees <sup>(2)</sup>	12,797	13,331
Total Recordable Incident Rate <sup>(3)</sup>	0.59	0.68

(1) Power supplied to final consumer including previous year metering cut-offs.

(2) Includes staff on maternity leave.

(3) Total Recordable Incident Rate -Annual total combined number of Lost Time Incidents, fatalities, Restricted Work Injuries and Medical Treatment Injuries (excluding First Aid)/number of hours worked x1,000,000. This covers all employees, agency and contractor staff. Excludes EDF Energy Renewables and Hinkley Point C project.

#### 1.4.5.1.1 Strategy

EDF Energy's strategy targets a sustainable long-term business, meeting its customers' needs for energy and associated services in an efficient and responsible way while focused on supporting the transition to a lower-carbon economy through generation of safe, reliable and affordable low-carbon electricity. As part of its 2020 project EDF Energy has developed detailed action plans which build on the high-level vision and objectives defined by EDF group's CAP 2030. All these actions are underpinned by a focus on maintaining industry leading safety performance and improving cost efficiency across the business.

In its energy supply business, EDF Energy aims to make energy easy for its customers by doing things better, faster and cheaper and enabling customer engagement by applying digital technologies and innovation. This also involves installing smart meters to our customers' homes and small business premises, as part of the national programme. EDF Energy helps customers to make the most of their energy consumption and production and of their increasingly connected, smart homes (similarly connected public buildings, communities and cities), whilst providing excellent service and convenience. Through its energy services joint venture with Dalkia, including the recently acquired company Imtech, EDF Energy aims to help businesses explore and develop solutions that deliver energy, carbon and cost savings. In response to the major transformations within the energy industry, it has also launched Blue Lab, which aims to rapidly identify, develop and trial new business opportunities and services for customers.

In generation, EDF Energy seeks to create value through continued operational excellence of existing assets and by developing a portfolio of new investments. In partnership with China General Nuclear Corporation (CGN), EDF is building two new nuclear units (3.2GW capacity in total) at Hinkley Point in Somerset, based on the EPR technology. EDF Energy is also working with CGN to progress a similar 3.2GW EPR project at Sizewell in Suffolk, where a second stage public consultation was conducted in February 2017. The feedback from this is being reviewed and EDF Energy continues to engage with its stakeholders through further pre-development consent order application consultation. Further it is proposing to develop a new nuclear power station based on CGN's UK HPR1000 technology for the UK at Bradwell in Essex. Through EDF Energy Renewables (a joint venture with EDF Énergies Nouvelles), EDF Energy operates around 700MW of wind farms and is also continuing to develop new renewable generation projects; it is also exploring options for flexibility assets including the development of a new 49MW battery storage project at West Burton B, which will provide frequency response services to the National Grid.

EDF Energy aims to secure value from its existing nuclear, coal and gas assets through continued operational excellence and safe, reliable generation. Since 2009, EDF Energy has extended the lifetime of all of its Advanced Gas Reactors (AGRs) by an average of 8 years. This has allowed the UK to continue to benefit from existing nuclear low carbon energy for as long as possible, as well as providing ongoing nuclear employment opportunities and the maintenance of nuclear industry skills within the UK. However, due to large non-replaceable components, there is a technical limit to the AGR lifetimes, and as we approach this limit, we will be seeking to optimise the end of life value of the stations. This may include the small, incremental extension of individual reactors, where safety and technical

considerations allow. As part of adding value from the end of AGR lifetimes, EDF Energy is also exploring opportunities to develop new activities in nuclear decommissioning, building on its expertise in operating the UK's existing nuclear stations.

Other important strategic actions concerning the Company's generation fleet include optimising the operations of the West Burton B Combined Cycle Gas Turbine power station and the remaining lifetime value of coal generation capacity under the UK capacity market mechanism.

#### 1.4.5.1.2 Activities

##### 1.4.5.1.2.1 Nuclear generation

EDF Energy owns and operates eight nuclear power stations in the UK (15 reactors) with a total capacity of 8.9GW.

Since 2009, Centrica plc. ("Centrica") has held a 20% shareholding in Lake Acquisitions Limited, the company in which the nuclear generation assets sit (except Nuclear New Build).

##### Nuclear generation fleet technology

Seven of the eight nuclear power stations are Advanced Gas-Cooled Reactor (AGR) power stations (Dungeness B, Hartlepool, Heysham 1, Heysham 2, Hinkley Point B, Hunterston B and Torness) and the eighth, Sizewell B, is a Pressurised Water Reactor (PWR) power station.

##### Safety and radiological protection

Nuclear safety is EDF Energy's overriding priority (see section 3.2.4.1 "Nuclear safety").

EDF Energy operates to strict procedures to minimise and control the radiation doses received by employees and contractors at all of EDF Energy's existing nuclear power stations. In 2017, the average individual dose received by all workers on EDF Energy's existing nuclear sites was 0.041mSv, the legal dose limit being 20mSv per year. The highest individual dose received in 2017 was 5.5mSv.

##### The operating lifetime of the nuclear power plants

The actual lifetime of each power station will be determined primarily by the technical and economic practicability of supporting its safety case. This is assessed at each statutory outage for the following operating period through inspection, maintenance, testing and assessment of plant performance. Following the outage, consent is required from the Office for Nuclear Regulation (ONR) before restarting the reactor. The operating period between statutory outages is normally three years for the AGR power stations and eighteen months for Sizewell B.

In addition, every ten years, the stations are subject to a more detailed and wide ranging Periodic Safety Review (PSR) of design, operational and organisational safety which must also be accepted by the ONR in order to secure continued operation. In January 2017, the ONR accepted the Hinkley Point B and Hunterston B PSRs, and in January 2018 the ONR accepted for the Dungeness B PSR. ONR are currently assessing the Hartlepool and Heysham 1 PSR with acceptance due in January 2019. Heysham 2 and Torness PSRs are in production and due for ONR assessment in 2019 with an ONR acceptance due in January 2020.

The AGRs were designed with a nominal 25 year lifetime, and Sizewell B with a 40 year lifetime. However, with the aggregation of technical information, and operational and safety experience, it has been possible to revise the expected AGR lifetimes. Prior to EDF Energy ownership, the AGRs had been extended by an average of 10 years, and it has been EDF Energy's intention, where possible and economic, to seek further lifetime extensions. This may require additional investment in each plant, and requires technical, safety, and economic justifications to be made; and since it may result in increasing the nuclear liabilities, the consent of the Nuclear Decommissioning Authority (NDA).

Since British Energy was acquired by EDF, the AGRs have been further extended by an average of eight years. The last extensions were declared in February 2016. Hartlepool and Heysham 1 were extended by a further five years, and Heysham 2 and Torness were extended by seven years.

Although the work has not yet been carried out to support the extension of Sizewell B, EDF Energy expects that it should be possible to extend it by c.20 years.

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**CURRENT OPERATING LIVES <sup>(1)</sup> AND CLOSURE DATES:**

Power Plant	Type of reactor	Start of Generation	Power Station Lifetime (Formally Declared)	Life Extensions (Already Formally Declared)	Associated Scheduled Closure Date	Scheduled Periodic Safety Reviews
Hinkley Point B	AGR	Feb. 1976	47 years	22 years	2023	2017
Hunterston B	AGR	Feb. 1976	47 years	22 years	2023	2017
Dungeness B	AGR	Apr. 1983	45 years	20 years	2028	2018
Heysham 1	AGR	Jul. 1983	41 years	15 years	2024	2019
Hartlepool	AGR	Aug. 1983	41 years	15 years	2024	2019
Torness	AGR	May 1988	42 years	17 years	2030	2020
Heysham 2	AGR	Jul. 1988	42 years	17 years	2030	2020
Sizewell B	PWR	Feb. 1995	40 years	–	2035	2025

(1) As formally recorded by EDF Energy and approved by the NDA.

**CAPACITY AND OUTPUT BY POWER PLANT:**

Power Plant	Capacity <sup>(1)</sup> (MW)	Output <sup>(2)</sup> (TWh)	
		2017	2016
<b>AGR Power Plants</b>			
Dungeness B	1,050	5.7	7.7
Hartlepool	1,180	9.3	6.6
Heysham 1	1,155	6.3	7.6
Heysham 2	1,230	10.3	9.6
Hinkley Point B	955	7.3	7.2
Hunterston B	965	7.3	7.9
Torness	1,185	8.9	9.9
<b>PWR Power Plant</b>			
Sizewell B	1,198	8.8	8.6
<b>TOTAL</b>	<b>8,918</b>	<b>63.9</b>	<b>65.1</b>
<b>LOAD FACTOR <sup>(3)</sup></b>		<b>82%</b>	<b>83%</b>

(1) Capacities are stated net of all power consumed for the power stations' own use, including power imported from the Grid.

(2) Output in each year reflects any refuelling, planned and unplanned outages.

(3) Load factors are obtained by dividing the actual output by the output that would have been achieved by each power plant operated at its stated capacity appropriate for the period.

**Operational review of the existing nuclear generation fleet**

The nuclear generation fleet produced 63.9TWh during 2017, 1.2TWh less than 2016 (65.1TWh). The reduction in output is largely due to an additional statutory outage in 2017, two more reactor core inspection outages at Hinkley Point B and Hunterston B, higher unplanned losses and one less day of generation (2016 being a leap year), offset by fewer off-load refuellers and the first full year of seven out of eight boiler operation at Heysham 1 Reactor 1 since its load was constrained, following the discovery of a defect in a boiler spine in 2014.

The 2017 output is the second highest since Hinkley Point B and Hunterston B were derated in 2006. In addition, the load factor, which through revision of station capacities takes account of these deratings, was 82%, the second best performance over the lifetime of the fleet.

Planned statutory outages were completed on Dungeness B Reactor 21, Heysham 1 Reactor 1, Hunterston B Reactor 4, and Torness Reactor 1. A planned statutory outage was started at Sizewell B and Unit 2 returned on 31 January 2018 and Unit 1 returned on 1 February 2018. The outage was extended to make repairs to the steam generators.

**Radioactive Waste Management**

In the UK, radioactive waste is classified into four categories:

- low Level Waste (LLW), for which a near surface disposal route exists – including the LLW Repository at Drigg West Cumbria;
- intermediate Level Waste (ILW), for which no disposal route is currently available in the UK;

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- high Level Waste (HLW) is defined as radioactive waste in which the temperature may rise significantly as a result of the radioactivity, so this factor has to be taken into account in the design of storage and disposal facilities;
- higher Activity Waste (HAW) – this is effectively HLW, ILW and any LLW that are unsuitable for near-surface disposal.

EDF Energy nuclear generation's strategy for LLW and HAW reflects that the UK and Scottish governments are focused on application of the waste hierarchy (reduce, reuse, recycle, recover). The use of a range of waste recycling and disposal routes will help to make the best use of the UK's Low Level Waste Repository (LLWR) in Cumbria. Only a disposal route for LLW currently exists in the UK.

HAW is stored for the medium-term in safe, purpose built facilities at EDF Energy's stations while longer term national solutions are being established within England and Scotland.

Under historic contractual arrangements, spent fuel from the AGRs is transported to Sellafield nuclear reprocessing site (owned by NDA) for reprocessing or long term storage. Heat generating HAW from the reprocessing of spent AGR fuel are converted into glass blocks for safe, long term storage.

Regarding Sizewell B, the spent fuel is stored on site and EDF Energy has built a further spent fuel dry storage facility on the Sizewell B site to allow the station to continue to safely store all of the spent fuel that will be generated over Sizewell B's life. Following long-term surface storage, the Sizewell B PWR spent fuel will be disposed to a future UK geological disposal facility.

The nature of EDF Energy nuclear generation's business and its historic government link means that the strategy for spent fuel and the management of radioactive waste from EDF Energy nuclear generation's power stations is approved by the NDA. However, EDF Energy has policies to continually improve and minimise the spent fuel and waste arising through the Company's wider safety, sustainability and environmental policies.

#### Costs relating to radioactive waste management and decommissioning – Restructuring Agreements

Restructuring Agreements were originally entered into in 2005 as part of the restructuring of the former British Energy Group of companies (hereafter referred to as "the EDF Energy Nuclear Generation Group") and were carried out from 2002 under the aegis of the UK government in order to stabilise the financial situation of the EDF Energy Nuclear Generation Group (EENGG).

By virtue of these restructuring agreements:

- the Nuclear Liabilities Fund (NLF), an independent trust set up by the UK government as part of the restructuring, agreed (at the direction of the Secretary of State) to fund, to the extent of its assets: (i) qualifying uncontracted nuclear liabilities (including liabilities in connection with the management of spent fuel at the Sizewell B power station) and (ii) qualifying costs of decommissioning in relation to the existing nuclear power stations owned and operated by EENGG;
- the Secretary of State agreed to fund: (i) qualifying uncontracted nuclear liabilities (including liabilities in connection with the management of spent fuel at the Sizewell B power station) and qualifying costs of decommissioning, in each case in relation to the existing nuclear power stations owned and operated by EENGG, to the extent that they exceed the assets of NLF and (ii) subject to a cap of £2,185 million (in December 2002 monetary values, adjusted accordingly),

qualifying contracted liabilities for the EENGG's spent fuel (including in particular liabilities for management of AGR waste from spent fuel loaded prior to 15 January 2005); and

- EDF Energy is responsible for funding certain excluded or disqualified liabilities (mainly liabilities incurred in with the event of an unsafe or careless operation of the power stations) and the potential associated obligations of its subsidiaries to the NLF and the Secretary of State are guaranteed by the principal members of the EENGG.

Certain companies in the EENGG, including EDF Energy Nuclear Generation Limited, entered into a separate contract, now with the NDA for management of AGR spent fuel loaded from 15 January 2005 (termed "new fuel") and have no responsibility/liability for this fuel after it is received at Sellafield.

The Secretary of State and EDF agreed to limited amendments to the Restructuring Agreements, in connection with the acquisition of EENGG by Lake Acquisitions Limited. The amendments, among other things and subject to limited exceptions, restrict the majority of rights and obligations imposed by the Restructuring Agreements only to EENGG and its subsidiaries and subsidiary undertakings and accordingly, do not extend similar rights and obligations to EDF group, or its other subsidiaries and subsidiary undertakings. The amendments do not impact on the contractual funding commitments of the Secretary of State or NLF to the EENGG.

Certain amendments have been made to the Restructuring Agreements, reflecting the EENGG's access to an improved credit rating following the acquisition. In particular, EENGG is required to maintain a minimum cash reserve. The amendments reduced the minimum level to £290 million. The cash reserve may be further reduced to nil if EENGG achieves and maintains an investment grade rating or if irrevocable Committed Facilities of the same amount are put in place between third party financial institutions or a member of the wider EDF group with an investment grade rating and a member of the EENGG.

#### 1.4.5.1.2.2 Renewable generation

Through EDF Energy Renewables (EDF ER), a joint venture between EDF Energy and EDF Énergies Nouvelles, EDF Energy is developing its renewable assets. In addition, EDF Energy has signed power purchase agreements with renewable generators and supports independent developers. This ensures a balanced approach for compliance with its Renewables Obligations (RO) and the provision of renewable electricity to its customer base.

EDF ER currently operates 36 wind farm sites with a total generation capacity of 704.2MW, including Beck Burn (31MW) which was brought into operation in 2017. One other onshore wind farm is currently in construction, Dorenell (177MW), EDF ER's largest onshore wind farm to date, expected to commence operation early 2019.

EDF ER continues to expand its scope of technologies with a 49MW battery storage facility under construction. This facility will be constructed adjacent to the West Burton coal and CCGT stations. In addition, the facility has successfully secured a 15 year Capacity Market agreement for delivery commencing October 2020 in the 2016 Capacity Market Auction held in December 2016.

EDF EN Services UK Limited, a joint venture between EDF Energy and EDF Énergies Nouvelles, which commenced operations in October 2015, continues to expand and now provides operation and maintenance activities for 25 wholly and partly owned wind farms and 2 externally owned wind farms.

#### 1.4.5.1.2.3 Thermal generation and gas storage

Power plant	Location	Year commissioned	Number of units	Type of station	Capacity (MW)	Output (TWh)	
						2017	2016
Cottam	Nottinghamshire	1970	4	Coal-fired	2,000	3.1	1.5
West Burton A	Nottinghamshire	1970	4	Coal-fired and OCGT <sup>(1)</sup>	1,987	1.7	1.2
West Burton B	Nottinghamshire	2013	3	Combined Cycle Gas Turbine	1,332	6.6	5.3

(1) Open Cycle Gas Turbine.

In 2017, Cottam and West Burton A coal-fired power plants generated 4.8TWh of electricity. This is higher than last year, and represented a good performance in a year of particularly low dark spreads, in addition to outages at seven of the eight coal-fired units. West Burton B CCGT generated 6.6TWh, driven by improved market spark spreads and continued Balancing Mechanism activity.

In February 2017, all of the coal units, including OCGTs, and all of the CCGT Units, secured a one year Capacity Market agreement starting in 2017, at the clearing price of £6.95/kW.

EDF Energy operates two mid cycle gas storage facilities in Cheshire. Hole House, purchased from EDF Trading in April 2014, is operational with a total working gas capacity of c.18 million therms. Hill Top Farm became commercially operational in mid-January 2015 with three cavities. The remaining two cavities are being developed and are scheduled to come on-line by the end of 2018.

#### 1.4.5.1.2.4 Customer business

	31/12/2017	31/12/2016
Customer electricity supplied (GWh)	43,769	46,242
Customer gas supplied (GWh)	27,879	28,307
Number of domestic customer accounts (thousands)	5,160	5,221

The Customers business is responsible for the supply of gas and electricity to residential and business customers across the United Kingdom and the wholesale market optimisation of EDF Energy's generation and customer assets.

EDF Energy sells energy to two major customer segments: domestic and business customers. The size of business customers ranging from large industrial businesses to small privately-owned businesses. EDF Energy adopts different risk management strategies for domestic and non-domestic customers.

##### Domestic

During 2017, EDF Energy supplied 12.4TWh of electricity and 27.8TWh of gas for the domestic segment. As at 31 December 2017, EDF Energy had 3.2 million electricity accounts and 2.0 million gas accounts on this segment.

##### Competition

The latest market share data from Cornwall to the end of October 2017 showed that the combined market share of small and medium suppliers is now around 21%, compared to 16.5% at the end of January 2017. There were 60 small and medium suppliers at the end of June (excluding white labels and licence lites), including Engie and Vattenfall, who acquired iSupply Energy.

EDF Energy had 5.16 million product accounts at end of December 2017, a decrease of ~60,000 since the beginning of the year. The volume of product accounts has remained overall constant with last year's level whilst undergoing two Standard Variable tariff price changes and a significant number of fixed price tariff closures. Market share has been retained over last 12 months and is currently 10.3% (at 31 October 2017 – latest figure available).

EDF Energy has partnered with "MoneySuperMarket"/"MoneySavingExpert" to offer very competitive collective switch tariffs which has secured substantial sales during 2017.

In 2017, it has launched its first 'bundled' tariff, offering customers one year's free heating insurance with their energy tariff ("Blue +Heating Protect").

##### Regulatory Change

Standard Variable tariff increase announcements have been made in 2017 by all major suppliers. Following the publication of the political parties' manifestos prior to the General Election in June, and intense media speculation about the scope of a wider price cap, the introduction of a cap has now been confirmed by the Government from February 2018 for vulnerable consumers. The details (including

the level it will be set at for remaining consumers) are not available at present. Ofgem announced in July it was considering introducing a more targeted guaranteed tariff for vulnerable consumers, and it also suggested it will continue its actions aimed at the disengaged customer database (on Standard Variable tariff for over three years), although the planned April 2018 national rollout being deferred.

Following a consultation on a new Confidence Code and related trials, Ofgem will consult on the full removal of the Whole of Market view on price comparison websites in 2017. This could allow price comparison websites to exclude suppliers who do not pay them a fee from any comparisons.

##### Smart Metering

Following the General Election, the UK government's Department for Business, Energy and Industrial Strategy (BEIS) has reinforced its commitment to delivering smart meters to domestic and business customers by 2020. In 2017, EDF Energy installed c. 340,500 smart meters for its customers, the majority being installed by its in-house field force. It is working with its contracted outsourced field force providers to support the required ramp up in their installation rates for 2018 and beyond. All reasonable actions have been taken to keep deliberating the Smart Metering programme. The national IT and communications infrastructure (the DCC) is now live, after delays, and suppliers are beginning to trial low volumes of second generation smart meters which use this infrastructure. EDF Energy has completed the associated internal IT system changes, including the required interfaces to the DCC, and plans to transition to installing second generation meters connected to the DCC throughout 2018.

##### Domestic Customer Services

In the Citizen's Advice complaints (domestic) league table, EDF Energy has maintained in 2<sup>nd</sup> place of all major suppliers, which was first achieved in 2016, as at Q3 of 2017. EDF Energy is 15 points behind SSE and over 50 points ahead of British Gas which is placed 3<sup>rd</sup> on the league table.

In 2017, EDF Energy responded to 78% of all customer emails within 24 hours, started 83% of Live Chats within 1 minute. Customer Services Telephony Average Speed of Answer was 2 min 51 secs for domestic customers, and was impacted by the volume of Smart Metering calls received throughout the year. The service to customers compares favourably to other energy suppliers according to a recent Which survey.

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EDF Energy's customers are very positive regarding the service received across contact channels, providing an Advisor Recommendation Score of +56. The company also achieved a digital transition ("Digital Net Ease Score") of 4 out of 5, showing its customers are happy using its digital applications. During the year, 67% of transactions were completed by customers using inbound self-serve channels. There have been significant changes in the digital arena helping the ease in which customers can interact with us.

### Non-domestic customers

In 2017, the non-domestic segment supplied a total of 31.4TWh of electricity, 1.9TWh to 198,471 small business customers ("SME") and 29.5TWh to medium and large business customers ("I&C") accounts. The business customer electricity market in the UK is c.180TWh in total, making EDF Energy the largest supplier to business customers. Almost half of the business electricity market is serviced by just three main players.

Medium business continues its strong performance, with high volume and gross margin wins. Volume in this segment continues to grow month on month. The October 2017 round was, as usual, very competitive with pressure on £/MWh margins, though overall performance was, again, excellent.

On the partnerships side, all opportunities for 2017 delivery have been successfully renewed at anticipated margins, including extensions of Scottish Procurement (SP) and Royal Mail Group, retention of B&Q (and gain of Screwfix), Jaguar Land Rover and Veolia. Additional successes included being awarded a place at the Crown Commercial Services demand side response framework. Large business successfully retained Anglo Beef Processors (October 2017, 12 months, 6GWh). 2017 sprint campaign is underway to meet Gross Margin target.

### Wholesale Markets Optimisation

#### General principles

The policies surrounding EDF Energy's energy purchasing and risk management activities are carried out in accordance with EDF group's policies and ensure that EDF Energy's activities are optimised and its services delivered at a competitive price while limiting its gross margin volatility.

The Wholesale Markets Optimisation (WMO) division's purpose is to manage the wholesale market risk of EDF Energy in one place within pre-defined risk limits and control framework. It provides a unique interface with the wholesale markets, via EDF Trading. WMO also provides modelling services to the whole of EDF Energy, as well as negotiating and managing asset backed commercial structures with third parties e.g. NDA and Centrica.

#### Electricity sales and procurement

The power generated by the generation fleet is sold via the WMO division within EDF Energy's customers business. Since April 2010, 20% of the output from nuclear generation is separately sold to Centrica, the minority shareholder of the current nuclear fleet, under the agreements made at the time of the Centrica transactions. The remaining 80% is sold to WMO under the same transfer price as used for the transaction with Centrica, based on published market prices, smoothed over forward electricity prices where liquidity allows.

Over and above its own generation, EDF Energy also sources electricity through export power supplied from power purchase agreements which are mainly with renewable and CHP generators. In 2017, EDF Energy acquired approximately 6.1TWh through this channel.

For delivery in 2017, EDF Energy's net position on the wholesale market was a sale of approximately 21.6TWh (including structured trades). In 2017, EDF Energy sold approximately 48.7TWh and bought 27.1TWh.

#### Gas, coal and carbon rights procurement

Coal and gas contracts (physical and financial) and CO<sub>2</sub> emissions rights are entered by EDF Energy to hedge the requirements of its power plants and gas consumers.

Purchases are based on coal and gas asset generation forecasts and target coal stock levels. All EDF Energy's 2017 coal deliveries were from domestic suppliers only.

#### 1.4.5.1.2.5 Nuclear New Build business

##### Nuclear New Build (NNB) activity

On 21 October 2015, EDF and China General Nuclear Power Corporation (CGN) signed a Strategic Investment Agreement leading to co-investment in the construction of two EPR reactors at the Hinkley Point C (HPC) in Somerset. The agreement also includes a partnership in the UK for the project to develop nuclear power plants, at Sizewell C (SZC) in Suffolk and Bradwell B (BRB) in Essex.

Final contracts for HPC were signed on 29 September 2016 following the final investment decision (FID) made by EDF SA's Board of Directors on 28 July 2016. HPC is owned by EDF (66.5%) and CGN (33.5%).

It marks the beginning of the new nuclear build programme in the UK,, and the end of the project's development phase following ten years of preparation and planning, from achieving the Generic Design Assessment for the EPR and the Nuclear Site Licence to the start of enabling works on site.

Since the contracts were formally signed for HPC, in late September 2016, there has been a tremendous amount of construction activity resulting in many milestones being delivered. These include the pouring of first nuclear safety concrete for the first permanent structures on site and the completion of two concrete batching plants. Safety is a key focus of the EPR design. The same EPR technology is already being deployed at the new nuclear power stations currently being constructed by EDF at Flamanville in France (see section 1.4.1.2.2 "Update on the Flamanville EPR project") and at Taishan in China (see section 1.4.1.2.3.2 "Taishan ERP"). Using the same technology, adapted for UK regulatory requirements and Hinkley Point C site specifics, will enable the efficiencies that come with standardisation of design in the construction and operation of a series of plants to be realised.

##### Hinkley Point C (HPC)

###### Financing

Under the Strategic Investment Agreement, EDF's share in HPC is 66.5% and CGN's share is 33.5%.

EDF intends to remain the majority shareholder, and has agreed with the British Government not to sell down its control of HPC during the construction period without the previous approval of the British Government. Whilst keeping a stake of at least 50%, EDF intends to bring other investors into the project in due course.

Guarantee agreements by the Infrastructure and Projects Authority (IPA) were also signed on 29 September 2016 with Her Majesty's Treasury. Under these agreements, a first tranche of up to £2 billion of guarantee is available subject to fulfillment of conditions precedent. EDF had confirmed to the British Government that the Group did not intend to avail itself of the guarantee. The cancellation was acted on 5 February 2018<sup>(1)</sup>. The project will be equity financed.

###### Project Costs and Timeline

Following the Final Investment Decision in September 2016, EDF has undertaken a review of the costs and timeline of HPC project.

Working with teams from the project company (NNB), the conclusions of this review are as follows:

- the milestone for the first nuclear safety concrete for the reactor building of tranche 1, scheduled for mid-2019, provided that the final design, which is on a tight schedule, is completed by the end of 2018;
- project completion costs are estimated at £19.6 billion real terms in 2015 sterling, an increase of £1.5 billion in 2015 sterling<sup>(2)</sup> compared to previous evaluations. This estimate assumes the successful operational action plans, notably those performed in collaboration with suppliers. The estimated additional costs<sup>(3)</sup> result mainly from a better understanding of the design adapted to the requirements of the British regulators, the volume and sequencing of work on site and the gradual implementation of supplier contracts. EDF's projected rate of

(1) Please refer to the press release "2017 annual results" published by EDF group on 16 February 2018 ("United Kingdom" section).

(2) Excluding interim interest and the currency effect compared with a benchmark project exchange rate (£1 = €1.23).

(3) Net of action plans.



return (IRR) is now estimated at approximately 8.5% <sup>(1)</sup>, compared to about 9% <sup>(1)</sup> initially;

- the risk of deferral of delivery (COD) is estimated at 15 months for tranche 1 and 9 months for tranche 2. This risk would entail an additional potential cost of around £0.7 billion in 2015 sterling. Under this assumption, the IRR for EDF would be around 8.2% <sup>(1)</sup>.

Regarding the overall schedule, the project teams are fully mobilised and are implementing action plans to ensure that the objective set to deliver tranche 1 by the end of 2025 is fulfilled.

The agreements between EDF and CGN include a capped compensation mechanism in case of cost overruns or delays; these agreements are subject to a confidentiality clause.

### Progress of the project

The project achieved the following objectives in 2017:

- the first nuclear safety concrete in the galleries (these are a network of connected tunnels that will house the wiring and are the first permanent structures on the site);
- start of construction work on accommodation on the site campus;
- delivery of design studies for the positioning of the prestressing (PSG) for the gallery at the Delivery Control Centre by the Engineering Control Centre (the PSG is a circular structure in the form of a tunnel located below the containment chamber in the reactor building); this "stress" exerted by the tendons enables the reactor building to withstand high internal pressures should an incident occur;
- the first safety concrete in the gallery and the delivery of the design studies for the foundations of the pumping station at the Delivery Control Centre; the pumping station acts as an interface between the reactor and the saltwater used for cooling via a water intake tunnel and a channel (an artificial basin opposite a larger body of water to avoid sediment infiltrating the water intake tunnel);
- the start of work to install the cooling water pipes, also known as CRF pipes.

At end 2017, the expenditure to date on the project stood at £4.6 billion, excluding interim interest.

### Exchanges with the UK office for nuclear safety and regulation (ONR)

Recently, the ONR has for the first time conducted an inspection in order to verify the quality assurance arrangements for the supply chain. This inspection ensured that the measures taken were appropriate and that the lessons learned from the incidents related to the AREVA Creusot Forge and the first safety concrete had been implemented throughout the supply chain.

Overall, the ONR stated that it was satisfied by the findings of the inspection and acknowledged the considerable efforts made during the project.

### Manufacturing of equipment

Manufacturing at the Framatome Creusot Forge factory is currently being resumed. Furthermore, the project team is also busy monitoring a plan to improve safety and quality at Framatome, by means of a Steering Committee chaired by the HPC Project team.

### Contract for Difference <sup>(2)</sup>

Regarding the risk identified in the report (15 months for tranche 1 and 9 months for tranche 2), these are below the deadlines set out in the signed contract.

The HPC project company, NNB Generation company (HPC) Limited and the Department of Energy and Climate Change (DECC) have agreed, on October 2015, on the full terms of the CfD for HPC, which was approved by European Commission in October 2014.

The CfD was signed on 29 September 2016 alongside all the other contracts with the UK Government and it is a contract to provide security in respect of revenues generated from electricity produced and sold by HPC through compensation based on the difference between the Strike Price and the market price, for a period of 35 years from commissioning.

From the plant's start date, if the reference price at which the generator sells electricity on the market is lower than the strike price set under the terms of the contract, the generator will receive an additional payment. If the reference price is higher than the strike price, the generator will be liable for the difference.

The key elements of the CfD are:

- the strike price for HPC is set at £<sub>2012</sub>92.50/MWh or £<sub>2012</sub>89.50/MWh if the Sizewell C project is launched (*i.e.* if a final investment decision is taken), in order to reflect the fact that the first of a kind costs of EPR reactors are shared across the HPC and Sizewell C sites;
- the strike price is fully indexed to UK inflation through the Consumer Price Index (CPI);
- the lifespan of the contract is 35 years; any delay on Tranche 2 of more than 8 years after the date of the contractually stipulated date of commercial commissioning may result in a change to the CfD profits. The adjustment is partial if one of the two reactors is commissioned within its specific window;
- the project is protected against certain unfavourable regulatory and legislative changes; provision has also been made to review the costs (up or down depending on the assumptions used) in the fifteenth and twenty fifth years, and to review certain conditions for the costs corresponding to decommissioning and waste management operations (Funding Decommissioning Programme);
- should there be savings from the construction of the HPC project, these will be shared with consumers through a lower electricity price.

There is no explicit volume guarantee in the CfD, nor is there a ceiling; however, the contract is protected against the risk of erasure in case of changes to regulations or the market.

### Principal project risks

These risks are detailed in section 2.1.5 "Specific risks related to the Group's nuclear activities".

As with any project of this scope, and even though the CfD has a protective role, the project has risks in terms of timing and budget overruns, which were assessed during the detailed review performed by EDF following the Final Investment Decision.

### Brexit

The UK voted to leave the membership of the European Union on 23 June 2016.

- It is important to note that c.1/3 of the project costs are in EUR. This exposes the project and the EDF group to the GBP/EUR exchange rate. With the pound down against the euro:
  - the cost of the project in pounds increases; the project's IRR in pounds is not protected,
  - the Group's debt decreases;
- given the long-term investment horizon, EDF is implementing a gradual strategy to cover its investment in pounds;
- the HPC project is protected against the power market price changes during the CfD period.

### Euratom Treaty

The Group has been reviewing the impact of the UK's exit on the Euratom Treaty and the impact the exit may have on its business, and the actions required to mitigate any risk.

The UK Government introduced the Nuclear Safeguards Bill in October 2017. The Bill has been considered in a Public Bill Committee and has been validated without amendment in November 2017. The next stage is known as the Report Stage and will be followed by the final reading of the bill in the House of Commons, before its review before the House of Lords. No slot has yet been announced for this final reading.

(1) IRR calculated at the July 2017 exchange rate (£1 = €1.16). Any changes to the exchange rate could affect the IRR.

(2) Terms of the contract are available on the UK government website: <https://www.gov.uk/government/publications/hinkley-point-c-documents>.

# 1. PRESENTATION OF EDF GROUP

## Description of the Group's activities

The Bill creates the legal framework for a nuclear safeguards regime to operate in the UK to replace the current legal framework provided principally by the UK's membership of the European Atomic Energy Community ("Euratom").

The UK will continue to be a member of the International Atomic Energy Agency (IAEA) and work is ongoing on new agreements with international parties to ensure it continues to meet relevant international standards.

### Funded Decommissioning Programme (FDP)

Contracts for the Funded Decommissioning Programme (FDP) were signed on 29 September 2016. There is a statutory requirement for nuclear operators to have a FDP under which an independent Fund Company will collect contributions and manage the money built up to pay for decommissioning of the nuclear reactor at the end of the generation.

The Nuclear Decommissioning Fund Company (FundCo) was set up in compliance with the Energy Act 2008 as its purpose is to provide costs of decommissioning by implementing the FDP.

FundCo had its first Board meeting since the contracts were signed where the 2016 statutory accounts were approved.

The overall objective of the FDP is to ensure that operators make prudent provision for:

- the full costs of decommissioning their installations;
- their full share of the costs of safely and securely managing and disposing of their waste; in doing so, the risk of recourse to public funds is remote.

### Sizewell C

The SZC Project equity documents were signed on 29 September 2016 alongside the HPC contracts. EDF and CGN signed the main terms of an agreement in principle to develop Sizewell C in Suffolk, till a final investment decision with the project to build and operate two EPR reactors, subject to third party funding.

Once the final investment decision is made, EDF will participate in the development phase at 80% and CGN at 20%.

In compliance with the planning process, the second phase of formal consultation was completed in February 2017. Many responses were received. The feedback is being reviewed and will help develop plans for the next stage of public consultation and proposals for the station.

### Bradwell B

EDF and CGN signed an agreement on 29 September 2016 for the joint submission to the British safety authority for a design certification (Generic Design Assessment) for a British version of the HPR1000 third-generation Hualong reactor. The HPR1000 would be based on Unit 3 of the CGN plant in Fangchenggang, China, which is the reference power plant for both companies developing the British design of Hualong.

During the development phase, CGN would have a stake of 66.5% and EDF of 33.5%.

In January 2017, CGN and EDF Energy began the GDA process for the UK the UK HPR1000 nuclear technology. This follows the department of Business, Energy & Industrial Strategy asking the regulators to begin the assessment and marks the first step in the robust and thorough process for the permission to build a nuclear power station at Bradwell in Essex.

The Office for Nuclear Regulation (ONR) and the Environment Agency announced in November 2017 they have permissioned entry into step 2. This marks the start of the high level technical assessment of the design of the UK version of the HPR1000 technology.

The Bradwell B project is at an early stage. A variety of technical studies to understand the site and surrounding environment in more detail needs to be completed. As part of this, early site investigation and assessment work is required, which CGN and EDF Energy are now beginning to plan and undertake. This will involve drilling bore holes and other survey work. Planning application for these works was approved by the local council in December 2017.

The results of these works and findings will be used to inform the power station proposals.

The EDF group and its partner CGN are committed to financing the development of Sizewell C and Bradwell B in the amount of a maximum of £1.1 billion, and a final investment decision on the construction is expected to be taken at a later date.

## 1.4.5.2 Italy

### 1.4.5.2.1 EDF group strategy in Italy

The Italian energy market represents a strong strategic interest for EDF due to the magnitude of its importance in both the European electricity and gas markets, its connection to the French markets and its key position in the Mediterranean basin.

Like the majority of European energy systems, the Italian market is currently facing a certain number of challenges. Thanks to its current position and to its integrated presence in the gas and electrical energy value chain, Edison is well-placed to seize opportunities created by market changes, all while pursuing efficiency and profitability, in line with CAP 2030 priorities.

In 2017, Edison implemented its transformation strategy, in line with the following main development factors:

- Edison has the objective of fortifying its position on the Italian market by providing innovation in its offering. Based on the strong positioning of its brand, Edison aims to grow its portfolio of individual gas and electricity customers. The high quality offering in particular through the development of energy services and low-carbon energy offer has an objective of reinforcing, aim to increase proximity to the end market, in particular in the industrial customer segments, tertiary and public administration;
- to optimise its electricity generation portfolio in Italy and to reduce CO<sub>2</sub> emissions, Edison is aiming on the one hand to increase its renewable energy generation to 40% of its generation portfolio by 2030, by promoting specific capital investments in hydroelectricity and the development of wind projects. On the other hand, the Company intends to concentrate the thermal generation portfolio, which includes state-of-the-art, high-efficiency and low-emission power plants, on the most efficient assets;
- in the gas sector, Edison represents the EDF group's gas platform: thanks to its accumulated knowledge, the Company, together with EDF Trading and under EDF's supervision, provides integrated management for all of EDF's gas activities and resources. In this regard, with effect from 1 August 2017, EDF entrusted Edison, through a contract for services, the asset management and the development of its upstream activities (including gas supply, contract management and medium-long term optimisation, transport and storage). Beyond optimising the current portfolio, Edison also aims to contribute to Italy's growth as a gas market to improve its own competitiveness and that of the EDF group, and to enhance flexibility and security of supply;
- in the E&P (Exploration & Production) sector, Edison intends to value its portfolio of assets mainly in Italy and in the Mediterranean basin by integrating it with the gas and electrical energy value chain.

**1.4.5.2.2 The EDF group's activities in Italy**

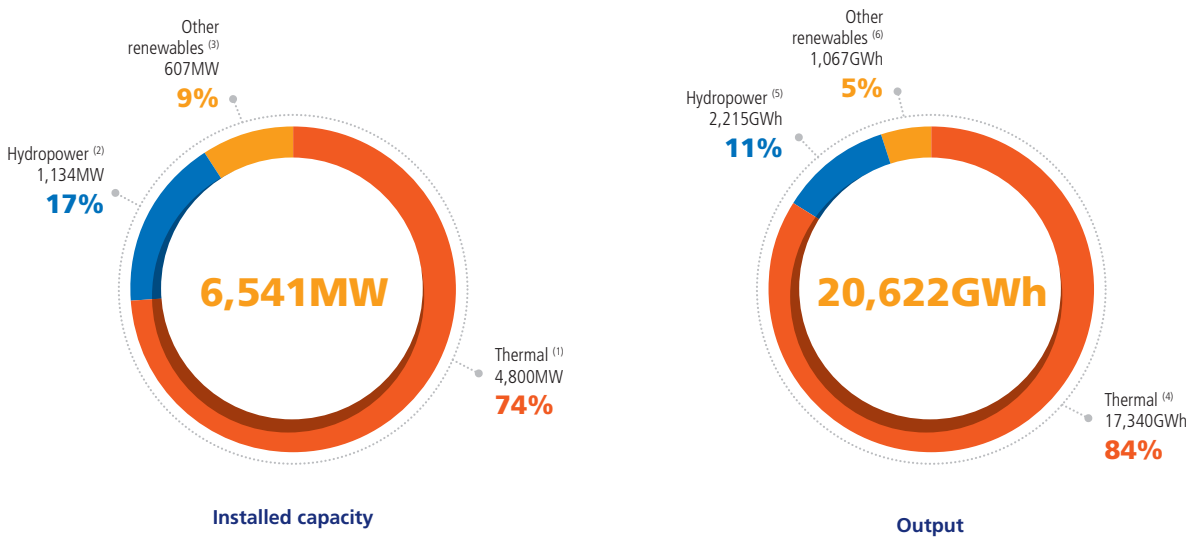
As of the end of 2017, the Group was mainly present in Italy through its 97.446% shareholding in Edison, which is a major player in the Italian electricity and gas markets and a well-known Italian brand.

Since 1 April 2016, Fenice, a wholly-owned EDF subsidiary specialised in environmental services, has been integrated into Edison. This operation is consistent with the strategic objective of Edison to become a key player on the Italian market for energy services, with a more complete and diversified offering.

The EDF group is also present in Italy through Citelum and the Italian subsidiary of EDF Énergies Nouvelles.

**1.**

**→ Installed capacity and output of Edison in 2017**



(1) Including Generation 4,621 MW and Services of Energy Efficiency with the customers 179 MW.  
 (2) Including Generation 1,132 MW and Services of Energy Efficiency with the customers 2 MW.  
 (3) Including Generation 604 MW and Services of Energy Efficiency with the customers 3 MW.  
 (4) Including Generation 16,469 GWh and Services of Energy Efficiency with the customers 871 GWh.  
 (5) Including Generation 2,209 GWh and Services of Energy Efficiency with the customers 6 GWh.  
 (6) Including Generation 1,064 GWh and Services of Energy Efficiency with the customers 3 GWh.

In 2017, electricity consumption on the Italian market was 320.4 TWh, up 2.0%, or 6.1 TWh, due to particularly high temperatures during the summer months. Increased consumption was covered by an increase of 0.7 TWh (+2.0%) in net imports and net power generation, amounting to 285.1 TWh in 2017 (+5.3 TWh vs. 2016). The 4.6% rise in thermoelectric output, in particular gas-fired power, and a 14.0% increase in solar power more than offset the 14.3% drop in hydraulic generation.

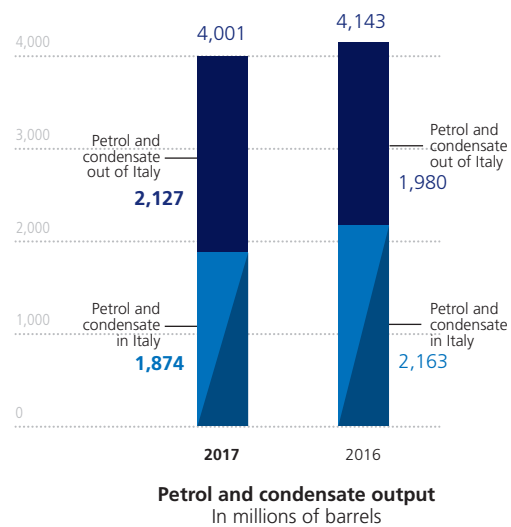
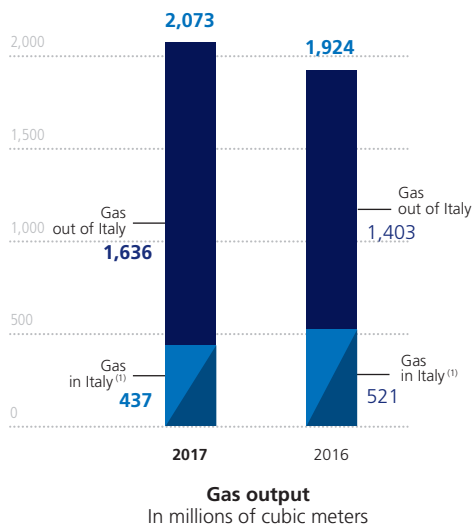
Based on power generation data for 2016 (1), Edison is the third-largest producer at the national level, after Enel and Eni. In 2017, it's net electricity output in Italy was 19.7 TWh, which accounted for around 7% of net Italian electricity generation.

The national demand for gas was 74.7 Gm<sup>3</sup>, up by +6.1% in comparison with 2016 due to a 8.7% increase in the use of gas for electricity production linked to an increase in electricity consumption and lower hydropower and coal-fired thermal power output. Industrial use also rose by 6.9%, and residential consumption by 3.5%, as a result of lower winter temperatures.

Natural gas imports in Italy represented 93% of the country's demand, and Edison made 22% of these imports, i.e. 15.1 Gm<sup>3</sup>.

(1) Data published by the AEEG. The 2017 data will be available mid-2018.

➔ **Output of gas and hydrocarbons of Edison**



(1) Includes output from Croatia (Izabela gas field) imported into Italy since July 2014.

In Italy and abroad, the Group's gas production business through Edison increased by 7.7% compared with 2016, reaching 2.1Gm<sup>3</sup>.

Production of oil and condensates fell by 3.4% in 2017 to reach 4 million barrels, including 1.9 million of barrels in Italy.

### 1.4.5.2.3 Edison's activities

#### 1.4.5.2.3.1 Electricity generation business

At 31 December 2017, Edison's installed generation capacity in Italy was 6.4GW, with net electricity output of 19.7TWh for 2017, down by 3% compared with 2016. This was mainly due to decreased thermoelectric and hydropower output, as a result of the sale of the CCGT plants of Termica Milazzo in August 2016 and Gever in March 2017 and due to unfavourable weather conditions during the year.

Edison's generation fleet is currently made up of 89 hydropower plants, 18 thermal power plants, 33 wind farms, 5 photovoltaic plants and 1 biomass plant. Combined-Cycle Gas Turbines (CCGT) account for 84% of electricity generation, while hydropower accounts for 11% and combined wind and solar for 5%.

Edison operates around 1,132MW of hydropower facilities with an output of 2.2TWh (down 11.3% compared with 2016) in line with the national average.

Following the acquisition in 2016 of 100% of Alperia's hydropower facilities located on the Cellina River, in exchange for its equity interests in two hydropower joint ventures, Hydros (40%) and Sel Edison (42%), and the purchase of nine mini-hydropower plants in Piémont and Frioul - Vénétie Julienne, Edison strengthened its hydropower generation fleet in 2017. More specifically, the Company completed construction on a 4.2MW mini-hydropower plant in Pizzighettone on the Adda River and purchased Tavagnasco's 4.8MW plant in Piedmont. Edison's strategy to develop the mini-hydropower sector was also confirmed by the acquisition of 50.1% of Frendy Energy, a company listed on AIM (Alternative Investment Market) on the Milan stock exchange, which owns 15 power plants located mainly on irrigation canals in Piedmont and Lombardy. Following the acquisition of a controlling interest in the Company, Edison launched a tender offer in November to acquire the remaining 49.9% that was publicly traded which resulted in the acquisition in January 2018 of total stake of 72.9% in Frendy Energy.

In the renewable energies sector, Edison also maintains a critical size, thanks to E2i Energie Speciali srl (E2i), a company created in 2014 in partnership with the F2i fund, which holds 70% of the capital, the 30% remaining being held by Edison Partecipazioni Energie Rinnovabili (EPER) which is itself 83.3% held by Edison and 16.7% by EDF Énergies Nouvelles.

E2i holds 594MW of renewable assets (contributed 82% by Edison and 18% by EDF EN Italia) and transfers 100% of the energy generated to Edison, which uses it for integrated management of its production portfolio.

EDF EN Services Italia SA, a company owned by Edison (30%) and EDF EN Services SA (70%), is responsible for operating and maintaining this platform.

With the aim of developing its activities in the wind sector, at the end of 2016, E2i won a public auction for eight projects for the construction, reconstruction or extension of wind farms, for total installed capacity of 165MW, including 153MW with the guarantee of a subsidised tariff. In November, the European Investment Bank (EIB) provided Edison a line of credit totalling €150 million, with a maturity of 15 years and an availability period of 24 months, which finalised the financing for the eight E2i projects. Completion of the construction will enable E2i to increase its portfolio by more than 700MW of installed capacity.

In November 2017, Eolo Energia Srl, owned by Edison Partecipazioni Energie Rinnovabili (51%) and E2i (49%), sold its 22.9% stake in Alerion (one of the leading wind power companies in Italy) within the context of a mandatory public tender offer launched by Fri-el Green Power for 100% of the Company's shares. An IPO was launched at the request of CONSOB, the Italian market regulator, due to tacit collusion.

The sale price was €3.0/share vs. €2.46/share paid during the voluntary public tender offer launched by Eolo Energia at the end of 2016.

In addition, outside of Edison and the partnership with F2i, EDF EN is present in Italy (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

In order to streamline its generation fleet and increase the efficiency and flexibility of its portfolio, on 2 March 2017, Edison sold its 51% stake in Gever to Burgo, a company managing the Burgo paper mills and in July sold its 50% stake in Parco Eolico Castelnuovo.

Internationally-speaking, Edison benefits from a well-established presence in Greece, where it is one of the main electricity operators in the country, through ElpEdison SA, with a 38% equity interest with Hellenic Petroleum, Hellenic Energy and Development (the Hellactor group) and Halcor. ElpEdison owns two CCGT plants: one in Thessaloniki (389MW) and one in Thivsi (410MW), built by Edison and selling electricity on the private users market.

Finally, in Brazil, Ibiritermo, a 50%-owned subsidiary of Edison, operates a 226MW CCGT power plant.

#### 1.4.5.2.3.2 Hydrocarbon business

For the implementation of its gas strategy, the EDF group, through Edison, benefits from experience developed along the entire value chain, from exploration-production through to the direct sale of natural gas.

Edison's gas supply portfolio in Italy is mainly based on long-term contracts and, in 2017, it included around 15.1Gm<sup>3</sup> of imports *via* gas pipelines and LNG, with 0.4Gm<sup>3</sup> of own production in Italy and 5.8Gm<sup>3</sup> purchased on the market.

In 2017, sales of gas in Italy to end customers amounted to 21.3Gm<sup>3</sup> (compared with 21.9Gm<sup>3</sup> in 2016). Edison delivered 4.5Gm<sup>3</sup> of gas to the industrial sector, 2.4Gm<sup>3</sup> to the residential sector, 7.3Gm<sup>3</sup> to the thermoelectric sector (including Edison's own internal needs), and 7.1Gm<sup>3</sup> to the wholesale market.

In recent years, Edison has revised the long-term gas import contracts with its suppliers. This process resulted, in particular, in the revision of the price of the Libyan long-term gas contract, decided on at the end of 2015 by the International Court of Arbitration of the International Chamber of Commerce in favour of Edison, and in two other commercial agreements for price revisions concluded in 2016 concerning the contract for the supply of Qatari and Libyan gas, which aligned the purchase prices with market terms.

In exploration and production, Edison possessed, at the end of 2017, 60 concessions and exploration permits in Italy and 45 abroad, and approximately 36.5 billion cubic metre equivalents in reserves. Abroad, Edison's most significant asset is the Abu Qir gas field in Egypt; in early 2009, Edison purchased the exploration, production and development rights for this field for an initial period of 20 years, extendable by further 10 years. At the end of 2017, the consortium, in which Edison holds an 11,25% stake with Sonatrec, Repsol and DEA Deutsche Erdoel AG, commissioned the output of the Reggane Nord gas fields in Algeria in the Sahara desert. Lastly, Edison is also active in Croatia, the UK and Norway, where it has licences for the North Sea, Norwegian Sea and Barents Sea.

#### Gas infrastructures

Edison is involved in various gas import infrastructure projects (see section 1.4.6.2.2.2 "Infrastructures"), such as IGI Poseidon, 50%-owned by Edison, a company involved in the development of several projects that aim to connect Greece and Italy (ITGI-Poseidon), Greece and Bulgaria (IGB, in 50/50 partnership with Bulgaria), as well as Greece and Cyprus (EastMed).

In 2017, Edison, Depa and Gazprom signed a cooperation agreement to work together in establishing a southern route for Russian gas supplies from the Black Sea, through the development of a gas pipeline project between Greece and Italy under the Ionian Sea. The project will be able to benefit from the activities already developed on the ITGI-Poseidon project.

In order to streamline its non-strategic assets, provide financial support to the investment plan with the aim of becoming the market leader in the generation of renewable energies and increase its residential customer portfolio, in October 2017, Edison sold to Snam Spa sa its 7.3% stake in Adriatic LNG Terminal, which manages the Rovigo offshore regasification terminal (8Gm<sup>3</sup> per year). Edison has nonetheless maintained the use of 80% of the terminal's capacity, *i.e.* 6.4Gm<sup>3</sup> per year, intended for the regasification of gas imported from Qatar with Ras Laffan Liquefied Natural Gas Company Limited II (RasGas II). At the same time, Edison also sold to Snam Spa its entire stake in Infrastrutture Transport Gas SpA (ITG), a company which owns and manages the Cavarzere-Minerbio gas pipelines (see also section 1.4.5.2.3.5 "Regulated activities").

#### 1.4.5.2.3.3 Sales and supply activities

In 2017, Edison sold 73.7TWh of electricity in Italy (compared with 91.2TWh in 2016, *i.e.* down 19%), of which 19.7TWh generated and 54TWh purchased on the markets. Sales to end-customers amounted to 10.9TWh, down by 5.6% compared with 2016, due mainly to lower sales in the business market. At the end of 2017, Edison (excluding Gas Natural) was serving around 494,000 electricity customers and around 480,000 gas customers, both in the business and residential segments.

In October 2017, Edison signed a binding agreement with Gas Natural Fenosa (Gas Natural) for the acquisition of Gas Natural Vendita Italia (GNVI), a company owned by Gaz Natural, which manages the sale of natural gas and electricity on the Italian market. With a portfolio of around 420,000 residential customers and

15,000 SMEs, with gas sales totalling 3.3TWh per year, and around 53,000 residential customers and SMEs in the electricity sector, GNVI enables Edison to increase its customer portfolio by 50%. GNVI's customer base is mainly made up of customers characterised by a very low *attrition* rate located in Central and Southern Italy, enabling Edison to extend its presence in the country. At the same time, Edison acquired Servigas, a company specialised in the maintenance of residential boilers with 90,000 contracts.

The acquisition of Gas Natural Vendita Italia was completed on 22 February 2018.

In addition, Servigas's operations present synergies with those of Assistenza Casa, in which Edison acquired a 51% stake in March 2017 (the remaining 49% is owned by the International group Home Serve). With a network of around 1,400 tradespeople and 300,000 customers, the Company provides innovative services for the installation and maintenance of household and "smart home" appliances, allowing Edison to broaden its electricity and gas offerings through value-added services. In sales and marketing, Edison continues to grow its electricity and gas sales to individuals and to the SME segment, aiming for excellence in customer relationships and focusing on selected loyal customers. In parallel, Edison intends to maintain its position as a leader in the business-customer market, by developing an advisory approach in energy. Improvement of the sales process continued in 2016 and resulted in better service to customers. Growing customer satisfaction, combined with the development of low-carbon offers and value-added services targeted by segment will strengthen ties with the end market and create the conditions for an expansion of the customer base.

#### 1.4.5.2.3.4 Activities on the market for energy services

Consistent with the strategic priorities of the Group, Edison's organisation was enriched in 2016 thanks to the creation of the Market Division for Energy Services, with the objective of contributing to the expansion of Edison on the market for services, with the development, sales and management of energy and environmental services.

The activities of Fenice as well as those of Edison Energy Solutions were integrated into this new Division. The proposed solutions are dedicated to the development of energy efficiency projects intended for major industrial clients, small and medium-sized enterprises and tertiary customers. With the "public administration" project, the Division aims to produce an offering for a sector that is in a growth phase in terms of the demand for energy services. The environmental activities complete the service offering.

The business models are adapted to the requirements of the customers: the Division, *via* its companies, designs, builds and manages, on behalf of its customers, assets such as combined generating plants, photovoltaic installations, electricity substations, thermal power plants for industrial use, cold generation power plants, compressed air generating plants, fluid distribution systems (electricity, gas, hot or refrigerated air, compressed air, industrial gas, water) and industrial water treatment plants. The range of services is completed by a consulting activity in terms of energy, management of environmental securities and internal and external training for customers and partners. Contracts with the FCA group (formerly Fiat), which are currently being renewed, still account for over half of Fenice's business.

The projects are developed in the form of industrial partnerships or performance contracts with customers; the financial model is also adapted to the requirements of the customer and may range from assistance to the customer with third-party financing as far as direct investment by Edison (Esco) in the projects.

In order to bolster its growth strategy and promote penetration into this sector by providing an integrated service offering for all segments of the market, in March 2017 Edison acquired a 51% stake in Comat Energia with group Comat (which holds 49%). This company operates in the heating sector, including the use of wood biomass for urban heating in the Piémont region, with more than 100 thermal power plants making it possible to increase the energy efficiency of both public and private buildings. In addition, in December 2017, the business portfolio grew in size following the acquisition of Energy Facility Solutions, a company which handles heat supply and the management of facilities, managing more than 1,800 public buildings (schools, hospitals, social housing, etc.) and private buildings, mainly in the northeastern region of Italy.

# 1. PRESENTATION OF EDF GROUP

## Description of the Group's activities

Energy efficiency operations are carried out abroad (Spain, Poland, Morocco) by Fenice. The Russian subsidiary of Fenice was sold to Dalkia in September 2016.

In 2016, EDF Fenice Spa, 100%-held by Fenice Spa, consolidated its "Global Energy Partner" business model in energy efficiency services to industry. With conclusion of several ESCO-type contracts and completion of numerous energy audits, EDF Fenice Iberica is currently positioning itself as a benchmark in energy efficiency services to industry in the Spanish market. Moreover, in 2016 it formed a subsidiary in Morocco, EDF Fenice Maroc, following the signing of a contract with an international group in the agri-food sector to build and run a wastewater treatment plant.

Fenice Poland, 100%-held by Fenice Spa, operates principally in the field of outsourced management of industrial utilities (cogeneration, heating, cooling, compressed air, electricity grid, industrial gases). It also handles various energy and associated environmental services (potable water, waste treatment, and liquid effluents). Fenice Poland also has the administrative concessions which are necessary to supply customers connected to its distribution networks (electrical, gas, heating).

### 1.4.5.2.3.5 Regulated activities

#### Gas transport and storage

Edison owns 100% of the Edison Stoccaggio company, dedicated to regulated gas-storage activities.

Edison also operates two storage facilities in depleted reservoirs (fields which have been depleted of natural gas): Cellino (since 1984) and Collalto (since 1994).

Moreover, Edison has been operating a third site, since 2013, San Potito & Cotignola.

The volume being worked upon on all of the sites is 1Gm<sup>3</sup>.

In addition, the Company is continuing to develop a storage project on the Palazzo Moroni site.

Lastly, in July 2017, Edison sold to Snam Spa its entire stake in Infrastrutture Trasporto Gas SpA (ITG), a company which owns the Cavarzere-Minerbio gas pipeline, a functional link from the Rovigo terminal to the national network as well as its 7.3% stake in Adriatic LNG Terminal which manages the same terminal (see section 1.4.5.2.3.2 "Hydrocarbon business").

#### Distribution

Gas distribution in Italy is regulated and supervised by AEEG, the electricity and gas authority that establishes, in particular, quality and safety parameters, as well as network access rules.

Infrastrutture Distribuzione Gas SpA (previously called Edison Distribuzione Gas) is the company dedicated to the distribution of natural gas within the Edison group. In 2017, Infrastrutture Distribuzione Gas distributed 257.6Mm<sup>3</sup> of natural gas to around 151,500 users in northern and central Italy.

### 1.4.5.2.4 EDF Énergies Nouvelles

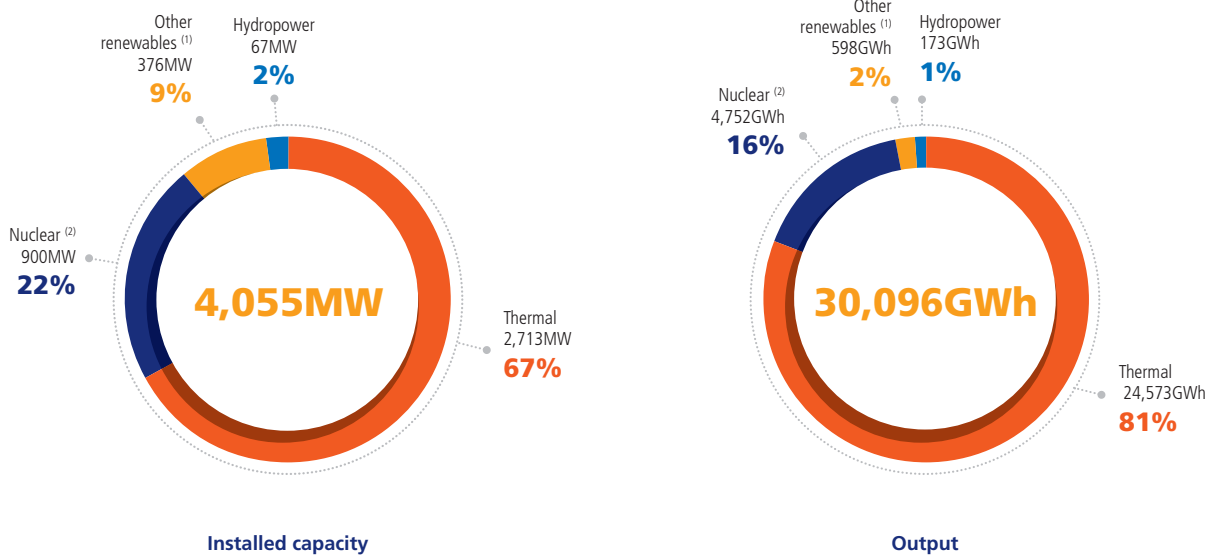
The capacities held by EDF EN Italia at 31 December 2017 totalled 384.4MW gross wind power (264.9MW net power) and 76.9MW gross photovoltaic power (or 74.3MW net power), in addition to 39.8MW gross wind power capacities owned by Futuren (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

### 1.4.5.2.5 Citelum

The Group is also present in Italy through its subsidiary Citelum, which holds numerous contracts in public lighting, traffic light signalling and global projects relating to smart cities, such as the ones of Syracuse or Lonato del Garda.

## 1.4.5.3 Other international

### ➔ Installed capacity and Output in 2017 for the "Other International" segment



(1) Excluding international data for EDF Énergies Nouvelles, part of the "Other activities" segment, see section 1.4.1.5.3 "EDF Énergies Nouvelles".  
 (2) 2017 Data including the disposal of EDF Polska.

### 1.4.5.3.1 Northern Europe

#### Belgium

The Benelux region features important interfaces with the Franco-German electricity marketplace and projects for new links with Germany and with Great Britain are being examined. Benelux also constitutes an important node in the European gas

market because of its numerous import and transit infrastructures, such as the Zeebrugge hub and the Dunkirk LNG terminal nearby.

The EDF group is present in Belgium through its two subsidiaries, EDF Belgium and EDF Luminus.

## EDF Belgium

As part of a long-term nuclear energy cooperation agreement with Electrabel, EDF holds 50% in undivided co-ownership of the Tihange 1 nuclear power plant, through its wholly-owned Belgian subsidiary, EDF Belgium. The capacity attributed to EDF represents 481MW (or 2% of Belgian generation capacity). Tihange 1 output, which is attributed to EDF Belgium is sold to EDF SA (via a long-term contract renewed at the end of 2015 for 10 additional years) which, in turn, resells the electricity to EDF Luminus at a market price.

Belgium's 2003 nuclear phase-out legislation originally provided for the closure of Tihange 1 on 1 October 2015. Nevertheless, it was finally decided to extend its operation upon 2025, following the adoption in 2012 by the Belgian government of the Equipment Plan, and the Law of 2013 amending the Law of 2003 pertaining to the timeframe for the phasing out of nuclear energy. This extension was the subject of an agreement concluded on 12 March 2014 between Electrabel, EDF and the Belgian State, defining its terms and conditions.

The extension of the lifespan of Tihange 1 requires significant investment, with EDF's share amounting to around €300 million, spread over the period from 2011 to 2020.

## EDF Luminus

At the end of 2017, the EDF group held 68.63% of the EDF Luminus company through its subsidiary EDF Belgium, with the remaining equity held by Belgian public shareholders.

EDF Luminus is the second largest player in the Belgian energy market after Electrabel, and it holds a balanced upstream/downstream portfolio. The company, whose market share is close to 20%, possesses almost 10% of total Belgian generation capacity with 2.018MW installed at the end of 2017. The electricity generation of EDF Luminus reached 6.7TWh in 2017. The company has 1,800 employees, including the newly-acquired subsidiaries.

As part of the Group's CAP 2030 strategic plan, EDF Luminus has the ambition of developing its windfarm fleet and accelerating the deployment of its energy services in order to provide its customers with innovative and sustainable solutions, whilst pursuing its objective of reducing costs and rationalising its thermo-electrical generation fleet.

EDF Luminus owns 10.2% (419MW) of Belgium's Tihange 2 and 3 nuclear power plants (commissioned in 1983 and 1985 respectively) and the Doel 3 and 4 plants (commissioned in 1982 and 1985 respectively), which have a lifespan of 40 years. EDF Luminus also has 100MW drawing rights on the French Chooz B nuclear power plant, based on a band of guaranteed output according to the average availability of the French fleet.

The Doel 3 and Tihange 2 nuclear reactors, which represent around 20% of the energy requirements in Belgium, and which had been at a standstill from 2012 to 2014, are again operational since the end of 2015. On 22 September 2017, Doel 3 was shut down to conduct a series of long-planned revisions. The inspection indicated that civil engineering work would be required for the facility's non-nuclear section, which would delay the restarting of Doel 3 until 15 April 2018.

Within the overall framework of the agreement concluded on 30 November 2015 between the Belgian State and Electrabel for the extension of the two Doel 1 and Doel 2 power plants, an agreement was reached concerning the nuclear tax in Belgium for the years 2015 (200 million) and 2016 (130 million). The financial impact for the two Belgian subsidiaries of the EDF group was €34.5 million in 2015 and €18.4 million in 2016. A variable formula will apply from 2017 to 2019, with a minimum annual total of €150 million for the nuclear tax in Belgium.

Apart from the drawing rights in the nuclear fleet, EDF Luminus also possesses a thermal fleet comprising several power plants (combined cycles and open cycles) for an installed capacity of 1,215MW. In a particularly unfavourable economic environment and in compliance with Belgian law that required the authorities be notified by 31 July 2016 of any possible permanent shutdown, the EDF Luminus Board of Directors validated a management proposal at its meeting of 24 June 2016 that such notification should be given for the following power plants: Seraing, Ham, Izegem and Angleur 3 with the actual shutdowns scheduled for 31 October 2017.

On 13 January 2017, the Federal Minister of Energy announced a plan to renew the strategic reserve for electricity, increasing the volume to between 750MW and 900MW, in order to guarantee security of supply for Belgium, by making use of the generation units that were notified of their shutdown. Following exchanges with the European Commission, the plan's duration (one year) and volumes were reviewed. As a result, the Seraing gas power plants (485MW) owned by EDF Luminus and

Vilvoorde (265MW) owned by Energy Market were incorporated into the strategic reserve with effect from 1 November 2017 for one year at a price set by royal decree.

Official notification of approval from the European Commission is expected in early 2018.

Separately, EDF Luminus decided to postpone the final shutdown of the open cycles of Angleur 3 and Izegem until 31 October 2019 and has informed the competent authorities. These units are therefore available after 1 November 2017 and, as a result, are not eligible for the strategic reserve. However, a decision was also made at the end of October 2017 to shut down the Ham facility with immediate effect, as it had been notified to the authorities in 2016.

EDF Luminus is moreover present in renewable energies with 7 hydropower plants and 31 onshore wind farms totalling 114 turbines spread across Wallonia and Flanders. Since the end of 2015, the Company has been the leader in onshore wind farms in Belgium and now has an installed capacity of 376MW. In 2017, EDF Luminus erected 28 wind turbines for a total capacity of 75.4MW.

## Sales and marketing

Under its "Luminus" brand, EDF Luminus supplies electricity and gas to more than 1.7 million residential and business customers (in number of delivery points) in Belgium, with a net loss of 24,000 customers in B2C (business-to-customer) in 2017 compared with the net gain in electricity customers in 2016.

## Energy services

The company is involved in the energy services segment for residential customers, through its subsidiaries Rami Services, Dauvister and Leenen, by providing these customers boiler installation and maintenance services, selling and managing a smart thermostat (Netatmo) as well as providing Comfort services in the event of unforeseen damages to housing. At the end of 2017, the B2C portfolio for these last three services exceeded 167,000 contracts. With close to 70,000 services sold in 2017, sales more than tripled in comparison to 2014.

As regards industrial customers, EDF Luminus, together with ATS, Vanparijs and Dauvister, offers comprehensive integrated electricity and heating solutions to industrial customers. In addition, its subsidiary EDF Luminus Solutions (co-owned with Dalkia (51%/49%)) is dedicated to energy efficiency services for such facilities such as administrative buildings, hospitals, schools, sports facilities, swimming pools and apartment complexes on the basis of an energy performance contract.

In 2017, EDF Luminus pursued its strategy to expand into energy services by acquiring two companies: Newelec, which is in the same business as ATS but in Wallonia, and Insaver which provides installation services for photovoltaic panels, insulation and batteries to private users in Flanders. ATS also acquired Gezel II which provides HVAC services locally in the northwestern part of the country. Dauvister acquired the operating assets of Peterman Poelaert, a company specialised in boiler installation and replacement for industrial customers in Brussels and Brabant-wallon.

## The Netherlands

Through a joint venture, Sloe Centrale BV, the EDF group and PZEM (formerly Delta) (each holding 50%) own an 870MW CCGT power plant in the southwest of the Netherlands, whose two 435MW units were commissioned in 2009. Thanks to its very high technical performance, the Sloe plant was called upon to operate in 2017 for 4,635 hours, an excellent performance under market conditions that were not very favourable to gas power plants.

## Switzerland

The EDF group is present in Switzerland through its investments in Alpiq Holding SA (25%) and in hydraulic generation facilities in Le Châtelot (50%), Emosson (50%) and Mauvoisin (10%).

Alpiq is a significant player in the European energy market, active in the generation, sale, and trading of energy as well as in energy services, and represents more than one third of Switzerland's supply of electricity. At the end<sup>(1)</sup> of 2016, installed capacity was 5,940MW, broken down as follows: nuclear (795MW), thermal (2,160MW), hydropower (2,677MW) and other renewables (308MW).

In 2016, its sales amounted to CHF 6,078 million<sup>(1)</sup>. In terms of sales, Alpiq is top-ranked among Swiss electricity companies.

Alpiq's activities rest primarily upon generation assets, which strongly exposes it to variations in market price. In order to address the new market environment which has been strongly degrading since 2011, the Alpiq group launched a significant cost

(1) 2017 data not yet available at the date of publication of this document.

reduction plan as well as profound restructuring measures. These measures include the opening up of its energy services business to investors (made up of Digital & Commerce, Industrial Engineering and Building Technology & Design) as well as an ambitious programme of disposals, including Swissgrid, AVAG and AEK, which contributed to reducing the net indebtedness of the Group to less than CHF 1 billion, with the cash flow originating from operational activities.

#### Germany

In 2016, jointly with the Dutch infrastructure fund DIF, EDF Invest took a 50% equity stake in Thyssengas, the gas transmission network operator in West Germany.

The EDF group also has storage for natural gas in salt cavities located in Etzel. The aboveground facilities are operated through a 50/50 joint-venture with EnBW (see section 1.4.6.2.2 "Gas assets and projects"). Via its subsidiary EDF Gas Deutschland, EDF also holds a 16% stake in BEP gas pipelines (Bunde-Etzel-Pipelinegesellschaft).

The Group owns 50% of a run-of-river hydropower plant located in Iffezheim on the Rhine River (148MW, 5 turbines, extension work on this plant was completed in 2013).

EDF Deutschland holds an 11.67% stake in the Berlin-based start-up ubitricity, which provides recharging solutions for electric vehicles.

In Germany, EDF EN developed, built and then resold more than 100MW onshore (build & sale), and now has a development pipeline of around 100MW. EDF EN also holds a 72% stake in REETEC, a service provider for onshore and offshore wind power based in Bremen. In July 2017, via REETEC, EDF EN acquired the German company, Off-shore Wind Solutions GmbH (OWS), specialising in the offshore operation and maintenance of wind farms. Since July 2017, EDF EN also owns an 87.5% stake in Futuren, a French company specialising in onshore wind farms in France, Germany, Morocco and Italy. In Germany, Futuren operated 139MW and manages 357MW on behalf of third parties (see section 1.4.1.5.3 "EDF EN").

EIFER, a research centre which reports to EDF's R&D department, is based in Karlsruhe and has more than 110 employees. Its work focuses on the optimisation of energy resources and decentralised generation (integration of renewables), energy in cities and local communities as well as energy conservation and the environment (electro-mobility, Power-to-Gas, Smart Cities).

Electranova Capital holds a stake of around 13.4% in Sunfire, a Dresden-based company which develops high-temperature electrolysers (Power-to-Gas and Power-to-Liquids).

Lastly, EDF Trading actively participates on commodities market in Germany, especially the intraday and gas markets.

#### 1.4.5.3.2 Central and Eastern Europe

##### Poland

On 13 November 2017, EDF finalised the sale of EDF Polska's assets (cogeneration and electricity generation) to PGE Polska Grupa Energetyczna SA after obtaining all the regulatory approvals and authorisations required under the sales contract signed between EDF and PGE on 19 May 2017.

This sale includes the Rybnik power plant, coal cogeneration power plants in Krakow, Czechnica, Gdansk, Gdynia and Wroclaw as well as gas cogeneration power plants in Torun, Zawidawie and Zielona Gora, representing total installed capacity of 4.4GWth and 1.4GWe respectively. It also includes heating networks in Czechnica, Torun, Zawidawie and Zielona Gora. The Wroclaw power plant as well as the power plants and heating networks in Czechnica, Zawidawie and Zielona Gora are indirectly owned (50% +1 share) via Kogeneracja.

The transaction was made based on EDF Polska being valued at around 6.1 billion zlotys on a full consolidation basis (i.e. close to €1.4 billion). It has contributed to a decrease in EDF group's net indebtedness in the amount of €1.0 billion. This transaction is part of a plan to sell at least €10 billion of assets, undertaken by the Group in 2015-2020. This transaction will also reduce EDF group's carbon footprint by around 23%.

EDF group is present in Poland, through its subsidiaries EDF Énergies Nouvelles, DK Energy Polska and Fenice Poland, and intends to remain the Polish government's partner in the development of the country's energy mix and its nuclear programme.

In addition the Group, through its subsidiary, EDF Énergies Nouvelles, owns two wind farms, of 48MW in Linowo and 58MW in Rzepin (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

In October 2015, DK Energy Polska, a subsidiary of Dalkia SA in Poland, acquired 100% of the shares of Zakłady Energetyki Ciepłej Katowice SA (ZEC), a company which is mainly specialised in the generation and distribution of heat in the region of Katowice (Upper Silesia) and a leader in the area of mine gas recycling. This acquisition was intended to serve as a base for the development in the Polish market of the Dalkia offer in energy services for industrial businesses and local communities (heating networks and energy-efficiency) and to develop the use of mine gas as a substitute for coal.

#### Russia

The EDF group is present in Russia in the energy services sector, via the local subsidiary sold by Fenice to Dalkia, newly renamed DK Energy Russia (see section 1.4.6.1.1 "Dalkia").

#### 1.4.5.3.3 Southern Europe

##### Spain

At 31 December 2017, the EDF group held 31.48% of the capital of Elcogas, a 320MW power plant of the ICCG type (Integrated Combined-Cycle Gasification), alongside Endesa Generación (40.99%) and Iberdrola Generación (12.0%). Since the profitability of the power plant was no longer assured, it was disconnected from the network in 2016 and a process of dismantling, which is likely to take place over a period of around three years, is on-going. Elcogas signed a put option agreement over land and certain facilities with Papeier Ence group. The Ence group has until June 2018 to exercise this option for the purpose of developing and building a 50MW biomass power plant on the site.

The Group is also present on the Spanish market through the local subsidiary Fenice (EDF Fenice Iberica, see section 1.4.5.2.2 "EDF group's activities in Italy") and the Citelum subsidiary (see section 1.4.6.1.2 "Citelum").

The 2017 sale of renewable assets owned by EDF EN in Spain should be noted (see section 1.4.1.5.3. "EDF Énergies Nouvelles").

EDF Trading operates in this market from its trading platform in London (see section 1.4.6.3 "Optimisation and trading: EDF Trading").

Lastly, since 2015, EDF Invest has held a minority stake in Madrileña Red de Gas, the operator of the main gas distribution network in the Madrid region (see section 5.1.3.3.2 "New investments and partnerships").

#### 1.4.5.3.4 North America

The EDF group operates throughout the North American continent, with a strong presence in the United States.

It has more than 5.3GW of installed capacity in North America. It also manages, on behalf of third parties, around 36GW of installed capacity under operation and maintenance or optimisation services contracts.

EDF's activities in North America mainly include:

- investments in nuclear generation, related to its 49.99% stake in CENG ("Constellation Energy Nuclear Group"), a joint venture with the Exelon group (leading American nuclear operator) in three nuclear power plants. CENG has installed capacity of 4GW (i.e. 2GW consolidated by EDF group). These three facilities are operated by Exelon;
- renewable energies, with a net capacity of 4GW, mainly located in the United States through EDF Renewable Energy, a wholly-owned American subsidiary of EDF Énergies Nouvelles. Equally, EDF Renewable Services (a wholly-owned subsidiary of EDF Renewable Energy) manages close to 10GW in North America through operation and maintenance contracts on its own account or on behalf of third parties;
- trading, throughout the entire value chain in North American gas -and electricity markets through EDF Trading North America, and the supply of energy management products in the US and Canada through EDF Energy Services (a wholly-owned subsidiary of EDF Trading North America);



- energy services, local management of energy and energy efficiency, under the management of Dalkia and its subsidiaries Tiru and Groom Energy Solutions;
- R&D and Innovation, as part of EDF Innovation Lab;
- urban street lighting, via Citelum, a wholly-owned subsidiary of EDF.

#### 1.4.5.3.4.1 Nuclear activities in the United States

##### Nuclear generation: Constellation Energy Nuclear Group (CENG)

On 6 November 2009, the EDF group and CEG established CENG. Since the merger between Exelon and CEG, EDF and Exelon have owned stakes of 49.99% and 50.01% respectively in CENG. EDF and Exelon agreed in 2014 to transfer the power plant operating licenses of CENG to Exelon. Pursuant to this agreement, Exelon manages the day-to-day operations of the three CENG nuclear sites (five nuclear reactors).

As part of the transaction, in 2016, CENG paid EDF US\$400 million in special dividends and EDF was granted a put option to sell its CENG shares to Exelon at fair market value exercisable between 1 January 2016 and 30 June 2022.

CENG is governed by a Board of Directors of ten members, five of whom are appointed by the EDF group and the other five, including the Chairman, by Exelon.

##### CENG's nuclear activities

CENG's nuclear business is under the control of the US Nuclear Regulatory Commission (NRC).

CENG operates five nuclear reactors, spread across three operating sites and representing a combined capacity of 4,240MW. The duration of licences for Units 1 and 2 of Calvert Cliffs, Unit 1 of Nine Mile Point and RE Ginna is 60 years.

Reactors	Capacity (in MW)	% interest	company-owned capacity (in MW)	Output <sup>(2)</sup> (TWh)	
				2017	2016
Calvert Cliffs 1	894	100	894	7.83	7.18
Calvert Cliffs 2	881	100	881	7.27	7.57
Nine Mile Point 1	620	100	620	4.89	5.35
Nine Mile Point 2 <sup>(1)</sup>	1,287	82	1,056	9.11	8.29
RE Ginna	575	100	575	4.70	5.04
<b>TOTAL</b>	<b>4,240</b>		<b>4,009</b>	<b>33.80</b>	<b>33.44</b>

(1) CENG owns 82% of this unit (i.e. 1,056MW of the unit's total capacity of 1,287MW). The 18% of Unit 2 of Nine Mile Point not owned by CENG belongs to the Long Island Power Authority (LIPA). LIPA receives 18% of the capacity and electricity generated by Nine Mile Point Unit 2, in consideration for payment to CENG of its share of the costs incurred by the unit, and is responsible for its 18% share of the costs of dismantling the unit. CENG and LIPA are each required to provide specific funding for Nine Mile Point 2.

(2) These values correspond to the sum of the exact values expressed to one decimal place after rounding.

The assets of EDF represented 2% of the US nuclear generation capacity and 0.4% of total electricity generation in 2017.

The principal competitors of EDF on this market are Entergy, AEP, Exelon, Dynergy and NRG.

##### Regulations of the State of New York

On 1 August 2016, the New York Public Service Commission (NYPSC) issued an ordinance establishing a new regulation, the Clean Energy Standard (CES), of which one of the aspects is aimed at the preservation of nuclear resources in the State of New York, by the recognition of their zero-carbon electricity generation environmental characteristics. The planned mechanism includes the creation of a programme of zero emission certificates (ZEC: Zero Emission Credit) in order to preserve the low-carbon nuclear generation installations, which comply with the criteria determined by the NYPSC. The New York State Energy Research and Development Authority (NYSERDA) centralises the award of ZECs to eligible power plants via a 12-year contract, administered in six tranches of two years, with effect from 1 April 2017 until 31 March 2029. The payment of ZECs to eligible producers will be made on the basis of the number of megawatt-hour produced, subject to caps and minimum performance requirements. The price to be paid for the ZEC for each tranche will be determined administratively using a formula based on the social cost of carbon estimated by the federal government in 2016. This formula also includes downward adjustments related to price fluctuations in the energy market and capacity. For the first tranche (from 1 April 2017 to the end of March 2019), the price of a ZEC was fixed at \$17.48 per MWh generated. For the following tranches, the price will be updated twice annually.

Each electricity supplier ("Load Serving Entity") is required to purchase a ZEC volume consistent with its market share in the State of New York. Recovery of program costs from customers who benefit from regulated tariffs is included in their electricity bills.

The NYPSC has established that Ginna and Nine Mile Point nuclear facilities are eligible for the ZEC program. On 18 November 2016, agreements for the sale of ZECs for Ginna and Nine Mile Point were signed with NYSERDA. During the 2017 fiscal year, CNEG recognised \$248 million for the sale of ZECs.

Several stakeholders have filed petitions with NYPSC requesting a review of CES mechanisms. A petition, aimed at invalidating the ZEC program, was filed on 30 November 2016 in a New York court by environmental groups. This petition

contends that NYPSC is not empowered to set up this program and that it violated, from its implementation, certain technical provisions of New York State law on administrative procedures (SAPA). On 15 February 2017, CENG filed a motion to have this case dismissed. The matter is currently being investigated.

On 19 October 2016, a coalition of thermal generation companies filed a complaint before the New York federal district court against NYPSC, alleging that the ZEC program would violate certain provisions of the US constitution, and more specifically that it would interfere with regulatory requirements of the Federal Energy Regulatory Commission concerning wholesale tariffs and that it would constitute severe discrimination against competitors from other states. The State and CENG filed an appeal on 17 November 2017.

##### 1.4.5.3.4.2 EDF Trading in North America

EDF Trading operates in the North American markets for electricity (including transmission rights), gas, coal and environmental products. EDF Energy Services is the commercial and industrial retail arm of EDF Trading and provides management and optimisation services to large-scale energy intensive commercial and industrial customers throughout North America (see section 1.4.6.3 "Optimisation and trading: EDF Trading").

##### 1.4.5.3.4.3 EDF Énergies Nouvelles in North America

EDF Énergies Nouvelles, through its subsidiaries EDF Renewable Energy, EDF Renewable Services, EDF EN Canada and EDF EN Mexico, continued its expansion in North America, commissioning 812,5MW gross of wind, solar photovoltaic and biogas capacity in 2017.

EDF Renewable Services manages wind and solar projects, both for the Company's own accord and on behalf of third parties (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

##### 1.4.5.3.4.4 Dalkia in North America

Dalkia, a wholly-owned subsidiary of the EDF group, is present in the North American energy services markets (local management of energy and energy efficiency) with 414 employees. Dalkia operates through its subsidiaries Tiru in Canada, DK Energy US and Groom Energy Solutions in the United States (see section 1.4.6.1.1 "Dalkia"). The principal competitors on this market are Veolia and Constellation.

#### 1.4.5.3.4.5 Research & Development

EDF has an R&D and Innovation team (EDF Innovation Lab) located in Silicon Valley, which assists with the development of EDF in the United States and contributes to innovation within the Group (see section 1.6.3 "International business and partnerships"). In 2016, this team identified the company Off Grid Electric (OGE), EDF's partner in the supply of competitive off-grid solar energy in the Ivory Coast (see section 1.4.5.3.9 "Off-grid energy").

#### 1.4.5.3.4.6 Citelum in North America

Citelum, an EDF subsidiary in the field of urban street lighting, is also present in the United States (see section 1.4.6.1.2 "Citelum"). On 21 November 2017, the Company signed its first contract with the city of Albuquerque to convert more than 20,000 streetlights to LED, implement an Internet of Things (IoT) architecture and deploy a central management system. Through this contract, Citelum USA is committed to reducing energy consumption and maintenance costs for a 15-year period, as well as providing better lighting and services.

#### 1.4.5.3.5 South America

In South America, the EDF group is present in the Brazilian and Chilean markets, and is extending its ambitions in certain countries in the region, in which it is prospecting for development opportunities.

##### 1.4.5.3.5.1 Brazil

Since April 2014, the Group has held 100% of EDF Norte Fluminense, following the buyback of the 10% equity interest held by Petrobras in the share capital of EDF Norte Fluminense. The company, which built and has operated since the end of 2004 the Combined-Cycle Gas plant of Norte Fluminense, with installed capacity of 827MW, located in the region of Macaé, has a supply contract for 725MW to the Light distribution company over a 20-year period. In 2017, the power plant's generation increased to 5.45TWh. When Brazil's market conditions and electricity grid permit, the remaining balance is sold on the open electricity market. In 2017, EDF Norte Fluminense sold 285GWh, between own generation (209GWh) and other energy transactions. In addition to these sales on the national market, 22GWh were generated and exported to Argentina.

EDF Norte Fluminense has an additional solar power plant, intended for industrial consumption, comprising 1,764 photovoltaic modules which generated 302MWh in 2017, helping to reduce its CO<sub>2</sub> emissions by around 116 tonnes.

In addition, on 11 December 2014, through its subsidiary EDF Norte Fluminense, EDF acquired a 51% stake in Compagnie Énergétique de Sinop (CES), which is responsible for the construction and future operation of Sinop's hydropower facilities of an installed capacity of 400MW. The two other shareholders are Eletronorte (24.5%) and CHESF (24.5%), subsidiaries of the Eletrobras group. Construction of the dam began in spring 2014 and commissioning for commercial operations is scheduled for the end of 2018. The EDF group has an industrial role in both the construction and the future operation of the dam. At the end of October 2017, close to 94% of the construction on the electricity generation factory (civil engineering work, supply and erection of the electromechanical equipment) was completed.

In line with the CAP 2030 strategic plan, the EDF Énergies Nouvelles subsidiary is accelerating its development in Latin America and notably in Brazil, where it entered the solar energy market with the two-stage acquisition from Canadian Solar Inc. of the Pirapora I (399MWc) solar project in the north of the state of Minas Gerais. EDF Énergies Nouvelles has been present in the country since February 2015, following the acquisition of more than half of the portfolio of Ventos da Bahia (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

EDF is also present in Brazil via Edison, of which the 50%-held subsidiary Ibiritermo operates a CCGT of 226MW in the state of Minas Gerais, as well as via Citelum, a subsidiary of Citelum created in 1999 and specialising in street lighting.

EDF's main competitors in Brazil are ENGIE, Neoenergia, CPFL, ENEL and EDP.

##### 1.4.5.3.5.2 Chile

Since 2013, EDF is jointly developing with its Chilean partner Andes Mining & Energy (AME) and the American company Cheniere, a gas to power project combining the design, construction, and operation of a CCGT-type power plant with a power output of around 600MW, a storage infrastructure and an LNG Floating Storage Regasification Unit (FSRU).

Via its subsidiary EDF Chile, created in 2014 for this purpose, the Group has a 45% shareholding in the two project companies (Penco-Lirquén LNG terminal and El Campesino power plant), alongside BiobioGenera (45%), of which AME is the controlling shareholder and the company Cheniere owns 10%.

This "gas to power" project is part of Chile's energy policy, aimed at a balanced mix of gas, hydraulic and renewable energy generation. The project nonetheless suffered a setback when the Chilean Supreme Court, in a decision on 30 January 2017, revoked the permit for the Penco Lirquen regasification terminal. At this stage, various measures have been taken to further the Group's expansion into electricity generation in Chile, including re-starting the process to obtain a permit.

In addition, El Campesino power plant signed an agreement to acquire ESSA, the owner of a 750MW generation asset, which is expected to be finalised in the first half of 2018.

The EDF Énergies Nouvelles subsidiary is also present in Chile with the solar power plant of Boléro (146MWc), located in the Atacama desert and inaugurated in December 2016, and the Santiago Solar photovoltaic project (115MWc), 50/50 jointly owned with Andes Mining Energy (AME). EDF Énergies Nouvelles is also pursuing its development in wind-farms with the Cabo Leones project of 115MW (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

The principal competitors of EDF on this market are Endesa, AES Gener, Colbun and Engie. Furthermore, other players such as Mainstream, WPD and Gas Natural Fenosa also show ambitions in the electricity generation segment, essentially of renewable origin.

Lastly, Citelum, a wholly-owned subsidiary of the EDF group, is also present in the country, in the street lighting market. (see section 1.4.6.1.2 "Citelum").

#### 1.4.5.3.6 Asia-Pacific

The EDF group's activities in the Asia-Pacific region are focused on China and fast developing countries. The presence in the sectors of electricity generation, networks and services constitutes an industrial challenge for the Group. In nuclear power, in addition to the project to build and operate two EPR reactors in Taishan, new projects should provide the Group with access to technological innovation and enable it to exploit its industrial expertise. EDF's objective is, thus, to maintain its competitive and technological advantages in the international arena focused on the global nuclear programme, the equipping of emerging countries, and the perspective of the French fleet renewal.

##### 1.4.5.3.6.1 Activities in China

The EDF group has been present in China for more than 30 years through its advisory services in nuclear, thermal and hydraulic technologies. Today, it is one of China's most significant foreign investors in electricity generation, with investments in coal-fired thermal power plants that have a total installed capacity of 2,000MW<sup>(1)</sup>. With the Taishan project Phase I (two 1,750MW reactors), EDF also became an investor with a 30% stake in an electricity generation project involving an EPR-type nuclear power plant. Lastly, the EDF group has been involved in renewable electricity generation in China since 2016 and is developing partnerships which open up new prospects for investment in the nuclear industry, renewable energies, energy services and engineering.

Citelum subsidiary is also present in this country for public lighting, through the contract signed with Kunming city.

(1) Share in the capacity corresponding to EDF's stake.

## Nuclear power generation activities

### Daya Bay, Ling Ao and Taishan EPR Phase I power plants

After having led the design, construction and commissioning in 1994 of Daya Bay (two nuclear reactors of 1,000MW each) and then assisted the Chinese group China General Nuclear Power Co. (CGN) in the construction of the Ling Ao Phase 1 power plant (two reactors of 1,000MW commissioned in 2002 and 2003), followed by Phase 2 (two additional reactors of 1,000MW commissioned in 2010 and 2011), EDF is currently providing assistance to the CGN group with the operation of its entire fleet. The performance achieved by these power plants since commissioning is one of the Group's main benchmarks in China. In addition, EDF owns a 30% shareholding in Taishan Nuclear Power Joint Venture Company Ltd., which was set up to fund, build and operate two EPR nuclear reactors in Taishan, in the province of Guangdong. Through this project, the Group represents the first foreign investor in Chinese nuclear power generation. The project's success will rest on the complementary expertise of the EDF and CGN groups. The project reached a milestone in 2017 when testing was carried out on reactor number 1. The commissioning of this tranche is scheduled in 2018, and in 2019 for unit 2 (see also section 1.4.1.2.3.2 "Taishan EPR").

### Partnership agreements

The General Partnership Agreement between EDF and CGN was signed in 2007 and complemented in 2014 by implementation of agreements related to engineering, R&D, and plant operation. The EDF group has set up a facility based in Beijing and Shenzhen (the Group's front office for China's nuclear industry) with the aim of promoting the EDF model of an integrated architect-assembler operator while acting as a flagship for French industry and positioning itself to support the Group's projects, in partnership with the Chinese nuclear sector. Experts in this facility are working, in particular, to further promote French codes and standards, as well as the Group's nuclear safety guidelines. The organisation also hosts the representative of the *Partenariat France Chine Électricité* (PFCE) association chaired by EDF and made up of qualified suppliers of EDF which are seeking to develop in China.

In 2010, the Group concluded a partnership framework agreement with China National Nuclear Corporation (CNNC), extended in March 2014, aimed at developing their cooperation along deeper, global lines. Also in 2013, the Group signed an agreement with CGN and AREVA - Framatome, which prepared the terms for the construction of future reactors and provided for EDF's contribution to CGN's operating fleet and its evolution.

The partnership with CGN enabled the initiation of discussions concerning its participation in joint nuclear projects in Great Britain, which resulted in the signature by EDF and CGN of the final contracts for the Hinkley Point C power plant on 29 September 2016. An agreement covering the development of the UK Hualong technology was also signed at that time.

Lastly, in the context of the Franco-Chinese governmental declaration of June 2015, tripartite agreements (EDF and AREVA - Framatome with CGN and CNNC) were signed in 2015, providing for the continued EPR construction in Taishan, the participation of the Chinese industrial customers in Great Britain, as well as a partnership for the development of medium- and large-sized reactors. In addition, an agreement between AFCEN and NEA (National Energy Administration) covering cooperation as regards codes and standards was signed in November 2017. Its objective is to promote mutual recognition of nuclear codes and standards and to establish a basis for cooperation between France and China enabling both countries to operate on the international nuclear market.

The joint statement endorsed by the French and Chinese Presidents in January 2018 welcomes the cooperation between French and Chinese industrial players on EPR, particularly in Taishan, and calls for further joint efforts on British projects (Hinkley Point C, Sizewell, Bradwell).

## Coal-fired thermal power generation activities

### Shandong Zhonghua Power Company Ltd. (SZPC)

The EDF group holds 19.6% of SZPC, a company which owns three coal-fired power plants in the Shandong province, commissioned between 1987 and 2004, with a total capacity of 3,060MW. The other shareholders are the Guodian group (which merged with Shenhua in 2017 to form a new group, State Energy Investment Group) and the Hong Kong electricity producer CLP.

### Datang Sanmenxia Power Generation Company Ltd. (DSPC)

The EDF group holds 35% of DSPC, the company that owns the Sanmenxia 2 power plant in Henan province, commissioned in 2007, with an installed capacity of

2x600MW, using a technology known as "supercritical coal". This investment was made through a joint venture with a fixed lifespan, established by the Chinese authorities, running until 2039. The other shareholders are two Chinese companies including Datang, the majority shareholder in DSPC.

### Fuzhou Power Generation Company (FPC)

The EDF group holds 49% of FPC, a joint-venture created in 2014 with a subsidiary of the Datang group to build and operate an "ultra-supercritical" coal-fired thermal power plant (2x1,000MW) in the Jiangxi province. The first unit was commissioned in December 2015, the second in April 2016. Fuzhou is thus the first power plant of the "ultra-supercritical" type (in other words, having increased output and a limited environmental impact) operated by the EDF group. This technology makes it possible to reach high levels of temperature and pressure in the boiler, assuring a better output (close to 44% for Fuzhou) than a traditional power plant, while decreasing coal consumption and CO<sub>2</sub> per kilowatt-hour generated.

## Renewable energies

EDF Énergies Nouvelles holds an 80% interest in UPC Asia Wind Management (AWM) which develops and builds wind projects in China with a team of close to 100 employees. Through AWM, the EDF group has an equity stake in six wind power plants (including two under construction) for total installed capacity of 319.5MW (143.6MW in proportion to EDF's equity) as well as a project pipeline under development representing several hundred MW.

## Research & Development (R&D) activities

Six years after its creation, EDF's R&D centre in China has stepped up support to EDF China's divisions and is deploying its expertise on priority thematic areas for EDF's development in China. The Centre's activities involve the generation and storage of low-carbon electricity, innovative electricity grids, local multi-energy systems and open innovation. Modelling and digital simulation capacities are a strong component in each one of these fields.

## Energy services

In the city of Sanmenxia (Henan province), EDF set up a joint venture (of which 65% is held by EDF) for the construction and operation of an urban heating network using the recovery of unavoidable heat emitted by thermal power plants of its partner Datang. The concession agreement, for a period of 30 years, was signed on 9 August 2016 and the network entered into commercial operation on 15 November 2016. After the success of the first heating season, the municipality of Sanmenxia decided on 29 August 2017 to extend the concession area granted to the joint venture and to reduce CO<sub>2</sub> emissions by 200,000 to 240,000 tonnes per year starting from 2021.

In the city of Lingbao (Henan province), EDF set up a joint venture on 13 November 2017 with the municipal investment company (of which 65% is held by EDF) to build and operate a heating network powered by a 35MW biomass cogeneration power plant. The 30-year concession agreement was signed on 9 January 2018 as part of the French President's state visit to China. Construction on the power plant is expected to begin in Q1 2018. This project will provide additional income to local farmers and will allow for the controlled elimination of agricultural waste and the avoidance of 150,000 tonnes of CO<sub>2</sub> per year.

In the city of Sanya (Hainan province), EDF and its partner Changfeng Energy were chosen on 8 August 2017 by the municipal government to complete a network of multi-energy plants in the city's tourist areas under a 30-year concession agreement. This initiative will make it possible to supply cooling (air conditioning) and sanitary hot water to hotels, shopping centres and hospitals. The joint venture (of which 50% is held by EDF) was set up on 6 November 2017 and the concession agreement was signed on 9 January 2018 in the presence of the French and Chinese Presidents. This project will enable the avoidance of 20,000 to 70,000 tonnes of CO<sub>2</sub> per year.

Concerning energy services, the contract signed with Dongfeng Peugeot Citroën Automobile in Wuhan in 2013 for street lighting was extended in 2014 and 2015. EDF is also working with the municipality of Wuhan for the planning, development and operation of energy services in the Franco-Chinese eco-district of Caidian. An initial contract was signed in 2016 for the completion of two pilot projects covering street lighting and the energy efficiency of a test building.

The Group also proposes to bring innovative solutions to industrial customers and eco-districts by drawing on EDF's expertise in Europe, particularly in the fields of smart grids, cogeneration, waste heat recovery and decentralised renewable energies (heat pumps, district solar, biomass and geothermal power).

### Engineering services

Concerning engineering services, EDF is working with its partners to respond to international calls for tender. This complementarity of expertise led to the signing of a contract in 2017 with Asian Development Bank, in conjunction with the Chinese network operator State Grid, to carry out a feasibility study on the interconnections between the electricity grids of countries located in Northeast Asia (China, Mongolia, Japan, Korea). In addition, EDF is considering the feasibility of upgrading its exploration and maintenance services in partnership with Chinese players.

In the Chinese market, EDF International Networks develops service and consultancy offers to optimise the performance of local players in managing electricity distribution networks.

#### 1.4.5.3.6.2 Southeast and Southern Asia

The EDF group's activities in South-East Asia and in Southern Asia are focused on the development of the electricity sector, particularly through involvement in projects for the design, construction and operation of new thermal gas and hydraulic generation plants in countries offering Independent Power Plant (IPP) type opportunities, as well as in the field of renewable energies, smart cities and innovation.

#### Vietnam

At 31 December 2017, EDF owned 56.25% of Mekong Energy Company Ltd. (MECO), the company owning Phu My 2.2, a combined cycle gas power plant with a capacity of 715MW (or around 1.7% of the country's installed capacity). The other shareholders are TEPCO (JERA) and SGM2 (Sumitomo). This is the first IPP project financed exclusively by foreign investors in Vietnam. The BOT (Build, Operate, Transfer) contract has a term of 20 years. In 2005, EDF provided "turnkey" delivery of the power plant, and operations are now managed by MECO.

#### Laos

At 31 December 2017, the EDF group held a 40% stake in Nam Theun 2 Power Company (NTPC), which owns the hydropower complex Nam Theun 2 with an installed capacity of 1,070MW, built by the EDF group under a "turnkey" contract, commissioned in 2010 and which represents approximately 18% of the installed capacity of the country. The other shareholders are a Thai company, EGCO (Electricity Generating Public Company Limited), which holds 35%, and a Lao State company, LHSE (Lao Holding State Enterprise), which holds 25%. NTPC company operates the power plant on a 25-year concession agreement concluded with the government of Laos.

#### India

Concerning nuclear energy, following the memorandum of cooperation relating to the plan to build 6 EPR reactors in Jaitapur signed in January 2016, EDF and the national Indian electricity company Nuclear Power Corp of India Ltd. (NPCIL) furthered their discussions in 2017 to better define the framework of their cooperation, which culminated on 10 March 2018 with the signing of an industrial way forward agreement for the implementation of six reactors (see section 5.2 "Subsequent events").

In addition, in 2016, EDF won a contract for 75,000 smart meters from the New Delhi Municipality Council, the municipal authority for the Indian capital. The Group, via its subsidiary EDF International Network responded to this call for tenders within the framework of a consortium led by WAPCOS, an infrastructure engineering company wholly-owned by the Indian State.

The EDF Énergies Nouvelles subsidiary is also present in India in photovoltaic solar energy, and since 2016 in wind farms (see section 1.4.1.5.3. "EDF Énergies Nouvelles").

### Research & Development

Following an agreement signed in June 2013 with the Singapore Housing and Development Board, the city's largest construction firm, with the aim of developing an innovative urban modelling tool, the EDF group, in 2014, opened a centre of excellence for sustainable cities in Asia: EDF Lab Singapore. This R&D centre dedicated to urban planning has as its mission to reinforce existing collaboration and to initiate new collaborative relationships with Singapore and other cities of the region. In October 2017, EDF signed a research partnership with Nanyang Technical

University to bring the Renewable Energy Integration Demonstrator Singapore, a multi-company project involving a smart electricity grid demonstrator (Smart Grids), to an island off the coast of Singapore.

#### 1.4.5.3.7 Africa

The Group wishes to develop on the African continent by assisting countries with high-energy demand, on a selective basis appropriate to each geographic region, and by building sustainable and multi-industry partnerships. EDF is also intensifying its action in the supply of competitive off-grid energy.

#### South Africa

The EDF group established a subsidiary in 2007 in Johannesburg, initially with a view to preparing the relaunching of the South African nuclear programme. The energy guideline plan for the country, promulgated in May 2011, provided for the commissioning of 9.6GW of nuclear power capacity by 2030. This programme is in the process of being reviewed and will be extended to 2050. Several scenarios integrating nuclear, renewable energies and liquefied natural gas are being discussed with a view to promulgation in 2018. The South African subsidiary is also responsible for developing EDF's business activities in Southern Africa, particularly as regards generation projects as well as the sale of services relating to thermal engineering, hydropower, transmission and distribution.

In addition, EDF EN has gained a foothold in the South Africa wind power market during the course of the various phases of the request for bids launched by the Ministry of Energy since 2011. The company was selected through its subsidiary InnoWind (of which 84% is held by EDF EN) and operates a gross capacity of 107.6MW.

The Group is also present in South Africa via the company KES (Kukhanya Energy Services), created in 2002 (see section 1.4.5.3.9 "Off-grid energy").

#### Mozambique

The Group has been active in Mozambique since the end of the 1980s involving the provision of engineering services and has formed preferred partnerships with EDM (Electricidade de Moçambique).

The EDF group and EDM have entered into a cooperation agreement signed in June 2017 with the aim of promoting exchanges in all areas of connected and non-connected electricity systems for hydraulic, thermal and renewable generation as well as in networks and training.

The EDF group, in conjunction with WLE - World Leading Education, was selected within the framework of a call for tenders relating to professional training and the renewal of EDM's training centres.

#### Morocco

The EDF group has been active in Morocco since the 1970s, and has formed preferred partnerships with Morocco's national electricity and water office (ONEE), electricity distribution authorities, and industrial players. To help support its development, the Group created EDF Maroc in 1997, EDF EN Maroc in 2012 as well as EDF Fenice Maroc in October 2016.

The Group and ONEE continued their cooperation, pursuant to the general agreement signed in January 2012, in the areas of renewable, thermal and hydraulic generation, as well as in networks and training.

After having been selected by ONEE through a call for tenders, the consortium led by EDF EN in partnership with the Japanese group, Mitsui & Co., is developing the 150MW Taza wind farm (see section 1.5.1.4.3 "EDF Énergies Nouvelles").

The Group is also involved in energy efficiency activities in Morocco with the Fenice subsidiary (EDF Fenice Maroc, see section 1.4.5.2.2 "EDF group's activities in Italy") and in public lighting with the Citelum subsidiary.

#### Senegal

The Group is also present in Senegal, through the ERA company, the operator of the rural electrification concession in Kaffrine-Tambacounda-Kédougou (see section 1.4.5.3.9 "Off-grid energy"). It is also present through a service contract involving generation with an independent power producer and several service contracts through its subsidiary EDF International Networks, responsible for implementing contracts to improve the performance and ensure the reliability of the local operator Senelec's distribution network.

## Cameroon

The State of Cameroon (30%), the IFC (World Bank Group, 30%) and EDF (40%) are developing the Nachtigal 420MW hydropower project, situated on the Sanaga River, close to Yaoundé, for an investment decision scheduled for the end of H1 2018. In July 2016, Nachtigal Hydro Power Company was created to assist with the project and signed a Concession Agreement for Electricity Generation in April 2017.

The Nachtigal hydroelectric power plant is a sizeable project for the country and will, on commissioning, be the largest generation resource in Cameroon. It will provide around one third of the electricity needs and will generate numerous economic benefits for the local economy.

## Republic of the Congo

EDF International Networks, a wholly-owned subsidiary of the EDF group, opened a branch in September 2017 to further develop its activities in the country in support of SNE.

## Egypt

In October 2017, the EDF group entered into the renewable energy generation market in Egypt. EDF EN, in 50/50 partnership with the Egyptian company Elsewedy, will co-finance, build and operate two 50MWc photovoltaic plants in Benban near Assouan. These projects will benefit from a Power Purchase Agreement (PPA) for a period of 25 years (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

In 2017, EDF was awarded two contracts for consulting services, one with EETC for engineering and supervising construction of the dispatcher in the Delta, and another with EEHC to manage the deployment of 53,000 smart meters that its subsidiary EDF International Networks will complete in a consortium led by the French industrial company Sagemcom and including the Egyptian company Globaltronics.

Since the mid-1990s, the EDF group has been present in Egypt in Exploration and Production (E&P) of hydrocarbons through its subsidiary Edison (see section 1.4.5.2.3.2 "Italy - Hydrocarbon business").

## Ivory Coast

EDF group is developing the "Biovéa" project for a biomass electricity power plant with two 23MW units in partnership with SIFCA, an Ivorian agro-industrial group in West Africa. This project is already included in the Ivorian State's development master plan and an agreement on the transfer price of generated energy was signed on 30 November 2017. The investment decision is scheduled to be made in early 2019.

In August 2016, the Group created a local subsidiary to support its development strategy in the Ivory Coast.

In October 2016, EDF created the ZECI company, a joint-venture with the US company Off Grid Electric (OGE), for the deployment of an off grid energy project for rural and peri-urban populations (see section 1.4.5.3.9 "Off-grid energy").

## Ghana

In October 2017, the EDF group opened a local branch to support its development strategy in this country. It is also present in Ghana through the ZEGHA company (see section 1.4.5.3.9 "Off-grid energy").

### 1.4.5.3.8 Middle East

The EDF group is present in the Middle East, with a regional office based in the United Arab Emirates (UAE) covering the area's development and project monitoring activities.

In addition, the Group has offices in Qatar, Doha, Saudi Arabia (Riyadh), Lebanon (Beirut), Bahrain and the United Arab Emirates (Abu Dhabi and Dubai).

These offices manage the commercial activities and projects in these various countries.

The area's major projects are in the UAE with the customer DEWA (responsible for water and electricity in the city of Dubai):

- a development project for a 800MW solar photovoltaic power plant. EDF, through its subsidiary EDF EN, is developing this project alongside Masdar, an Abu Dhabi-based company belonging to the Mubadala group and the customer DEWA. This power plant, scheduled to be fully completed in April 2020, will be the world's largest solar power plant;

- an assistance project for the management of a 250MW dam pumping station, planned for the Hatta mountains in the Emirate of Dubai, for the customer DEWA.

Another major project is in the process of being completed in Doha: engineering consultancy for the customer Kahramaa (water and electricity in Qatar) in connection with the completion of electricity substations and high-voltage cable networks (project falling under "Phase 13").

In 2014, in Saudi Arabia, the EDF group signed a partnership agreement with the Saudi Electricity Company (SEC), the country's benchmark electricity operator, enabling a broad cooperation between the two groups, including training initiatives. In the extension of this agreement, the GOC "Generation, Optimization Center" contract signed in February 2016 provides for support by EDF for the implementation of regional generation optimisation centres. In October 2016, an agreement was also signed concerning the training of future Saudi nuclear engineers, who will be trained within the Group's installations.

## Israel

The EDF group has been present in Israel since 2010 through its subsidiary EDF Énergies Nouvelles, which operates photovoltaic power projects connected to the grid with gross installed capacity of 193.5MWc, and launched in 2017 the construction of an additional 105MWc. It is continuing development of a portfolio of projects representing close to 300MWc of solar energy (see section 1.4.1.5.3 "EDF Énergies Nouvelles").

The Group also supports its Italian subsidiary Edison's efforts to expand into gas exploration.

Furthermore, the Group's Hydraulic engineering centre supplies services to the first Israeli project for the storage of electricity through pumping, on Mount Gilboa.

### 1.4.5.3.9 Off-grid energy

The EDF group has 15 years of experience in the field of "off-grid" – decentralised energy – in Africa *via* companies created for that purpose.

#### KES

In South Africa, the KES (Kukhanya Energy Services) company, created in 2002, is 50% owned by EDF, 15% by the local operator, Calulo, and 35% by Total. It initially developed its business through photovoltaic kits in Kwazulu-Natal, and then extended its activities into the Eastern Cape region. At the end of 2017, KES provided solar electrical energy to almost 135,000 people and wishes to continue its development in Southern Africa.

#### ERA

In Senegal, the EDF group holds a 70% stake in the ERA company, alongside Matforce, a local partner. Since 2014, ERA has been the operator of the rural electrification concession of Caffeine-Tambacounda-Kédougou (25% of Senegal's surface area). Having received a grant from the French Development Agency, with a third and last tranche expected to be soon released, ERA develops the electricity grid, installs photovoltaic panels in rural areas and currently provides electricity to around 35,000 people. The tariff review process initiated in June 2017 by the Regulator at the request of concession holders should be completed in early 2018 with the publication of new tariffs which should ensure the concession's financial equilibrium and enable its long-term development.

#### ZECI

The EDF group and Off Grid Electric (OGE) – an American company involved in the distribution of solar energy in Africa, in which Electranova Capital, EDF's cleantech venture capital investment fund, holds a shareholding – created in October 2016 a joint company in the Ivory Coast, ZECI, for the supply of competitive off-grid solar energy in Africa.

Within the framework of this joint venture, the EDF group and OGE assume the cost of the installation and maintenance of 300,000 solar kits intended for rural and peri-urban homes. These individual kits include solar panels which are easy to install, backed up by batteries for the storage of electricity, and which can be paid for merely by the use of a mobile phone. Thanks to these kits, at the end of 2017, more than 50,000 people will be able to have light and to power all their low-consumption household appliances such as a television or a radio proposed within the offer, or to recharge their mobile phones.

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## Description of the Group's activities

The EDF group created Neot Offered Africa (EDF New Business's equity stake alongside the investment fund of Meridiam, a management company) with the aim of financing these kits. ZECI's goal is to provide power to almost 2,000,000 people by 2021 in the Ivory Coast, with a plan to quickly extend this initiative to other countries in the region and to develop the offer on a large scale.

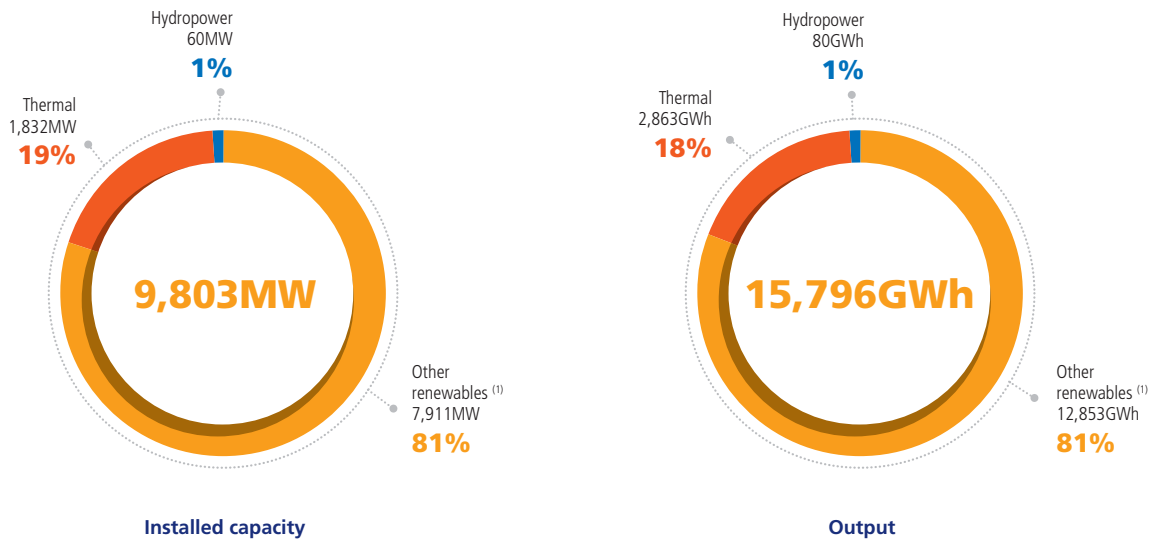
### ZEGHA

Off Grid Electric, the Ghanaian company CH group and EDF decided to create ZEGHA and launched the pilot phase in December 2017 on the Ivorian model.

This phase will last four months with development expected to begin in Q 2018.

## 1.4.6 ENERGY SERVICES AND OTHER ACTIVITIES

### ➔ Installed capacity and output in 2017 for the "Other activities" segment



(1) Including the whole EDF Énergies Nouvelles entity.

### 1.4.6.1 Energy services

The EDF group is a significant player in energy services in France. These include sectors as varied as street lighting, heating networks, decentralised low-carbon generation based on local resources (like the recovery of household waste), control of consumption and electric mobility.

The Group's CAP 2030 strategic plan emphasises the development of energy services. In June 2017, the Group clarified its goal by announcing its objective of doubling sales in services by 2025, including 25% from international sales.

This goal is reflected in EDF Energy Solution's new umbrella brand, which strictly targets companies and local authorities. It features all the subsidiaries which are part of this strategy and draws on the past experience and expertise of each one of them. EDF Energy Solutions thus promotes the Group's full range of expertise present throughout the entire energy chain, from low-carbon means of generation to energy management via increasingly connected systems, and including the maintenance of technical facilities, such as boiler plants and heat networks. Its focus is to assist its customers in the various stages of their energy transition and to affirm that it wants "to invent with them their energy future".

#### 1.4.6.1.1 Dalkia

The EDF group has held a 99.94% equity interest since July 2014 in Dalkia, a leading player in the European energy services market with a full range of services and an excellent sales network in France, serving to reduce energy consumption and to improve the performance of the facilities.

#### Dalkia's operations

Dalkia now operates in the face of three major challenges: the fight against global warming and the need to reduce greenhouse gas emissions, energy efficiency as a source of savings, and the territories transformation in an increasing urbanisation context and the resulting industrial development.

Dalkia brings expertise to its customers, in order to develop, realise, and manage innovative energy solutions, which are more ecological and more economical, for sustainable growth of cities and businesses.

From decentralised energy generation to demand-side management, while optimising distribution, Dalkia is present at each stage of the energy chain, in order to improve system performance. Thanks to its 80 years of experience in managing heating and cooling networks, optimising industrial utilities, improving the energy performance of a building, or using alternative and renewable energies, Dalkia offers its customers tailor-made solutions to reduce their energy consumption and to improve the environmental and economic performance of their facilities.

In this way, in 2017, Dalkia (including its subsidiaries) has allowed its customers to avoid 4.1 million tonnes of CO<sub>2</sub> emissions and realised 6.5TWh of energy savings.

Dalkia manages 79,000 energy facilities in the following three customer segments:

#### Heating and cooling networks

The development of the networks was an important growth engine in the last few years for Dalkia which established a reproducible model for value creation, resting upon numerous optimisation levers:

- improvement of the efficiency of teams and organisations, optimisation of the performances of operations upon the takeover of networks;
- reconfiguration of generating plants and grids: anticipation of future network needs, taking into account organic growth potential and progression of energy efficiency, integration of the challenges of regulatory compliance, reduction of unnecessary redundancies;

- modification of the energy mix for greater efficiency and less CO<sub>2</sub>, with the optimisation of cogeneration and the development of renewable energies (biomass, geothermal, energy recovery of waste, biogas, etc.);
- additional services in order to better enhance assets (for example, support service for the electricity grid).

Thus, Dalkia is one of the leaders in France in the management of urban heating and air-conditioning networks, operating 350 heating or cooling networks, both urban and local, and providing heat to 2.3 million homes. Deploying this model across its geographic targets will constitute a significant part of its future growth.

### Industrial utilities

Dalkia is active in the industrial utilities business for 2,030 industrial sites. The challenges are to improve environmental performance (particularly by controlling CO<sub>2</sub> emissions and the valuation of energy recovery), competitiveness and security of supply.

Dalkia's strategy is to allow its industrial customers to concentrate on their core processes, by assuming responsibility for the generation of their utilities and the technical management of their facilities, while optimising their energy use and their greenhouse gas emissions. Dalkia differentiates itself by a large and coherent range of services, which includes the optimisation of industrial utilities (steam, electricity, cold, compressed air); adjustment of usage to requirements, and identification of sources of unavoidable energy and recoverable co-products, optimisation of industrial building usage, and reduction of greenhouse gas emissions.

### Building energy services

Building energy services consist of management of the energy facilities in buildings: optimisation of local thermal energy generation, transformed energy supply, operation and maintenance of technical facilities. They also seek to improve the operation of existing systems in order to maximise their effectiveness and to reduce their CO<sub>2</sub> emissions. Dalkia provides integrated energy services ranging from the design, construction and upgrading of facilities, to transformed energy supply and management and maintenance of facilities, for tertiary, industrial, public-sector and private-sector customers.

### Key achievements for Dalkia in 2017

With respect to heating networks, Dalkia completed extensions and the creation of new urban heating networks that use renewable and recovery energies (like those in Lyon, Charleville-Mézières, Sarreguemines, Béthune, Poitiers, Limoges, etc.). In this regard, renewable and recovery energies currently represent 37% of Dalkia's energy mix.

For building energy services, emphasis is placed on energy performance contracts which include the thermal renovation of the buildings.

In addition, Dalkia continues to find economic and environmental performance solutions for industrial customers, through for example cogeneration development (Toyota, Munksjo, PSA, etc.).

Dalkia has also continued its development and actions internationally by acquiring Imtech in the UK, through the joint venture EDF Energy Services jointly held with EDF Energy, and by acquiring 100% of the share capital of Matex Controls in Poland.

### Main subsidiaries of Dalkia in France

#### Optimal Solutions

Optimal Solutions, a wholly-owned subsidiary of the Dalkia group, positions itself as a specialist in the design and realisation of energy efficiency solutions in France, strongly complementing Dalkia's regions, through two activities: energy performance of buildings for local authorities and the tertiary and residential sector, and energy performance of electrical facilities and equipment for the services and industrial sector.

#### Tiru

The Tiru company, a subsidiary 75% owned by the Dalkia group, is specialised in waste recovery serving local authorities and industrial customers:

- waste recovery *via* incineration, methanisation and boilers running on solid recovered fuel (SFR) able to generate electricity, steam or biogas;
- materials recovery *via* compost, the sorting and packaging of recyclable materials and solid recovered fuel generation.

Tiru designs, builds and currently operates facilities located in France, Great Britain and Canada.

#### Cesbron

Cesbron, a wholly-owned subsidiary of the Dalkia group, is specialised in the design, installation and maintenance of cooling solutions for industrial and tertiary customers. It also provides cooling solutions, air treatment, reversible heating and processes for bakeries and industrial kitchens.

#### Dalkia Biogas

The Dalkia Biogas group (formerly Verdesis), a wholly-owned subsidiary of the Dalkia group, is specialised in the generation and recovery of biogas. It is present in France and Belgium and provides the following services: industrial, agricultural or territorial methanisation, biogas processing (drying and filtration), biogas recovery by cogeneration or treatment and biomethane injection.

#### CRAM

The CRAM group is a regional player mainly specialised in building energy services. In 2017, Dalkia increased its stake in the capital of CRAM SAS from 85% to 95%.

#### Techsim

The Techsim company, a wholly-owned subsidiary of the Dalkia group, is specialised in energy solutions for the generation of compressed air, nitrogen and breathable air in the industrial and nuclear sectors.

#### Asteriot

The Asteriot company provides solutions dedicated to fluids management and energy optimisation in collective-use buildings (housing units, tertiary, administrative buildings) by using information collected from connected objects. The Dalkia group acquired a 51% stake in Asteriot in June 2017.

### Main subsidiaries of Dalkia abroad

#### Matex Controls

The Matex Controls company, based in Poland, designs, builds and maintains technical facilities (ventilation, heating, air conditioning, fire protection, etc.) for commercial buildings and industrial customers. It also provides innovative solutions for the building's energy performance management, including VEMS© (Virtual Energy Management System).

#### ZEC

The ZEC company is mainly specialised in the generation and distribution of heat in the region of Katowice in Poland (Upper Silesia). It has recognised expertise in the energy recovery of mine gas to be used by heating networks and electricity distribution facilities.

#### Fenice Rus

Specialised in energy efficiency for industrial customers, Fenice Rus is one of the pioneers in the energy services sector in Russia.

#### Imtech

Imtech, a company acquired by Dalkia in 2017, is specialised in thermal and electrical engineering, technical maintenance of facilities and the integration of acquisition and data control systems in the United Kingdom and Ireland. Imtech provides its services to the construction, industry, services sector and local authorities.

#### Groom Energy Solutions

Groom Energy Solutions LLC provides companies and industrial customers with a comprehensive approach to consultancy, project management and the performance of energy efficiency work, with nationwide coverage in the United States.

#### 1.4.6.1.2 Citelum

Citelum is the subsidiary of the EDF group dedicated to smart lighting and connected services, and one of the leading players in the field in France and throughout the world.

With roughly 450 employees in France, Citelum employs close to 2,600 people, mainly in Europe (including France, Italy, Spain and Denmark) and in America (including the United States, Mexico, Brazil and Chile), which enables it to manage the services of more than 1,000 cities throughout the world (Mexico, Copenhagen, Barcelona, Rome, etc.).

The technological changes in lighting equipment currently enable it to make use of an existing connected infrastructure, thereby facilitating energy savings, remote management of installations and improvements to security as well as showcasing cultural heritage. In addition, this lighting equipment, connected to other devices (sensors, cameras, etc.), offers new value-added services in the areas of the prevention of pollution, video-monitoring of the territory, information to users or the management of urban mobility and parking.

Citelum operates on the following three value chains:

- increasing attractiveness for customers through the optimisation of lighting, while limiting energy expenditure;
- improving perceived security by optimising the use of the allocated resources;
- creating more fluid mobility and parking, promoting an increase in receipts from customers.

Citelum marks out its difference through its capacity to assist in all phases of a project, from design and completion of the works to operation and maintenance, by incorporating into its service offer solutions for financing, innovation with its Citegestion subsidiary's digital urban space management platform, Muse®, and strong skills in contractual engineering.

In 2017, Citelum was selected together with Bouygues Energies & Services to carry out an innovative connected management project for public space in Greater Dijon. The 12-year project is being carried out under a contract for design, construction, operation and maintenance, shared by the areas's 24 towns and provides for an energy efficiency commitment of 65%. The centralised command center was mainly designed from the urban space management platform Muse®. This platform thus meets the needs of Greater Dijon in terms of event coordination, facilities management, local safety and making the urban area more attractive.

In 2017, Citelum was also awarded a contract in the state of New Mexico in the United States for the renovation of the city of Albuquerque's streetlights, as well as for the design of a "Smart City" platform with Cisco. The 15-year contract includes the conversion of 20,000 streetlights to LED, the implementation of "IoT" architecture (a web platform connecting objects to one another) and the deployment of a centralised management system for works and maintenance. Through the renovation of the city's lighting system and use of the Muse® platform, Citelum will enable the city to meet its performance objectives in the course of the project - 58% of energy savings and a reduction of 123,000 tonnes in CO<sub>2</sub> emissions, while ensuring the city an optimal level of lighting and service, as borne out by the indicators.

In 2017, Citelum also started work on its two main contracts in Mexico City (Mexico) and Naples (Italy).

Citelum has already implemented this type of solution throughout the world, with major references in Copenhagen (Denmark), Syracuse (Italy), San Cugat (Spain) and Sète (France).

#### 1.4.6.1.3 EDF New Business

Innovation has always been at the core of EDF's strategy. In June 2017, in order to broaden the scope of its activities, the EDF group created a new structure called "EDF New Business", regarded as EDF's start-up incubator.

The purpose of EDF New Business is to create new growth drivers for the Group, by providing innovative and competitive products and services to its residential customers, companies and local authorities. EDF New Business plans to invest

€40 million in ten start-ups over the next two years. Five areas will be prioritised:

- energy efficiency, for both residential and business customers;
- sustainable well-being in habitat, the smart home;
- the energy cloud, *i.e.* management of decentralised energy systems (storage, managing intermittency in energy generation, flexibility);
- the sustainable city, the range of offers available to local communities (electric vehicles, etc.);
- the Company of the future, operational excellence of industrial and tertiary customers.

As both an investment fund and incubator, EDF New Business is built around a tight-knit team working in close cooperation with EDF's R&D Department and all of the Group's resources committed to open innovation and partnerships with start-ups (for example EDF Pulse, Innovation Hub, etc.).

EDF Nouveaux Business also draws on ideas and expertise from the Group's employees, and is in a position to provide them dedicated support to assist them in developing their project as part of an entrepreneurial approach.

To succeed in developing new business activities and innovative solutions in new technologies, EDF New Business can also invest directly in fledgling start-ups, or put them in contact with the Group's ecosystem, particularly the dedicated funds such as Electranova Capital. The entity can also create joint ventures with start-ups able to explore new business models and set out to conquer new markets in France or abroad.

EDF New Business has several start-ups, subsidiaries and investments in the Group, including SecLab, ZnR Batteries, Perfesco, EDF Store & Forecast, Neot Capital.

Moreover, since 1 June 2017, EDF New Business has contributed to the creation of new companies, such as Agregio, Metroscope, N Green Mobility, NeoT OffGrid Africa and Hoppy.

#### Metroscope

Created in December 2017, Metroscope is a new subsidiary of the EDF group which arose out of an intrapreneurial project. Through a system of artificial intelligence, Metroscope provides real-time diagnostics allowing all types of industrial customers to increase and/or optimise the performance of their industrial facilities, by identifying random disturbances, failures and efficiency loss affecting their operating systems.

Industrial operators are thus able to optimise the maintenance of their production facility and reduce operating costs. This "factory 4.0" solution was chosen by the Executive Management of EDF's nuclear fleet and is currently being deployed in all 58 nuclear generation units in France. The Group also plans to market Metroscope's solutions outside the Company to its industrial customers by 2019.

#### 1.4.6.1.4 Other service subsidiaries of the EDF group

Other subsidiaries within the EDF group complete the range of energy services that EDF offers. These focus on specific areas, targeting different categories of customers (individuals, professionals, businesses and local authorities) and cover a wide range of activities including research, construction, equipment maintenance, investment financing and assistance with obtaining permits and subsidies.

#### Energy management

To help customers manage their energy and fluid consumption, the EDF group provides facility monitoring and management solutions. Its subsidiaries Netseenergy and Edelia are active in this strategic area.



### Netseenergy

Netseenergy, a company that is wholly owned by EDF, offers a range of services which enables business customers and regional regional municipalities to optimise the energy performance of their property assets. This company is an important player in the digitalisation of energy management *via* service offers such as:

- innovative energy audits: algorithmic control of customers' energy and real estate property data; data science and big data;
- performance management of energy and real estate property: automated data collection, mobile applications, customised energy management by an energy manager.

### Edelia (Edev Téléservices)

Edelia is a company which is wholly-owned by EDF that designs, develops and implements solutions for monitoring and controlling energy. For more than 12 years, Edelia has acquired expertise in optimising smart home data, through the deployment of many demonstrators, which give meaning to energy data. Edelia produces a range of digital and innovative solutions ("IoT" web platform connecting objects to one another, service hub, applications, websites, assessments, etc.) for the EDF group's customers. In a context of the deployment of smart meters and the development of the smart home, these solutions are modular and tailored to the various users, both private and professional. Data mining from connected objects has expanded the subsidiary's areas of expertise, thus reinforcing its software know-how involving energy coaching.

### Electric mobility

The transportation sector today is very dependent upon fossil energies and is one of the significant sources of emissions of CO<sub>2</sub>. Yet, low-carbon electricity constitutes a lever for developing eco-friendly mobility and transports in a territory. This is why the EDF group is investing in this field, particularly through its subsidiary Sodetrel.

The Group's solutions include:

- consulting services for regional authorities and businesses on the positioning and scale of electric vehicle charging infrastructure;
- installation of recharging infrastructure for all customer segments: residential, local authorities and businesses, car parks and supermarkets;
- remote management and supervision of charging stations.

The Group has also participated in experimental ride-sharing in Grenoble, Nice and Monaco.

### Sodetrel

Sodetrel, a company which is wholly owned by EDF, offers a range of electric mobility schemes for local authorities, energy consortia, and businesses. In this regard, it proposes a wide range of offers to its customers, from the provision and installation of charging infrastructure to commercial operation of associated services, also including tools for the supervision of charging stations and key solutions in hand for technical operation and maintenance.

Sodetrel is committed to providing smart and connected recharging solutions to optimise energy consumption for the end user (companies or private users) and the energy network.

Since 2015, Sodetrel, in the framework of a consortium<sup>(1)</sup> has deployed a network of 200 rapid-charging stations that are interoperable on highways and compatible with all models of electric vehicles in the market.

### Electrical engineering: HTMS

HTMS, a wholly-owned subsidiary of EDF, is involved in the operation and maintenance of high-voltage and medium-voltage equipment and substations, the supply and replacement of circuit breakers and transformers, troubleshooting, project management support and training. The company's core business is the optimisation of maintenance operations to ensure operator safety, the availability of facilities and the sustainability of plant and equipment.

The company also provides independent assessments and consulting (operational audits, definition of maintenance policies and equipment upgrades) and monitoring assignments for major projects.

Its activity is organised around three agencies (Lorette, Audruicq and Nantes), to which the operational branches are attached (Bordeaux, Lyon and Avignon).

In 2017, HTMS continued its expansion, with sales up 20% compared to 2016. The company made strong inroads into markets involving HVA maintenance for industrial customers by signing a partnership agreement with the Portuguese company Efacec for the heavy maintenance and repair of power transformers.

### Heating: CHAM

CHAM, an EDF's wholly-owned subsidiary, is a major player in the field of maintenance and replacement of heating and hot water production equipment in France. It intervenes with residential customers, in individual homes, in public and private collective residences, and with professionals.

CHAM carries out more than 700,000 interventions per annum, in order to improve the performance of its customers' equipment.

### Third-party investment in energy efficiency: Perfesco

Perfesco, a wholly-owned subsidiary of EDF, provides eco-energy efficiency services that include covering the investment cost and the installation to assist its customers in their energy transition. To do so, this company identifies high-energy consumption items at major economic players and offers to install more economical equipment, making profit based on the savings generated.

## 1.4.6.2 Gas activities

In Europe, the EDF group requires over 25 billion cubic metres of gas, equivalent of half France's national consumption. As such, EDF has developed a gas strategy to ensure the security of gas supply for its around 5 million customers, its cogeneration plants and its gas power plants.

The Group is thus present throughout the natural gas chain in both France and Europe, mainly through EDF in France and its subsidiaries EDF Energy, EDF Luminus and Edison, that represent, with effect from 1 August 2017, the Group's gas platform, *via* a contract for services for asset management and the development of its upstream activities (see section 1.4.5.2.1 "EDF group strategy in Italy"). It also relies on EDF Trading for its short-term operations relating to interventions on the continental and United Kingdom wholesale markets, as well as on Dalkia for cogeneration plants.

Lastly, the Group is present outside Europe, especially in the United States, where EDF Energy Services is an important natural gas supplier of major industrial customers and distributors.

### 1.4.6.2.1 Natural gas end-market

In Europe, on 31 December 2017, the downstream customer portfolios were as follows:

- in France (EDF and ÉS): around 1.5 million customers (from retail customers to major industrial players) with consumption of around 35.2TWh in 2017;
- in Italy (Edison): around 480,000 customer accounts, 6.91Gm<sup>3</sup> of gas (around 73.1TWh) *i.e.* a market share of 15%;
- in the UK (EDF Energy)<sup>(2)</sup>: around 2.0 million customer accounts, 27.8TWh, *i.e.* around 5% of market share;
- in Belgium (EDF Luminus): around 611,800 customer accounts, 13.6TWh, *i.e.* around 18% of market share.

(1) This consortium brings together EDF, automobile manufacturers Renault, Nissan, BMW, Volkswagen and ParisTech. The Corri-Door project is being financed in half by the European Commission.

(2) Excluding Northern Ireland.

### 1.4.6.2.2 Gas assets and projects

#### 1.4.6.2.2.1 Supply sources

In Europe, the Group's gas supply comes from short- and long-term gas markets and from a diversified portfolio of long-term contracts, originating from Qatar, Russia, the North Sea and North Africa.

In the United States, the majority of the supplies originates from the gas markets.

In the rest of the world, specific contracts have been concluded to ensure the supply of the Group's gas power plants.

#### 1.4.6.2.2.2 Infrastructures

##### Gas pipelines

Apart from its various rights to transport capacity in the European network, the EDF group participates, through its Edison subsidiary, in infrastructure projects for gas importation (see section 1.4.5.2.3.2 "Hydrocarbon business").

##### Liquefied natural gas (LNG) regasification terminals

EDF, via its subsidiary Dunkerque LNG (65% owned by EDF, 25% by Fluxys and, 10% by Total), has commissioned, since 1<sup>st</sup> January 2017, a new methane terminal within the Grand Port Maritime of Dunkirk. With a regasification capacity of 13 billion cubic metres per annum, the methane terminal has begun its commercial activities. This terminal, with a storage capacity of 600,000 cubic metres and linked to the French and Belgian transport networks, has the particularity of producing no CO<sub>2</sub>, the calories necessary for the reheating of liquefied natural gas originating from the warm water from the nuclear power plant at Gravelines located nearby. EDF is also the main shipper using the terminal.

In Italy, Edison sold Snam Spa its 7.3% stake in Adriatic LNG Terminal, the company operating the Rovigo offshore terminal, in October 2017. Edison nonetheless retained the right to use 80% of the terminal's regasification capacity, i.e. 6.4 billion cubic meters per year (see section 1.4.5.2 "Italy").

The Group also holds regasification capacities in the terminal of Zeebrugge (Belgium).

##### Storage

In Germany, the EDF group has storage for natural gas in salt cavities situated in Etzel. The aboveground facilities are operated through a 50/50 joint venture with EnBW. EDF has around 190 million cubic metres of volume capacity in this salt cavity storage.

With respect to storage activities of the Group in Italy and in the United Kingdom, see respectively, sections 1.4.5.2.3.5 "Regulated activities" and 1.4.5.1.2.3 "Thermal generation and gas storage".

The Group also holds storage rights in the Netherlands, Belgium and France.

#### 1.4.6.2.2.3 Exploration and Production (E&P)

The Group is developing its upstream activities in hydrocarbons exploration and production, through Edison (see section 1.4.5.2 "Italy"). Proven reserves amounted to 36.5 billion cubic metres of gas equivalent, with 2.8 billion cubic metres produced in 2017.

### 1.4.6.3 Optimisation and trading: EDF Trading

EDF Trading (EDFT) is the EDF group's exclusive interface with the wholesale energy markets providing market, optimization and risk management services to the EDF group and third parties. The company operates across Europe, North America and Asia in the wholesale markets for electricity, natural gas, LNG and LPG, environmental products and coal and freight (through its partnership with JERA Trading). EDF Trading is one of the largest wholesale energy market traders in Europe and in North America. Through its EDF Energy Services subsidiary, it is one of the main independent providers of energy management services for power generation companies and retailers and a Top 10 retail supplier to large commercial and industrial users in North America.

EDF Trading's registered office is located in London. The company has around 820 employees and is governed by the UK's financial market regulator, the Financial Conduct Authority.

### European Electricity market

EDF Trading is a leading participant in the European electricity wholesale market, providing a full range of risk management services to EDF group's asset operators and to third parties. It has an extensive geographic footprint and scale of activity which makes it able to adapt quickly to changes in the market and to develop new business where appropriate. In 2017, EDF Trading worked closely with EDF in managing its ARENH commitments and assisted in managing the flexibility of EDF's hydro and thermal assets. The company also launched new optimization services including hydro swaps, ancillary services and participation on new intraday overnight hubs. EDFT began a joint venture with Edison for trading power and also expanded its services to EDF's larger commercial and industrial (C&I) customers.

### European Gas

EDF Trading is a leading participant in the European gas wholesale market. It optimizes EDF group entities' gas assets including production, transmission rights, long-term supply contracts and re-gasification and storage capacities. This enables it to support the EDF group and third party customers with complete gas wholesale market solutions. In 2017, EDFT managed the marketing, optimization and transportation of EDF's storage capacities and provided structured solutions for EDF's assets exposed to illiquid market hubs. It also launched gas market access services for Dalkia.

### North American power and gas

EDF Trading is a leader in the North American wholesale electricity markets with an extensive geographic footprint. It is also one of the top gas marketers. EDFT contracts or manages about 4.2 Gm<sup>3</sup> (150 bcf) of natural gas storage and transacts approximately 1.4 Gm<sup>3</sup> (50 bcf per day) of gas. It serves a portfolio of customer contracts including long-term electricity, natural gas and environmental products. Additionally, it provides tolling, gas storage, gas transport and congestion management. In 2017, EDFT expanded its physical footprint through natural gas transportation agreements on the Rockies Express and ANR Pipeline company.

### Environmental products

EDF Trading is committed to the environmental products marketplace and, as part of a leading renewable generator, offers a broad range of multi-commodity structured solutions that help the EDF group and third party customers around the world. EDFT is active in the compliance and voluntary carbon markets, including guarantees of origin certificates in Europe, Renewable Energy Certificates in the US, and International Renewable Energy Certificates in the rest of the world. In addition, it is a recognised leader and provider of risk management products in the European weather market. In 2017, EDFT extended its contract with EDF Renewable Energy in the US to manage the Longhorn Wind Project in Texas which comprises 100 Vestas V100 wind turbine generators. EDFT sold more than 20TWh of guarantees of origin to various European counterparties by marketing EDF's hydropower assets for production periods between 2015 and 2020. EDFT also launched a new green gas offer to EDF's residential customers.

### Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG)

EDF Trading offers a complete range of LNG and LPG services including supply, delivery and nominations into the appropriate network. 2017 was the first year of commercial operation for the Dunkerque LNG terminal and EDFT has worked with EDF to market and optimize EDF's capacity, increasing simultaneously its volumes and cargoes to develop a significant LNG portfolio. In December 2017, EDF Trading signed an agreement with JERA for an extended partnership regarding LNG optimization activities. For LPG, EDFT has expanded its trading activities to the United States, which will enable EDFT to become more actively involved in the upstream LPG market.

## Coal and freight trading

In April 2017, EDF Trading concluded the sale of its coal and freight business to JERA. EDFT now holds a 33% financial stake of JERA Trading, one of the largest coal traders globally.

## EDF Energy Services

EDF Energy Services is EDF Trading's dedicated customer platform in North America and provides comprehensive risk management services to large C&I businesses, power generators and retail energy providers. It offers all environmental products, natural gas and electricity to a portfolio of large C&I customers and is ranked in the top 10 of suppliers in North America. Additionally, it has supply agreements with retail energy aggregators who supply residential and small commercial customers

### 1.4.6.4 Equity interests

#### 1.4.6.4.1 EDF Trading Logistics

With a fuel oil supply volume of approximately 1 million tonnes and 2.8 million tonnes of coal delivered in 2017, EDF Trading Logistics acts as EDF's vehicle for fuel oil purchases. It organises fuel oil and coal supply logistics operations for all of the EDF group's thermal plants in mainland France, Corsica and France's overseas departments, in close collaboration with EDF Trading, and controls the coal terminals in the ports of Le Havre and Saint Nazaire.

In addition, EDF Trading Logistics provides the Group its expertise in regard to managing risks relating to the transport of fuel oil (hazardous materials), an activity that has received ISO 14001 certification, and in the management of environmental crises arising from this activity.

#### 1.4.6.4.2 Other equity interests

As well as interests in local distribution companies or LDCs (SMEG, Enercal, Électricité de Mayotte, EDSB), the EDF group has industrial subsidiaries and

throughout the US and Canada. EDF Energy Services is the first generation services provider for third-party power stations in the US, dispatching over 30,000MW of generation output across 115 power stations and dozens of Load Demand Response customers. Some of these customers are European entities or are present in Europe, allowing EDF to serve their needs on a global scale. In 2017, EDF Energy Services expanded its business footprint and its customer base. It is now licensed to do business in every deregulated power market and most gas markets. It has developed a digital, integrated platform to enable its customers to access information relating to their energy consumption more efficiently and to scale their operations for future growth. EDF Energy Services also launched its first electric vehicle charging station at the University of Notre Dame campus in Indiana, and signed two new agreements to manage battery projects.

holdings. These companies contribute, within their specific field of activities (generation, fuel, engineering) to the Group's missions, and more specifically, to those of generation and engineering: namely to ensure the short- and medium-term performance of EDF's portfolio of generation assets in France.

These companies include SAE, which specialises in fuel transport and trading operations on behalf of the EDF group; SHEMA, which specialises in hydropower generation by small power plants; and SOCODEI, a wholly-owned subsidiary of EDF specialising in the treatment and packaging of low- and intermediate-level radioactive waste.

In continental Europe outside France, EDF has launched a strategic review of its energy generation assets based on fossil fuels.

For recent changes in the dedicated asset portfolio, see section 5.1.6.1.6 "Management of financial risk on EDF SA's dedicated asset portfolio".

## 1.5 LEGISLATIVE AND REGULATORY ENVIRONMENT

EDF group entities are subject to a wide variety of regulations in the conduct of their business activities. In particular, EDF is subject to the European legislation on the electricity and gas markets, which has been transposed into French law, as well as to the applicable environmental, nuclear power, health and safety regulations.

The following review of legal and regulatory provisions is not designed to be an exhaustive description of all such provisions that are applicable to the EDF group.

### 1.5.1 EDF AS A PUBLIC UNDERTAKING

As of 31 December 2017, the French State held 83.50% of EDF's share capital and 83.60% of EDF's voting rights and, pursuant to Article L. 111-67 of the French Energy Code, must at all times hold at least 70% of EDF's capital.

As an undertaking in which the French State holds a majority share, EDF is subject to the provisions of Order no. 2014-948 of 20 August 2014 on the governance and equity transactions of companies with a public shareholding and its Application Decree no. 2014-949 of the same date.

The French Government Shareholding Agency (APE), which was founded by Decree no. 2004-963 of 9 September 2004, fulfils the State's remit in its capacity as EDF's shareholder and, in this respect, proposes and implements the State's decisions and guidelines, in consultation with the ministers concerned.

In accordance with the legislation that applies to all undertakings of which the State is a majority shareholder, EDF may have to undergo certain State audit procedures, in particular through an economic and financial evaluation assignment, pursuant to Decree no. 55-733 of 26 May 1955 on State economic and financial evaluation and Decree no. 53-707 of 9 August 1953 on State evaluation of national public

undertakings and certain organisations, the purpose of which has an economic or social component.

EDF also has to undergo the audit procedures performed by the French General Accounting Office (*Cour des Comptes*) and Parliament. Thus, in addition to the control performed by the Statutory Auditors, the Company's accounts and management and, where applicable, those of its directly-held majority subsidiaries, fall under the control of the French General Accounting Office, in accordance with Articles L. 111-4, L. 133-1 and L. 133-2 of the French Code of Financial Jurisdictions.

Moreover, the Legislative Decree of 30 October 1935 allows the Minister for the Economy to have EDF audited by the General Finance Inspection Office.

Lastly, the disposal of EDF shares by the State, or the dilution of the State's stake in EDF's capital, is subject to a specific procedure under Order no. 2014-948 of 20 August 2014 on the governance and equity transactions of companies with a public shareholding. Among other things, this Order simplified the previously applicable rules that resulted from the so-called "privatisation" Laws no. 86-793 of 2 July 1986, no. 86-912 of 6 August 1986 and no. 93-923 of 19 July 1993.

### 1.5.2 PUBLIC SERVICE IN FRANCE

#### Statutory definition of public service in France

Articles L. 121-1 *et seq.* of the French Energy Code outline the framework for the public electricity sector (see section 1.5.3.2 "French Legislation: Energy Code" below for a description of this regulation).

## Public service missions

Articles L. 121-1 *et seq.* of the French Energy Code state that the purpose of the public electricity service is, *inter alia*, to guarantee electricity supply throughout French territory, while acting in the general interest, to develop and operate public electricity networks and to supply electricity at regulated sales tariffs and at the basic necessity tariff.

## Balanced development of electricity supply mission

The purpose of the balanced development of electricity supply mission, which is defined in Article L. 121-3 of the French Energy Code, is to achieve the objectives defined in the multi-year energy plan (PPE), which Law no. 2015-992 of 17 August 2015 on Energy Transition for Green Growth substituted for the multi-year generation investment plan (PPI). The PPE was defined by decree, and sets out priority courses of action for the public authorities for the management of all forms of energy in continental metropolitan France. It must be compatible with the greenhouse gas emission reduction targets set in the carbon budget and the low carbon strategy, which are defined by Decree no. 2015-1491 of 18 November 2015, pursuant to the aforementioned Law of 17 August 2015.

The PPE contains sections on (i) the security of supply, (ii) improving energy efficiency and reducing primary energy consumption, in particular fossil fuel, developing the utilisation of renewable energies and energy recovery, the balanced development of energy networks, storage and conversion, and managing the demand for energy, (v) the preservation of consumer purchasing power and the competitiveness of energy prices, in particular for undertakings that are exposed to international competition and (vi) the evaluation of the needs for professional skills in the field of energy and how training courses can be adapted to these needs.

It defines the quantitative objectives for the plan and the maximum indicative budget for the public funds that the State and its public institutions will mobilise in order to attain them. This budget is defined in terms of commitments and accomplishments. It may be broken down by objective and by industry sector.

The first PPE must cover an initial period of three years (2016-2018), then a second period of five years (2018-2023). Subsequent PPEs will be drawn up for two, successive five-year periods.

The first PPE was defined by Decree no. 2016-1442 of 27 October 2016 on the multi-year energy plan. Pursuant to the law, on 6 April 2017, EDF prepared a Corporate Strategy Plan (PSE) presenting the actions that the Company commits to implementing in order to meet the security of supply and electricity generation diversification objectives defined in the first period of the PPE. The PSE was submitted for approval by the Minister for Energy who, after reviewing its compatibility with the PPE, asked EDF to develop a new plan.

The balanced development of electricity supply mission also involves guaranteeing the supply of areas that are not interconnected to continental metropolitan France (Corsica, and the overseas *départements* and territories), as well as some islands in Brittany, Corsica, Guadeloupe, Guyana, Martinique, Mayotte, La Réunion, and Saint-Pierre-et-Miquelon will each have their own specific PPE. Other areas that are not interconnected with the continental metropolitan network, except for Saint Martin and Saint Barthélemy, will be subject to a section appended to the PPE for continental metropolitan France.

As a power producer, EDF, along with the other producers, contributes to the performance of this mission.

The PPE plan, covering the 2019-2023 period, will be debated during the first half of 2018 (Decision no. 2017/41/PPE/1 of 6 September 2017 relating to the draft PPE revision). The adoption of the PPE and the publication of the corresponding decree are expected by the end of 2018.

## Mission to develop and operate public transmission and distribution networks

The mission to develop and operate the public electricity transmission and distribution networks, which is defined in Article L. 121-4 of the French Energy Code, involves ensuring:

- a rational electricity distribution service in France through the public transmission and distribution networks, in a way that is environmentally friendly, the interconnection with neighbouring countries;
- connection and access to the public transmission and distribution networks, under non-discriminatory conditions.

These are the public network operators designated by law who are responsible for this mission: RTE for transport, Enedis and Local Distribution Companies (*Entreprises Locales de Distribution*, or LDCs) for distribution, EDF in zones that are not interconnected to the continental metropolitan network.

## Mission to supply electricity

The public service mission to supply electricity, which is defined in Article L. 121-5 of the French Energy Code, involves ensuring the supply of electricity throughout France to customers who benefit from regulated electricity sales tariffs.

By law, this mission has been entrusted to EDF and to the LDCs.

The conditions under which customers can benefit from regulated electricity sales tariffs are defined in Articles L. 337-7 *et seq.* of the French Energy Code.

The mission to supply electricity also involves the application of the special "basic necessity" rate (TPN). This public service mission is assigned to all electricity suppliers. The Law of 17 August 2015 on Energy Transition for Green Growth provides for the gradual replacement of the TPN by "energy vouchers". These vouchers are a special means of payment that allow households that are experiencing financial difficulties to cover part of their energy consumption expenses (electricity, gas, fuel oil, etc.) or their expenditure on improving the energy efficiency of their home. Pursuant to Decree no. 2016-555 of 6 May 2016 on energy vouchers, the energy voucher system has been trialled since 20 May 2016 in the French départements of Ardèche, Aveyron, Côtes-d'Armor and Pas-de-Calais and should be rolled out fully by 1 January 2018.

The mission to supply electricity moreover includes supplying emergency power to customers who are connected to the public networks. The relevant administrative authority designates emergency suppliers through one or more tendering procedures. As the implementing regulations had not yet been adopted on the date of this Reference Document, this provision has still not entered into force.

## Social cohesion

Article L. 121-5 of the French Energy Code provides that the supply of electricity at regulated tariffs must contribute to social cohesion, in particular through the national equalisation of regulated electricity sale tariffs and tariff entitlement.

Article L. 115-3 of the French Social Action and Families Code prohibits electricity suppliers from cutting off electricity supplies to the primary residences of individuals or families during the winter period (from 1 November to 31 March) due to unpaid bills, including through contract termination. Electricity suppliers may, nevertheless, in certain cases, reduce the power supplied, except with regard to customers who benefit from the TPN or "energy vouchers".

In its capacity as an electricity supplier, EDF is required to maintain electricity supplies under the conditions laid down by said Article and by Decree no. 2008-780 of 13 August 2008 on the procedure that is applicable in the event of unpaid electricity, gas, heating and water bills, implemented in its amended form pursuant to Decree no. 2014-274 of 27 February 2014.

## Public Service Contract

On 24 October 2005, a Public Service Contract was signed by the State and EDF pursuant to Article L. 121-46 of the French Energy Code. This contract, which details the commitments made by EDF and the State and specifies the rules governing the financial compensation for service commitments, will remain in force until a new contract is signed, as provided for in the contract itself.

## Commitments by EDF (excluding network managers)

EDF's public service commitments include:

- access to the public electricity service and the supply of electricity to customers who choose to remain at regulated tariffs;
- production and sales. These areas include the implementation of the energy policy and maintaining secure power generation that is environmentally friendly;
- contributing to the safety of the electricity network. In this regard, EDF undertakes to enter into several contracts with RTE, in particular concerning the optimisation of work on generation facilities and the availability of the resources required to maintain network balance.

## Commitments by network managers

In the Public Service Contract, the Enedis and RTE network managers made commitments concerning the management of the public networks for the transmission and distribution of electricity and the safety of the electricity system. These commitments are financed by the Tariff for Using the Public Electricity transmission and distribution Networks (TURPE).

These commitments concern, above all, network safety, supply quality, third party safety and the preservation of the environment – four areas where customers' and local authorities' expectations are especially high.

## More accessible services

On 28 September 2010, the State and EDF, as well as eight other major public service operators, signed a partnership agreement entitled “+ de services au public” (“more services to the public”), which aims to develop access to a set of services intended for rural populations in France (information on bill payment, general information, travel ticket sales, etc.).

Reception staff and internet access points are some of the many resources made available to users through shared facilities such as Multiservice Conciliation and Information Points (PIMMS), Public Service Relays (RSP) and other structures such as town halls. Following the experimental phase, during which these services were deployed in twenty-two French départements, in July 2013, the Inter-Ministerial Committee for the Modernisation of Public Action (CIMAP) decided to extend this initiative throughout France.

## 1.5.3 ELECTRICITY MARKET LEGISLATION

### 1.5.3.1 European legislation

Three European Directives, which form the basis for the current organisation of the electricity market in France, were successively adopted in order to lay down the common rules for the generation, transmission, distribution and supply of electricity. Directive no. 96/92/EC of 19 December 1996 laid the foundation for opening up the electricity market to competition.

Directive no. 2003/54/EC of 26 June 2003 reiterated the major principles and took an additional step on the path to opening up the market, by progressively expanding eligibility to all customers.

Directive no. 2009/72/EC of 13 July 2009, known as the “Third Directive”, was adopted as part of the third “Energy Package”. This Directive primarily strengthens the guarantees of the independence of transmission system operators and increases the power of the national regulatory authorities. These provisions have now been incorporated into the French Energy Code.

Moreover, the rules that govern the conditions for access to the network for cross-border exchanges in electricity are currently defined by regulation (EC) no. 714/2009 of the European Parliament and Council of 13 July 2009, which is part of the third Energy Package. This regulation, inter alia, provides for a compensation mechanism between transmission system operators for the costs incurred by hosting

cross-border flows of electricity on their networks. This compensation is paid by the operators of the national transmission systems from which cross-border flows originate and the systems where those flows end.

Finally, the “Security of Electricity Supply” Directive no. 2005/89/EC, which was adopted on 18 January 2006, is designed to provide a better definition of the responsibilities of the various operators, ensure that minimum operational standards are respected, maintain balance between demand and supply, and channel investments toward the systems. The objectives of this Directive have been taken into account in various French laws and regulations.

## Energy Union

On 30 November 2016, the European Commission presented a legislative package entitled “Clean Energy for All Europeans”, which is a proposal to revise all legislation on electricity. This package is made up of 11 legislative texts and a considerable number of communications documents that accompany the European Commission's proposals. These proposals concern the organisation of the wholesale and retail markets for electricity, and are designed to give increased importance to consumer-centred measures. The legislative proposals are also an opportunity to confirm or propose new European targets for 2030 in terms of energy efficiency (a 30% target proposal) and renewable energy (a 27% target proposal). A new regulation is proposed for security of supply, and a revised regulation is proposed concerning the Agency for the Cooperation of Energy Regulators (ACER). All the proposed provisions are intended to create a more cohesive organisational framework for the electricity markets, for the benefit of the European energy and climate policies, as part of the planned European Energy Union. A technical memo on Energy Union Governance completes the package and specifies the method for monitoring the achievement of objectives by the Member States that will be implemented by the Commission. The parliamentary debate began in early 2017, and the Council was also involved in negotiating these texts. The adoption of the definitive texts is not expected before the first half of 2018 and perhaps even the second half for trialogue negotiations (European Parliament/Council/EC). The (new or revised) provisions are therefore expected to enter into force between 2019 and 2021, depending on whether they are immediately applicable in the Member States (regulations) or have to be transposed into domestic law (default time of 18 months).

## The Agency for the Cooperation of Energy Regulators

Regulation (EC) no. 713/2009 of the European Parliament and Council of 13 July 2009, established an Agency for the Cooperation of Energy Regulators (ACER). The ACER plays a role in developing network codes in the electricity and gas sectors, and can make decisions relating to cross-border infrastructures (on this subject, see also section 1.5.6.2.5 “Regulations applicable to renewable energy generation”).

### 1.5.3.2 French legislation: the Energy Code

The various pieces of legislation on energy<sup>(1)</sup> Law 504 were incorporated into the French Energy Code by Order no. 2011-504 of 9 May 2011, with the exception of the majority of the provisions on nuclear energy, which were incorporated into the French Environment Code, pursuant to Order no. 2012-6 of 5 January 2012. Moreover, Decree no. 2015-1823 of 30 December 2015 organised the regulatory section of the French Energy Code. Consequently, around one hundred decrees on energy law have been repealed.

The Law of 17 August 2015 on Energy Transition for Green Growth amended numerous provisions of the French Energy Code, and in particular the objectives of the energy policy, which are now focused on the emergence of a competitive economy that creates an abundance of jobs through the mobilisation of all the industrial sectors (in particular the green growth sectors), security of supply and the reduction of reliance on imports, competitive and attractive energy prices, the preservation of human and environmental health, social and territorial cohesion, the fight against fuel poverty, and contributing to the implementation of a European Energy Union.

(1) Law of 15 June 1906, Law no. 46-628 of 8 April 1946, Law no. 2000-108 of 10 February 2000, Law no. 2003-8 of 3 January 2003, Law no. 2004-803 of 9 August 2004, Law no. 2006-1537 of 7 December 2006, Law no. 2010-1488 of 7 December 2010.

### Generation facilities

Anyone can operate an electricity generation facility provided that, above a certain power threshold determined by decree, an operating licence issued pursuant to Article L. 311-5 of the French Energy Code is obtained. The powers and responsibilities of local authorities with regard to electricity generation are defined in Articles L. 2224-32 and L. 2224-33 of the French Local Authorities Code, and in Article 88 of Law no. 2010-788 of 12 July 2010 on the national commitment to the environment.

### Regulated Access to Electricity from the Existing Nuclear Fleet (ARENH)

The rules governing Regulated Access to Electricity from the Existing Nuclear Fleet (ARENH), provided for in Articles L. 336-1 *et seq.* of the French Energy Code, have been implemented since 1 July 2011. See section 1.4.3.3 "Regulated access to historic nuclear power (*Accès Régulé à l'Énergie Nucléaire Historique*, or ARENH)" on this point.

### Choice of electricity supplier

All customers, without exception, have been eligible since 1 July 2007, *i.e.* they may freely sign a contract for the purchase of electricity with a producer or supplier of their choice that is established on the territory of the European Union or on the territory of a State that is party to an international agreement with France (Article L. 331-1 of the French Energy Code).

Customers can choose to benefit from regulated electricity sales tariffs under the conditions set out in Articles L. 337-7 *et seq.* of the French Energy Code. Pursuant to these provisions:

- household and non-household final consumers whose power demand is less than or equal to 36 kVA benefit, at their request, from regulated sales tariffs; this is also true for all customers in areas that are not interconnected to continental metropolitan France;
- household and non-household final consumers whose power demand is greater than 36 kVA, who had not exercised their eligibility on 7 December 2010 were able to benefit from regulated sales tariffs until 31 December 2015. Since 1 January 2016, these consumers no longer benefit from regulated tariffs. Article 25 of Law no. 2014-344 of 17 March 2014 on consumption provided for a six-month transitional period, during which customers who had not signed a new contract with the supplier of their choice before 31 December 2015 could, in order to guarantee the continuity of their electricity supply, continue to benefit from a contract with EDF <sup>(1)</sup> during a maximum transitional period of six months, at the end of which they would no longer be supplied (*i.e.* on 30 June 2016). During this period, customers had the opportunity to terminate this contract at any time without having to pay an indemnity. EDF had an obligation to inform the customers concerned, by letter, of the expiration of the transitional contract three months and one month before it ended. Order no. 2016-129 of 10 February 2016 introduced, from 1 July 2016, a mechanism ensuring the continuity of the gas and electricity supply: customers who, on 30 June 2016, had not subscribed to the market offering were deemed to have accepted a new contract proposed by the designated supplier, following a competition procedure, by the CRE in its decision of 4 May 2016. In November 2016, the CRE organised a new call for tenders for the lots that could not be allocated in May 2016. This call for tenders was unsuccessful for the lots concerning electricity supply contracts.

Article L. 111-84 of the French Energy Code requires internal accounts to be kept that make it possible to distinguish between supply to customers who exercised their right to eligibility and supply to customers at regulated tariffs. The State and the CRE have a right of access to the electricity companies' accounts.

### Third-party access to networks

Article L. 111-91 of the French Energy Code provides that network managers must guarantee access to the public transmission and distribution networks in order to:

- perform the public service missions to supply electricity at regulated electricity sales tariffs and at basic necessity special rates;
- perform electricity procurement contracts;
- perform electricity export agreements signed by a producer or by a supplier who is located on French national territory.

Disputes concerning third-party access to networks are heard by the Settlement of Disputes and Sanctions Committee (CoRDIS), which is part of the Energy Regulation Commission (CRE).

The tariffs for using the Public Electricity Transmission and Distribution Networks (TURPE) referred to in Articles L. 341-2 *et seq.* of the French Energy Code entered into force on 1 August 2017. They have been defined, with regards to transmission (TURPE 5 HVB) through a decision of the CRE of 17 November 2016 and a decision of the same date concerning distribution (TURPE 5 HVA/LV). In a decision dated 12 January 2017, which was published in the *Journal Officiel* of 17 January 2017, the Minister for the Environment, Energy and Sea, in accordance with Article L. 341-3 of the Energy Code, asked the CRE to draw up a new draft decision on the tariffs for the public electricity distribution networks, on the basis of the Minister's energy policy guidelines. In particular, the Minister asked for new uses that are linked to energy transition and local movable peak times be better taken into account and asked for a higher level of remuneration that will allow the network manager to carry out its missions and for the application of the method for determining the tariff that complies with the legal framework introduced by the Law on energy transition. The CRE, therefore, adopted a new decision on 19 January 2017, indicating that there was no need for a new decision to modify its decision of 17 November 2016. Through its decision of 26 October 2017, the CRE added to its decision of 17 November 2016 on TURPE five distribution of a decision determining the conditions for covering the costs associated with customer management ("supplier commissioning").

### Subsidy mechanisms for certain production sectors

EDF is subject to electricity purchase obligations that result in contracts being signed with facility operators. The purchase obligation system, which was created by Law no. 2000-108 of 10 February 2000 on the modernisation and development of the public electricity service, was amended by Law no. 2015-992 of 17 August 2015 on Energy Transition for Green Growth, which clarified some aspects of this system and created a new form of subsidy in the guise of additional remuneration. The subsidy mechanism for certain production sectors that results from the aforementioned Law of 17 August 2015 now has three separate systems.

Firstly, the purchase obligation regime provided for by Articles L. 314-1 *et seq.* of the French Energy Code. These articles provide that EDF (as well as the LDCs that are responsible for supply in their service area) must sign purchase contracts, at the request of producers, for the electricity generated by technology sectors, the development of which the public authorities wish to support, either because they use sources of renewable energies, or because they have a specific form of energy efficiency (e.g. cogeneration). The eligible facilities are listed in Article D. 314-15 of the French Energy Code.

Article R. 314-2 of the French Energy Code provides that producers who benefit from the purchase obligation must sell all of their production to EDF under agreements entered into on the basis of indicative models approved by the Minister for Energy. Purchasing terms and conditions, specifically the electricity purchase prices, are set by order of the Ministers for Energy and the Economy.

Secondly, the additional remuneration regime, which was introduced by Law no. 2015-992 of 17 August 2015 on Energy Transition for Green Growth and is governed by Articles L. 314-18 *et seq.* of the French Energy Code. The additional remuneration takes the form of a premium that is paid to producers as a complement to their income from selling the electricity they produce on the market, as well as the assignment of their capacity certificates. In this respect, EDF is obliged to enter into an additional remuneration contract with eligible producers who request one and with certain producers who currently benefit from a purchase obligation and who wish to benefit from an additional remuneration agreement for the remainder of the term of their initial purchase contract. The eligible facilities with additional remuneration are listed in Article D. 314-23 of the French Energy Code.

Thirdly, the tendering procedure which, pursuant to Articles L. 311-10 *et seq.* of the French Energy Code, may be launched by the Minister for Energy when production capacities do not meet the targets of the multi-year energy plan. EDF is then required, outside the areas served by LDCs, to enter into an electricity purchase contract or a contract that provides for additional remuneration with the selected bidder(s) (this is a memorandum of understanding in the event that it is EDF itself in the capacity of "producer" that is chosen following the call for tenders).

The additional costs for EDF and the LDCs that result from contracts signed pursuant to the obligation to purchase energy are compensated by the State and financed, in particular, by the "Energy Transition" special purpose account, created by the Amending 2015 Finance Law. For 2016, the special purpose account (CAS) was

(1) Or their Local Distribution Company.

funded by part of the proceeds of the domestic tax on final consumption of electricity (TICFE), part of the proceeds of the domestic tax on natural gas consumption (TICGN), as well as part of the domestic tax on coal, lignite and coke (TICC) and part of the domestic tax on energy products (TICPE). For 2017, the special purpose account (CAS) is now only funded by part of the domestic tax on gas consumption (TICC) and part of the domestic tax on energy products (TICPE). For 2018, Article 50 of Law no. 2017-1837 of 30 December 2017 (the Finance Act for 2018) substitutes these TICC and TICPE percentages with an amount in order to overcome the return forecast uncertainties of these taxes as well as the revenue expansion of the CAS which will incorporate the income generated by the auctioning of the guaranteed sources provided for in Article L. 314-14 of the French Energy Code.

## Mechanism for compensating the additional costs of public service

### Compensation of Public Electricity Service costs (CSPE)

Article L. 121-6 of the French Energy Code lays down the principle that the State must compensate in full the costs that are attributable to the public service generation and supply missions that are assigned to EDF and the LDCs.

For electricity generation, the expenses defined by Article L. 121-7 of the French Energy Code include:

- the additional costs that result both from electricity purchase agreements entered into by EDF and the LDCs after tendering procedures (Articles L. 311-10 *et seq.* of the French Energy Code) and from purchase obligation agreements signed within the framework of Articles L. 314-1 *et seq.* of the French Energy Code, as well as additional remuneration agreements that are entered into pursuant to Articles L. 314-18 *et seq.* of the French Energy Code;
- in areas that are not interconnected to continental metropolitan France:
  - additional generation costs that are not covered by the generation portion in regulated sales tariffs, the costs of storage facilities managed by the electricity system manager, within the limits of the additional generation costs they help to avoid,
  - additional electricity procurement costs (other than those, mentioned above, linked to the purchase obligation) that are not covered by the generation portion in regulated sales tariffs, within the limit of the additional generation costs they help to avoid,
  - the costs paid by electricity suppliers in respect of energy demand control initiatives, less any income received through these initiatives, within the limit of the additional generation costs they help to avoid,
  - the costs of studies paid by a producer or supplier with a view to implementing electricity supply projects that are identified in the Decree on the multi-year energy plan;
- and, since the Amended Finance Act for 2016, the direct costs for EDF and the LDCs directly induced by the signing and managing of purchase contracts, contracts for additional remuneration and contracts signed following tendering procedures, within the limit of the costs that an average undertaking that would have incurred if properly managed and adequately equipped.

For the supply of electricity, the costs defined in Article L. 121-8 of the French Energy Code include:

- revenue losses and additional costs incurred by suppliers due to the implementation of the special "basic necessity" rate (TPN);
- costs incurred by suppliers as a result of their participation in the plan established for low-income persons (within the limit of a percentage, which is set by order, of the cost borne by the supplier in respect of the TPN for the year in question).

Moreover, in accordance with the provisions of Article L. 121-8-1 of the French Energy Code, the purpose of the CSPE is to finance the costs incurred by operators of public electricity transmission networks in respect of the calls for tender they may initiate if the load shedding capacities do not meet the targets stipulated in the multi-year energy plan.

The mechanism for compensating public service costs, governed by Articles L. 121-9 *et seq.* of the French Energy Code, was reformed as of 1 January 2016, pursuant to

Law no. 2015-1786 of 29 December 2015 (the Amended Finance Act for 2015), which aims to secure the financing of the costs of the public energy service.

The electricity (and gas) public service costs are now financed in full, as follows:

- the costs linked to energy transition, which correspond to the subsidy mechanisms for renewable energies, as well as the reimbursement of the "long-term" compensation deficit incurred by EDF as it stands on 31 December 2015, are registered in a special purpose account (CAS) for "energy transition" that was created by the Amended Finance Act for 2015. Law no. 2016-1917 of 29 December 2016 (the Finance Act for 2018) provides that the two sources of revenue that will provide additional funding for the special purpose account (CAS) are a part of the domestic tax on coals, lignite and coke (TICC), as well as a part of the domestic tax on energy products (TICPE). The Finance Act for 2018 substitutes these TICC and TICPE percentages with an amount in order to overcome the return forecast uncertainties of these taxes as well as the revenue expansion of the CAS which will incorporate the income generated by the auctioning of the guaranteed sources provided for in Article L. 314-14 of the French Energy Code;
- the other public service costs – excluding the costs associated with the subsidy mechanisms for renewable energies – (fuel poverty, tariff equalisation in areas not interconnected to metropolitan France, cogeneration, and the budget for the energy conciliator, etc.) are entered directly in the general budget;
- revenue from the domestic tax on the final consumption of electricity, which was renamed the "Contribution to Public Electricity Service" (CSPE), is directly affected to the general budget. The CSPE will be collected directly from final consumers of electricity in the form of an additional levy on the electricity sale price or directly from electricity producers that produce electricity for their own uses.

The amount of the CSPE was set at €22.50/MWh as from 1 January 2016. This amount has been maintained for 2017 and 2018. As an exception, for electro-intensive and hyper-electro-intensive undertakings and distribution companies, reduced tariffs of between €0.5/MWh and €7.5/MWh have been defined.

The Decree no. 2016-158 of 18 February 2016 specifies the rules for determining the costs that can be attributed to public service energy missions, the procedure for determining the amount of the costs to be compensated for each operator, and the transactions for paying the compensations to the operators who bear the expenses.

Each year, the CRE records the amount of the costs that can be attributed, in respect of the previous year, to public service energy missions that are the responsibility of the operators and assesses, for the following year, the provisional amount of the same costs, and updates its cost forecast for the current year. Doing so, it distinguishes between the costs that are allocated to the "energy transition" special purpose account and those financed directly by the general budget.

Each year, before 15 July, the CRE sends the Minister for Energy its assessment of the amount of these costs.

The massive expansion of facilities that generate electricity using renewable energy sources (mainly wind power and photovoltaic facilities) and that benefit from the purchase obligation, for several years, has led to a significant increase in the costs to be compensated. Yet, since 2007, the amount of the CSPE that is actually applied to consumers has not made it possible to cover these costs, thus leading to an offsetting shortfall, for which EDF alone pays and that adversely impacts the group's indebtedness. It therefore became necessary to design a new balanced mechanism (*i.e.* that avoids a new structural deficit being created), the financing of which is not based exclusively on electricity consumers alone (electricity is by far the least carbon-heavy energy and yet an imbalanced tax situation penalises its ability to compete with other energy forms, which is in contradiction with the CO<sub>2</sub> emissions reduction targets of the "Energy Transition" Law).

EDF and the public authorities have reached an agreement for the repayment of the debt formed by the offset deficit as it stands on 31 December 2015 *i.e.* €5.779 million. Under the new mechanism that has been in force since 1 January 2016, this debt shall be paid off by 31 December 2020, according to a progressive repayment schedule that was defined by an Order of 13 May 2016, which was amended on 2 December 2016.

On 22 December 2016, EDF sold part (26.40%) of this debt to a pool of investors comprised of a bank and a dedicated Special Purpose Entity (SPE). The proceeds of this sale without recourse totalled €1.542 billion. The debt sold includes a component which is not classified as dedicated assets. The sale of this component has led to an improvement of the Net Indebtedness of approximately €645 million. The remainder corresponds to the portion of the debt that was allocated to Dedicated Assets. It will be reinvested in these assets.

### Compensation for additional distribution costs

The purpose of the Electricity Equalisation Fund (FPE), the accounting management of which is entrusted to EDF under Article L. 121-29 of the French Energy Code, is to distribute the charges incurred as a result of public service missions assigned for managing the electricity distribution networks among the operators concerned, in particular those linked to the specificities of the networks operated and that will not be covered by the portion relating to the use of those networks in the regulated tariffs or by the tariffs for using the public electricity distribution networks. The costs linked to involvement in the development of areas with particular geographical, economic or social difficulties, as defined by Article 42 of Law no. 95-115 of 4 February 1995, are also concerned.

### Capacity guarantees

Articles L. 335-1 *et seq.* of the French Energy Code, which are taken from the NOME Act (New Organisation of the Electricity Market – *Nouvelle Organisation du Marché de l'Électricité*), obligate each electricity supplier to contribute to the security of electricity supply in continental metropolitan France, in light of its customers' power and energy consumption patterns. Each supplier must therefore provide annually, under penalty of an administrative sanction, an amount of capacity guarantees according to its customers' consumption at peak periods. Suppliers will obtain these capacity guarantees from generation or load operators, which must first have their capacities certified by the public distribution network manager.

The aims of this mechanism are:

- to make it possible to maintain or develop generation or load shedding capacities that ensure the level of security of supply set by the public authorities;
- to improve the remuneration of these capacities;
- to share the expense of this security of supply among all suppliers.

The "capacity mechanism rules" proposed by RTE were approved by a ministerial order of 22 January 2015 after consulting the CRE.

The Law of 17 August 2015 on Energy Transition for Green Growth has adapted the capacity mechanism to small players allowing LDCs to transfer their capacity obligations, no longer just to other LDCs but "to any other supplier" and allowing electricity suppliers to transfer their capacity obligations to a final consumer for its consumption or to a public network operator for its losses (Article L. 335-5 of the French Energy Code).

Moreover, Article L. 335-3 of the French Energy Code introduced the possibility for all capacity operators to transfer to a third party their liability for discrepancies between effective capacity and certified capacity, and the payment of the penalties in respect of said discrepancies.

On 13 November 2015, the European Commission opened an in-depth investigation in light of European rules on State aids, with respect to the planned French capacity mechanism.

On 8 November 2016, the European Commission approved French plans for a capacity mechanism. During the investigation, France agreed to amend the mechanism as follows: introduction of long-term contracts (7 years) for new capacities, taking into account foreign capacities and measures to prevent any manipulation of the market.

Revisions made for the improvement of market transparency and surveillance led to the publication of the Order of 29 November 2016. This made it possible for the mechanism to enter into force on 1 January 2017: the first auction of capacity guarantees on EPEX took place on 15 December 2016 and 22.6GW of capacity guarantees were traded at a price of €10/kWh.

Over-the-counter transactions remain possible.

The implementation of the commitments concerning the opening of the mechanism to foreign capacity providers requires a revision of the 2012 Decree, adopted in 2012 by the Council of State after reviewing the opinions delivered by the Higher Energy Council, the National Council for Standards Assessment, the Energy Regulation Commission and the Competition Authority. The timetable presented by

the French authorities to the European Commission is therefore based on an adaptation of the applicable French regulations in 2018 so that such commitments may be effectively implemented by 2019 (the year of delivery).

Concerning the introduction of long-term contracts, the French authorities have undertaken to implement the mechanism so as to carry out a capacity selection process in 2019 and to ensure an initial effective participation of the capacities selected for the delivery year 2023. Moreover, they undertake to introduce no later than in 2019 a transitional system of multi-year contracts in order to cover the period between 2020 and 2023. For example, this would mean that in 2019, a "sustainable" mechanism for the delivery year 2023 would be introduced, along with a transitional mechanism for the delivery years 2020, 2021 and 2022 (*cf.* recital 138 of the European Commission decision of 8 November 2016).

### Electricity load shedding

The Law of 17 August 2015 on Energy Transition for Green Growth amended the legal rules on load shedding and, in particular, Articles L. 271-1 *et seq.* of the French Energy Code on this subject.

These provisions amend the previous legal rules and stipulate, in particular:

- that load shedding is defined as "the action to reduce temporarily the effective withdrawal level of electricity from the public electricity supply and distribution networks by one or more consumption sites, compared to a forward-looking consumption plan or an estimated consumption, when an ad hoc request is sent to one or more final consumers by a load manager or an electricity supplier";
- that there is the possibility for consumers to monetise each of their demand responses, either vis-à-vis their supplier as part of a demand response offer that is inseparable from the supply, or via the intermediary of load managers;
- that the Government will organise calls for tenders if the load management capacities do not meet the targets of the multi-year energy plan (this mechanism replaces that of the load shedding premium);
- finally, for load shedding that leads to significant energy savings, the law provides that the administrative authority may require the payment to the supplier to be shared between the load manager and RTE.

The terms and conditions for applying these provisions are specified in Articles R. 271-1 *et seq.* of the French Energy Code, last completed by Decree no. 2017-437 of 29 March 2017 and by the rules for valuing the demand response on the wholesale energy markets (known as the "NEBEF 3.0" rules) approved by the CRE on 7 December 2016 and applicable for 2017 and the rules concerning scheduling, the balancing mechanism and the recovery of balancing charges, in their version approved by a decision of the CRE of 7 December 2016 and applicable for 2017.

### Self-consumption of electricity

Article 119 of Law no. 2015-992 of 17 August 2015 on Energy Transition for Green Growth authorised the Government to take, by way of an order, the necessary measures to ensure the controlled and secure development of facilities intended to consume all or some their own electrical output.

Following Order no. 2016-1019 of 27 July 2016 on the self-consumption of electricity came the publication of Articles L. 315 to L. 315-8 of the French Energy Code on 28 July 2016, which were ratified and completed by the Law of 24 February 2017 and distinguish between individual and collective self-consumption and in particular:

- require network operators to facilitate self-consumption operations, to implement the necessary technical and contractual arrangements, particularly with regards to the metering of electricity and to enable the realisation of self-consumption operations under transparent and non-discriminatory conditions;
- provide that the CRE establish special tariffs for public distribution networks for consumers participating in self-consumption operations when the installed capacity of generation facilities supplying them is less than 100 kilowatts.

The provisions of Decree no. 2017-676 of 28 April 2017 amending the French Energy Code specifies the conditions for applying these provisions, particularly with regards to collective self-consumption (no measurement used to qualify self-consumption, procedures for assessing the 100kW threshold provided for by law for the eligibility of TURPE "self-consumption" facilities to be defined by the CRE, general principles of distributing generation between each consumer participating in a collective self-consumption operation, link between the legal entity responsible for a collective self-consumption operation and the public distribution network



managers, maximum capacity of the generation facilities eligible for derogation from the obligation to be attached to a balance group, which is set in the decree at 3kW).

At this stage, the implementation methods for self-consumption operations are still to be decided and in autumn 2017 the CRE organised self-consumption workshops with stakeholders and launched three calls for contributions on self-consumption: tariff issues, contractual framework and support mechanisms.

### **Closed distribution networks**

Article 167 of Law no. 2015-992 of 17 August 2015 on Energy Transition for Green Growth authorised the Government to take any measure, by way of an order, arising from the law in order to add a section on closed distribution networks to the French Energy Code to provide a framework for a practice made possible by Article 28 of Directive 2009/72/EC.

Following Order no. 2016-1725 of 15 December 2016 on closed distribution networks, Articles L. 344-1 *et seq.* of the French Energy Code specify the definition of the closed distribution networks, their legal regime, missions assigned to the manager of the closed distribution network and the sanctions applicable if these provisions are not adhered to.

Article L. 344-13 of the French Energy Code provides that the terms and conditions for applying these provisions are defined by decree of the Council of State. To date, this decree has not been adopted.

A draft law to ratify the order was registered in the French Senate on 15 February 2017.

### **Domestic networks**

Law no. 2017-1839 of 30 December 2017 ending the research and use of conventional and non-conventional hydrocarbons and introducing various provisions relating to energy and the environment was published in the *Journal officiel* of 31 December.

Its purpose, in particular, is to define and authorise the creation and operation of domestic building networks which constitute a new category of networks alongside public electricity distribution or transmission networks, and closed electricity distribution networks.

Pursuant to Articles L. 345-1 *et seq.* of the French Energy Code, domestic networks can now only be legally created if four criteria are met: the domestic building from which the network will be created must i) stand alone, ii) belong to a single owner, iii) be used primarily for offices, iv) not contain any dwellings.

A decree must specify the terms and conditions for implementing these legal provisions.

### **Electricity sector regulation**

#### **The Energy Regulation Commission**

The Energy Regulation Commission (CRE) is an independent administrative authority created by Article 28 of the Law of 10 February 2000.

Articles L. 131-1 *et seq.* of the French Energy Code give a general definition of the remit of the CRE, which is tasked with contributing to the correct functioning of the electricity and natural gas markets for the benefit of final consumers. In this respect, the CRE ensures, in particular, that the conditions for access to electricity and natural gas transmission and distribution networks do not impede the development of competition.

The CRE has significant powers: the power to make proposals, advisory powers and decision-making powers (approval power and regulatory power).

The CRE makes proposals, in particular, to the Ministers for the Economy and Energy regarding the amount of the costs that are attributable to the public service missions assigned to power producers, and the net amount of the related contributions. Once the Decree has been published that specifies the methods for identifying and recognising the costs that are taken into account for the calculation of the ARENH price, the CRE will also propose the ARENH price. Moreover, since 7 December 2015, it has been the CRE's responsibility to send its justifiable proposals for changes in the regulated sales and transfer tariffs for electricity (on which it previously could only issue an opinion) to the Ministers for the Economy and Energy. The decision is deemed to have been made in the absence of any objections

by one of the Ministers within the three months following the receipt of these proposals.

The CRE now has significant decision-making power to set the Tariffs for Using the Public Transmission and Distribution Networks (TURPE): it sends its reasoned decision to the administrative authority, which can only ask the CRE for a new decision in the event of non-compliance with energy policy guidelines. Under its residual regulatory power, the CRE also takes network connection decisions, as well as decisions to define the rules for calculating and adjusting the rights of suppliers to the ARENH.

The CRE is also vested with very broad powers that enable it to obtain any information that it may deem useful for the fulfilment of its remit, as well as authority to settle disputes and to apply penalties, through the Settlement of Disputes and Sanctions Committee (CoRDIS).

The Law on Energy Transition for Green Growth also gives the CRE the possibility of having the information it obtains through its remits audited, at the expense of the audited undertakings.

Organic Law no. 2017-54 of 20 January 2017 on Independent Administrative Authorities and Independent Public Authorities and Law no. 2017-55 of 20 January 2017 on the General Statute of Independent Administrative Authorities and Independent Public Authorities, provided these authorities, including the CRE, with a common legal status. These laws mainly lay down the rules relating to the mandate of members, the ethics of members, the operation and organisation of these authorities and parliamentary control.

### **Regulatory framework**

#### **Tariff for Using the Public Transmission and Distribution Networks (TURPE)**

Pursuant to Article L. 341-3 of the French Energy Code, the tariff for using the public electricity transmission network is set by way of a reasoned decision by the CRE.

A new tariff for use of the public transmission network (TURPE 5 HVB) entered into force on 1 August 2017 for a period of around four years. This tariff was set by the decision of the CRE of 17 November 2016 and was published in the *Journal officiel* on 28 January 2017. This decision provided for an increase of 6.76% on 1 August 2017, followed by an inflation-based change on 1 August of each year (apart from corrections arising from the income and expense regularisation account).

The financial remuneration of RTE's assets is derived from the product of the regulated asset base (RAB), estimated on 1 January 2017 at €13,598 million, by a fixed remuneration rate. This remuneration rate corresponded to a nominal rate before tax of 7.25% for the 2013-2016 tariff period. For the 2017-2021 period, this rate is 6.125% before tax.

On this basis, in 2017, network access tariff revenues were around €4.168 million for the electricity transmission network, revenues from services €91 million and revenues from interconnections €389 million.

Concerning the transmission and distribution of natural gas (Law no. 2003-08 dated 3 January 2003), see section 1.5.4.2 "French legislation: French Energy Code".

#### **Tariff for using the public electricity distribution networks (distribution TURPE)**

Over 90% of Enedis' sales are made up of revenues made from electricity transmission. The tariff for using the public electricity network (TURPE), in terms of levels and structure, is set by the CRE in a transparent and non-discriminatory manner, in order to cover all the costs borne by the efficient network operators.

A new tariff for using the public distribution network (TURPE 5 HVA/LV), established through a decision of the CRE of 17 November 2016, entered into force on 1 August 2017 for a period of around four years. It provides for an average increase of 2.71% on 1 August 2017. It will then change in accordance with inflation on 1 August of each year between 2018 and 2020 (excluding corrective effects from the regularisation account for income and expenses).

In the context of TURPE 5 HVA/LV, Enedis' financial remuneration is derived from the sum of the remuneration on managed assets (RAB paid at 2.6%) and the remuneration of regulated shareholders' equity (remunerated at 4.1%).

The Minister for Energy, who has a two-month deadline, by a decision of 12 January 2017 published in the Journal officiel dated 17 January 2017, requested a new decision, considering that the CRE's project did not take into account the country's energy policy.

Through a new decision dated 19 January 2017, the CRE confirmed its initial decision of 17 November 2016. Both decisions were published in the Journal officiel of 28 January 2017. On 2 February 2017, Enedis filed a request with the Council of State for the annulment of these two CRE decisions.

On 3 February 2017, EDF, acting as a shareholder of Enedis, also filed a request for annulment with the French Council of State against the same deliberations by the Energy Regulation Commission (CRE).

By a judgment dated 9 March 2018, the French Council annulled the TURPE 5 deliberations in so far as they did not apply the "risk-free rate" to the corresponding assets in determining the cost of capital invested, to works for which provisions for renewal have been allocated during the tariff period covered by the so-called "TURPE 2" tariffs (for their as yet unamortized fraction), and to works handed over by the licensing authorities to the grid operator during the same tariff period (for the same fraction). Such annulment shall not take effect until 1 August 2018. The CRE shall resume a TURPE deliberation taking effect on that date.

The CRE completed its decision on 17 November 2016 with a decision of 26 October 2017, published in the Journal officiel of 14 December 2017, on the remuneration to be paid by Enedis to suppliers for their management of single contract customers ("supplier commissioning"). Taking into consideration the changes made to the French Energy Code by Law no. 2017-1839 of 30 December 2017 *ending the research and use of conventional and non-conventional hydrocarbons and introducing various provisions relating to energy and the environment*, particularly those concerning the competence of the CRE in relation to supplier commissioning, the CRE has, in a new decision of 18 January 2018 published in the Journal officiel on 25 January 2018, included all of its decision of 26 October 2017.

### Linky regulation

The Linky project is subject to a specific regulatory framework regarding meters operating life (20 years), with a dedicated regulated asset basis (RAB) for the meters installed between 2015 and 2021 and the associated systems.

The CRE's decision dated 17 July 2014 also set a nominal return rate before tax of 7.25% and a 3% additional premium in return for an incentive regulation to better meet costs and system performance, targets as well as deadlines bringing the return on the RAB to 10.25%. The incentive regulation can also trigger penalties potentially lowering the return, although not below a floor of 5.25%.

In addition, the implementation of a postponed tariff, set up to guarantee a neutral impact of Linky on the tariff for customers, means that payments for the 2014-2022 period will be made during the 2023-2030 period. This postponed tariff, which is attached a 4.6% compensation covering the cost of financial carry, will be totally paid by 2030. At 31 December 2017, the deferred amount is +€645 million (this represents a receivable from Enedis in relation to their network users, which is not recognised on the Group's balance sheet at 31 December 2017, pursuant to the accounting standards in force on this date).

## 1.5.4 GAS MARKET REGULATION

### 1.5.4.1 European legislation

Directive no. 98/30/EC of 22 June 1998 and Directive no. 2003/55/EC of 26 June 2003 were the major steps towards opening up the gas market to competition.

New rules aimed at improving the functioning of the internal natural gas market were defined in Directive no. 2009/73/EC of 13 July 2009, and by regulation (EC) no. 715/2009 of 13 July 2009 on conditions for access to the natural gas transmission networks.

Pursuant to this legislation, the network codes for capacity allocation mechanisms (CAM) and (balancing) rules officially entered into force on 1 November, and 1 October 2015 respectively. The first requires the capacities at interconnection points between transmission networks to be commercialised by bundling the output capacity of the first network with the input capacity of the second network, and by selling these interconnection capacities *via* auction. This first code has been replaced

by a new code from regulation (EU) 2017/459 of 16 March 2017. The purpose of the second is to harmonise the balancing rules on transmission networks.

These codes have been completed by a network code on the standardisation of tariff structures for the transmission of gas from regulation (UE) 2017/460 of 16 March 2017.

### 1.5.4.2 French legislation: the Energy Code

Directive no. 2009/73/EC of the European Parliament and of the Council of 13 July 2009 was transposed into French law by Order no. 2011-504 of 9 May 2011, which organised the legislative section of the French Energy Code. The French Energy Code entered into force on 1 June 2011.

#### Access to natural gas networks

The French Energy Code provides that customers, suppliers and their agents have a right to access natural gas transmission and distribution infrastructures, as well as LNG facilities, under the terms and conditions set forth in an agreement with the operators that run them.

Natural gas network operators must refrain from discriminating between users or categories of users in any way.

#### Customers

Since 1 July 2007, all customers can freely choose their supplier.

Pursuant to the provisions of Article L. 445-4 of the French Energy Code, household and non-household customers who consume less than 30,000kWh per year may benefit from regulated tariffs, at their request and without having to meet any conditions. Household customers who are entitled to the special "basic necessity" rate for electricity may benefit from a special solidarity tariff that is applicable to the supply of natural gas for part of their consumption. This special tariff will gradually be replaced by the "energy voucher" system (see section 3.5.4 "fight against energy poverty contribution").

Customers whose consumption exceeds 30,000kWh per year can only benefit from regulated gas sales tariffs for a site if no market-based offer has been accepted for the site concerned, pursuant to Article L. 445-4 paragraph 2 of the French Energy Code.

Non-household final customers who consume more than 30,000kWh per year and who still benefit from the regulated tariffs for the sale of natural gas that are stipulated in Article L. 445-3 of the French Energy Code are no longer eligible for these tariffs:

- for non-household consumers who are connected to the transmission network, since 18 June 2014;
- for non-household consumers whose consumption level has exceeded 200,000kWh per year, since 31 December 2014;
- for non-household consumers whose consumption level has exceeded 30,000kWh per year, since 31 December 2015.

Article 25 of Law no. 2014-344 of 17 March 2014 on consumption introduced a six-month transitional period, during which customers who had not signed a new contract with the supplier of their choice before 31 December 2015, were allowed, in order to ensure the continuity of their electricity supply, to continue to benefit from a contract with their incumbent supplier during a maximum transition period of six months, at the end of which they would no longer be supplied (*i.e.* 30 June 2016). During this period, customers had the opportunity to terminate this contract at any time without having to pay an indemnity. The supplier was under an obligation to remind the customers concerned, by letter, of the term of the transitional contract three months and one month before it would automatically come to an end. Order no. 2016-129 of 10 February 2016 introduced, from 1 July 2016, a mechanism ensuring the continuity of the gas and electricity supply: customers who, on 30 June 2016, have not subscribed to the market offering are deemed to have accepted a new contract proposed by the designated supplier, following a competition procedure, by the CRE in its decision of 4 May 2016. In November 2016, the CRE organised a new call for tenders for the lots that could not be allocated in May 2016 and for newly-concerned and for the newly concerned consumption sites. This call for tenders made it possible to award one lot for gas supply contracts.

Through a decision of 19 July 2017, the Council of State annulled the Decree of 16 May 2013 on regulated natural gas sales tariffs on the grounds that maintaining such tariffs is contrary to European Union law. Indeed, regulated natural gas sales tariffs do not fulfil the conditions laid down in Directive 2009/73/EC and, in particular, do not pursue any objective of general economic interest. However, that decision only annulled the disputed decree and not the regulatory provisions of the Energy Code relating to regulated natural gas sales tariffs in force since 1 January 2016. As such, regulated natural gas sales tariffs remain as long as the Prime Minister does not repeal these provisions.

## Suppliers

Article L. 443-4 of the French Energy Code defines suppliers as persons who (i) are established on the territory of a Member State of the European Union or on the territory of another State pursuant to international agreements, and (ii) hold a licence issued by the Minister for Energy.

EDF is authorised to supply natural gas to non-household customers that do not provide services in the public interest, pursuant to an Order of the Deputy Minister of Industry of 14 September 2004, and, pursuant to an Order of 9 August 2005, to non-household customers that provide services in the public interest, as well as to natural gas distributors and suppliers, and, pursuant to an Order of 15 June 2007, to household customers.

EDF only supplies its customers at market-based prices. Regulated sales tariffs can only be proposed by Engie and LDCs responsible for gas supply.

## Underground storage and third-party access to natural gas storage facilities

Article L. 421-4 of the French Energy Code requires all suppliers to hold, on 31 October of each year, directly or indirectly through an agent, sufficient inventories of natural gas in France to meet their direct or indirect contractual obligations to supply household customers and other customers that provide services in the public interest or that have not contractually accepted an interruptible gas supply, during the period between 1 November and 31 March.

Articles R. 421-1 to R. 421-2 of the French Energy Code specify the legal framework that applies to underground storage facilities for natural gas.

The Order of 31 July 2017 defined the terms and conditions for taking into account other modulation instruments for the implementation of the obligation of natural gas suppliers to declare and hold stocks and their storage capacities.

Law no. 2017-1839 of 30 December 2017 ending the research and use conventional and non-conventional hydrocarbons and introducing various provisions relating to energy and the environment, published in the Journal officiel of 30 December 2017 amends the rules for accessing underground natural gas storage facilities necessary for the security of supply, to establish a regulated access framework, guaranteeing the coverage of the costs borne by the operators of these facilities through the natural gas transmission network access tariffs. Suppliers will be able to subscribe to storage capacities *via* an auction system, the terms of which will be defined by the CRE. Obligations to hold natural gas stocks by suppliers provided for in Article L. 421-4 of the French Energy Code have therefore been abolished.

## Control and penalties

The French Energy Code grants the Minister for the Economy, the Minister for Energy and the CRE, power to oversee the gas market. The Minister for Energy may also levy a fine, or withdraw or suspend an authorisation to supply natural gas. The CRE can carry out investigations into whether offences that breach the provisions of the French Energy Code have been committed (Article L. 135-13 of the French Energy Code).

## 1.5.5 PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

### French legal system applicable to concessions

In accordance with Articles L. 121-4 *et seq.* and L. 322-1 *et seq.* of the French Energy Code, and Article L. 2224-31 of the French Local Authorities Code, the public distribution of electricity is operated under a system of public service concessions. Pursuant to this body of law, the contracting authorities organise the public

electricity distribution service through concession agreements and general specifications that set forth the respective rights and obligations of the contracting authority and the operator. Currently, the contracting authorities are most often public institutions formed by associations of several municipalities cooperating together, however contracting authorities at *département* level are becoming more common.

The separation of supply and network activities imposed by Community Directives has led to the identification of a public service with two distinct missions: on the one hand, the regulated tariff supply mission entrusted to EDF and the LDCs in their exclusive service areas and, on the other hand, the development and operation of the public electricity distribution networks, entrusted to Enedis and the LDCs in their service areas, and EDF for areas not interconnected to the continental metropolitan network.

Article L. 334-3 of the French Energy Code provides that the signature of new concession agreements and amendments, as well as renewals of existing concession agreements, must be executed by three parties: the contracting authority, the distribution network manager (for the provisions relating to management of the public distribution network) and by EDF (or the LDC that has the authority in the geographic area) for supply at regulated tariffs. The current concession agreements in force are deemed to have been signed jointly by these three entities.

Pursuant to Order no. 2016-65 of 29 January 2016 on concession agreements and its Application Decree no. 2016-86 of 1 February 2016, transposing Community Directive no. 2014/23/EU of 26 February 2014 into national law, concession contracts for the operation of the public distribution network and the supply of electricity at regulated tariffs are concluded by mutual agreement, that is to say without publicity and competitive bidding procedures.

## Rights of the contracting authorities

The rights of the contracting authorities are detailed in section 1.4.4.2.2. ("Distribution Activities") of this Reference Document.

## 1.5.6 GENERAL REGULATIONS THAT ARE APPLICABLE TO THE ENVIRONMENT, NUCLEAR POWER, HEALTH, HYGIENE AND SAFETY

EDF's business in France, as well as in other countries where EDF operates, is subject to regulations that are applicable to the environment, nuclear power, health, hygiene and safety. Compliance with these increasingly strict and continuously changing regulations exposes the Group to significant costs in order to ensure it does business compliantly.

### 1.5.6.1 General regulations those are applicable to the environment, health, hygiene and safety

#### Environmental regulations

##### Public involvement in environmental matters

The general framework for the public's involvement in the preparation of regulatory and individual decisions by the public authorities that have an impact on the environment is laid down in Articles L. 120-1 *et seq.* of the French Environment Code. These provisions apply in the absence of specific provisions that are laid down by specialised legislation.

This legal framework has recently evolved with the adoption of Order no. 2016-1060 of 3 August 2016 reforming procedures to ensure public information and involvement in the development of certain decisions that may have an impact on the environment, completed by Decree no. 2017-626 of 25 April 2017. This order, which was adopted pursuant to Law no. 2015-990 of 6 August 2015 on Growth, Business and Equal Opportunities (known as the "Macron Law"), (i) introduced an opening chapter into the French Environment Code that defines the targets for public involvement and the rights of those involved, (ii) expanded the consultation procedure ahead of the decision-making process and (iii) modernised the procedures for downstream consultation.

### Environmental Liability (the “LRE” Law)

The purpose of the Law of 1 August 2008 on Environmental Liability (LRE), which is incorporated into the French Environment Code under Articles L. 160-1 to L. 165-2, is to promote the prevention and remedying of environmental damage to water, soil and biodiversity that reaches a certain level of seriousness. The remedy must be environmental only and must allow the natural environment to return to its previous state or an equivalent state.

### Balanced management of water resources

The Water Framework Directive of 23 October 2000 is the foundation of Community water policy. It defines a framework for the management and protection of water, for each major river basin, and sets targets for maintaining and restoring the status of surface waters, in particular to ensure the correct ecological and/or chemical status of water by 2015.

In France, the Directive was primarily transposed into law through the Water and Aquatic Environments Act of 30 December 2006, which stipulates the measures that are designed to ensure that the Directive’s targets are attained. These targets are determined for each river basin in the master plans for water development and management (SDAGEs). All EDF’s activities that could impact water and aquatic environments must be compatible with the targets set in the SDAGEs.

The Water Act also requires the various uses of water to be reconciled. The requisite balanced, sustainable management of water resources therefore has consequences for the operating rights of hydropower plants, and indirectly for all EDF’s activities that affect aquatic environments.

### Protection of biodiversity

As an occupant and user of natural land and water areas, EDF is directly concerned by biodiversity issues.

In order to protect and restore biodiversity, the Grenelle Environmental Forum set ambitious targets, which include the implementation of a national strategy for the creation of protected land areas (SCAP), which aims to provide extensive protection, by 2019, for at least 2% of metropolitan French land mass, as well as the creation of a green and blue belt, a tool for land-use planning that sets up green corridors to connect protected areas, thereby enabling flora and fauna to migrate.

The provisions on the green and blue belt, as well as the contents of the procedure for designing regional green coherence schemes (SRCE) that implement it have been incorporated into the French Environment Code, in Articles L. 371-1 to L. 371-6 and R. 371-16 to R. 371-35, and completed by Decree no. 2012-1492 of 27 December 2012 and Decree no. 2014-45 of 20 January 2014.

Law no. 2016-1087 of 8 August 2016 on the Restoration of Biodiversity, Nature and Landscapes has improved the protection of biodiversity. The main provisions of the Law on biodiversity incorporate new guidelines that are set forth in the French Environment Code (the principle of non-regression of environment Law, the principle of prevention and the objective of “zero net loss” of biodiversity). It has created new institutions for preserving biodiversity, including the French Agency for Biodiversity (AFB). It has also introduced also introduced new rules on the compensation of environmental harm into the French Civil Code.

### Single environmental authorisation

Order no. 2017-80 of 26 January 2017 and Decree no. 2017-81 and 2017-82 of 26 January 2017 on environmental authorisation were published in the Journal officiel on 27 January 2017. Order no. 2017-80 of 26 January 2017 on environmental authorisations aims to perpetuate the attempts to consolidate the authorisation procedures implemented since March 2014. It definitively incorporates into the French Environmental Code a single environmental authorisation system. The comprehensive authorisation system allows for a coordinated appraisal of authorisation applications and the issuance in a single document, for a given project, of all the decisions required of the State (see section 1.5.6.2.1 “Regulations applicable to facilities classified for the protection of the environment (ICPEs)”). It is likely that the single authorisation procedure will apply to EDF projects.

### Whistleblowers

On 8 November 2016, the French Parliament definitively passed the bill on transparency, the fight against corruption and the modernisation of economic life, and the proposed constitutional bylaw on the authority of the Defender of Rights over the guidance and protection of whistleblowers.

Law no. 2016-1691 of 9 December 2016 includes rules to protect whistleblowers, who are defined as individuals who reveal or report, for no ends of their own and in good faith, a felony or a crime, a serious and blatant breach of an obligation provided for by the law or a regulation, or a serious threat or harm to the public interest. The provisions introduced by the law aim to protect whistleblowers from potential criminal or disciplinary proceedings, and provide for a set of rules on internal whistleblowing to be used in companies.

This framework is completed by the provisions of Decree no. 2017-564 of 19 April 2017, which provides for a common reporting procedure for all companies in the same group and guarantees the confidentiality of the procedure.

### Environmental class action

Law no. 2016-1547 of 18 November 2016 on the Modernisation of Justice in the twenty-first century created a general right to class action and includes an environmental class action, as provided for in Article L. 142-3-1 of the French Environment Code.

This right enables groups of individuals who are placed in a similar situation and who suffer harm to file a class action before the courts of judiciary in order to cause a breach to cease and obtain compensation for “*bodily injury and damage to property that result from harm caused to the environment*”. Environmental class actions may be brought via environmental protection associations that have been accredited in accordance with Article L. 141-1 of the French Environment Code, or by associations that have been accredited under the conditions defined by a decree issued following consultation of the Council of State (Decree no. 2017-888 of 6 May 2017), the purpose of which, according to their by-laws, includes the defence of victims of bodily injuries or the defence of the economic interests of their members.

### Social and environmental reporting obligation for businesses (RSE)

Articles L. 225-102-1 and R. 225-104 of the French Commercial Code provide for the disclosure in EDF’s management report of information on how the EDF group takes into account the social and environmental consequences of its activity as well as its societal commitments in relation to sustainable development (CSR reporting see chapter 3).

Under Directive no. 2014/95/EU of 22 October 2014, transposed into French law by the Order of 19 July 2017 and its Application Decree of 9 August 2017, it is expected that as of the 2018 fiscal year the aforementioned CSR reporting will be replaced by the publication in the management report of an extra-financial performance report, covering, where appropriate, all of the companies included in the scope of consolidation.

In addition, the Law of 27 March 2017 on the Duty of Care of Parent Companies and Ordering Companies provides for the establishment and implementation of a vigilance plan with reasonable due diligence measures to identify and prevent risks to human rights, fundamental freedoms, serious bodily injury or environmental damage as well as the health risks resulting from their activities, those of their subsidiaries, subcontractors and suppliers, whether they are located in France or abroad (see section 3.6.1).

### PCBs and PCTs

The Group is subject to regulations on polychlorobiphenyls (PCBs) and polychloroterphenyls (PCTs) in the various countries where it operates, particularly in Europe.

European Directive no. 96/59/EC of 16 September 1996 required that an inventory of equipment containing PCBs and PCTs at levels of more than 500 ppm be drawn up, together with a national plan for decontamination and the gradual disposal of these substances, which are mainly found in certain electricity transformers and condensers. Decontamination of equipment containing these substances was to be completed by 31 December 2010 at the latest. EDF had a special disposal plan and has achieved this objective.

Pursuant to Decree no. 2013-301 of 10 April 2013, EDF must clean up and decontaminate equipment with pollution levels of between 50 and 500 ppm, with the possibility, as the holder of more than 150 pieces of equipment, of benefiting from a “specific plan” that is approved by order of the Minister for the Environment. This plan must, as a minimum, provide for the decontamination or destruction of one-half of the equipment before 1 January 2020 and all equipment before 31 December 2025. The contents of the application for the specific plan were defined by an Order of 28 October 2013. RTE’s and Enedis’ specific decontamination plans were approved by two orders of 14 April, and 3 July 2014.

The Decree of 10 April 2013 also specified the new obligations in terms of identifying, labelling, declaring and using equipment with fluid containing PCBs with a volume of more than 5dm<sup>3</sup>. The rules for conforming to these obligations were stipulated in detail by two orders of 7 January, and 14 January 2014.

## Greenhouse gases (GHG)

### Allowance trading scheme

Some of the EDF group's activities fall within the scope of application of Directive no. 2003/87/EC of 13 October 2003, as amended by Directive no. 2009/29/EU of 23 April 2009, which established a European scheme for greenhouse gas (GHG) emission allowance trading, using the project mechanisms set forth in the Kyoto Protocol (the Emissions Trading System (ETS) Directive).

In France, this Directive was transposed and integrated into Articles L. 229-5, R. 229-5 *et seq.* of the French Environment Code. The Group has an annual obligation to surrender allowances equal to the level of CO<sub>2</sub> emitted by its facilities. In order to comply with this obligation, under certain conditions, the Group may use credits issued under projects eligible for the project mechanisms provided for under Articles 6 and 12 of the Kyoto Protocol (joint implementation and clean development mechanism).

Under the ETS Directive, the third period for the greenhouse gas (GHG) emission allowance trading scheme started on 1 January 2013. The provisions of the French Environment Code on this scheme were amended accordingly by Order no. 2012-827 of 28 June 2012 (ratified by Law no. 2013-619 of 16 July 2013) and by Decrees no. 2012-1343 of 3 December 2012 and no. 2014-220 of 25 February 2014. Since 1 January 2013, the rule for the electricity sector is the auctioning of quotas, in accordance with the rules defined by regulation (EU) no. 1031/2010/EC of 12 November 2010. Since that date, EDF has to purchase 100% of its allowances.

In order to support the price of GHG allowances on the European market, in Decision (EU) no. 2015/1814 of 6 October 2015, the European Parliament and the Council decided to create a market "stability reserve" that makes it possible to remove surplus allowances from the market. This mechanism will enter into force on 1 January 2019. In addition, a structural reform of the mechanism is currently under way at the European level for the period after 2020.

### GHG reporting

Pursuant to Articles L. 229-25 and R. 229-45 *et seq.* of the French Environment Code (which were respectively amended by Order no. 2015-1737 and Decree no. 2015-1738 of 24 December 2015), companies with over 500 employees must provide an annual report on their greenhouse gas emissions and a summary of the actions they plan to take to reduce such emissions. Article R. 229-46, as amended by the aforementioned Decree of 24 December 2015, specifies that the "groups defined in Article L. 2331-1 of the French Labour Code may draw up a consolidated report on greenhouse gas emissions for all their companies that have the same level 2 nomenclature code for French activities" and that employ more than 500 persons. The information disclosed is made public and must be updated every four years.

## Energy efficiency

### Energy Efficiency Directive

On 25 October 2012, the European Union adopted a Directive on energy efficiency (no. 2012/27/EU). The purpose of this Directive, for which the transposition deadline was 5 June 2014, is to enable the European Union to reach its energy savings target of 20% by 2020. With this aim in mind, the Directive enhances the provisions of European legislation on energy efficiency services (no. 2006/32/EC) and cogeneration (no. 2004/8/EC).

The Directive of 25 October 2012 contains several provisions that are liable to impact the activities of the EDF group, first and foremost of which is the obligation for Member States to reach an energy savings target each year that is equivalent to an aggregate annual reduction in energy sales of 1.5% over the period 2014-2020, which can take the form of an obligation for energy distributors and/or suppliers to reduce sales. The Directive also contains provisions on providing customers with information on their consumption, the promotion of energy services, taking into account energy efficiency in heat and cold production, and in the transmission and distribution of energy.

### Energy audits

Articles L. 233-1 *et seq.* of the French Energy Code (derived from Law no. 2013-619 of 16 July 2013, which transposed Article 8-4 of the Directive into French law),

require large undertakings to perform an energy audit on their business activities in France by 5 December 2015 at the latest, then every four years. The thresholds above which undertakings are concerned, the scope of the audit and the conditions to be met by the energy auditors are laid down in Articles R. 233-1 and R. 233-2 and D. 233-3 to D. 233-9 of the French Energy Code, completed by the Order of 24 November 2014 on the terms and conditions of application of the energy audit. Undertakings that use a certified energy management system that is ISO 50001 compliant may, under certain conditions, be exempted from this obligation. In accordance with regulations, EDF has sent an audit report to the administration.

### Energy savings certificates

At the national level, the energy savings certificates (CEE) mechanism, which is provided for in Articles L. 221-1 *et seq.* of the French Energy Code, places energy suppliers under the obligation to save energy. This mechanism defines a three-year objective that is shared between persons subject to an obligation to achieve energy savings (the "obligors") based on their sales volumes. At the end of the relevant period and under penalty of sanctions, the obligors must produce energy savings certificates that correspond to the amount of the energy savings they are under the obligation to achieve, which are obtained either by carrying out (directly or indirectly) energy savings actions or by purchasing credits from the other obligors or "eligible" economic players through a National Register of Certificates (the Emmy Register).

For the second period of the mechanism, between 1 January 2011 and 31 December 2013, the stated total savings target was 345TWhc (compared to 54TWhc for the first period). In order to ensure the continuity of the mechanism, and until the third period starts, the second period has been extended by one year, from 1 January to 31 December 2014, by a Decree of 20 December 2013.

The third period started on 1 January 2015 and ended on 31 December 2017. The energy savings target for the third period was set at 700TWhc (*i.e.* 233.4TWhc/year). Decree no. 2014-1668 of 29 December 2014 (now Articles R. 221-1 *et seq.* of the French Energy Code) and several implementing orders that were published in December 2014 determined the conditions and terms for the issuance of CEE for this new period.

The Law of 17 August 2015 on Energy Transition for Green Growth amended the CEE system for the third period, by adding an additional system to the obligation that was already provided for, concerning the energy savings made for the benefit of households that are in a precarious situation in terms of energy. Decree no. 2015-1825 of 30 December 2015 (now Articles R. 221-1 *et seq.* of the French Energy Code) and several ministerial orders of the same date have clarified the rules on meeting the energy savings objectives that are specifically for the benefit of households that are in a precarious situation in terms of energy. The level of this specific obligation for energy suppliers was set at 150TWhc for 2016-2017.

The fourth period started on 1 January 2018 and will end on 31 December 2020.

Decree no. 2017-690 of 2 May 2017 on energy savings certificates sets forth the implementation methods for energy savings certificates for the fourth period. The text sets the total level of obligations for the 2018-2020 periods at 1,200TWhc of classic shares and an extra 400TWhc to be achieved for households in a situation of energy poverty. It involves a doubling of obligations compared with the third period.

### Registered natural sites and classified sites (buried lines)

The EDF group is also subject to regulations on classified and registered sites that are stipulated in Articles L. 341-1 to L. 341-22 and R. 341-1 to R. 341-31 of the French Environment Code.

The aim of these regulations is to preserve natural heritage sites and sites for which the conservation, from a landscape, artistic, historical, scientific, folkloric or scenic standpoint, is in the public interest. "Classification", which is reserved for the most singular sites, provides extensive protection, whereas "registration", for which the framework of rules is less restrictive, is proposed for less sensitive sites.

Under the French Environment Code, new electricity lines on classified sites must be buried. Registration and classification can also have an impact on the day-to-day operation of facilities (if more than one site is visible at the same time; obligation to obtain the opinion of the State architect – *architecte des Bâtiments de France* –, etc.).

## Health, hygiene and safety regulations

### Asbestos

In France, the regulations require, among other things, the identification of materials containing asbestos in buildings and, if necessary, monitoring procedures or asbestos removal work. EDF is also subject to regulatory obligations to inform and protect workers who may be exposed to asbestos dust inhalation.

### Legionella

EDF operates cooling towers, particularly for its electricity generation activities, which are subject to the regulations on facilities classified for environmental protection (ICPE) and basic nuclear facilities (BNF) including Decision no. 2016-DC-2016 of 2016 December 2016 of the Nuclear Safety Authority which is dedicated to the prevention of risks resulting from the dispersal of pathogenic microorganisms (Legionella and amoeba). EDF must, among other obligations, carry out a methodical analysis of the risk of proliferation of legionella in its air cooling towers and implement a preventive maintenance plan for cleaning and disinfection. EDF is also required to carry out analyses once or twice a month, depending on the type of facility involved.

### Nanoparticle substances

As from 1 January 2013, Articles L. 523-1 *et seq.* and R. 523-12 *et seq.* of the French Environment Code made it mandatory to report the quantities and uses of nanoparticle substances or nanomaterials produced, distributed or imported in France. Information on these substances must be made available to the public and to inspection authorities. The information to be declared and the rules governing the declaration were specified in an Order of 6 August 2012. EDF is likely to be concerned by these provisions as it uses nanoparticle substances.

### Exposure to Electromagnetic Fields (EMF)

Pursuant to the Grenelle 2 Law, Decree no. 2011-1697 of 1 December 2011 requires managers of public electricity transmission networks to perform regular verifications of the EMF caused by electric lines that transmit electricity.

Law no. 2015-136 of 9 February 2015 on Simplicity, Transparency, Information and Consultation Regarding Wave Exposure introduced an obligation to provide information for persons who install equipment that emits electromagnetic fields on residential premises. In due course, this obligation may concern some entities of the EDF group.

### Chemical products

Regulation (EC) no. 1907/2006 on the Registration, Evaluation and Authorisation of Chemicals, known as "REACH", which came into force on 1 June 2007, applies to EDF as a user, but also as a manufacturer and importer of chemical products. EDF has complied with its obligation to register substances that it manufactures or imports in quantities of more than 1,000 tonnes per year with the European Chemicals Agency. In May 2013, EDF registered the monochloramine that is manufactured *in situ* at certain nuclear plants.

In addition, the Biocides Regulation (EU) no. 528/2012 of 22 May 2012 provides for a new procedure, with an extended scope of application, of authorisations for placing of biocidal products on the market that are generated *in situ*. In this new regulatory environment, EDF could be concerned as a manufacturer and user of monochloramine and sodium hypochlorite. Applications for authorisation will be prepared and filed within the framework of this Biocides Regulation.

### Health and the environment

Law no. 2013-316 of 16 April 2013 on the Independence of Expertise in the Area of Health, the Environment and the Protection of Whistleblowers confirmed the recognition of an alert procedure in the area of public health and the environment within businesses and laid down the rules for using this procedure. This Law also organises a system to protect whistleblowers and set up the National Commission for Ethics and Public Health and Environment Alerts (CNDASE). Several decrees have specified the rules for the implementation of this system (Decree no. 2014-324 of 11 March 2014, Decree no. 2014-1629 and Decree no. 2014-1628 of 26 December 2014).

## 1.5.6.2 Regulations applicable to EDF installations and group activities

### 1.5.6.2.1 Regulations applicable to facilities classified for the protection of the environment (ICPEs)

#### Facilities concerned and main obligations

Certain facilities operated in France by the EDF group, in particular fossil fuel-fired power plants, are subject to legislation on facilities that are classified for the protection of the environment (ICPEs), which is organised in the French Environment Code. These facilities are subject to a prior declaration, simplified authorisation (known as "registration") or to an authorisation depending on the magnitude of danger or adverse effects they may cause to the environment or public health.

The ICPE Regulation requires that the site be restored when a facility is taken out of service, depending on the expected future use of the land. Under Article L. 516-1 of the French Environment Code, lodging financial guarantees is also required for certain ICPEs that are subject to authorisation (including Seveso facilities) and registration. The basis and amount of the financial guarantees vary depending on the facility. These financial guarantees are designed to provide collateral for the financing of the measures that must be adopted in the event of an accident before or after closure, as well as the surveillance, safety works and restoration operations after closure. These guarantees do not cover compensation owed by the operator to third parties who may suffer loss or harm in connection with the activity carried out.

The list of the ICPEs concerned by the obligation to lodge these guarantees and the rules for calculating and lodging the financial guarantees are stipulated by the Order of 31 May 2012 (that was amended by an Order of 12 February 2015) and the Order of 31 July 2012. An Order of 5 February 2014 provides the framework for lodging guarantees *via* the intermediary of a private guarantee fund. The EDF group operates facilities that are concerned by these new requirements. The Decree no. 2015-1250 of 7 October 2015 increased the threshold above which guarantees are required from €75,000 to €100,000 (Article R. 516-1 of the French Environment Code). It also provides for additional financial guarantees to be lodged with the Caisse des dépôts, as well as the amendment of the rules governing how guarantees are triggered, in particular by allowing them to be implemented as soon as court-ordered liquidation proceedings are initiated.

Under the conditions laid down in Order no. 2017-80 and by Decree no. 2017-81 and 2017-82 of 26 January 2017, the reform of the environmental authorisation entered into force on 1 March 2017. As of this date, for projects subject to authorisation under ICPE or facilities, structures, works and activities (IOTA) subject to water legislation, the two procedures have been merged into the environmental authorisation. This new scheme incorporates, within book I of the French Environment Code, a new chapter VIII entitled "Administrative Procedures" comprising a separate section entitled "Environmental Authorisation" and is composed of Articles L. 181-1 to L. 181-31 and R. 181-1 to R. 181-56

#### Seveso facilities

Since 1 June 2015, "Seveso" ICPEs have been governed by the provisions of the Seveso 3 Directive (2012/18 of 4 July 2012), which replaced the Seveso 2 Directive (96/82/EC). The entry into force of the Seveso 3 Directive resulted in the use of dangerous products (under the CLP Regulation of 16 December 2008) that were not covered by the Seveso 2 Directive being incorporated into the scope of the Seveso regulations.

The Seveso 3 Directive also contains stricter provisions concerning access by the public to information related to safety, public participation in the decision-making process and access to justice, as well as improvements in the way information is collected, managed, made available and shared. The Seveso 3 Directive also introduced stricter standards for facility inspections. Law no. 2013-619 of 16 July 2013 transposed the legislative portion of the Directive into French law by inserting into the Environment Code (Articles L. 515-15 *et seq.*) a section that is specific to Seveso facilities. These provisions, completed by Decree no. 2014-285 and no. 2014-284 of 3 March 2014 and by an order of 26 May 2014, entered into force on 1 June 2015.

Decree no. 2015-1250 of 7 October 2015 amended the rules governing how the financial guarantees that are applicable to "Seveso" ICPEs are lodged, in particular by allowing operators of multiple facilities to pool these guarantees. A forthcoming order will specify the rules for lodging these guarantees, as well as the methodology for calculating pooled guarantees.

### Facilities that are subject to the "IED" Directive

Directive no. 2010/75/EU of 24 November 2010 on industrial emissions (known as the "IED" Directive) revised and recast several existing Directives into a single piece of legislation, including the IPPC, LCP, Waste Incineration and VOC Directives, among others.

Chapter III of this Directive affects EDF as it regulates the combustion plants that are found in fossil fuel-fired plants, in particular. The applicable requirement levels depend on the rated thermal input of the combustion plants concerned and on the fuel used. This Directive, which was partially transposed into French law via Order no. 2012-7 of 5 January 2012 (and incorporated into the French Environment Code in Articles L. 515-28 to L. 515-31), has the effect of broadening the application of the IPPC Directive to include new activities, enhancing the scope of the best available techniques (BAT) on which the fixed emission limit values will be based, causing a periodic reconsideration of operating conditions in order to take into account changes in BAT and, in certain cases, requiring a "baseline report" on the state of soil.

Decree no. 2013-5 of 2 January 2013 partially transposed the provisions of the IED Directive on the state of soil. Article 1 of the Decree, which is now Article R. 512-4 of the French Environment Code, states that interim analysis of the soil will now be required in the event of a substantive change of the facility and, if pollution occurs, the operator must propose measures. Another Decree no. 2013-374 of 2 May 2013 completed this transposition by introducing provisions into Articles R. 515-58 to R. 515-84 of the French Environment Code that are specific to facilities that are covered by the IED Directive. These provisions apply to fossil fuel-fired plants, under the conditions laid down, in particular, by the Order of 26 August 2013 on combustion plants with power of 20MW or more. Finally, Decree no. 2017-849 of 9 May 2017 amending the regulatory provisions of the French Environment Code on facilities mentioned in Annex I of Directive 2010/75/EU of the European Parliament and Council of 24 November 2010 on industrial emissions has streamlined administrative procedures (including the content of the review file) and made the implementation of the IED Directive more operational.

#### 1.5.6.2.2 Specific regulations applicable to basic nuclear facilities

In France, EDF is subject, in particular, to Law no. 2006-686 of 13 June 2006 on Transparency and Safety in the Nuclear Field (the "TSN Law"), which was integrated into the French Environment Code, to the provisions for its implementation and, in particular, Decree no. 2007-1557 of 2 November 2007, which was most recently amended by Decree no. 2016-846 of 28 June 2016 on the modification, final shutdown and decommissioning of basic nuclear facilities, and on sub-contracting, and to the Order of 7 February 2012, as amended, which laid down the general rules for basic nuclear facilities (the "BNF Order"). These texts specify the legal regime applicable to basic nuclear facilities (BNF). The Law was amended by Order no. 2016-128 of 10 February 2016 that contains various provisions on nuclear matters and which, in particular, transposed into French law Council Directive no. 2014/87/Euratom of 8 July 2014 amending Directives no. 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations and Directive no. 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. It will also concern the NSA's powers of sanction.

The TSN Law created the Nuclear Safety Authority (NSA), an independent government agency, with the Minister for Nuclear Safety retaining authority to issue the main authorisations and draft general regulations.

The construction of a BNF is authorised, following a public debate and a public enquiry, by a decree that is issued after consulting the NSA and on the basis of a report by the Minister for Nuclear Safety. The decree that authorises the construction must state the identity of the operator, the nature of the facility, its maximum capacity and its perimeter. The application for authorisation to construct a BNF must include, in particular, a preliminary safety report (PSR), a study of the impact of the facility on the environment and health, a decommissioning plan and a risk management study (RMS). The decree that authorises the construction of the BNF sets a time limit to commission the facility and the frequency of safety inspections if they are not scheduled every 10 years and, moreover, lays down basic requirements

to protect public safety, health and sanitation, as well as nature and the environment. The authorisation to commission a BNF is issued by the NSA after a public consultation. In this respect, the operator provides the updated safety rule set and an internal emergency plan (IEP) that specifies the organisational measures and requisite resources that must be implemented by the operator in the event of an emergency. A periodic safety inspection assesses the compliance of the facility with the applicable regulations and updates the assessment of the risks that the facility poses to the interests mentioned above.

Pursuant to the decree that authorises the facility to be set up, the conditions applicable to pumping water, discharging liquid and gaseous wastes – whether radioactive or not – as well as the related limits placed on these activities are set by an NSA decision; decisions that set the limits for discharges by facilities into the environment require a ministerial approval.

The NSA also issues regulations pursuant to the decree that authorises the facility to be set up, in order to prevent or limit the effects of any accidents or incidents, to define measures to protect residents on an individual and collective basis, limit noise pollution and manage the waste generated by and stored at the facilities.

### Rules on nuclear safety and the inspection of basic nuclear facilities

The nuclear facilities operated by EDF are subject to the general regulations on basic nuclear facilities derived from the French Environment Code. Priority must be given to the protection of the interests mentioned by the law (public safety, health and sanitation, nature and the environment) via the prevention of accidents and the limitation of their consequences in respect of nuclear safety, as specified by the BNF Order. In this respect, nuclear safety is defined as a set of technical provisions and organisational measures concerning the design, the construction, the operation, the shutdown and the decommissioning of BNF, as well as the transportation of radioactive substances, which are adopted with a view to preventing accidents or limiting the effects thereof.

The NSA also has the authority to issue regulatory decisions of a technical nature to complete the terms and conditions for application of the decrees and orders issued in the field of nuclear safety and radiation protection, with the exception of those related to occupational healthcare. These decisions are subject to the approval of the relevant ministers. Since the aforementioned BNF Order was published, out of the thirty or so decisions that are being prepared, more than twenty decisions have already been published and approved; others are being prepared.

The provisions of the French Environment Code concerning BNF have also introduced mechanisms for informing the authorities. In this respect, all accidents and incidents that occur as a result of the operation of a BNF and that could potentially cause significant harm to the health of the population or to the environment, must be declared without delay by the operator to the NSA and to the administrative authority. Moreover, the methods used to inform the public have been improved, with, for example, the creation of a High Committee for Transparency and Information on Nuclear Safety (HCTINS) and the possibility now given to any member of the public to ask the operator directly for information on the risks involved in exposure to ionising radiation and on the safety and radiation protection measures adopted to prevent or reduce these risks or exposure.

Moreover, criminal law penalties have been established to punish BNF operators who do not comply with their legal and regulatory obligations, such as a three-year prison sentence and a €150,000 fine if a BNF is operated without authorisation, or a one-year prison sentence and a €30,000 fine if radioactive substances are transported without authorisation or approval.

It should also be noted that in July 2014, the Council of Ministers of the European Union adopted Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear facilities (see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities").

The legal framework described above for nuclear safety and inspection was completed by certain provisions of the Law of 17 August 2015 on Energy Transition for Green Growth and Order no. 2016-128 of 10 February 2016 that contains various provisions on nuclear matters.

In particular, the role of local information commissions (CLI) was reinforced: they can review all matters that fall within the scope of their remit of their own motion, they must be consulted if the specific intervention plan is amended and can inspect BNF at the request of the chair of the CLI in case of an event greater than or equal to 1 on the INES scale, etc. In addition, the ASN's administrative sanctioning power has been strengthened, notably with the creation, within the ASN, of a Sanctions

Committee composed of State Councillors and advisers to the French Court of Cassation, which will be able to impose administrative fines of up to €10 million.

### Decommissioning of nuclear facilities

The decommissioning of a BNF is prescribed by a Prime Minister's decree that is issued after a public enquiry and an opinion by the NSA. This decree specifies the stages of the decommissioning, how long it will last and the intended final status. Once the decommissioning has been completed, the operator must send the NSA a declassification request, which, following an approval decision by the NSA, makes it possible to end the BNF status of the facility. The Law of 17 August 2015 on Energy Transition for Green Growth, in particular its provision that is now Article L. 593-25 of the French Environment Code, gave legislative value to the principle implemented since the early 2000s by EDF according to which decommissioning must take place within a timeframe that is "as short as possible" after final shutdown, under conditions that are economically acceptable and in compliance with the principles set forth in Article L. 1333-2 of the French Public Health Code and section II of Article L. 110-1 of the French Environment Code. Moreover, the aforementioned Law introduced an additional administrative stage which consists of the operator having a duty, at least two years before the scheduled shutdown date, to make a declaration that its facility will be shut down.

Decree no. 2016-846 of 28 June 2016 on the modification, final shutdown and decommissioning of basic nuclear facilities, and sub-contracting, amended the Decree of 2 November 2007, known as the "Procedures Decree", by implementing the provisions derived from the Law on Energy Transition for Green Growth, in particular the content of the shutdown declaration and decommissioning application files.

### Radioactive waste

EDF's business is subject to French regulations on the sustainable management of radioactive waste. EDF bears liability for the radioactive waste resulting from its operations. In France, radioactive waste is managed by the National Agency for Radioactive Waste Management (ANDRA), a public institution of industrial and commercial nature created by Law no. 91-1381 of 30 December 1991 on research into the management of radioactive waste.

The method used to manage radioactive waste in France depends on the level of radioactivity and on the radioactivity lifespan of the waste (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues"). The Law of 28 June 2006, which is now Articles L. 542-1 *et seq.* of the French Environment Code, defines the organisation and the financing of radioactive waste management, along with the terms for a framework to evaluate and cover the costs of decommissioning BNF, as well as managing spent fuels and radioactive waste, is incorporated into Articles L. 594-1 *et seq.* of the French Environment Code. In particular, the assets allocated to cover provisions cannot be used for any other purpose by the operator, and separate accounting procedures for these assets must be used. The implementation of these provisions is controlled by the administrative authority, *i.e.* the Minister for Energy, which is itself overseen by a National Assessment Commission for the financing of decommissioning costs for BNFs and the management of spent fuels and radioactive waste.

Decree no. 2007-243 of 23 February 2007 on securing the financing of costs in the nuclear industry sets forth the terms and conditions for implementing the Law of June 2006.

A report is filed with the administrative authorities and the NSA every three years and a copy sent to the Statutory Auditors. This report includes, in particular, a valuation of the costs, the methods used for the calculation of provisions, and the composition of the assets. The administrative authorities may require any additional supporting documents, have an outside organisation conduct a study, or require an expert valuation of the assets at the operator's expense.

Directive no. 2011/70/Euratom, which was transposed by Order no. 2016-128 of 10 February 2016 containing various provisions on nuclear matters, forms a common set of fundamental rules for the management of spent fuel and radioactive waste for a certain number of European Union Member States, and clarifies several concepts. This text presents, in particular, deep geological disposal as the safest and most sustainable option to manage Long-Lived, High-Level Waste and considers the possibility of creating disposal facilities shared between several Member States, on a voluntary basis.

### The financing of decommissioning and radioactive waste management activities

The Law of 28 June 2006, which is now Articles L. 542-1 *et seq.* of the French Environment Code, defines the organisation and the financing of radioactive waste management, along with the terms for a framework to evaluate and cover the costs of decommissioning BNF, as well as managing spent fuels and radioactive waste, such terms being incorporated into Articles L. 594-1 *et seq.* In particular, the assets allocated to cover provisions cannot be used for any other purpose by the operator, and separate accounting procedures for these assets must be used. The implementation of these provisions is controlled by the administrative authority, *i.e.* the Minister for Energy, which is itself overseen by a National Assessment Commission for the financing of decommissioning costs for BNFs and the management of spent fuels and radioactive waste.

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### Regulations on radiation protection

In France, nuclear activities that present a risk of exposing persons to ionising radiation are regulated by two separate sets of rules, depending on the category of persons to be protected. Regulations on the basic protection of the population against such radiation, which are governed by the French Public Health Code, are primarily based on all nuclear activities being subject to a declaration, registration or authorisation. Authorisations granted to establish a Basic Nuclear Facility serve as the authorisation required under the French Public Health Code. Article R. 1333-8 of the French Public Health Code sets the maximum exposure level of the general public at 1 mSv per year.

French regulations on the protection of workers against the dangers of ionising radiation, which are governed by the French Labour Code, lay down various obligations for employers of workers who are likely to be exposed and, in particular, set a limit on exposure of workers to ionising radiation at 20 mSv over a period of twelve consecutive months.

The French Health Code contains the provisions applicable to controlling high-level sealed radioactive sources and orphan sources.

Directive no. 2013/59/Euratom of 5 December 2013, which laid down "basic safety standards", repealed Directive no. 96/29 of 13 May 1996. This Directive must be transposed before 6 February 2018. The aforementioned Order no. 2016-128 of 10 February 2016 brought about this transposition. The entry into force of these provisions is subject to the publication of the decrees reforming the French Public Health Code and the French Labour Code.

### Civil liability of nuclear facility operators

Several international conventions govern the civil liability of nuclear facility operators, in particular the Paris Convention of 29 July 1960 on Third-Party Liability in the Field of Nuclear Energy and the Brussels Convention of 31 January 1963, which supplements the Paris Convention. These two conventions are applicable in the signatory countries that have ratified them, including France and the United Kingdom (see also section 2.5.6 "Specific insurance for nuclear facility operation").

The Paris Convention established a special liability derogation system, with specific characteristics. Liability for nuclear damage to persons and property is strict (even in the absence of a fault), limited in terms of the amount and duration, and is exclusively focused on the operator of the nuclear facility.

In France, the operator's liability was limited to €91.5 million per nuclear accident at a facility and to €22.9 million per nuclear accident during transport. These amounts were respectively increased to €700 million and €70 million on 18 February 2016 when Article 130 of the Law of 17 August 2015 on Energy Transition for Green Growth mentioned below entered into force.

Over and above the maximum amount for which the operator is liable, the State in which the incident occurred is responsible for compensating victims up to a maximum of €201.4 million (provided that said State is a Contracting State of the Brussels Convention); over and above this amount, Member States that have ratified



the Brussels Convention (including France) contribute collectively to compensation up to a limit of €345.3 million.

The Convention also provides that the operator has an obligation to take out insurance or lodge a financial guarantee for the liability amounts established in order to guarantee the availability of funds. The Minister for the Economy monitors French operators' compliance with this obligation. EDF complies with the current coverage requirements (see section 2.5 "Insurance").

Protocols to amend the Paris and Brussels Conventions were signed on 12 February 2004 but have still not entered into force. They require significantly higher amounts of compensation than the original conventions, in order to cover a greater number of victims and types of damage that are eligible for indemnification. The operator's liability will thus be at least €700 million per nuclear incident in a facility and €70 million per nuclear incident during transport. The State, in which the nuclear facility of the operator that is liable for causing the damage is located, is liable for amounts above the €700 million for which the operator is liable, up to €1.2 billion (provided that said State is a Contracting State of the Brussels Convention). Over and above this amount, the Contracting States of the Brussels Convention are liable up to a maximum amount of €1.5 billion. In addition, for personal injury only, the time limit to claim compensation has changed from 10 years to 30 years from the date of the incident. Another important change is the introduction of a detailed definition of "nuclear damage", which includes economic losses, the cost of protective measures, the cost of measures to rehabilitate damaged environments, and certain other losses resulting from damage to the environment. These new provisions will, however, only be applicable as of the date when the protocol that amends the Paris Convention comes into force, i.e. when at least two-thirds of the sixteen Contracting States have ratified it. France has adopted a law permitting ratification of both protocols (Law no. 2006-786 of 5 July 2006), but has not yet filed the corresponding ratification instruments.

Moreover, on 30 April 2014, France filed its ratification instrument for the joint protocol relating to the application of the Vienna Convention and the Paris Convention, which thus entered into force for France on 30 July 2014. This joint protocol establishes a link between the Paris Convention, which covers countries in Western Europe, and the Vienna Convention of 21 May 1963 on Civil Liability for Nuclear Damage, which covers (among others) countries in Eastern Europe. It enables the parties to one of these two conventions (Paris or Vienna) who adhere to the protocol to benefit from the coverage provided by the other convention.

### Protection of facilities that house nuclear materials

The purpose of the regulations on the protection and control of nuclear material governed by Article L. 1333-1 of the French Defence Code is to detect and prevent the loss, theft or misappropriation of nuclear material that is stored at facilities or being transported, or any attempts to alter, damage or disperse such material.

These regulations were completely recast by Decree no. 2009-1120 of 17 September 2009 on the protection and control of nuclear material, its facilities and its transportation, as set forth in the French Defence Code. The main purpose of this Decree was to extend the protection of nuclear material to the facilities where it is stored. Several orders published in 2011 detail operators' obligations.

For nuclear power plants, the Order of 10 June 2011 on the physical protection of facilities that house nuclear materials, which can only be held with an authorisation, is based on in-depth defence of targets, namely the nuclear material, equipment or functions, which, in the event of default or damage by a malicious act, are liable to have radiological consequences. Accordingly, the operator must set up several lines of protection in the form of six zones (e.g. access control areas, a vital area, an internal area, etc.). Following an amendment by an Order of 15 September 2015, the Order of 10 June 2011 now makes it possible to set up safety devices in dangerous areas if the assessment of the contents of the safety study provided for in Article R. 1333-4 of the French Defence Code reveal that the means implemented to meet the safety objectives appear to be insufficient.

The Order of 9 June 2011 organises the system for physically monitoring nuclear material, as well as the accounting conditions for nuclear material and operator obligations. Accordingly, operators must ensure that the physical monitoring and accounting are protected against the malicious actions identified when the authorisation is issued.

Law no. 2015-588 of 2 June 2015 on the Improvement of the Protection of Civilian Facilities That House Nuclear Materials, which is now incorporated into the French Defence Code, created a specific criminal misdemeanour of trespassing in these facilities. For the implementation of these rules, Decree no. 2015-1255 of 8 October 2015 created restricted access nuclear areas (ZNAR) that must be delineated within each facility. Trespassing in a ZNAR constitutes a criminal misdemeanour that carries a one-year prison sentence and a €15,000 fine. These penalties are increased in the event of aggravating circumstances (to a three-year prison sentence and a €45,000 fine, in particular when the offence is committed in a group, and to a seven-year prison sentence and a €100,000 fine, in particular if the offence is committed with the use or threat of a weapon). All of the orders that define the ZNAR for each nuclear power plant have been published.

### 1.5.6.2.3 Regulations applicable to fossil fuel-fired energy generation

The EDF group's fossil fuel-fired energy generation business is subject in France to the regulations that are applicable to ICPEs (see section 1.5.6.2.1 "Regulations applicable to facilities classified for the protection of the environment (ICPEs)"). EDF's fossil fuel-fired facilities must also comply with specific regulations on air quality, adopted mainly as a result of European Directive no. 2001/81/EC of 23 October 2001 on National Emission Ceilings for Certain Atmospheric Pollutants (the NEC Directive), and Directive no. 2001/80/EC of 23 October 2001 on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants (the LCP Directive), which, since 1 January 2016, has been repealed and replaced by Directive no. 2010/75/EU of 24 November 2010 on Industrial Emissions (the IED Directive). These Directives have been transposed into French law by several orders, in particular the Order of 30 July 2003 on boilers that are present in existing combustion facilities with a power rating of more than 20MWth, which, since 1 January 2016, has been repealed and replaced by the Order of 26 August 2013 on combustion facilities with a power rating of 20MW or more, which are subject to authorisation under section 2910 and section 2931.

Exemptions from obligations concerning emissions into the air were possible until 31 December 2015. As of that time, the ceilings and the exemptions originating from the IED Directive mentioned above will apply, with, in particular, specific issues concerning production facilities in the overseas departments and emergency systems, for which the pollution levels require negotiating adapted provisions. Two orders of 26 August 2013, which entered into force on 1 January 2014, bring together all the provisions that are applicable to combustion facilities and specify the conditions under which these facilities will be allowed to exceed emissions limits.

Fossil fuel-fired energy production is also subject to the provisions of the Seveso 3 Directive and to the obligation to lodge financial guarantees (see section 1.5.6.2.1 "Regulations applicable to facilities classified for the protection of the environment (ICPEs)").

Directive no. 2015/2193/EU of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants must be transposed into French law by 19 December 2017. It lays down rules designed to limit the air pollution caused by sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and dust from medium combustion plants, and to reduce the airborne emissions and their potential risks for human and environmental health. The facilities concerned are combustion plants with a rated thermal input of 1MW or more and less than 50MW, regardless of the type of fuel they use. Draft decrees and orders amending the regulations applicable to combustion facilities under the classified installations regulation for the protection of the environment for the purpose of transposing Directive 2015/2015/EU are in the process of being adopted.

### 1.5.6.2.4 Regulations applicable to hydropower facilities

In France, hydropower facilities are subject to the provisions contained in Articles L. 511-1 et seq. of the French Energy Code. They require concession agreements granted by the State (for facilities generating over 4.5MW), or an authorisation from the Prefecture (for facilities under 4.5MW), (see section 1.5.1.4.1.4 "Hydropower generation issues") concerning hydropower concessions.

EDF's hydropower generation business is subject to the substantive provisions of water regulations. Such regulations cover in particular control over variations in water levels and flow rates, the safety of areas in the vicinity and downstream of hydropower facilities and, in general, maintaining balanced management of water resources (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety").

### Competitive tendering for hydropower concession contracts

Until 1 April 2016, the competitive tendering procedure for hydropower concession contracts was still governed by Decree no. 94-894 of 13 October 1994, which has now been incorporated into Book V of the regulatory section of the French Energy Code (cf. Decree no. 2015-1823 of 30 December 2015 on the organisation of the regulatory section of the French Energy Code). This Decree, as amended by Decree no. 2008-1009 of 26 September 2008, places concessions within the legal framework for public service delegation contracts defined by Law no. 93-122 of 29 January 1993, known as the "Sapin Law", it being specified that the former preferential right of the outgoing operator was eliminated by the Water Act (Law no. 2006-1772 of 30 December 2006) as it was incompatible with European law.

For all procedures initiated as from 1 April 2016, the award of hydropower concession contracts is now governed by Order no. 2016-65 of 29 January 2016 and by its Application Decree no. 2016-86 of 1 February 2016 on concession contracts. This legislation has repealed the aforementioned provisions of the "Sapin Law", in order to modernise them and align them with European law (Directive no. 2014/23/EU of 26 February 2014 on the award of concession contracts).

The Law of 17 August 2015 on Energy Transition for Green Growth has completed the legal framework for hydropower concession contracts by giving the State the possibility:

- of combining concession contracts that form a "series of facilities that are hydraulically linked", by setting a new deadline for all the concession contracts concerned (Articles L. 521-16-1 and L. 521-16-2 of the French Energy Code);
- of creating semi-public hydroelectric companies (SEM) made up of private-sector operators and a public Division (State, local authorities, etc.), each of which holds at least 34% of the shares (Articles L. 521-18 *et seq.* of the French Energy Code);
- of extending certain concession contracts in return for investments by operators where these investments are necessary in order to reach national energy policy targets (Article L. 521-16-3 of the French Energy Code).

The purpose of the Decree of 27 April 2016 on hydropower concession contracts is to implement the provisions of the aforementioned Law of 17 August 2015 and to modernise the regulatory framework for hydropower concession contracts (in particular by clarifying certain aspects of the procedure for awarding hydropower concession contracts by approving a new model for general terms and conditions).

A collection of texts complete this framework and concern the execution of the hydropower energy concession agreement: one can quote, in particular, Order no. 2016-518 of 28 April 2016 making various modifications to Book V of the French Energy Code, which aims to strengthen the administrative control of hydroelectric installations and to clarify certain rules with regards to the renewal of their operating rights, the Decree of 27 May 2016 relating to the purchase obligation and additional remuneration, which may concern certain hydroelectric facilities, the Orders of 3 August 2016 relating to the environmental assessment of public information and participation projects and procedures, or the Law of 7 October 2016 for a digital republic.

### Annual concession fee

In accordance with Article L. 523-2 of the French Energy Code, when a hydropower concession contract is renewed or extended under the conditions provided for by Articles L. 521-16-2 or L. 521-16-3 of the French Energy Code, an annual concession fee that is proportional to the revenues generated by the concession contract is levied, which is paid in part to the French State and in part to the French départements and municipalities through which the waterways used flow. A limit is set by the contracting authority on a case-by-case basis for each new or renewed concession contract. Article 69 of Law no. 2015-1785 of 29 December 2015 (the Budget Act for 2016) expressly confirmed that this type of concession fee excludes the application of the concession fees provided for by Article L. 523-1 of said Code, which apply to concession contracts that were renewed before 2006.

### Safety and security of facilities

Articles R. 214-112 *et seq.* of the French Environment Code contains provisions that are applicable to the safety and security of hydropower facilities that are authorised and operated under concession contracts. Dams are divided into three classes (A, B and C) according to their characteristics, in particular their height and the volume of the floodwaters. According to this classification and the legal rules applicable to the facility, the regulations require the operator or concession contract holder to fulfil a certain number of obligations in order to guarantee the safety and security thereof (in particular by carrying out and updating hazard studies – see section 1.5.1.4.1.2 "Hydropower safety"). The aforementioned Decree of 27 April 2016 on hydropower energy concession contracts contains provisions that are designed to unify the regulations, regardless of the legal rules that are applicable to the facility.

### 1.5.6.2.5 Regulations applicable to renewable energy generation

The "Climate Package" (known as the "2020 Energy-Climate Package") is the source of a set of measures aimed at ensuring that, by 2020, the EU will achieve the objectives of a 20% reduction of greenhouse gas (GHG) emissions, a 20% improvement in energy efficiency and a 20% portion of renewable energy (REN) in energy consumption. The "2020 Energy-Climate Package", which was adopted on 24 October 2014, set new targets for 2030: a 40% reduction in GHG emissions compared to 1990, 27% of renewable energies in the energy mix and a 27% improvement in energy savings.

One of the five instruments that make up the "2020 Energy-Climate Package" is Directive no. 2009/28/EC of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources, known as the "REN" Directive. It allocates the effort to reach the target of 20% of renewable energies in final EU energy consumption by 2020 among Member States, taking into account, among other aspects, the national energy mix, the potential of each State and its GDP, and requires Member States to adopt national renewable energy action plans.

According to Article 4 of the aforementioned REN Directive, France adopted its National Action Plan in favour of renewable energies (2009-2020). This plan, in accordance with the REN Directive, sets a national target of a 23% share of energy from renewable sources in the gross final consumption of energy by 2020. The Law of 17 August 2015 on Energy Transition for Green Growth also provides for a target of 32% of renewable energies in energy consumption by 2030. Moreover, the same Law provides that the National Plan will be replaced by the part of the PPE that concerns the development of renewable energies and energy recovery.

In order to achieve the objectives of the REN Directive, the Grenelle 2 Law created new land planning instruments with a view to enabling balanced development between the various renewable energy sectors. These include:

- regional climate, air and energy schemes (SRCAEs), for which the legal framework is laid down in Articles L. 222-1 to L. 222-3 and R. 222-1 to R. 222-7 of the French Environment Code. As of 1 May 2014, all regions had adopted their SRCAE;
- regional schemes for connection to renewable energy networks (S3RERs), of which Articles D. 321-10 to D. 321-21 and D. 342-22 to D. 314-25 of the French Energy Code specify the content, approval rules, host capacity management and financial conditions for the connection of electricity producers.

Under Article 15 of the REN Directive, an Order of 14 September 2011 (ratified by Law no. 2013-619 of 16 July 2013) amended the legal rules on the guarantees of origin of the electricity produced using renewable sources or by cogeneration, laid down in Articles L. 314-14 *et seq.* of the French Energy Code. The terms and conditions to implement this new scheme and the rules for appointing the organisation in charge of managing guarantees of origin (issuing, transfer, cancellation) are stipulated in Articles R. 314-24 to R. 314-41 of the French Energy Code. As producer and mandatory purchaser of electricity produced using renewable energy sources, the EDF group is concerned by these provisions. The Law of 17 August 2015 on Energy Transition for Green Growth has empowered the Government to take Order no. 2016-1059 of 3 August 2016 relating to the electricity generation from renewable energies, which has amended the provisions applicable to facilities generating electricity from renewable sources in order to ensure their better integration into the electricity market and to provide the technical provisions necessary for better integration into the electricity system of connected electricity generation facilities to a public distribution network, particularly facilities generating electricity from renewable sources.

The Grenelle 2 Law also contains exceptional provisions designed to encourage the development of sea-based energies, which were enhanced by the Law of 17 August 2015 on Energy Transition for Green Growth.

In addition, Article 18 of Law no. 2014-1545 of 20 December 2014 on the simplification of corporate life empowers the Government to set up a dedicated, comprehensive authorisation system for sea-based facilities that produce renewable energy and that are located in the maritime public domain, and for the connection structures for these facilities. Moreover, Decree no. 2016-9 of 8 January 2016 simplified the legal procedures that are applicable to sea-based renewable energy projects that win competitive tendering procedures.

Furthermore, the Law of 17 August 2015 on Energy Transition for Green Growth provides an exceptional appeal timeframe for the benefit of "facilities that produce energy from renewable sources" of four months in which to contest an authorisation, as from, respectively, either the publication of the authorisation, or its notification.

#### **1.5.6.2.6 Regulations applicable to wind power generation**

Pursuant to Articles R. 421-1 and R. 421-2 of the French Urban Planning Code, a building permit must be obtained for land-based wind farms with a height equal to or greater than 12 metres. However, the environmental authorisation granted for the completion of an onshore wind farm project is exempted from the requirement for a building permit, in accordance with Article R. 425-29-2 of the French Urban Planning Code. For its part, the construction of wind farms on the public maritime domain is exempted from the requirement for a building permit, in accordance with Article R. 421-8-1 of the French Urban Planning Code.

In addition, the Grenelle 2 Law provides that onshore wind farms are now subject to the nomenclature applicable to ICPEs with the legal system of authorisation or declaration (see section 1.5.6.2.1 "Regulations applicable to facilities classified for the protection of the environment (ICPEs)") under section 2980 "Terrestrial facilities for the generation of electricity using mechanical wind energy with one or more wind-power generators". In connection with the application for a building permit, an impact study must be performed for wind farms that are subject to authorisation and submitted with the building permit file.

The Law of 17 August 2015 on Energy Transition for Green Growth amended the rules on the distance required between wind farms and housing: the minimum distance of 500 metres is maintained, but may be increased in light of the impact study, which is part of the authorisation application. It also inserted provisions into Article L. 146-4.I of the French Urban Planning Code that are designed to facilitate the location of land-based wind farms in municipalities concerned by the "Coastline" Law. A decree is also expected to clarify the rules on wind farm location with regard to military facilities and sectors, weather monitoring equipment and air navigation equipment.

The operator of a wind farm, or in the event of default, the parent company, is responsible for decommissioning the farm and site restoration, as soon as operation is terminated for any reason (Articles L. 553-3 and R. 553-1 of the French Environment Code). For this purpose, the operator is required to lodge financial guarantees as of the start-up of generation and for subsequent accounting periods.

The authorisations relating to the generation and transmission works necessary for the development of offshore wind farm projects are subject to a specific litigation framework, laid down by Decree No. 2016-9 of 8 January 2016.

#### **1.5.6.2.7 Regulations applicable to public procurement**

Directive no. 2014/24/EU on Public Procurement and Directive no. 2014/25/EU on Procurement by Entities Operating in the Water, Energy, Transport and Postal Services Sectors, to which EDF is subject as a purchaser, have been transposed into French domestic law by:

- order no. 2015-899 of 23 July 2015 on public procurement contracts, which unified the various competitive tendering procedures that previously existed in the French Public Procurement Code and Order no. 2005-649 of 6 June 2005;
- decree no. 2016-260 of 25 March 2016 that implemented the Order of 23 July 2015.

These texts entered into force on 1 April 2016.

### **1.5.7 REGULATIONS ON WHOLESALE ENERGY MARKETS**

Inspired by the rules contained in Directive no. 2003/6/EC on Market Abuse applicable to financial markets (see section 4.1 "Corporate governance code"), regulation (EU) no. 1227/2011, known as the "REMIT" regulation, on wholesale energy market integrity and transparency came into force on 28 December 2011. This regulation is aimed at preventing market abuse and manipulation on wholesale energy markets and strengthening the confidence of market participants and consumers.

Strengthening wholesale energy market integrity and transparency must foster open and fair competition on these markets, in particular so that prices set on these markets reflect a fair and competitive interplay between supply and demand. The regulation prohibits insider trading and market manipulation, and establishes an obligation to publish inside information as defined in the REMIT.

The European Agency for the Cooperation of Energy Regulators (ACER) is primarily responsible for monitoring wholesale trades in energy products, in order to detect and prevent transactions based on inside information and market manipulations.

ACER also collects the data needed to assess and monitor markets. The regulation provides that market participants, or a person authorised to do so on their behalf, provide ACER with a detailed statement of the transactions in the wholesale energy market.

Lastly, market participants that perform transactions for which a declaration to ACER is mandatory must register with the national regulatory authority of the Member State in which they are established (the CRE in France) or, if they are not established in the European Union, that of a Member State in which they do business.

## **1.6 RESEARCH & DEVELOPMENT, PATENTS AND LICENCES**

The main missions of the EDF group's Research and Development Division (R&D) are firstly, to support the group's divisions and subsidiaries on a day to day basis, by providing them with its top-level expertise and high performance practices, and secondly, to contribute to build the group's future by anticipating the developments and major challenges with which it is confronted.

In particular, these challenges include the following:

- the complementarity between nuclear generation and generation from intermittent renewable energies in order to support the energy transition and reduce CO<sub>2</sub> emissions;
- water use and environmental management;
- the rapid development of emerging countries and the resulting shift in consumption areas;

- the significant development of information technology applied to energy, offering new opportunities for the electricity business;
- the changing behaviours of clients: consumers and local authorities who are also becoming producers, and seeking to consume more effectively, living in buildings, neighbourhoods and cities that have greater energy autonomy.

In this context, R&D's role is crucial when it comes to finding solutions to all of these challenges. Its avenues of research are structured around three broad priorities:

- developing and experimenting with new energy services for clients, enabling demand-side management that is both flexible and low-carbon, thanks to improvements in knowledge of demand, the development by clients of energy efficiency, the promotion of new, effective uses of electricity, often in combination with renewable energies (heat pumps, electric mobility, etc.), the development of technical and economic modelling to engineer buildings, industry and sustainable cities, and the development of uses and consumption being integrated into the electricity system itself through the use of smart grids and appropriate pricing;
- preparing the electricity systems of the future, by: optimising the lifespan of network infrastructures and accompanying adaptation of the electricity system by improving network asset management; implementing optimisation models and economic scenarios for new infrastructure projects relating to energy transport; inserting intermittent energies; and developing smart grids;
- consolidating and developing competitive low-carbon production mixes: One of the major challenges of the transition is to ensure the efficient co-existence of traditional means of generation, notably by further improving the security and performance of the existing nuclear plant as well as its operating lifespan, with the development of new renewable energies by improving their performance and integration into the energy systems.

In addition to its overall activity, R&D has also identified four research programmes that fall into the "disruptive - future-ready" category. They are:

- energy storage, photovoltaic energy and electric mobility which we deem to be paramount to the evolution of the electricity system:
  - Storage: doubling of the R&D workforces between 2018-2020,
  - PV: opening of the Île-de-France Photovoltaic Institute (IPVF) at the end of 2017; support for the 30GW solar power plan,
  - Mobility: activities pertaining to charging vehicles and battery life;
- local energy services and systems, with industrial fine-tuning of technical resources for urban planning and definition of optimum procedures to incorporate local energy systems within an overall national system;
- the use of digital technology in customer relations to offer innovative services and, within our own industry, to improve monitoring of our installations and maintenance forecasting,
- small modular reactors: small reactors that could be used, in particular, to address the market for areas that are isolated or suffer from weak transmission links.

### 1.6.1 R&D ORGANISATION AND KEY FIGURES

EDF's R&D is both integrated and cross-disciplinary, in order to facilitate synergies and method transfers between the different divisions within the group.

In 2017, the group's overall research and development budget amounted to €611 million, €546 million of which was earmarked for the EDF R&D budget. This is one of the largest R&D budgets of any major electricity company. Approximately two-thirds of this budget is devoted to programmes put together on a yearly basis under contractual agreements with EDF's operational divisions and subsidiaries. The remaining third goes to medium and long-term anticipation initiatives that fall within Group R&D priority areas.

In 2017, approximately 19% of this budget was devoted to protecting the environment. In particular, expenditures covered research into energy efficiency, uses of electricity as a substitute for fossil fuels, renewable energies and their insertion into the grid, sustainable cities, the local impacts of climate change and other

environmental issues such as biodiversity, water quality, and the mitigation of disturbances.

EDF's R&D Division employs 1,941 staff (1,892 FTE) in France, representing 27 nationalities; 83.9% have manager status, 31.8% are women, 121 are Ph.D. students and 59 are on work study programmes. Around 160 researchers teach in universities and major engineering schools. Including Edison and EDF Energy, this total number of staff is 2,160 (a FTE of 2,118).

The EDF R&D Division, which hired 63 people in 2017, channels its employees towards other entities of the EDF group. In 2017 the result of this mobility was a net reduction in headcount of 81.

The R&D Division is made up of 13 technical departments. Their skills cover all the Group's field of activities: renewable energies and storage, networks, nuclear generation, thermal, hydropower, energy management, trade and services, IT systems, environment. They are specific to particular disciplines, business lines and projects, and also come together for work on major systems. EDF's R&D Division manages an internal training body, the Technology Transfer Institute (Institut de Transfert de Technologie, ITech), whose purpose is to disseminate EDF's R&D practices, know how and innovations to the rest of the EDF group. Some ITECH training courses are open to other companies. ITECH has a catalogue of training courses (out of the 130 courses on offer, 56 were available to professionals from outside the Group in 2017), which is updated each year. ITECH generated €214,000 of revenue in 2017; its training courses are also used by the Vocational Academies (see section 3.3.1.3 "Skill development: preparing for the future").

At present, the R&D Division is organised on a multi-site basis. Three are located in France in the greater Paris area and six worldwide: Germany, United Kingdom, China, United States, Singapore and Italy. The Chatou and Les Renardières (near Fontainebleau) centres respectively have workforces of 451 and 552 people. The new EDF Lab centre in Paris Saclay has a workforce of around 938 people. Around 230 researchers work outside France, including some 30 expatriates.

EDF's main R&D centre, formerly located in Clamart was inaugurated in 2016, in Palaiseau, on the Paris-Saclay campus, with the arrival, since the month of March, of employees previously based in Clamart. With this new facility, which is intended to accommodate up to 1,500 people, including Group researchers, Ph.D. students, interns and partners, EDF is setting fresh ambitions for its R&D and placing scientific and industrial innovation and research at the heart of its priorities. The new EDF training centre which is located in the immediate vicinity of the R&D centre, opened its doors in September 2016. Together on one site, the new research centre and training centre form the EDF Lab Paris-Saclay complex. This strategic decision positions EDF as a leading player on the Paris-Saclay campus, thereby enabling it to benefit from more dynamic collaboration with the higher education establishments and public and private-sector research centres located nearby.

In addition, a number of partnership agreements have been concluded with other institutions of the Paris-Saclay University:

- SEIDO, a joint EDF-Telecom Paris Tech laboratory dedicated to the Internet of Things and cyber security for electricity systems. Its mission is to prepare and facilitate the deployment of energy demand management and energy efficiency services, making use of interoperable, communicating energy-related objects (heating, air conditioning, white and brown goods, electric vehicles, etc.), thereby helping to provide coherence for the system as a whole, as well as safety (security, confidentiality, and so on);
- the shared Rise Grid laboratory, devoted to the modelling and simulation of smart grids, in association with the Supélec engineering school;
- the SEISM Institute for modelling the effects of seismic activity from fault lines through to structures, which was founded by EDF, the French Atomic Energy Commission, CentraleSupélec, the École normale supérieure Paris-Saclay and the National Centre for Scientific Research (CNRS);
- PGM0, the Gaspard Monge Programme for optimisation and operational research, housed by the Jacques Hadamard Mathematics Foundation, and established with the patronage of EDF's R&D Division;
- IMSIA, the Institute of Mechanical Sciences and Industrial Applications, which since June 2015 has brought together ENSTA, CNRS, and CEA Saclay alongside EDF;
- the Energy Finance and Markets laboratory, shared with Dauphine University, ENSAE and École polytechnique;

- the Île-de-France Photovoltaic Institute (IPVF), which is an institute for energy transition (ITE) dedicated to developing ground breaking technologies in the photovoltaic field, brings together EDF, Total, Air Liquide, Riber, Jobin Yvon, the CNRS and École polytechnique in a partnership which is supported by the French State within the framework of ITE funding by the Commissariat-General for Investment (CGI).

The R&D sites house two joint research units with the CNRS: the Institute for Mechanical Science and Industrial Applications (formerly Laboratory for the Mechanics of Ageing Industrial Structures, LaMSID) and the Institute for Research & Development on Photovoltaic Energy (IRDEP), as well as an international R&D centre, the Materials Ageing Institute (MAI).

To carry out its research, EDF continues to invest in powerful and recognised means of digital simulation. It is developing cutting-edge computing code and resources that are among the best in industry. Its current capacity is 1,800 Teraflops.

In addition, the Group benefits from unique experimental resources; these include specific analytical loops to study chemicals/corrosion, failure, aero-acoustics, etc.; loops focusing on components and processes; resources for on site test interventions; and resources dedicated to the characterisation of materials and their ageing. Two recent flagship installations are noted below:

- **Concept Grid:** a scaled-down electricity grid for the purpose of trialling and testing the insertion of the innovative hardware and "intelligent" systems that together make up a smart grid, prior to them being installed on the grid itself. Concept Grid is designed to prepare future developments of the grid by studying the integration of new components and equipment from the world of information and communication technology to facilitate demand-side management. It is also intended to facilitate the integration of decentralised production, by studying the behaviour of production resources on the electricity system, and electricity storage applications. Concept Grid provides the missing link between a conventional research laboratory, in which innovations are tested in conditions that are not entirely representative of reality, and the actual grid, where quality of service considerations restrict experimentation;
- **VeRCors:** construction of a model reactor building to 1/3 scale in order to study how double containment buildings age. This model was completed in 2016 and the initial tests have been conducted. Due to its reduced thickness, it enables the Group's researchers to analyse then predict the effects of ageing of the concrete enclosures of reactor buildings and to check the solidity of this type of structure over time. It is used in conjunction with several digital models, which make it possible to model concrete ageing phenomena.

In terms of innovation, the R&D plays a leading role in guiding and supporting the Group in the innovation dynamic, established in the context of its "CAP 2030" strategy.

To that end, through its Innovation Hub, R&D develops services supporting innovation and explores new avenues of business development. The two ultimate objectives of this Innovation Hub are as follows:

- support, boost and enhance the value of innovation within the Group: 'innovate now'; this involves supporting the divisions and R&D in the implementation of innovation processes, growth and entrepreneurship;
- help to anticipate and explore models that break with the norm 'venture forth'; These new models may tomorrow constitute new business lines for the Group, whether they are new services or new technological solutions.

These initiatives rely heavily on open and collaborative innovation, notably through the animation of a network of external partners and connections with French and international eco-systems. This network (start-up, incubator, major groups) is harnessed in an effort to face the challenges of the Group.

In 2017, the actions were based around the following priorities:

- consolidating processes of valorisation and protection of internal innovation and boosting the 'time to business' through actions aiming to accelerate/promote the industrialisation phase;
- development of collaborative innovation notably through SME partners and start-ups proposing value added solutions for the Group's divisions. The objective

for EDF is to detect, assess and propose high value external innovations to the Group's divisions. R&D validated more than fifty demonstration projects this year.

More broadly, the innovation dynamic relies on a network of partners. Partnerships have been entered into with incubators/accelerators like Paris&Co, Numa and EDF is a member of the Scientipôle and Incuballiance associations. Framework agreements with junior entrepreneurs (HEC, ESSEC, ESCP, etc.) have been launched, to carry out market studies. Agreements are being negotiated with networks of international experts to assess our technologies;

- internal and external optimisation and dissemination of innovation. R&D contributes directly to creating value for innovation, externally through its contributions within the framework of the EDF Pulse competition, events such as Vivapolis.

R&D also contributes to the development of new business, notably through entrepreneurship in connection with the New Business Executive Management (see section 1.4.6.1.3 "New EDF Business").

EDF also has a stake in the Amorceage Technologique Investissement fund (ATI) managed by CEA Investissement. This is directed at new French companies working in technological innovation for energy, the environment, micro-technologies and nanotechnologies.

Lastly, EDF has taken six stakes in venture capital funds in France, North America and China in order to provide access to a global pool of *start-ups* and innovations:

- Robolution Capital, a fund focusing on robotics, launched in March 2014;
- Chrysalix, a Canadian fund dedicated to *cleantech venture capital*, in December 2011;
- Tsing capital, the first Chinese fund to be devoted to *cleantech venture capital*, in December 2011;
- DBL Investors in the USA, a fund set up in 2008;
- Mc Rock, a Canadian venture capital firm that specialises in the Industrial Internet of Things (IIoT), in 2015;
- Partech, a transatlantic venture capital firm specialising in information and communication technologies, in 2017.

## 1.6.2 R&D PRIORITIES

EDF R&D's work serves all the Group's divisions. For each of them, it offers technological solutions or innovative business and economic models designed to improve their performance, and prepare the Group's future in the longer term by means of medium and long-term anticipation initiatives. It is one of the factors in EDF becoming a global industrial group providing low-carbon electricity systems.

EDF's R&D performs work for Enedis on the networks under a services agreement, which defines obligations that guarantee the protection of commercially sensitive information and compliance with the principle of the independent management of the distributor.

As the energy sector undergoes profound change, the goal of EDF R&D may be defined in terms of three strategic avenues: developing and experimenting with new energy services for clients, preparing the electricity systems of the future and, moreover, consolidating and developing competitive, low-carbon production mixes.

R&D also engages in research into information technology to support these three strategic avenues. This research is in turn structured around five major areas: complex systems, the management and the processing of large volumes of data, the Internet of Things, cyber security and the simulation of physical problems.

Research in this field has a twofold purpose:

- improving divisional performance through advanced simulation technologies;
- facilitating the emergence of new opportunities for business lines through innovative uses of new information and communications technologies.

### 1.6.2.1 Developing and experimenting with new energy services for clients

The development of energy efficiency and distributed renewable energies, regulatory and technological changes (digitisation) as well as market deregulation, have all led to profound changes in the relationship between energy firms and their clients. They allow clients to become actively involved in their consumption and production of energy, on an individual or regional scale.

In this context, the challenges for the EDF group's marketers and specialised subsidiaries are multiple:

- the development of price categories in order to adapt them to conditions of intensified competition and to anticipate the end of regulated sales tariffs;
- the desire to develop electricity use in building and transport, built on a low carbon mix to preserve market share threatened by the emergence of a new environmental regulation for 2020, to succeed the 2012 Thermal Regulation (RT);
- demand-side management: Green deal in the United Kingdom, energy savings certificates in France, suppliers must fulfil their increasing obligations;
- the development of smart technologies: the deployment of smart meters, easier access to client consumption data and the emergence of connected objects will open, for the public, access to new services permitted by new smart technologies (remote operating, increasingly customised offers, etc.);
- changes in client relations, which are becoming increasingly digital, with more demanding client expectations accompanied by changing behaviours. However, the modernisation of this relationship should not obscure the accompanying increase in clients' energy vulnerability, which calls for an appropriate response from the Company;
- the increased power wielded by local territories within the framework of the Energy Transition Law and the NOTRe Law: the regional authorities, already active in the fields of urban planning and public energy distribution, can increasingly take responsibility for their future energy strategies. The notion of sustainable territories, which combines aspects of planning (eco-districts) and mobility (electric vehicles), is becoming a key structural component in local policies. New potential areas of service are emerging at the intersection of the development of smart technologies and the shift in power to local territories;
- the emergence of demand among customers to become stakeholders in their own electricity generation through private energy generation and consumption;
- the development of the performance of our specialised subsidiaries in their respective areas of activity.

To rise to these challenges, EDF R&D is focusing its action around three priority areas:

- this theme is shared among each of the following three areas, according to the market targeted;
- energy efficiency and low-carbon use: innovating to develop new uses for electricity (heat pumps for buildings and industry, lighting, and electric mobility) ultimately in order to stimulate future electricity demand and effective energy solutions in the long term for all customer segments, in a way that is compatible with new regulatory frameworks, developing comprehensive energy supply and energy services solutions for industry and the tertiary sector. The programme under which this activity is run also manages the B2B market;
- Smart Home and Customer relations: developing methods and tools for the modernisation of customer relations in order to enhance commercial performance and cut costs through the use of new information technologies and associated data processing, (consumption data and Internet data) - Big Data logic - and new price offerings encouraging dynamic demand management to meet the new flexibility requirements of the electricity system; producing tools to develop downstream energy services for the residential market, with the functionalities of the Linky meters and smart devices. The programme which drives this activity also manages the B2C market;

- Energies and Territories: designing and modelling local energy systems; developing the tools and technologies to deliver an innovative service offering for sustainable towns, cities and territories in France and internationally. The programme that drives this activity is responsible for the B2G market in order to develop a range of forecasting, optimisation and piloting tools centred on individual and collective self-consumption, as well as supply and service offerings for residential and tertiary customers, on behalf of EDF SA and its subsidiaries EDF ENR-Solaire and Store & Forecast. R&D is examining new economic models centred on the aggregation of different types of flexible demand (demand response, deferred consumption, self-consumption, renewable energies, energy planning and management on a local level).

For instance, research has been conducted into new uses for electricity, such as electric mobility, heat pumps and more economic buildings. R&D has launched a demonstrator, on an industrial site, of its industrial high-temperature heat pump prototype, allowing waste heat recovery on customer's processes. A co-development initiative has been launched with equipment manufacturers, which will ultimately lead to a reduction in the cost of heat pumps for the tertiary, commercial and residential sectors. Lastly, innovations relating to smart energy management for electricity used for heating have been developed, in particular for residential heat pumps and the modernisation of storage tanks in order to make them compatible with innovative control modes, such as off-peak periods for solar energy. Moreover, work has intensified on the operating safety of industrial electrical networks, and a specific project on smart lighting has been initiated to support the development of solutions for Citelum. This work is a component of a broader project destined to produce a range of offers of the EDF group for the Smart Factory, in line with the objectives outlined in the Factory of the Future initiative launched by the government.

As for client relations, to allow residential clients to be aware of their electricity use and its budgetary impact between two bills, EDF has designed and developed a prototype range of features compatible with smart meters, including an application for smart phones and PCs that allows consumers to estimate their bill, taking into account their own particular characteristics, seasonal variations in their electricity consumption, and their past consumption history. EDF R&D is also working on research initiatives to combat energy vulnerability, for instance by designing relevant client relations offers and resources. R&D continued to develop a new offering of energy services this time combining electricity supply, control of electric heating by connected thermostat and the digital customer interface for a new EDF subsidiary.

2017 also saw the launch of new customer interfaces, using techniques linked to artificial intelligence, in particular chatbots, (voice-exchange devices).

In sustainable territories, to address the needs of cities that are seeking to optimise infrastructures and their management (e.g. for transport, waste treatment, buildings, energy production, and networks) and aspiring to become sustainable, "smart cities", R&D is developing urban engineering resources for EDF sales staff in France, such as the study performed for the Nice urban district. R&D particularly supported work organised around the Local Energy Pilot concept. R&D renewed its partnership with the city of Singapore to develop decision-support tools for town planning.

With these tools, collaboration with the Singaporean authorities covers the following areas: energy efficiency of buildings and their air-conditioning systems as well as household waste collection. It also includes the possibility of addressing issues such as the incorporation of photovoltaics into buildings, green roofs, and local water recycling. This modelling is coupled with innovative 3D visualisation tools at the level of individual buildings or a neighbourhood, allowing the impacts of planning decisions, for instance on greenhouse gas emissions, to be studied. The experience gained has now made it possible to develop a project in Lyon for the new Gerland neighbourhood, for the Lyon metropolitan area, which received the timely delivery of seven energy management modules, much to their satisfaction.

Electric mobility is an important dimension of sustainable cities: electric transport opens up the prospect of a fundamental transformation of modes of travel. Battery storage is the key technology for electric transport. R&D research in this respect consists, firstly, in characterising battery safety and performance in the lab, and secondly, in innovating in the realm of breakthrough technologies with the potential to deliver significant improvements in battery life and/or cost. R&D is also studying non mobile applications for the reuse of batteries that were originally used in electric vehicles (combining them with renewable energies, system services, etc.). In the longer term, R&D will adopt a similar approach for the hydrogen (H<sub>2</sub>) technologies that are used for mobility, including electrolysers and charging stations, as well as fuel cells for heavy transport and light vehicles.

More generally, the goals of R&D activities in the field of electric vehicles (EVs) and rechargeable hybrid vehicles (RHVs) are as follows:

- supporting the development of this new use (monitoring initial experimentation; standardisation; innovations with the potential to remove market barriers, such as wireless charging);
- naging integration with the electricity system (smart charging, dimensioning and location of charging stations);
- developing mobility service resources (fleet supervision platform, charging station operation software, smart charging stations for residential customers and resources to advise local authorities on mobility);
- preparing the integration of electric vehicles into local energy systems, with the study of vehicle to grid (V2G) and vehicle to home (V2H) models.

In particular, through partnerships with leading transport players (Renault, PSA, Toyota, Mitsubishi Motors, etc.).

All of the studies carried out for the Smart Cities, Smart Building and Smart Factory have enriched the work carried out on local energy systems, which incorporates the development of specific tools for the design and operation of hot and cold heat networks for specialised subsidiaries.

### 1.6.2.2 Preparing the electricity systems of the future

Energy transition towards a low-carbon economy in Europe primarily involves reducing the carbon footprint of electricity systems. This involves addressing new challenges for electrical systems:

- managing the intermittence of production sources that use renewable energies and pushing back the limits of their inclusion in electrical systems;
- integrating new uses of electricity by optimising the production mix and grid requirements;
- developing network transmission infrastructures and optimising electricity traffic in Europe;
- optimising decentralised energy systems (demand-side management, decentralised generation and storage, etc.) by integrating them into larger scale energy management systems;
- adapting the coordination of electricity systems in order to address a reduction in inertia in a context of increasing use of power electronics in order to factor in patterns of use and new production sources;
- and, more generally, optimising investments in production and storage facilities, in network infrastructures and energy efficiency and green energy solutions, having regard to the interest of the public and the competitiveness of electricity, without there being any significant increase in bills for customers, while also maintaining the quality and reliability of the electricity system.

The trend towards more intelligent electricity systems, also known as smart grids, is one of the pivotal points in transitioning towards a low carbon energy economy in Europe. It raises not only technical, economic and regulatory issues, but over and above the integration of renewable energies and new uses, issues relating to the management of information for the various users of the grid and the need to control costs.

R&D's work can be divided into three main categories.

The first category of work aims to anticipate the impacts of energy transitions and the emergence of decentralised energy systems on the development and management of electricity systems:

- energy transitions: this work involves developing an overview of changes in the fundamental aspects of demand, potential disruptions in supply, energy mix choices and the conditions for implementing energy transition scenarios (financing, technologies and infrastructures);

- market design and the emergence of local energy markets: this work involves contributing to the definition of the future ground rules for the electricity and gas markets in the context of the emergence of distributed energy systems.

The second category of work aims to improve the performance of electricity grids:

- R&D is working to improve the management of distribution network assets. Studies are being carried out into the lifespan of materials. Predictive maintenance techniques are also being tested. These combine detailed knowledge of the behaviour of components and data and image processing techniques, with the aim of optimising maintenance cycles and detecting early signs of equipment failure;
- in 2017, R&D entered the pre-industrialisation phase for a new generation of command and control and network management systems and distributed resources: the first components of dynamic, centralised and cyber-secure management tools, control terminals and new smart objects will be delivered with a view to being integrated into the industrial systems of the Group's entities and subsidiaries;

- another focus of R&D work is the impact of developing direct current for the incorporation of renewable energies in terms of hybridisation of large alternative synchronous electricity systems, recognising that this development may profoundly change the fundamental technical and economic dynamics of electricity systems with the increased use of intermittent renewable energies.

The third category of work aims to manage the transition of the electricity system to smart grids through the integration of intermittent renewable energies and new distributed resources such as energy storage and electric vehicle charging infrastructure:

- R&D work forms part of the joint European H2020 research programmes aimed at developing solutions to integrate a high proportion of intermittent renewable energies in the European interconnected system. In 2017, EDF R&D notably became involved in the EU-SysFlex project aiming at building a flexibility roadmap at the European level, in partnership with Eirgrid and 32 other European partners, within the Plan4Res project. This aims at developing a range of tools and methods for the coordination and integration of European energy systems and in the TDX-ASSIST project for the coordination of data exchange between public distribution and network operators in the context of the European electricity market;
- R&D is developing and trialling new functionalities for coordinating the distribution grid when decentralised production is used. This innovative coordination method makes it possible to maintain voltage on the high-voltage grid within its contractual range, on the basis of a grid status estimate, even when decentralised production resources are used;
- R&D is developing advanced tools to forecast intermittent renewable energy consumption and production. It is working in partnership with weather forecasting organisations in order to develop meteorological benchmarks for the management of electricity systems. It is also developing tools to improve energy loss forecasts and audits on different geographical levels;
- R&D is pursuing work on the development of predictive network management tools in the presence of intermittent renewable energy generation. Predictive management enables power flow arbitrations, generation injected by renewable energy installations and the unavailability of installations on the grids to be predicted. The functions developed for HVA grids are currently being extended to low-voltage grids;
- R&D provides its support in the deployment of Linky meters developed by Enedis; it is also exploring the development of metering systems which will have to integrate the new patterns of activity in the electricity market and the new regulations;
- R&D is also experimenting with electricity use coordination systems based on the Linky infrastructure. In particular, these experiments are making it possible to demonstrate the feasibility of load management and the new types of flexibility offered by the electric vehicle, distributed storage facilities and self-consumption solutions;
- R&D is also working towards the optimal integration of decentralised renewable resources in small-scale grids with the objective of facilitating a transition to a local low-carbon electricity mix. Several micro-grid prototypes have been successfully implemented in island networks by EDF SEI with the support of EDF R&D; these enable renewable energy and storage facilities to interact with conventional means of generation. The work concerns in particular the

optimisation of the control system, experimentation of island operating mode and analysis of the functional contributions of micro-grids in a complementary relationship between interconnected and local grids;

- moreover, R&D is working on innovative solutions for the management of production and consumption portfolios, and the associated risks. This involves anticipating the consequences of the development of new means of production and/or new decentralised uses for the management of energy systems, and assessing the key issues linked to the interfacing of the overall flexibilities (production, suppliers and energy markets) with the local flexibilities of the Distributed Energy Systems.

The activities in the second and third categories for the benefit of Enedis are performed under a services agreement entered into by the R&D Divisions of EDF and Enedis.

In order to prepare the solutions to these new challenges, a number of smart electricity prototypes have been developed in France and Europe, in the context of a collaborative approach. R&D has made significant contributions to this. The experience gained of these prototypes in 2017 yielded lessons including the need to focus on the levers for this and prioritise the solutions to be developed (business models, market architecture and energy regulation). These projects also offer opportunities to reflect and innovate, together with the electricity sector as a whole and the 'new information and communications technologies' sector, in order to tailor installations to the needs for flexibility of the electricity systems of the future.

Research into electricity systems uses extensive test facilities:

- laboratories for high-voltage electrical testing enabling a very wide range of qualification and investigation tests for all types of electrical equipment to be carried out: high power, mechanical and climatic endurance, dielectric materials, "high power" long term and aging; the high power testing laboratory benefited from a major renovation programme in 2017;
- system management test facilities, communicating devices and systems, metering equipment, power-line communication and electric vehicle smart charging;
- Concept Grid testing facility: Concept Grid is a scaled-down electricity network for the purpose of trialling and testing the installation of the innovative hardware and "intelligent" systems that together make up a smart grid, prior to them being installed on the grid itself.

### 1.6.2.3 Consolidating and developing competitive low-carbon production mixes

In the field of nuclear, hydro and fossil-fired power generation, EDF R&D is developing tools and methods to improve the safety of production resources, optimise their operational lifespan, and increase their performance in terms of output and environmental impact. There are three key priority goals: ensuring the Group maintains its advantage in terms of nuclear power over the long term, developing renewable energies while reducing their cost and increasing the extent to which they are used in electricity systems, while improving the environmental acceptability of our generation facilities.

To secure the Group's advantage in nuclear power generation in the long term, R&D is working to protect EDF's assets through actions in line with its policy to improve the safety of facilities, particularly with regard to enhanced performance and extended operating lifespan. In 2017, for example, R&D carried out tests on the VeRcors concrete containment model located in the Renardières R&D centre. This VeRcors model is a one-third scale, double-walled concrete containment structure representative of a 1,300MW reactor building. The results of the containment test carried out in March 2017 are being used to strengthen the digital twin of this containment building which aims to predict the ageing phenomena of the concrete and therefore the building's operating lifespan. A containment test is programmed every year, and thus after 5 tests (given that the thickness of the VeRcors wall is one third weaker than for an actual containment building), the digital twin will be able to predict with a reasonable level of confidence the ageing of the building beyond a 40-year lifespan.

Moreover, initiatives in the field of nuclear power also concern issues relating to the fuel cycle. They include the design of new power plants, in particular fourth-generation plants and Small Modular Reactors (SMR).

Furthermore, R&D actions contribute to improved knowledge and better control of the impact of facilities on the environment, and, at the same time, to ensuring that greater attention is paid to the environmental risks for industrial facilities. For instance, R&D is studying how water resource availability may change in the future as a result of changes in climate and physical geography. R&D research also contributes to understanding the possible risks and consequences for the power generation plants (availability of a heat sink, scope for modulation and location optimisation).

To support these programmes, R&D is developing digital simulation tools and experimental test resources, as well as tools that are capable of handling the fresh challenges raised by the increase in large sets of digital data, IT security, and new information and communication technologies. In 2017, EDF launched ConnexLab in Saclay to test new concepts of operation and maintenance. ConnexLab is part of the nuclear sector's digital transition initiative in partnership with AREVA NP (now Framatome) and CEA, equipment manufacturers, maintenance companies and digital model Suppliers.

In association with other European leaders in the nuclear sector, in March 2012 EDF R&D set up NUGENIA, an international non-profit organisation whose purpose is to develop a single cooperative framework for R&D in Europe for second- and third-generation nuclear systems, as part of the European Sustainable Nuclear Energy Technology Platform (*SNETP*). The organisation brings together 111 members from 25 countries in 2017 including industrial players, research entities, security authorities etc. EDF chairs this organisation, which will facilitate the creation of synergies and joint projects between members or with national R&D programmes in the following fields: safety and risk analysis, serious accidents, safety and risk analysis; serious accidents; reactor cores and performance; component integrity and ageing; fuel, waste and decommissioning; "Innovative Generation III Design"; as well as into cross-functional issues such as the harmonisation of practices (mainly in the safety field) and non-destructive controls and tests.

The second priority is support for the development of renewable energies. These are playing a growing role in the energy landscape both within Europe and worldwide; EDF is already a major player here, and is seeking to expand its role in the field still further.

For renewable energies, storage and hydrogen, the goal of R&D is to identify technological breakthroughs that offer a significant competitive advantage, and to help the most promising technologies emerge industrially, working in partnership with the academia and industry. EDF is investigating a wide range of renewable energies and storage solutions: hydropower, photovoltaics, onshore and offshore wind power, solar thermodynamic power, biomass, marine energies, geothermal power, electrochemical batteries, flywheels, flow cells, electrolyzers, fuel cells (hydrogen).

R&D is also working to develop tools and methods to enhance operational performance and optimise the cost of the EDF group's electricity generation system projects that are based on renewable energies and storage, with a number of aims in mind:

- contribute to the success of fixed-foundation and floating offshore wind farm projects, of EDF EN in France and in the United Kingdom by reducing investment risks: EDF R&D, for example, provides its expertise in the Group's offshore wind farm projects, in particular in terms of turbine system and foundation design, turbine certification, production assessment methods, by limiting uncertainties. R&D is also preparing the future by studying floating offshore windfarm technologies;
- to increase the competitiveness of the EDF group's PV and wind farm projects, through enhanced performance (predictive maintenance) and through the extended lifespan of PV and wind farm facilities, performance qualification brought by innovations, notably through demonstration projects with large-scale wind turbines, and also to show the potential reductions for tidal energy;
- to help the EDF group gain access to new markets, in particular, to be a CSP benchmark and succeed in the deployment of the "Mon soleil et moi" self-consumption offering without grid feeding;
- to enhance operational performance; R&D is participating, for example, in the development of an onshore wind farm performance analysis tool and is testing solutions for increasing the return of a wind farm in an electricity market through an efficient control system jointly integrating several dimensions (production optimisation, maintenance, lifespan, system services) to enhance EDF EN operational performance. EDF R&D also assesses and tests the contribution of



new business sectors to improve business performance (virtual and augmented reality, 3D printers, stealth blades, etc.);

- controlling the technical and economic impact on the electricity system, and managing the electricity system balance as renewable energies are incorporated. The work concerns the definition of procedures for renewable energies to be inserted into electricity grids. This involves analysing the different solutions allowing the integration of intermittent renewable energies and the evaluation of constraints and the cost of their integration into large systems: storage, super grids, smart grids, demand-side management, etc.;
- devising services and offerings that EDF might offer its customers in the area of stationary storage and design better storage/renewable energies/converter products according to planned use in order to optimise investment and running costs;
- anticipating and contributing to the emergence of forthcoming major breakthroughs in the areas of renewable energies and storage (technological or business model) and assessing them;
- boosting deployment of internal and external innovations to the divisions.

In 2017, R&D also strengthened its involvement in European H2020 joint research projects on renewable energies and storage: Project ROMEO, dedicated to the optimisation of offshore wind farm maintenance strategies thanks to artificial intelligence techniques, project FLOTEC, which supports and aims to carry out functional analysis of the industrialisation of the Scot Renewable floating tidal turbine, Project SCORE, which aims at optimising an energy system for buildings integrating hybrid storage, Project CREATE, dedicated to studying the technico-economic interest of thermal storage in buildings, project Next-CSP, which is developing a high temperature solar tower concentrated solar power (CSP) prototype on the Thémis platform in France.

The third priority is to improve the environmental acceptability of our production facilities. Climate change, the marked decline in biodiversity and Earth's limited resources make EDF a legitimate choice for a low carbon energy mix. The aim of the R&D Division's initiatives is:

- through its scientific and technical expertise, to contribute to the way in which the regulatory environment is implemented and evolves, in a way that is proportionate to the key issues;
- to provide justification for our production facilities being on par with the best available techniques, at an economically acceptable cost, and to leverage these best available techniques in new projects;
- to acknowledge and manage our impact on terrestrial and aquatic environments, enhance the value of our improvement initiatives, limit and enhance the value of our sub-products;
- to know how to anticipate and address new developments in climate change, for example by becoming more familiar with the robustness of the heat sinks for power plants in light of future climate change;
- to contribute to leveraging our positive actions with regard to local stakeholders.

### **1.6.3 INTERNATIONAL RELATIONS AND PARTNERSHIPS**

To conduct its research and development programmes, EDF R&D develops a large number of partnerships worldwide, the purpose of which is to maintain its expertise at the highest global level in the disciplines central to EDF's concerns, and to supplement its internal reservoir of skills.

R&D's partnership policy is embodied in a variety of ways, both nationally and internationally.

In France, over the past few years R&D has set up about fifteen laboratories on a joint basis with academic partners and technical or industrial centres. With them, it is participating in collaborative research projects funded by several national desks. Each shared laboratory offers an opportunity to establish a combined team in order to focus on a common scientific and technical problem, with a view to creating value, expertise and knowledge for all partners; this constitutes a major asset when taking part in cooperative projects. R&D also supports a few specially targeted teaching and research chairs.

In the field of nuclear R&D, a three-way agreement between CEA, EDF and AREVA was agreed upon at the beginning of 2014 and was renewed in 2017 (Framatome replacing AREVA). This new "Institute" agreement is designed to increase R&D programme coordination between partners and to make available programmes defined with reference to detailed goals, particularly industrial goals. In practical terms, this entails the following:

- formation of a Three-Party Programme Team (équipe programme tripartite, EPT), responsible for programme supervision and coordination. This team consists of four members per partner, for a total of 12 members;
- detailing of these programmes in the form of projects monitored by the EPT;
- implementation of these programmes in existing shared laboratories.

At the same time, the three-party agreement on R&D between CEA, IRSN and EDF was also the subject of negotiations in 2014; this has led to the signature of a four-party agreement including AREVA NP (now Framatome), allowing enhanced coordination with the "Institute" policy.

R&D is also present within the Energy Transition Institutes (Instituts de la transition énergétique, ITE) which were set up as part of France's "Investments for the Future" initiative:

- the Île-de-France Photovoltaic Institute (IPVF): EDF is one of the founding members of this Institute, which seeks technological breakthroughs in photovoltaic energy that is competitive in the market. Ultimately, the Institute will bring together some 150 researchers seconded from the different partners to work with state of the art equipment located at Saclay. The new building designed to house the IPVF was completed in autumn 2017. This building complex with a floor area of around 8,000 square metres and combines tertiary space and laboratories is located on the Paris Saclay Campus in close proximity to EDF Lab. Teams was installed and testing commenced in December 2017;
- France Énergies Marines, devoted to marine energies and offshore wind farms;
- SuperGrid, focusing on major transport networks to connect remote renewable energy production sites;
- Vedecom, devoted to electric mobility;
- Efficacy, working on energy efficiency and sustainable cities;
- INEF 4 working in the field of building rehabilitation and sustainable construction.

EDF is also the driving force behind ConnexiTY, an R&D programme aimed at connecting, through digital technology, players in the nuclear sector in order to simplify power plant operation, site preparation and design. To respond to this a new laboratory was opened in November 2017, ConnexLab at EDF Lab Paris-Saclay.

EDF is also a founding member of several European associations recognised at the EU level, such as Nugenia for nuclear power and EASE for storage.

Since the early 2000s, EDF has had a research centre in Germany, EIFER, in collaboration with the Karlsruhe Institute of Technology (KIT). This centre is chiefly devoted to decentralised production (fuel cells, hydrogen), sustainable cities and territories, geothermal energy, and biofuels. This centre was recently reorganised to increase the focus on hydrogen issues and also on innovations in technologies and business models being developed in Germany within the framework of EnergieWende. In the hydrogen field, 2017 saw increased cooperation between the Japanese research centre CRIEPI with EIFER and Edison's R&D centre. The EIFER centre also supports the commercial subsidiary EDF Deutschland in its sales and marketing development projects in the German market through the integration of innovative solutions in its range of offers.

Since 2010, research activity has increased internationally around several centres: in the United Kingdom, China, Singapore, the United States and Italy.

The United Kingdom Centre consolidates the Group's positions in the British research eco-system, particularly through Strathclyde University in the field of renewables, as well as with Manchester University, Imperial College, the National Nuclear Laboratory (NNL) and the University of Bristol in the field of nuclear energy. In 2012, this research centre became an independent legal entity, EDF Energy R&D UK Centre Ltd, a subsidiary of EDF Energy. This new status has raised EDF's profile and research capability in the United Kingdom, in line with the Group's development strategy. The centre thus provides direct support to the activities of EDF Energy business units whether in the existing nuclear field (extension of AGR reactor lifespans, decommissioning), or in new projects with the installation of an antenna in Bristol to support the HPC project. The centre is also fully mobilised, in digital

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## Property, plant and equipment

solutions for clients and offshore wind farm projects for which it is the reference centre for all the Group's projects in France and abroad.

The Beijing centre is an asset in terms of participating in large-scale Chinese smart grid demonstration projects for smart grids, or nuclear facilities (see section 3.6.1 "Activities in China"). The centre was reorganised in 2017 to provide direct support to EDF China's business units in line with EDF China's "Go 2020" strategic plan. It thus supports sustainable cities and more broadly local multi-energy projects combining electricity, heating and cooling networks. It also provides support to the new renewable energy development business unit established in China and the centre continues the cooperation initiated with the Chinese Academy of Science's Institute of Electrical Engineering on research and innovation work carried out at an experimentation facility dedicated to thermodynamic solar technology located in Badaling. Lastly, the centre has developed an extensive partnership with the China Electric Power Research Institute (CEPRI) of the network operator, State Grid, in the field of networks and notably on the issue of integrating renewable energies in the grids.

The main goal of the Edison R&D team in Italy is to coordinate all gas research programmes for the EDF group. In support of Edison's business development goals, the centre has also developed programmes in the field of digital customer solutions and the "Connected Home" in partnership with the French and UK R&D teams whose business units are facing the same challenges in terms of developing new customer services in competition-oriented markets. This work relies on the joint Edison and the University of Turin laboratory established to deal with these issues in 2015. As noted above, the Edison R&D centre is actively involved in research work in the hydrogen field.

The United States R&D and innovation sector is one of the largest and most buoyant in the world. EDF has had an R&D and Innovation team in Silicon Valley for several years, which supports EDF's development in the USA and contributes to innovation in the Group. EDF Innovation Lab's areas of activity include, in particular, analysis of technological, digital and regulatory trends and the assessment of new business models for the Group in the USA, in connection with distributed energy resources and microgrids. EDF Innovation Lab has thus supported EDF's International Management which markets an 'off-grid' access to electricity offerings in certain African countries with the Californian company OGE. Since 2017 EDF Lab has participated in several innovative electric mobility and micro-grid demonstration projects. EDF Innovation Lab has also contributed to the long-standing partnerships developed by EDF with elite establishments such as EPRI, MIT and UC Berkeley. It has just launched a partnership initiative with Stanford.

## 1.7 PROPERTY, PLANT AND EQUIPMENT

### 1.7.1 SERVICE SECTOR REAL ESTATE ASSETS - EDF AND ENEDIS IN FRANCE

EDF's Real Estate Division, comprised of the Group's Real Estate Department and its real estate subsidiaries, operates in France as the real estate service provider for EDF and Enedis's entities by managing and optimising a real estate portfolio of nearly 5.0 million square metres of offices and commercial premises, of which approximately 58% are fully owned by the Group and 42% are leased from third

parties (leases and concessions). In 2017, approximately 210 of these assets were disposed of, representing 0.4 million square metres or so in usable floor area. Among these 210 real estate assets, a portfolio of 186 assets was sold by Sofilo.

EDF Lab Singapore was set up in early 2014 primarily to support the promotion and implementation of the Group's know-how concerning sustainable cities and to market the various solutions described above to Singapore's urban planning agencies. Within the framework of the new City of the Future contract signed in November 2017 between EDF and Singapore's Housing Development Board, the city's main property developer, EDF has continued to increment its innovative 3D urban modelling tool with new modules integrating heat islands and mobility. 2017 marks the development of a new activity in the field of cost-effective micro-grids for insular or non-connected regions of South East Asia powered today by diesel generators. In mid-October 2017 the centre signed an agreement with NTU University for the development, construction and operation, for research purposes, of an innovative and cost-effective micro-grid on Semakau, an island territory of Singapore.

### 1.6.4 INTELLECTUAL PROPERTY POLICY

Intellectual property plays a major role in protecting the EDF group's technologies and know-how from competition, and in leveraging these assets through licensing agreements.

EDF is keen to strengthen its industrial property portfolio in order to make the most of its capacity for innovation and technological expertise. The portfolio is comprised of patents, registered software and formalised expertise.

#### Patents

At the end of 2017, EDF's portfolio comprised 604 patented innovations, protected by 1,855 property titles in France and abroad.

The strengthening of the patent portfolio is a priority. It aims to facilitate R&D cooperation, protect the development of EDF's activities, to contribute to the Group's external image, to boost researcher motivation and to further enhance the value of inventions.

In 2017, EDF filed 64 patent <sup>(1)</sup> applications (63 in 2016).

#### Trademarks

"EDF" is a registered trademark in over 90 countries. The Group's name is an essential part of its image and heritage: the EDF brand, Internet domain names and logos are therefore constantly monitored, in order to protect them against any unauthorised use likely to jeopardise the Group's image. Moreover, following the work to increase the status of the "EDF" brand, the Company has entered into brand licensing agreements with those of its subsidiaries that use the "EDF" brand.

The Group has also registered a large number of other trademarks, in particular those relating to the business of its various subsidiaries.

At the end of 2017, the EDF group's brand portfolio comprised some 456 names, protected by over 1,280 property titles.

(1) Note: Enedis has also filed three patent applications.

### 1.7.2 EMPLOYER PARTICIPATION IN THE CONSTRUCTION EFFORT

Each year, EDF is subject to an obligation to participate in the French construction effort program up to 0.45% of its total payroll, which represented approximately €18.7 million for 2017 (€18.4 million for 2016).

In return for this funding, EDF employees benefit from subsidies and services aimed at facilitating their residential mobility: assistance with renting, assistance with home purchasing, assistance with mobility, advice on financing.

### 1.7.3 SUBSIDISED LOANS FOR HOME OWNERSHIP

As part of its social policy, EDF helps its employees purchase their main home, thanks to a partnership concluded with a banking institution (SOCRIF). This institution produces, finances and manages loans granted to the Company's employees. EDF compensates this institution for the difference between the preferential rate at which SOCRIF grants loans to EDF employees and the rate resulting from the bank survey on the basis of which this institution was chosen.

As of 31 December 2017, the residual non securitised balance for personal residence mortgages amounted to €2.1 million on EDF's balance sheet (€2.7 million as of 31 December 2016).

1.

# 1. PRESENTATION OF EDF GROUP

# 2 RISK FACTORS AND CONTROL FRAMEWORK

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## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

The Group operates in an environment that is experiencing profound change, which generates various risks, some of which are beyond its control and come in addition to the risks inherent to its business operations. The Group describes hereinafter the material risks to which it considers itself exposed. One or more of these risks could have an adverse effect on the Group's activities or results. Moreover, other risks, of which it is currently unaware, or which it deems not material, may also have the same adverse effect.

The risks presented below in Chapter 2.1 "Risks to which the Group is exposed", concern risks related to the regulation of the energy markets, risks related to the economic, competitive and societal context, risks related to the transformation and operational performance of the Group and risks specifically related to the nuclear activities of the Group.

In particular, the Group faces legal risks in all of its activities and in its various markets. Legal risks relating *inter alia* to the statutory and regulatory framework, operating activities, partnerships set up and contracts concluded with customers and suppliers are described below and mentioned in sections 2.1 "Risks to which the Group is exposed" and 2.3 "Dependency factors". Key litigation, proceedings and arbitrations in which the Group is involved are described in section 2.4 "Legal proceedings and arbitration".

The measures taken by the Group to control the risks and activities to which it is exposed are described in section 2.2 ("Control of the risks and activities of the EDF group").

Chapter 2.5 describes the EDF group's insurance program.

## 2.1 RISKS TO WHICH THE GROUP IS EXPOSED

The Group operates in an environment that is experiencing profound change, generating numerous risks, some of which are external. They are in addition to the risks inherent in its business lines. Below, the Group describes the main risks to which it considers that it is exposed. One or more of these risks could have an adverse effect on the Group's activities or results. Moreover, other risks, of which it is currently unaware, or which it deems not material, may also have the same adverse effect.

The issues associated with the risks to which the Group is exposed are multi-criteria. They may be strategic or operational and may depend on regulations and on the economic or general context.

The risks caused by factors external to the Group are described in sections 2.1.1 and 2.2.2.

The risks associated with the regulation of energy markets are described in section 2.1.1 "Risks associated with the regulation of energy markets", particularly the regulation of the electricity market, for which it is necessary to take into account:

- competition rules, especially in Europe and France, where most of the Group's activities are conducted;
- public policies in the field of energy.

In section 2.1.2 "Risks related to the economic and general context", a description is given of the risks caused by exposure to the energy markets in which the Group operates, as well as the risks caused by changes to competition and new societal expectations, economic circumstances and elements of public policy or general

regulation in the various countries and territories where the Group exercises its activities.

The risks caused by factors internal to the Group are described in sections 2.1.3, 2.1.4 and 2.1.5.

In section 2.1.3 "Risks related to the transformation of the Group" a description is given of the risks associated with changes to the portfolio and model of activity of the EDF group, and to its transformation, in its industrial, services and sales activities.

In section 2.1.4 "Risks related to the operational performance of the Group", a description is given of the risks associated with the control of its operational activities in its various industrial, services and sales activities.

Section 2.1.5 is devoted to the specific risks related to the Group's nuclear activities, which involves additional risk factors and specific measures, notably with regard to the overriding requirements of nuclear safety and the long-term capital-intensive nature of the activity.

The exposure to risk may vary according to the geographical scope and duration. The potential impact of these risks may produce effects at very different time horizons, ranging from very short term (less than a year) to very long term (up to several decades or more, given the nature of the relevant industrial activities).

The geographical scope of exposure of the Group to its main risks is described in the table below.

Main risk factors	Scope of exposure
<b>Regulation of the energy markets, section 2.1.1</b>	<ul style="list-style-type: none"> <li>■ Modes of valuation by the regulation of low-carbon solutions</li> <li>■ Changes to the regulatory framework of tariffs</li> <li>■ Changes to the regulatory framework for the renewal of concessions</li> <li>■ Energy transition causing a profound transformation of the Group's business portfolio</li> <li>■ Changes to energy policies slowing the development of the Group</li> <li>■ Insufficient compensation for services in the public interest</li> </ul>
<b>Competitive and general context, section 2.1.2</b>	<ul style="list-style-type: none"> <li>■ Increased competition in the energy markets</li> <li>■ Exposure to the wholesale energy market</li> <li>■ Unfavourable economic circumstances</li> <li>■ Seasonal activities</li> <li>■ Exposure to climatic risk</li> <li>■ Changes to the environmental and health regulatory framework</li> <li>■ Vulnerability caused by the political, macroeconomic or financial context or circumstances of a region or a country</li> <li>■ Changes to international accounting standards</li> </ul>
<b>Transformation of the Group, section 2.1.3</b>	<ul style="list-style-type: none"> <li>■ Difficulty in making changes to the portfolio of activities according to the objectives targeted</li> <li>■ Maintenance of ability to promote synergies and integrated solutions upstream/downstream and with the subsidiaries of the Group</li> <li>■ Ability to perform the Group's acquisition and disposal operations and reach the targeted objectives</li> <li>■ Maintain the ability to adapt and develop skills according to the requirements of the Group</li> <li>■ Maintain the ability to ensure the long-term social and financial commitments of the Group</li> </ul>
<b>Operational performance of the Group, section 2.1.4</b>	<ul style="list-style-type: none"> <li>■ Ability to improve the operational and financial performance</li> <li>■ Granting and renewal of administrative authorisations</li> <li>■ Control of large projects</li> <li>■ Ability to implement the digital transition</li> <li>■ Malicious attacks against information systems</li> <li>■ Control of industrial risks</li> <li>■ Health at work</li> <li>■ Quality of employment/management dialogue and of industrial relations</li> <li>■ Default of Group's counterparties</li> <li>■ Financial risks</li> <li>■ Reputational risks</li> </ul>
<b>Nuclear activities of the Group, section 2.1.5</b>	<ul style="list-style-type: none"> <li>■ Operational nuclear safety</li> <li>■ Ability to continue the period of operation</li> <li>■ Ability to carry out the "Grand Carénage" programme</li> <li>■ Ability to build and operate the EPR reactors</li> <li>■ Industrial dependency for specific skills</li> <li>■ Ability to integrate Framatome and develop synergies</li> <li>■ Ability to control the nuclear fuel cycle</li> <li>■ Ability to control the decommissioning of reactors and the final processing of radioactive waste</li> <li>■ Exercise of nuclear civil liability</li> </ul>

Some orders of magnitude for the potential financial effects related to the materialisation of certain risks are mentioned without limitation in the present section 2.1, for information purposes only.

Certain risks may also turn into potential opportunities for the Group.

The measures taken by the Group to control the risks to which it is exposed are described in section 2.2 "Control of the risks and activities of the EDF group".

## 2.1.1 RISKS ASSOCIATED WITH THE REGULATION OF ENERGY MARKETS

**The regulation of the market for CO<sub>2</sub> emissions quotas, such as changes in the prices of these quotas, is likely to affect the profitability of the Group and its objectives in matters of low-carbon energy solutions.**

There is a risk, potentially caused by inappropriate regulation, that the prices of CO<sub>2</sub> remain low and do not enable sufficient development of low-carbon energy solutions, to the detriment both of the fight against climate change and the Group. This may risk a loss of opportunity to promote the Group's low-carbon energy solutions.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

**A significant share of the Group's revenue is generated by the activities subject to regulated tariffs, and changes in such tariffs and in the conditions of their application, may have an impact on the Group's results.**

In France, a significant share of the EDF group's revenue depends on regulated tariffs that are set by the public authorities or the regulatory authorities (regulated sale tariff and Tariffs for Using the Public Electricity Transmission and Distribution Networks (TURPE), see section 1.5.3 "Regulatory framework" and section 1.5.2 "Public service in France"). Determining tariffs with the participation of regulatory authorities in such a way is a method also used in other countries where the Group operates.

The principles defining the right to tariffs were reiterated in France in the NOME Act no. 2010-1488 of 7 December 2010 and are now provided for in Articles L. 337-7 to L. 337-9 and Article L. 445-5 of the French Energy Code (see section 1.4.2.1.3 "Energy sales contracts at regulated tariff"). The French Energy Regulatory Commission (CRE) may ask the Minister of the Economy and the Minister of Energy to limit or block tariff increases, for the same service quality and unless one of the relevant Ministers expresses its opposition to this proposition within three-month, such proposition consisting in a tariff increase limitation or tariff freeze is deemed to have been accepted. Stakeholders challenging the decisions setting tariffs in the courts. On 24 August 2017, Engie brought a claim before the Council of State for abuse of power against the decision of 27 July 2017 relative to regulated sale tariffs, claiming that the tariffs are contrary to European Union law.

The NOME Act also provided for a regulated access in France to electricity generated by existing nuclear capacity (ARENH) to the advantage of electricity suppliers competing with EDF (see section 1.4.3.3 "Regulated access to historical nuclear power (*Accès Régulé à l'Énergie Nucléaire Historique*, or ARENH)"). The ARENH price, which is regulated, is one of the price references used to set the regulated tariffs. Moreover, the conditions for the implementation of the ARENH, which offer numerous options to the advantage of alternative suppliers, give them arbitrage opportunities on the markets to the detriment of EDF. This therefore exposes EDF symmetrically to major uncertainties that negatively affect the efficiency of its energy markets risk management (see section 2.2.2.1.1 "Control of energy markets risks"). More generally, the Group sells a significant share of its energy output on the European markets or at regulated or contracted prices, indexed on market prices to a greater or lesser degree. In France, as in other countries, the Group cannot guarantee that the regulated sale or purchase tariffs will always be set at a level enabling it to preserve its short-, medium- and long-term investment capacity and its proprietary interests, by ensuring a fair return on capital invested by the Group in its generation, transmission and distribution assets.

For example, regularisation in France of the regulated tariffs applicable to the electricity sales for the period from 1 August 2014 to 31 July 2015, following the Council of State's decision of 15 June 2016 and the publication of the decisions setting forth the rectified tariffs in the Journal Officiel on 2 October 2016, reached a gross amount of € 1,030 million.

**At times, the Group operates its generation, transmission, distribution or supply businesses pursuant to public service concession arrangements and it is not always the owner of the assets it operates.**

The Group does not always own the assets that it uses for its activities and, in such case, frequently operates them pursuant to a public service concession arrangement.

In France, for example, Enedis does not own all distribution network assets: it operates them under concession agreements negotiated with local authorities (see section 1.4.4.2.2 "Distribution activities"), which grant it the exclusive right to engage in expansion actions and operate the public electricity distribution network. These public electricity distribution concession agreements are tripartite agreements between the licensing authority, the operator of the distribution network and the supplier at the regulated rate. Under the law, only Enedis and Local Distribution Companies (LDC) in their service areas (and EDF for areas not connected to the continental metropolitan network) may be appointed to operate the public energy distribution networks and only EDF and LDCs in their service areas may be appointed to provide the supply at the regulated rates. Therefore, at this time, when a concession agreement is renewed, Enedis and EDF do not compete with other operators. However, the Group cannot guarantee that such provisions will not be amended by law in the future (see section 1.5.5 "Public electricity distribution concessions"). Furthermore, the Group may not obtain the renewal of these contracts under the same financial terms and conditions.

The deployment by the Enedis public distribution network of smart meters (Linky) began in December 2015 and will continue until up until 2021 (see section 1.4.4.2.4 "Future challenges"). It is possible however that these time frames and associated costs may need to be revised owing to technical or administrative problems, or acceptability problems regarding the supply of equipment or their installation.

In France, RTE is both the owner and operator of the public transmission system pursuant to the standard concession terms of reference signed by the Minister of Industry (Decree no. 2006-1731 of 23 December 2006 – see section 1.4.4.1 "Transmission – Réseau de Transport d'Électricité (RTE)" and section 1.5.3.2 "French legislation: the French Energy Code").

In France, hydropower generation facilities are operated under concessions awarded by the French State for structures of 4.5MW or more and within the framework of prefectural authorisations for structures of less than 4.5MW (see section 1.5.6.2.4 "Regulations applicable to hydropower facilities"). The challenges associated with the renewal of hydraulic concessions in France are specified in section 1.4.1.5.1.4 "Hydropower generation issues".

The EDF group cannot guarantee that each of the concessions that it currently operates will be renewed, or that any concession will be renewed under the same financial terms and conditions as the initial concession. Furthermore, the Group cannot guarantee that the compensation paid by the government in the event of early termination of a concession's operation will fully compensate the Group's consequent loss of revenue, or that future regulations regarding the limitation of fees will not change in a way that could negatively affect the Group. These factors could have an adverse impact on its activities and financial position.

The Group also operates under electricity distribution or generation concessions in other countries where it does business, particularly in Italy in the field of hydropower generation. Depending on the conditions in each country, the transmission, distribution or generation concessions may not be continued or may not be renewed in its favour with changes to the financial terms and conditions of the concession specifications, which would have an adverse impact on the Group's activities and financial position.

**The legal framework organising the liberalisation of the energy sector in Europe remains recent. This framework may still change in the future and become more restrictive.**

The Group's activities in France and abroad are subject to numerous regulations (see section 1.5 "Legislative and regulatory environment"). Moreover, laws may vary from one country to another, including in the European Union where Directives only establish a general framework.

This legal framework organising the liberalisation of the energy sector is relatively recent. The legal framework is therefore subject to change in the future ("Energy Package"), and such changes could be unfavourable to the Group and, in particular, generate additional costs, be inconsistent with the Group's growth model, change the competitive context in which the Group operates, or affect the profitability of current or future generating units.

**The next multi-year energy plan (PPE) in France or other energy policies in the countries where the Group operates are likely to lead to profound transformations or hinder the Group in its development compared to its competitors.**

Act no. 2015-992 of 17 August 2015 on Energy Transition for Green Growth results in additional indications or constraints with regard to the power generation tools (target of 50% of nuclear power share in French electricity production by 2025, cap of the total authorised capacity of nuclear generation to 63.2GW) and the Company's governance (obligation for any operator producing more than a third of the national electricity generation to draft a strategic plan outlining the actions it agrees to implement to meet the targets set in the multiannual energy programme (PPE) and appointment of a Commissioner to these operators empowered to object to investment decisions whose implement would be incompatible with the objectives of the strategic plan or the PPE). At the meeting of the Council of Ministers on 7 November 2017<sup>(1)</sup>, the French government noted the studies carried out by RTE which show that the deadline of 2025 raises significant implementation difficulties in the light of France's climate change commitments of France, whereas France currently has electricity that is amongst the least carbon-dioxide emitting in Europe.

(1) <http://www.gouvernement.fr/conseil-des-ministres/2017-11-07/trajecoire-d-evolution-de-l-energie-electrique>.



At the same time, the competent authorities or certain governments could, in order to maintain or enhance competition in certain energy markets, take decisions contrary to the Group's economic or financial interests or that impact its model as an integrated operator (see in particular, section 1.5.3.1, "European legislation" and section 2.4.1 "Legal proceedings concerning EDF").

Although EDF complies, and will continue to comply, with the laws and regulations applicable in terms of competition and non-discrimination, competitors have initiated or may initiate litigation for non-compliance with these rules, which could be decided in a direction unfavourable to the interests of the Group.

**Changes to regulations concerning energy savings certificates ("ESC") could impose additional obligations on EDF and generate costs in relation thereto.**

In France, the energy savings certificates (ESC) measure, which is set out in Article L. 221-1 et seq. of the French Energy Code, imposes energy savings obligations on energy sellers. It sets a three-year energy savings target in terms of volumes for those bound by the obligations and financial penalties in case of failure to meet the targets. The Energy Transition for Green Growth Act of 17 August 2015 amended the EEC scheme for the third period of the scheme by adding to the original obligation a supplementary scheme for energy savings for households in situations of fuel poverty. Decree no. 2017-690 of 2 May 2017 fixes, over the period 2018-2020, the overall level of obligations, with a doubling of objectives compared to the third period (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety"). Regulated tariffs for the sale of electricity are increasing by an average of 0.8% on the first of February 2018, for residential customers and small professionals. This increase, decided by the French government, is compliant with the proposal from the Energy Regulation Commission (CRE) dated 11 January 2018, notably to take into account the increased obligation incumbent upon suppliers in matters of energy savings certificates. An increase in competition between energy suppliers, the economic crisis or a reduction in the main sources of energy savings could cause an additional difficulty in reaching this three-year objective. The Group cannot guarantee that the commercial costs incurred in meeting the three-year target will be fully passed on in energy prices, which would be detrimental to the Group's financial position.

**Laws and regulations that require transmission and distribution activities to be managed independently limit control over these activities.**

In accordance with current laws and regulations, EDF manages its transmission network independently from its generation and marketing activities and has transferred its transmission activity to a subsidiary. Since the creation of the subsidiary on 1 September 2005, RTE has been the owner and manager of the French electricity transmission network, which it operates, maintains and develops. On 31 March 2017, EDF finalised the disposal of 49.9% of the share capital of the Company that had held all shares in RTE since December 2016. At the end of the transaction, EDF, the Caisse des Dépôts and CNP Assurances were co-shareholders of the Coentreprise de Transport d'Electricité holding all of the capital of RTE. As RTE is a regulated subsidiary, managed independently according to the provisions of the French Energy Code, EDF is likely to be affected by limits or loss of control over certain strategic and operational decisions, which may have an impact on the outlook for and profitability of its transmission activity in France (see section 1.5 "Legislative and regulatory environment"). At the same time, in accordance with the provisions of the French Energy Code, EDF will continue, in its capacity as shareholder, to bear certain risks related to the activity of RTE and will retain possible liabilities in relation to third parties and to elements that could affect the profitability of assets.

In accordance with current laws and regulations, EDF manages its distribution network independently from its generation and marketing activities and has transferred its distribution activity to a subsidiary. Distribution is carried out by Enedis, whose main purpose is the operation and development of the public energy distribution network. Enedis has been operational since 1 January 2008. As Enedis is a regulated subsidiary, managed independently according to the provisions of the French Energy Code, EDF is likely to be affected by limits or loss of control over

certain strategic and operational decisions, which may have an impact on the outlook for and profitability of its distribution activity in France (see section 1.5 "Legislative and regulatory environment"). At the same time, in accordance with the provisions of the French Energy Code, EDF will continue, in its capacity as shareholder, to bear certain risks related to the activity of Enedis and will retain possible liabilities in relation to third parties and to elements that could affect the profitability of assets.

The Group may face similar risks in countries or regions where it owns or manages transmission or distribution networks and where it is subject to similar regulatory restrictions.

**The development of an integrated European electricity market could be hampered by a delay in the necessary adaptations of the European electricity system.**

The development of an integrated European electricity market relies in particular on the adaptation of the European electricity system, in particular in terms of transport infrastructure and interconnections. This adaptation must take into consideration new data on local, national and European energy policies, energy demands and production offers, in particular the growing role of intermittent energies. To successfully carry out these adaptations, it may be necessary to mobilise time and significant financial resources.

The length of this transitional period associated with the necessary adaptation of the European electricity system, which may extend from five to ten years with regard notably to investment programs in transport grids and interconnections in Europe for the next ten years, could lead to further difficulties for the Group's developing new synergies between the different entities of the Group or proposing new competitive offers.

**EDF has certain obligations, in particular public service obligations, that are remunerated by mechanisms that may not provide complete compensation for additional costs incurred in connection with such obligations, or that are subject to change.**

The public service contract entered into by the French government and EDF on 24 October 2005 specifies the objectives and terms for performing the public service obligations that EDF is appointed to perform under law (in particular Articles L. 121-1 et seq. of the French Energy Code), and also sets out the mechanisms under which EDF is compensated for the performance of these obligations (see section 1.5.2 "Public service in France").

The development of renewable energies connected directly to the distribution network may, in certain regions, saturate the reception capacities of the source substations and networks. This situation may possibly generate local imbalances, or disputes if Enedis must disconnect certain producers or connect them with significant delays. New investments may be required in these regions, with the risk that the costs associated therewith may not be taken into account.

EDF cannot be certain that the compensation mechanisms provided in the laws and regulations applicable to it for performing these public service obligations will fully compensate additional costs incurred to perform such obligations. Furthermore, EDF cannot guarantee that these compensation mechanisms will never be subject to change or that existing mechanisms will fully cover potential additional costs that may be incurred in relation with new duties imposed on EDF in connection with its public service obligations, in particular when a new public service contract is negotiated.

The occurrence of any of these events may have an adverse impact on EDF's activities and financial results and on the Group's financial position.

The provisional amount of expenses that can be attributed to public service energy missions and are to be compensated to EDF reaches €7,389.6 million in 2018, which represents an increase compared to previous years (decision of the French Energy Regulatory Commission (CRE) dated 13 July 2017 relating to the assessment of expenses that can be attributed to public service energy missions for 2018).

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

#### 2.1.2 RISKS RELATED TO THE COMPETITIVE AND GENERAL CONTEXT

**The Group faces stiff competition in the European energy markets and, especially, in the French electricity market, which constitutes its main market.**

In France, the electricity market has been totally open to competition since 1 July 2007. All EDF customers can choose their electricity supplier and therefore elect any of EDF's competitors (see section 1.4.2.1 "Presentation of the market in France"). EDF is prepared to face competition in a context of increased competitive intensity (new customer expectations, new regulations, emergence of new players, mergers between existing operators, changes in market prices, etc.). These changes, at constant consumption and price levels, have had and may have in the future an adverse impact on the Group's sales in France. Lastly, to achieve its objectives, EDF must adapt its marketing expenditures; this situation could have negatively impacted its profitability. Elsewhere in Europe, the Group faces different contexts, depending on the local competitive conditions (totally or partially open markets, position of competitors, regulations, etc.). The type of competition faced by the Group, the evolution over time of such competition and its effect on the Group's activities and results vary from one country to another. These factors depend in particular on the level of market depth and its regulations in the country in question and on other factors over which the Group has no control.

In this context, even if the Group considers that the European electricity market offers opportunities, including in terms of developing new low-carbon electricity uses and the need for energy services and energy efficiency, the Group may not be able to defend its market share or gain market shares as expected, or it may see its margins decrease, which would have a negative effect on its activities, its strategy and its financial position.

**In order to sell its output directly or indirectly, the Group is exposed to the prices of European energy wholesale markets and capacity markets in the course of deployment, the levels of which thus might impact its financial position.**

In conducting its production and marketing activities, the Group does business in energy markets, primarily in Europe. Therefore, the Group is exposed to price fluctuations in the wholesale energy markets (electricity, gas, coal, petroleum products). These fluctuations are particularly significant in the current context of wholesale energy prices in Europe (see section 5.1.2 "Economic environment").

In France, since the end of regulated tariffs for companies, the Group has been exposed to market prices. The degree of exposure depends on the level of subscription to the ARENH mechanism, which is itself dependent on the level of market prices: market exposure in France is thus at a maximum when no ARENH volume is subscribed and it is then estimated at about 80% of the EDF production in France.

The context in recent years of the low prices of the European energy markets, should they continue indefinitely, exposes the Group both in terms of its turnover and the valuation of its assets. The persistently low price levels create strong uncertainty regarding the turnover, the expected margin and the result. Should these price levels continue, they may also affect the profitability of the Group's generating units, mainly in Europe, and the conditions governing their maintenance or even their renewal.

Various factors affect these price levels: commodity prices in world markets, the balance between supply and demand, but also tariff, fiscal or subsidy policies allocated to certain means of production. Accordingly, the Group cannot guarantee that it will be able to avoid adverse impacts on the development of its business, the valuation of its assets and its financial position, following changes in electricity market prices.

The Group manages its exposure to these risks primarily through purchases and sales on wholesale markets. With the exception of petroleum products markets, these are recent markets that are still under development. Therefore, a lack of liquidity may limit the Group's ability to hedge its exposure to risks in the energy market. Moreover, certain of these markets continue to be partially partitioned by country due to, in particular, a lack of interconnections. Furthermore, these markets

may experience significant price increases or decreases that are difficult to foresee, as well as liquidity crises.

Energy market risks are managed in accordance with the "Energy market risks" policy adopted by the Group (see section 2.2.2.2.1 "Control of energy market risks"). The Group hedges its positions on these markets through derivatives, such as futures, forwards, swaps and options traded on organised markets or over the counter. However, the Group cannot guarantee that it is totally protected, in particular against liquidity risks and significant price fluctuations, which could have an adverse impact on its financial position and the valuation of its assets (see note 40 "Management of market and counterparty risks" in the notes to the consolidated financial statements for the year ended 31 December 2016).

Furthermore, the current context of prices in the European wholesale energy markets has an impact on the profitability of certain production tools, in particular fossil fuel-fired power plants, for all European producers. Capacity markets are currently being set up in several European countries, but with different approaches. This may limit the risk that certain power generation assets necessary to secure the supply will be closed or mothballed.

**The Group's activities may be handicapped by unfavourable economic conditions.**

The Group's activities are sensitive to economic cycles and economic conditions in the geographical areas in which the Group does business. An economic slowdown in these areas would result in a drop in energy consumption, investments and industrial production by the Group's customers and, consequently, would have a negative effect on the demand for energy and the services offered by the Group. Such economic conditions could, for example, threaten the profitability of certain of the Group's existing or planned assets or weaken certain of the Group's counterparties (see section 5.1.2 "Economic environment"). The current situation of overall excess capacity of European energy power plants is further weakened by the arrival of new heavily subsidised means of production in an economic context of stable or even declining consumption. The Group cannot guarantee that the effects of an economic downturn in the geographical areas where it does business will not have a significant adverse impact on its activities, operating income, the value of its assets, its financial position or outlook.

In addition, the Group is exposed to fluctuations in cycles of economic growth and in the respective levels of investment in the various countries in which it operates. A slowdown of the general or local economy, significant fluctuations in prices and the availability of energy and raw materials, a decrease in demand for energy and related services in the Group's main markets, events affecting its main customers, significant imbalances between supply and demand in the Group's main markets and, more generally, any major deterioration in the macroeconomic or microeconomic environment in which the Group operates are all risks that could directly or indirectly affect the Group's business volumes, margins, the value of its assets, its financial position or outlook.

**The Group is exposed to risks related to weather conditions and seasonal variations in the business.**

Electricity consumption is seasonal and depends to a great extent on weather conditions. For example, in France, electricity consumption is generally higher during winter months. Furthermore, available power may also depend on weather conditions. Thus, low water levels or heat waves may limit nuclear power generation due to the requirement that rivers downstream of facilities not exceed maximum temperatures. Hydropower generation is also sensitive to rainfall (quantity and annual distribution) and snowfall with respect to mountain ranges (see section 1.4.1.5.1 "EDF New Energies"). Similarly, power generated by wind power or solar plants depends on wind conditions or hours of sunshine at the sites where such facilities are installed (See section 1.4.1.5.3 "New renewable energies"). The service activities may themselves depend on peak periods, in winter and in summer.

Therefore, the Group's results reflect the seasonal character of the demand for electricity and may be adversely affected by exceptional weather conditions or by rain, snow, wind or sunshine conditions that are less favourable than anticipated. For example, the Group may have to compensate the reduced availability of economical power generation means by using other means with higher production costs, or by having to access the wholesale markets at high prices.

### The Group is exposed to the physical and transition effects of climate change.

The assets and activities of the EDF group are likely to be significantly affected by any physical and societal effects of climate change. These effects may be difficult to predict and could have unfavourable consequences for the financial condition of the Group, its operating results, cash flows or facilities. New regulatory developments associated with climate change could also have a negative impact on EDF's activity. The Group's climate change adaptation strategy is described in section 3.3.1. "EDF group's decarbonisation strategy" and 3.3.2 "Adapting the Group's business to climate change".

### The Group must comply with increasingly restrictive environmental and public health regulations, which generate costs and are sources of potential liability.

The activities of the Group are subject to rules in matters of protection of the environment and public health that are increasingly numerous and demanding, both at the French and European levels.

These rules concern the Group's industrial generation activities, as well as energy supply and energy-related services, which must, for example, incorporate the concept of demand management into their offers (for a description of the environmental, health and safety regulations applicable to the Group, as well as future regulations likely to have an impact on its activities, see sections 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety" and 1.5.6.2 "Regulations applicable to EDF installations and group activities").

The French regulatory framework has been strengthened with the entry into force of the law on the duty of care of parent companies and subcontracting companies requiring them to implement measures relating to the activity of the Company and of all the companies it controls aimed at identifying risks and preventing serious infringements of human rights and fundamental freedoms, the health and safety of persons and the environment arising directly or indirectly from the activities of the parent company and subcontracting companies, as well as companies it controls or its subcontractors or suppliers.

Non-compliance with these present or future regulations could expose the Group to significant litigation (see section 2.4. "Legal proceedings and arbitration"). The Group could be found liable, even if it is not at fault or has not breached applicable regulations. Furthermore, the Group may be compelled to compensate breaches, damage or injuries caused by entities that were not part of the EDF group at the time they were committed, if the Group thereafter takes over their facilities.

These regulations may be significantly reinforced by the national or European authorities (see section 1.5 "Legislative and regulatory environment"), which would have a negative impact on the activities of the Group and its financial situation. The Group continuously performs a monitoring in order to assess the impact of regulatory changes on its activity. The provisions implemented are described in section 3.2 "Environmental and societal requirements".

The Group's compliance with current regulations, and future changes to such regulations, has resulted and could continue to result in an increasing level of operating costs and investments necessary for such compliance. The Group may even be required to close facilities that cannot be made compliant with new regulations. In addition, other regulations, which may be more restrictive or which may apply to new areas which are not currently foreseeable, may be adopted by the competent authorities and have a similar effect.

Lastly, stakeholders' external perception of the Group's Sustainable Development policy may change, resulting in a deterioration of the Group's non-financial rating and image.

### As the Group's majority shareholder, the French government may influence the activities or decisions made by the Group.

Pursuant to Article L. 111-67 of the French Energy Code, the French government is EDF's principal shareholder and must retain ownership of at least 70% of its share capital. Under French law, a majority shareholder controls most corporate decisions, including resolutions that must be adopted by General Meetings (in particular, the appointment and dismissal of members of the Board of Directors, the distribution of dividends and amendments to the articles of association, including in the context of share capital increases, mergers or asset contribution deals). In addition, the legal restriction on dilution of the French government's stake may limit EDF's capacity to access capital markets or carry out external growth transactions.

### The results of the referendum in the United Kingdom on the withdrawal from the European Union are likely to have a negative effect on EDF's overall economic conditions, financial markets and activities.

In June 2016, a majority of UK citizens voted in favour of withdrawing from the European Union in a national referendum. The consequences of this referendum, and the procedures for the withdrawal of the United Kingdom, are the subject of negotiations within the withdrawal procedure specified by Article 50 of the Treaty on the European Union. The meeting of the European Council of 15 December 2017 enabled the second phase of negotiations to begin. Numerous policies are likely to evolve (monetary, tax, economy, energy...). The impact of these evolutions on the economic and financial environment (notably in terms of growth, exchange rates and inflation) and on the Group may exist from the transition phase or once the course of events is stabilised. These consequences will depend on the content of the negotiations, not only between the United Kingdom and the European Union, but also with other parties involved, such as the Commonwealth, the United States and China.

The referendum created significant uncertainty about future relations between the United Kingdom and the European Union, including in terms of which laws and regulations of European origin the United Kingdom will decide to replace or replicate in the event of withdrawal. Furthermore, the United Kingdom's withdrawal from the European Union could lead to changes in energy policy both within the European Union and the United Kingdom along with changes to texts relating to nuclear activity.

The draft law empowering the British Prime Minister to implement the right of withdrawal in accordance with Article 50 of the Treaty on European Union, which was approved by the House of Commons on 1 February 2017, provides for the joint exit from the European Atomic Energy Community established by the "Euratom" treaty, of which the United Kingdom became a member on 1 January 1973 at the same time as its becoming a member of the European Economic Community. Specific agreements will be studied accordingly in order to allow for continued cooperation in the nuclear field and operational continuity, with the United Kingdom remaining a member of the International Atomic Energy Agency. However, delays in setting up or deploying the new provisions could disrupt the implementation of ongoing or future projects.

The impact of all these developments on the activity of the Group in the United Kingdom remains limited in the short term. See section 1.4.5.1 "United Kingdom". It may however result in the worsening of the economic conditions leading to a restriction of the energy market. The evolution of the monetary and economic environment, the deflationary or inflationary context, as well as potential fluctuations in exchange rates or new adjustments by economic players may lead both to new risks and new opportunities for the Group in the United Kingdom market.

This new context may lead to changes in the profitability conditions for projects and raise questions or even repel investors associated with future projects of the Group in the United Kingdom or in Europe.

These developments, the uncertainty that they create, as well as the belief that any of them might occur, are likely to weaken European economic activity, threaten the stability of its regulatory environment and cause significant fluctuations in exchange rates (see the risk factor "exchange rate risk" below). This could have a material adverse effect on global economic conditions, and in particular on the Group's business, financial condition, and operating results, in particular in the United Kingdom.

### The Group does business in numerous countries and may face periods of political, economic or social instability.

The Group is exposed to "country risk", meaning that economic, financial, political or social conditions of a country in which it operates may affect its financial interests. The forthcoming elections in the countries in which the Group operates are likely to contribute to an environment of political uncertainty, and therefore legislative and regulatory uncertainty, and to a potential deterioration of economic conditions, notably if a country exits the euro zone or the European Union. A material change in the political or macroeconomic environment may require EDF to bear additional charges and/or expenditures in order to adapt to and comply with such new environment.

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### Risks to which the Group is exposed

Group's activities are described in section 1.4.5 "International activities". Certain Group investments and commitments are exposed to risks and uncertainties associated with doing business in countries that may experience, or have experienced, periods of political or economic instability. Several countries in which the Group operates have regulations that are less advanced and less protective, practice or may introduce controls or restrictions on repatriation of profits and capital invested, levy or may levy specific taxes and fees affecting energy businesses and impose or may impose restrictive rules on the business of international groups. In these countries, identified in particular by assessments performed by credit insurance groups (including COFACE) the electricity sector is also subject to sometimes rapidly changing regulations or regulations which may be influenced by political, social and other considerations, which may affect the operations or financial position of Group subsidiaries in a way that is contrary to its interests. The occurrence of any of these events may have an adverse impact on the Group's activities, and financial position.

Lastly, the Group has developed or built a portfolio of Independent Power Plants (IPPs) in different parts of the world, including Brazil, Vietnam, Laos and China, in which it plays one or more roles (engineering, project owner, project manager, investor, operator). In these different capacities, the Group may incur liability or its financial performance may be affected, especially if the return on capital employed for the IPPs is lower than expected, if long-term electricity contracts or pass-through clauses, if applicable, are challenged, or in the event of major changes to electricity market rules in the relevant country.

#### Risks associated with amendments to the IFRS standards applicable to the Group.

The EDF group's consolidated financial statements for the financial year ended 31 December 2017 have been prepared in accordance with the applicable international accounting standards published by the International Accounting Standards Board (IASB), as approved by the European Union as at 31 December 2017 (see note 1.1 to the consolidated financial statements for the financial year ended 31 December 2017).

This accounting standards framework evolves and new standards and interpretations are currently in the process of being drafted or approved by the competent international bodies. The Group is studying the potential impact of these standards and interpretations, but cannot foresee their development or potential impact on its consolidated financial statements.

### 2.1.3 RISKS RELATED TO THE TRANSFORMATION OF THE GROUP

#### The Group's expansion strategy may not be implemented in accordance with the objectives set by the Group.

The Group intends to continue its development as an efficient and responsible electricity producer, a champion of low-carbon growth in France, in its core countries in Europe (United Kingdom, Italy, Belgium) and internationally in line with the CAP 2030 strategy, combining the search for drivers of growth with the exploitation of existing assets. The strategy and drivers of the Group's transformation are described in section 1.3 "Strategy of the EDF group". The Group's upstream/downstream integrated model enables better management of the risks related to physical and market uncertainties, with the aim of maximising gross margin. See section 1.4 "Description of the activities of the Group". In order to procure the resources for its strategy, the Group thus implements programmes that focus on expansion, reorganisation, increasing profitability (see the discussion below of the risk factor entitled "The Group has set up programmes that aim to improve its operating and financial performance and increase its financial flexibility") and disposals. These programmes may be supplemented by a strategic analysis of assets which may itself lead to a requirement for additional financial agility, giving rise to these disposals.

The Group intends to develop and consolidate its integrated range of services solutions, notably eco-energy efficiency services, within a process of sustainable

development that is local to customers and regions. The energy services market is very competitive, and the energy efficiency market has strong development potential (see section 1.4.6.1 "Energy Services"). The integration of Dalkia into the Group since 25 July 2014 reinforces this expertise and development sector (see section 1.4.6.1.1 "Dalkia"). However, the Group cannot guarantee that its service offer will be successful or that it will always be able to implement its expansion policy in this area, which may have an adverse impact on its financial position and outlook.

In the new energies field, EDF relies primarily on its EDF Énergies Nouvelles subsidiary (see section 1.4.1.5.3 "EDF Énergies Nouvelles"), which does business in numerous countries. The profitability of these developments is often dependent on the support policies adopted in the various countries. The Group cannot guarantee that the support programmes will not change in some of these countries and adversely impact the profitability of investments made.

With regards to nuclear activities, (see section 2.1.5 "Specific risks related to the Group's nuclear activities"), the Group may not achieve the expansion that it anticipates or it may be unable to carry out projects that it has initiated in France and abroad, or it may be unable to carry out such projects over their duration under satisfactory economic, financial and legal conditions. In particular, through partnerships or equity investments, the EDF group is committed to international projects for the construction and operation of nuclear power plants (notably in China and the United Kingdom). These projects require obtaining administrative authorisations, licences, permits and, in certain cases, setting up additional partnerships. These are projects of large-scale and long duration, involving numerous industrial partners and significant investments, for which the financing conditions may still be subject to confirmation. Given the economic climate, obtaining such funding may be delayed. Also, changes to the regulatory framework in certain countries could have an impact on the commitments and liability of EDF. Even when it has negotiated protective contractual arrangements, the Group cannot guarantee that any or all of these projects will be carried out in accordance with the anticipated schedules, under satisfactory economic, financial, regulatory or legal conditions or that they will, in the long term, generate the profitability anticipated at the outset, which could have an adverse impact on the financial situation of the Group and on its image.

Furthermore, the expansion of the Group's gas business is an important issue, both in terms of the use of gas in power generation and the development of gas offers (see section 1.4.6.2 "Gas activities"). The outlook for global supply and demand for gas is changing (the boom in unconventional sources of gas, particularly in the United States, rising demand in emerging countries, etc.). The competitive environment for the gas sector is evolving in France and in Europe with the emergence of new operators and the mergers of energy companies. The dependence of European countries on imports of natural gas is already high and continues to increase, due mainly to the depletion of local resources and increasingly distant supply sources. To implement its gas strategy, the Group must not only have access to competitive sources of supply, but also to logistical infrastructure (such as storage, gas pipelines and LNG terminals) that allow it to transport its gas to locations near points of consumption, have the requisite flexibility and generate synergies between the various entities of the Group, including those which it does not control. The Group cannot guarantee that it will always, under competitive financial conditions, have access to gas supply sources (through long-term contracts or the acquisition of gas fields, for example) or to gas infrastructure, or be able to generate the synergies anticipated. All of these factors may slow the expansion of the Group's gas strategy, which could have an adverse impact on its activities, financial position and outlook. Moreover, in the event of a harsher global geopolitical context, the Group cannot guarantee that it could withdraw from projects in which it has committed itself either rapidly or under acceptable economic conditions (see section 1.4.5 "International activities").

More generally, the Group may face unexpected changes in its regulatory, economic and competitive context, which may render its decisions inappropriate, or it may encounter difficulties in implementing or changing its strategy, which may have an adverse impact on the Group's business, financial position and outlook.

### The Group's acquisition and disposal transactions carry risks and may not always achieve the objectives pursued.

As part of its development strategy, the Group is required to carry out transactions involving the acquisition of assets or equity interests, as well as the creation of joint ventures and, more generally, all types of external growth transactions (see sections 1.4 "Description of the Group's activities" and 5.1.3.2 "Investments and partnerships").

External growth operations imply risks including the following: (i) the assumptions adopted by the Group in valuing an acquisition may not prove accurate, particularly concerning anticipated market prices, cost savings, gains, synergies and the profitability; (ii) difficulties relative to the quality and performance of the assets acquired or the liabilities of acquired companies may be undervalued; (iii) difficulties relating to the quality of the counterparty may occur in invoking guarantees of liabilities granted by the seller in the case of acquisition contracts, (iv) difficulties integrating the businesses or companies acquired may occur; (v) the Group may not be able to retain certain key employees, customers or suppliers of the acquired companies; (vi) the Group may be required or wish to terminate pre-existing contractual relationships on costly or unfavourable financial conditions; (vii) the Group may increase its debt to finance these acquisitions, thus limiting its financial flexibility and the opportunity to obtain additional loans in the future; and (viii) the Group may be required to make commitments to the antitrust authorities, which may be implemented on terms that are less favourable than anticipated by the Group.

Consequently, the benefits expected from external growth operations may be lower or may not be obtained as quickly as expected, which could have an adverse impact on the Group's financial position and outlook.

The Group has also carried out and may carry out transactions involving the disposal of assets or equity investments, in particular as part of its plan for disposals announced on 22 April 2016 (see risk factor below, "The Group implements programmes aimed at improving its operational and financial performance and strengthening its financial flexibility. The objectives set for these programmes may not be achieved"). In connection with such disposals, the Group may provide guarantees concerning the assets sold and, consequently, may have to pay compensation or make price adjustments to the purchaser, which could have an adverse impact on the Group's financial position and outlook.

The Group may also decide to not carry out the external growth transactions and disposals it has planned, or to carry them out for a price other than the desired price, due *inter alia* to contractual, financial or regulatory limitations, or political intervention. This may have an adverse impact on the Group's financial position and outlook.

### The Group may not hold a controlling majority or it may share control in certain of its subsidiaries and equity interests.

Certain of the Group's business activities are conducted, or may in the future be conducted, through entities in which the Group shares control or in which it is the minority shareholder. In such situations, the Group may experience a deadlock if the partners are unable to agree, or decisions may be taken that are contrary to its interests, which may limit the Group's ability to implement the strategies it has adopted and have an adverse impact on its business activities, financial position and outlook.

### The price of EDF shares could be subject to significant fluctuations.

In recent years, the stock markets have undergone considerable fluctuations which have not always been commensurate with the results of companies whose shares are traded. Such fluctuations in the French and international financial markets could significantly affect the market price of EDF shares. Changes in energy prices, significant regulatory constraints surrounding the energy and nuclear markets, and the increasing demands of nuclear safety authorities also contribute to the volatility of EDF actions.

The EDF share price could also be significantly affected by many factors affecting the EDF group, its competitors, economic conditions in general or the energy sector in particular, for example as a result of political decisions on energy policy.

### The Group must continually adapt its expertise in a rapidly changing environment and renew a significant share of its workforce, while ensuring experience and skills are transferred to new employees.

In a changing environment, the human dimension is more than ever at the heart of EDF's strategic project, a key factor in the Group's performance. Anticipating requirements, taking into account changes to occupations and the necessary functional and geographic adaptation lead to the constant development and adaptation of skills. (see section 3.6 "Human resources").

In France, a large number of EDF employees leave the labour force each year, despite the impact of the reform of the special pension scheme for Electricity and Gas Industry employees on average retirement age. For example, within the scope of EDF, around 20% of the workforce could retire between 2015 and 2020 (see section 3.6.1 "Professional excellence: employment and skill development"). Although this situation is an opportunity to adapt the skills of EDF's personnel to the new challenges of the Group, replacing these employees requires anticipating requirements and transferring knowledge and coping with the competition to recruit the most qualified individuals, while EDF's attractiveness as an employer

The EDF group considers matching skills to requirements as a major challenge and therefore uses the appropriate measures to be able to acquire, retain, redeploy, develop or renew the skills that it will need in a timely manner and under satisfactory conditions. However, it cannot guarantee that the measures adopted will always prove sufficient, which may have an impact on its activities and financial position.

### A share of the Group's workforce is employed by organisations common to EDF and Engie. Therefore, the Group depends in part on management mechanisms set up within these joint structures.

A share of the Group's workforce is employed by organisations common to EDF and Engie (almost all of them by the joint department of Enedis and GRDF, the two distribution network managers). Therefore, certain decisions made within these joint organisations can have an impact on EDF, in particular on its costs and on the manner in which its resources are managed. Furthermore, EDF and Engie may have divergent interests or views concerning these joint structures, which may have an adverse impact on the Group's labour relations, financial results and financial position (see section 1.4.4.2.3 "Service shared by Enedis and GRDF").

### The Group may be required to meet significant commitments related to pensions and other employee benefits.

The pension plans applicable in the various countries in which the Group operates involve long-term commitments to pay benefits to the Group's employees (see note 31 to the consolidated financial statements for the financial year ended 31 December 2017). In France, in addition to these pension commitments, the Group also owes obligations for post-employment benefits and long-term benefits for employees currently in service.

To cover these commitments, the Group has set up outsourced funds or pension funds. Depending on the case, at the end of 2017, these assets only partially covered these commitments, although, for the Group, the maturity dates of these obligations are relatively smoothed over time. At 31 December 2017, the average duration of employee benefits commitments was 19.7 years in France and 21.0 years in the United Kingdom.

The amounts of these commitments, the provisions booked, the outsourced funds or pension funds set up and the additional contributions required to make up insufficient funding are calculated based on certain actuarial assumptions, including a discount rate subject to adjustment depending on market conditions and, in the event of any employee-related commitments in France, on the rules governing retirement benefits paid out by the general retirement scheme, and amounts owed by the Group. These assumptions and rules may be adjusted in the future, which could increase the Group's current commitments for pensions and other employee benefits and, therefore, require a corresponding increase in provisions.

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Furthermore, if the value of outsourced funds or pension funds proves insufficient to meet the corresponding commitments, in particular in the United Kingdom or France, primarily due to calculation assumptions or developments in the financial markets, (see risk factor above, "The Group is exposed to risks related to financial markets"), the Group may be obliged to make additional contributions to the relevant funds, which may have an adverse impact on its financial position.

#### 2.1.4 RISKS RELATED TO THE OPERATIONAL PERFORMANCE OF THE GROUP

**The Group has set up programmes that aim to improve its operating and financial performance and increase its financial flexibility. The objectives set for these programmes may not be achieved.**

The Group has set up and may set up programmes that aim to improve its operating performance and increase its financial flexibility. The meeting of the Board of Directors on 22 April 2016 adopted a performance plan which includes a reduction in operating expenses, actions to optimise the working capital requirement, control of net investments (excluding Linky, excluding HPC and excluding new developments), and an asset disposal plan. By press release dated 13 November 2017, EDF announced that it was accelerating the deployment of this performance plan. The aim of reducing operating expenses in 2018 compared to 2015 was therefore increased to €800 million instead of €700 million and is set at €1.1 billion in 2019 compared to 2015. The disposal plan of €10 billion, which was to be completed by the end of 2020, should be almost finished by the end of 2018. Total net investments, excluding acquisitions and asset disposal plans 2015-2020, will be less than or equal to €15 billion in 2018. However, the Group cannot guarantee that the performance improvement programmes that it implements will have the anticipated results or that these results will be obtained according to the planned timetable, nor that they will be sufficient to cope with regulatory and economic developments.

**The Group's activities require numerous administrative permits that may be difficult to obtain or that may be obtained only subject to conditions that may become significantly more stringent. Administrative appeals may also be filed against such permits, which may hurt the Group's business.**

The operation and development of the industrial activities of the Group requires numerous administrative permits, both at the local and national levels, in France and abroad. The procedures for obtaining and renewing these permits can be drawn-out and complex. These permits are not obtained systematically and the requirements for obtaining them may change and are not always predictable. Even when these permits have been granted, stakeholders may file administrative appeals against them (see section 2.4 "Legal proceedings and arbitrations"). Accordingly, the Group may incur significant expenses in complying with the requirements for obtaining or renewing these permits (for example, costs of preparing permit applications, investments associated with installing equipment required before a permit will be issued, setoffs of environmental impacts of structures to be built). This may also handicap the Group's industrial activities. Delays, overly high costs or the suspension of its industrial activities due to the inability to retain or renew permits may have an adverse impact on the Group's activities and profitability. In addition, the Group may have also used resources without obtaining necessary permits and authorisations and therefore have to cancel or withdraw from a project, which may have an adverse impact on its business, expansion or financial position.

**The Group is exposed to risks related to the control of major projects.**

As part of its activity, the Group has to plan or carry out, as project manager or prime contractor, projects that are inherently complex and require significant investments. The completion of such projects may be subject to numerous technical, operational, economic, regulatory or environmental contingencies which might delay or prevent completion and thereby negatively impact the Group's activities, its income, the value of its assets, its financial position and outlook. The risks associated with EPR projects are covered in section 2.1.5 "Specific risks related to the Group's nuclear activities".

**Technological choices made by the Group may be outperformed by more efficient technologies, notably in matters of the digital transition.**

In order to anticipate technological and societal developments, the Group constantly monitors the identification and use of technological innovations and breakthroughs. However, the Group can not foresee with certainty how these developments could ultimately affect the Group's activities or claim to identify these developments in a comprehensive manner. The Group's business activities rely on a certain number of choices, which may be outperformed by other technologies that prove more efficient, more profitable, safer or more pertinent in light of possible future standardisation and standards than the technologies used by the Group.

The use of new technologies by the Group's competitors or the development by these competitors of new, more efficient and more competitive technologies, notably concerning the digital transition, could have the effect of reducing or eliminating the competitive advantage that the Group enjoys as a result of certain of its technologies and its experience. Similarly any delay or failure in the Group's development of technologies, planning or the allocation of the Group's technology development resources could have a similar effect on the Group's competitive advantage and thus negatively impact its business, financial position, its attractiveness as an employer, its reputation and its prospects.

**For its business, the Group depends on information systems which may fail or be subject to malicious attacks.**

The Group operates multiple and very complex information systems (servers, networks, applications, databases, etc.) which are essential for the conduct of its commercial and industrial activities and which have to adapt to a rapidly changing environment. Indeed, the Group's business depends heavily on the efficiency of its technology and its information systems. Furthermore, the Group is fully committed to the digital transition. The risk involved with operating such systems and technologies can take numerous forms, including disruption, malfunction or failure of any of these systems, computer viruses, piracy, identity theft, diversion of sensitive data, corruption of electronically stored data, violations of regulations, human errors and terrorist attacks. The increased frequency and sophistication of recent hacking incidents demonstrates the importance of these computer risks, as well as the financial and reputational damage that may result from such incidents.

The Group has implemented procedures to test these systems in order to guarantee as far as possible that any new versions provide a level of functionality suited to the Group's needs and has set out procedures for managing incidents and crises in order to be able to provide solutions in the event of one-off failures. These procedures also address potential malicious attacks (see section 2.2.2.2.4 "Security of information systems"). Despite the Group's multiple security measures, none of these events may be completely excluded, which could have significant adverse consequences for the Group.

The Group has also implemented a policy to strengthen and improve its back-up programmes and information systems, which are tested annually, and crisis management procedures have been set out which are regularly improved through feedback from incidents. However, the Group cannot guarantee that these programmes will not encounter technical difficulties during deployment or delays affecting their real-life implementation or that such programmes will make it possible to limit, in the event of a major disaster, the negative impact on the activity and the Group's financial position.

**The Group operates facilities that may cause significant harm to the natural or human environment or for which accidents, or external damage of natural or malicious origin, could have serious consequences.**

The risks specific to nuclear facilities are the subject of an additional explanation in section 2.1.5 "Specific risks related to the Group's nuclear activities".

Persons working in or near electricity transmission and distribution facilities may, in the event of an accident, error or negligence, be exposed to the risks of electric shock and electrocution. In this field, the Group implements, in accordance with the provisions of the French Energy Code, the necessary prevention and safety measures. However, the Group cannot guarantee that these measures will prove sufficient in all cases. Questions concerning the risks to human health from exposure to electromagnetic fields (EMF), in particular from electrical networks operated by the Group, have been raised both in France and abroad. Based on studies completed over the past 20 years, the existence of health risks due to exposure to EMFs has not been proven. Furthermore, in a report published in June 2007, the World Health Organisation (WHO) considers that health risks, if any, are low and that adopting arbitrarily low exposure limits is unjustified. At this time, results from 30 years of research is available, but it cannot be excluded that medical knowledge about health risks related to exposure to EMFs may evolve, public sensitivity about such risks could increase or the precautionary principle could be applied very broadly. Despite these efforts, the possibility remains that the EDF group could be exposed to increased litigation or that the issue may lead to the adoption of more stringent and costly measures for the construction, development, upgrading or operation of the transmission and distribution network (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety").

More generally, the Group operates or has operated in France and abroad facilities which, as currently operated, could be or could have been the source of industrial accidents or environmental and public health impacts. The Group's facilities may be located in industrial areas where other activities subject to similar risks are conducted, which means that the Group's own facilities may be impacted by accidents occurring at neighbouring facilities owned by other operators and not under the Group's control.

In accordance with ISO 14001 (see section 3.1.8.2 "Management and prevention of environmental risks"), the Group implements appropriate measures to prevent and, if necessary, repair any industrial accidents or environmental damage caused by the facilities that it operates. These measures are intended, in particular, to protect the Group not only from the risk of an accident (such as explosion, fire, etc.) occurring in its own facilities, but also from the impact of such an accident occurring in a neighbouring facility owned by a third party. However, in general, the Group cannot guarantee that the measures taken to control these risks will prove fully effective if any of the events listed above were to occur. An accident of the type described above could have serious consequences for persons, property and business continuity, and the Group could be found liable. Insurance policies for civil liability and damages taken out by the Group could prove to be significantly inadequate, and the Group cannot guarantee that it will always be able to maintain a level of cover at least equal to current cover levels and at the same cost. The frequency and magnitude of natural disasters seen over the past few years could have and have had a significant impact on the capacities of the insurance and reinsurance market and on the costs of civil liability and damage insurance cover for the Group. Such accidents could also lead to the shutdown of the facility affected and, possibly, of similar facilities that may be considered to present the same risks (see section 2.5 "Insurance").

Lastly, facilities or assets operated by the Group or its employees may be the target of external attacks or malicious acts of any kind. Safety measures were incorporated into the design of the facilities and sites, and protective measures have been taken by EDF. Moreover, safety measures to counter various forms of attacks have been implemented in conjunction with the public authorities. An attack or malicious act committed on these facilities could have consequences such as injury to persons and damage to property, the Group being held liable on the grounds of measures judged to be inadequate and interruptions to operations. In addition, the Group cannot guarantee that European and national legislation regarding the protection of sensitive sites and critical infrastructure will not become more restrictive, which could generate additional investments or costs for the Group.

Any one of these events may have material negative consequences on the Group's activities, results, reputation and financial position.

**Repeated or widespread blackouts in an area served, particularly if they are attributable to the Group, may have consequences for the Group's activities, financial position and image.**

The Group may be exposed to repeated or widespread blackouts or be blamed for such blackouts, even if the causal event occurred in another network or was attributable to another operator, particularly in view of the unavailability of certain reactors associated with the additional controls undertaken by EDF (see section 2.1.5 "Specific risks related to the Group's nuclear activities" – "The nuclear fleet operated by the Group may require repairs or cumbersome or costly modifications").

The causes of blackouts may vary: local or regional imbalances between electricity generation and consumption, accidental interruptions to the power supply or transmission, cascading power failures, interconnection problems at borders and difficulty in coordinating operators, particularly in a market that may be evolving or insufficiently regulated.

The initial impact of such power failures would be repair costs incurred to re-establish power or restore the network. Power failures may also generate capital expenditures if it were decided, for example, to install additional generation or network capacity. This could also cause a decline in the Group's turnover. Lastly, power failures may have an adverse impact on the Group's image with its customers, particularly if the blackouts are attributable to the Group.

**Natural disasters, significant weather changes, industrial accidents of any kind or any major event on a scale that is difficult to predict may have a material adverse impact on the Group's industrial and commercial activities.**

EDF and its subsidiaries have developed crisis management plans to deal with natural disasters or major events. These crisis management plans are regularly evaluated and tested (see section 2.2.2.1.2 "Crisis management and business continuity").

As was the case with storms Klaus (2009) and Xynthia (2010) in France, and Irma (2017) in the Antilles, natural disasters (floods, landslides, earthquakes, etc.), other significant weather changes (droughts, etc.), or any other event on a scale that is difficult to predict (large-scale epidemics, etc.) may affect the Group's activities. The EDF group, based on its national and international experience of events of this type, implements measures to strengthen the robustness of its facilities, particularly industrial ones, and to limit the impact and consequences in the event of large-scale events. Experience feedback for major nuclear accidents at the international level is discussed in section 2.1.5 "Specific risks related to the Group's nuclear activities." In the event of an exceptional event, the measures that are adopted may generate costs in addition to the costs of repairing the damage caused by the natural disaster and the loss of earnings from the interruption to supply.

As part of the renewal of the storm insurance coverage, Enedis has signed with Swiss Re a parametric insurance policy covering its aerial distribution network against the consequences of high-intensity storms (see section 2.5.5.3 "Storm cover"). Island Energy Systems's aerial distribution networks are not covered for property damage. Damage to these networks could have an adverse impact on the Group's financial position in the absence of insurance cover or if cover is inadequate. In addition, renewing or taking out these specific covers may be difficult or costlier due to the impact, frequency and magnitude of natural disasters experienced in recent years by the alternative risk transfer markets.

In the event of a wide-spread health epidemic, EDF has created a plan intended to ensure the continuity of electricity supply, depending on the intensity of the crisis, while guaranteeing the safety of facilities and reducing the health risks to which its employees are exposed.

Despite having set up a crisis management structure that enables it to react promptly to such events, the Group cannot guarantee that the occurrence of a natural disaster, a weather event or any other event on a scale that by its nature is difficult to predict will not have material adverse consequences on its activities, income and financial position.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

#### The Group could be held liable for the occurrence of occupational illnesses or accidents.

Although the Group has for many years taken the steps necessary to comply with the health and safety laws and regulations in the various countries in which it operates, and considers that it has taken the measures required to ensure the health and safety of its employees and that of its subcontractors', the risk of occupational illnesses or accidents cannot be excluded. The occurrence of such events may lead to lawsuits against the Group and may result in the payment of damages, which could be significant.

The measures taken by the Group for radiation protection are described in section 1.4.1.1.3 "Environment, nuclear safety and radiation protection" for France and in 1.4.5.1.2.1 ("nuclear production", paragraph "safety and radiation protection") for the United Kingdom.

Regarding asbestos, the Group has taken measures to treat materials, as well as information and protection measures, as described in section 3.3.2 "The health and safety of our employees and our service providers' employees: an absolute priority". For a description of on-going legal proceedings, see sections 2.4.1 "Legal proceedings concerning EDF", paragraph "Asbestos" and 2.4.2 "Legal proceedings concerning EDF's subsidiaries and holdings", paragraph "Measures taken by employees concerning exposure to asbestos or other harmful chemical substances".

#### Labour disputes could have an adverse impact on the Group's business.

The Group implements measures to maintain the quality of employee/management dialogue. However, it cannot rule out labour disputes or unrest, such as strikes and walkouts, actions in support of claims or other labour disturbances, which could disrupt its activity. The Group has not taken out any insurance to cover losses due to business disruptions caused by labour movements. Consequently, its financial position and operating results may be adversely affected by labour unrest.

#### The Group's results are sensitive to fluctuations in the price and availability of materials and services that it purchases in connection with its business operations.

In the event of significant and sustained increases in the prices of raw materials, the Group may experience higher procurement costs for certain critical products or services. Such increases may also lead certain suppliers to reduce supply due to reduced profit margins. In addition, Group's results may be affected by fluctuations in commodity prices, such as gas and coal.

Moreover, there is increased demand for certain equipment or services, which may have an impact on their availability, in particular equipment used for combined cycle gas turbine power stations, wind turbines, photovoltaic panels and services and equipment in the nuclear sector.

#### A default by the Group's counterparties (partners, subcontractors, service providers, suppliers or customers) may have an impact on its activities and results.

Like all economic operators, the Group is exposed to possible default by certain counterparties (partners, subcontractors, service providers, suppliers or customers). A default by these counterparties may impact the Group financially (loss of receivables, additional costs, in particular if EDF is required to find satisfactory alternatives or take over the relevant activates or pay contractual penalties). Such defaults could also impact the quality of work performed, completion deadlines or the procurement of certain critical products or services, and exposes the Group to reputational risk, business continuity risk for certain projects or the loss of contracts.

The monitoring and oversight procedures applied within the Group in connection with its exposure to the counterparty risk inherent in its contractual relationships are described in section 2.2.2.2.2 "Control of financial risks and investments".

#### The Group is exposed to risks in the financial markets.

As a result of its activities, the EDF group is exposed to risks in the financial markets:

- liquidity risk: the Group must at all times have sufficient financial resources to finance its day-to-day business activities, the investments necessary for its expansion and the appropriations to the dedicated portfolio of assets covering long-term nuclear commitments, as well as to deal with any exceptional events that may arise. The Group's ability to raise new debt, refinance its existing indebtedness or, more generally, raise funds in financial markets, and the conditions that can be negotiated to this effect, depend on numerous factors including the rating of the Group's entities by rating agencies. The Group's debt is periodically rated by independent rating agencies (see section 5.1.6.1.2 "Financial rating"). Any downgrading of EDF's debt rating could increase the cost of refinancing existing loans and have a negative impact on the Group's ability to obtain financing;
- counterparty risk, in the financial area, may be covered by the use of margin calls. In the event of high volatility in the markets, the Group may have to mobilise cash (see section 5.1.6.1.1.2 "Management of liquidity risk");
- exchange rate risk: due to the diversity of its activities and their geographical distribution, the Group is exposed to the risks of fluctuations in foreign exchange rates, which may impact currency translation adjustments, balance sheet items and the Group's financial expenses, equity and financial position. In the absence of hedging, currency fluctuations between the euro and the currencies of the various international markets in which the Group operates can therefore significantly affect the Group's results and make it difficult to compare performance levels from year to year. If the euro appreciates (or depreciates) against another currency, the euro value of the assets, liabilities, income and expenses initially recognised in that other currency will decline (or increase). Moreover, insofar as the Group is likely to incur expenses in a currency other than that in which the corresponding sales are made, fluctuations in exchange rates could result in an increase in expenses, expressed as a percentage of turnover, which could affect the Group's profitability and income (see section 5.1.6.1.3 "Management of foreign exchange risk").

An adverse fluctuation of 10% in exchange rates related to currencies in which the EDF group's debts are denominated (USD, GBP, other currencies) would have an impact amounting to around 2% on the EDF group's indebtedness after hedging instruments.

Due to the exchange rate hedging policy implemented within the Group, the income statements of the companies controlled by the EDF group are marginally exposed to exchange rate risk;

- equity risk: the Group is exposed to equity risk on securities held primarily as dedicated assets constituted to cover the cost of long-term commitments in relation with the nuclear business, in connection with outsourced pension funds and, to a lesser extent, in connection with its cash assets and investments held directly by the Group (see section 5.1.6.1.5 "Management of equity risks" and 5.1.6.1.6 "Management of financial risk on EDF's dedicated asset portfolio");
- interest rate risk: the Group is exposed to risks related to changes in interest rates in the various countries in which it operates. These rates depend partly on the decisions of the central banks. Increases in interest rates could affect the Group's ability to obtain financing under optimum conditions or even its ability to refinance itself if the markets are very tight. The Group's exposure to changes in interest rates involves in particular two types of risks: (i) the risk of changes in the value of fixed-rate financial assets and liabilities along with the risk of changes in the Group's discounted liabilities and (ii) the risk of changes in cash flows associated with variable-rate financial assets and liabilities. Downward variations in interest rates could notably affect the value of the Group's long-term commitments in the nuclear field and its commitments in matters of retirement and other specific provisions in favour of the employees, which are discounted with discount rates which depend on interest rates with different time frames. Such changes in provisions could impact the Group's financial position by (i) affecting the financial rating of its debt securities and (ii) generating an obligation to pay for dedicated hedging assets (See risk factor below in section 2.1.5 "Specific risks related to nuclear activities", in the paragraph "Provisions made by the Group for spent fuel treatment operations, recovery and packaging of waste and for the long-term management of waste may increase significantly if assumptions... are revised") (and see section 5.1.6.1.4 "Management of interest rate risk").



The impact on income before tax of a 0.5% fluctuation in interest rates would be around +€240million<sup>(1)</sup> (impact on the financial result in relation to the cost of the debt and the accretion expense of the provisions, and on the gross operating surplus in relation to the benefits to the personnel).

As for the financial assets held by the EDF group and classified as floating-rate bonds and negotiable debt securities, the impact on income before tax of a 1% fluctuation in interest rates would be around €12 million.

Besides, the EDF group's exchange rate risk relates, in particular; to the value of the EDF group's long term nuclear commitments (see note 29 to the consolidated financial statements for the fiscal year ended 31 December 2017) and its commitments for pensions and other specific employee benefits (see note 31 to the consolidated financial statements for the fiscal year ended 31 December 2017), which are discounted to their present value using rates that depend on interest rates at various time horizons, and debt instruments held for the management of the dedicated assets constituted to cover these commitments.

For the specific case of nuclear provisions in France, given the decline in rates over the past few years, the discount rate could be reduced over the next few years by applying the method used by the Group, in accordance with regulation on the ceiling discount rate. The importance of this decline will depend on the future rates evolution. An increase in nuclear provisions due to a decrease of the discount rate may require allocations to the dedicated assets and may result in an adverse effect on the Group's results, cash flow generation and net debt.

With regards to the regulations on the ceiling discount rate, the order dated 29 December 2017 changes the statutory discount rate ceiling. The new formula leads, progressively over a period of ten years, from the regulatory ceiling as of 31 December 2016 (4.3%), to a regulatory ceiling equal, in 2026, to the average over the four previous years of the thirty-year constant maturity rate (TEC 30), increased by 100 basis points.

Given past and expected changes in rates, this new formula, which takes into account progressively the transition from the 4.3% regulatory rate to an average rate calculated over four years, including a 100 basis point spread, should lead to a steadier evolution of the regulatory ceiling rate during the next few years, as opposed to the previous formula.

As the case may be, this increase in provisions, including those covered by dedicated assets, does not mean however a mechanical impact on the amount to be allocated to dedicated assets as of the considered dates, as the former depends on:

- the profitability of dedicated assets and the resulting coverage rate: there is no need to allocate to dedicated assets once the coverage rate reaches 110%, as is shown by the situation at the end of 2017, where the increase in the provision of €0.7 billion (€0.6 billion for provisions to be covered by the dedicated assets), caused by the 0.1% drop in the discount rate, was not compensated fully by an allocation to dedicated assets because an allocation of €0.4 billion will suffice to achieve the coverage rate of 110%;
- the period within which the allocation is made, as applicable rules provide for the option to set a maximum three-year time period to proceed with the allocation, subject to approval by the supervisory authority.

As a reminder, changes in nuclear provisions estimates resulting from a variation of the discount rate are recorded (see notes 1.3.2.1 and 29.1.5.2 to the consolidated financial statements presented in chapter 6 of this Reference Document):

- as an increase or decrease of the corresponding assets, within the limit of their net book value, when the counterparty to the provision has been initially recorded as an asset;
- as financial income for the period in other cases.

Therefore any change of the discount rate therefore has a punctual impact on the financial results of the year during which the discount rate change occurred, without equivalence for the following years.

The policy and principles concerning the management of the Group's financial risks are described in section 5.1.6.1 "Management and control of financial risks". The control of financial risks is described in section 2.2.2.2.2 "Control of financial risks". However, the Group cannot guarantee that it is totally protected, in particular in the event of significant fluctuations in foreign exchange rates, interest rates and the equities markets.

**The Group is involved, and could be involved in the future, in litigation or regulatory investigations which may adversely affect the Group's reputation, as well as its relationship with regulatory bodies and results.**

Notwithstanding the fact that the Group has taken all necessary measures to ensure the compliance of its practices with the regulations in force, a risk of non-compliance cannot be totally ruled out.

As a result of its activities, the Group is involved in several litigation and arbitration cases and regulatory investigations, of which material ones are described in section 2.4 "Legal proceedings and arbitration". In the future, the Group may be involved or exposed to such proceedings. The potential adverse outcome of these proceedings may entail the payment of damages, or result in other civil or criminal adverse consequences (including financial consequences) for the Group. The implementation of class actions in France in 2014 and similar developments in other European jurisdictions, as well as recent or future regulatory changes, may increase litigation risks and related costs, which could have a negative impact on the Group's results and reputation.

**Prohibited and unethical practices carried out by employees or third parties in the conduct of business could, in certain circumstances, adversely affect the Group's reputation and shareholder value.**

The globalisation of the Group's activities and the strengthening of regulatory frameworks repressing unethical practices especially in the conduct of business could expose the Group, its employees, or third parties acting on the Group's behalf to criminal and civil sanctions that could adversely affect EDF's reputation and shareholder value.

In France, Act No 2016-1691 of 9 December 2016 on transparency, the fight against corruption and the modernisation of economic life requires companies to take measures to prevent and identify acts of corruption or trading in influence, under the control of a French Anti-Corruption Agency established under the Act and under penalty of administrative or criminal penalties. This law incorporates a system for protecting whistleblowers from possible criminal or disciplinary prosecution and provides, within a corporate framework, an internal alert reporting system (see section 1.5.6.1 "General regulations that are applicable to the environment, health, hygiene and safety"). These regulations could increase our compliance costs. Moreover, any failure to comply in any way with these regulations could lead to prosecutions being brought against EDF, which could have a negative impact on the Group's result and reputation.

## 2.1.5 SPECIFIC RISKS RELATED TO THE GROUP'S NUCLEAR ACTIVITIES

The EDF group is the world's leading nuclear operator in terms of the number of reactors in operation (73 reactors for which the EDF group is the nuclear operator, among 449 operating reactors in the world)<sup>(2)</sup>. With 58 reactors in operation in France, nuclear-generated electricity represents 48.3% of the installed power generation capacity at the end of 2017 and 71.6% of total electricity generation in France in 2017<sup>(3)</sup>. EDF also operates 15 reactors in the United Kingdom with 20.4% of generation in 2016<sup>(4)</sup>.

(1) This estimate is only indicative. The completeness of the economic effects of a rate increase for the Group is not presented here.

(2) Source: International Atomic Energy Agency, Power Reactor Information System, <https://www.iaea.org/pris> Indicating that there are 449 nuclear reactors in operation in the world on February 15<sup>th</sup>, 2018

(3) Source: RTE, <http://www.rte-france.com/fr/article/bilans-electriques-nationaux>

(4) Source: <http://www.iaea.org/pris/>

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

The Group has basic nuclear fuel cycle facilities and has had new activities in research, equipment manufacture and the supply of services to other nuclear operators, since the integration of the subsidiary New NP, which became Framatome, within the scope of the Group.

In addition, the Group holds minority stakes in nuclear power plants in operation in the United States (through CENG), Belgium and Switzerland, which it does not operate. The Group is investing in new reactor projects in France, the United Kingdom and China and carries out its nuclear industrial activity in other countries. The share of nuclear energy, as a low-carbon form of energy and a part of the Group's electricity mix, thus represents a significant industrial asset for the competitiveness of the Group.

The nuclear activities of EDF are associated with the following issues:

- as with any nuclear operator, the latter's obligations means giving ongoing priority to nuclear safety, based on technical and organisational provisions in order to guard against a nuclear accident and, in the hypothetical event of an accident occurring, to limit the consequences of such an accident. The nuclear business is carried out under the control of nuclear safety authorities in countries where the Group exercises nuclear operator responsibility.
- although the nuclear business can contribute effectively to the security of energy supply and to combating the greenhouse effect, it must also demonstrate its competitiveness and its acceptance over the different time scales in which it operates. As the nuclear business inherently requires substantial and long-term investments, special care must be taken with regard to the long-term soundness and efficiency of the maintenance and upgrading programmes for the fleet in operation, new reactor projects and compliance with very long-term commitments. The nuclear business is an industrial activity that brings together a large number of industrial partners in France, Europe and throughout the world. In France, EDF was assigned, by the public authorities, the role of lead company in the nuclear sector, with the integration of the New NP subsidiary, which became Framatome, which involves specific risks associated with the exercise of this responsibility and the activities of Framatome;
- in light of the fact that EDF is the world's largest nuclear operator, exploiting global feedback and making comparisons with best practices internationally <sup>(1)</sup> represents an ongoing challenge to ensure that the EDF group is best situated to be able to sustainably manage the risks and opportunities associated with being world leader;
- the nuclear business requires that the EDF group be able to control large complex projects which might continue over a number of years. Such projects in turn require the acquisition and mastery of innovative technologies, notably at the digital level.

#### **A decision by the French public authorities or the French Nuclear Safety Authority (ASN) to halt one or more nuclear power generation units could have material adverse consequences for the Group.**

The Act no. 2015-992 of 17 August 2015 on the Energy Transition for Green Growth calls for the nuclear component in electricity generation to be reduced by 50% before 2025. It also caps at current levels (63.2GW) the total authorised capacity of nuclear electricity generation. In practical terms, this provision forces EDF, in order to obtain permission for the commissioning of any new nuclear generating capacity (such as permission from the Flamanville EPR), to shut down any equivalent capacity. Accordingly, the early closure of one or more reactors in the EDF fleet might be decided upon, not because of an industrial choice but rather because of a legal decision. Such decisions must lead to EDF being compensated for the harm suffered, as reiterated by the French Constitutional Council in a decision of 13 August 2015. In this regard, concerning the nuclear power plant at Fessenheim, discussions with the State have led to a draft procedure, approved by the European Commission, defining the principles for compensation and which is described in section 1.4.1.1.6 "Decommissioning of nuclear power plants". This protocol, authorised by EDF's Board of Directors, provides for a compensation scheme based on an initial fixed part estimated to date at approximately €490 million with a payment forecast of 20% in 2019 and 80% in 2021 and an additional variable part which may, as the case may be, result in further payments, as a consequence of the loss of earnings incurred for

EDF until 2041. The 2016 amended Finance Law no. 2016-1918 dated 29 December 2016 opened a specific account in order to finance the compensation procedure between the State and EDF relative to the early closure of the nuclear power plant at Fessenheim. Lastly, it may be decided that new nuclear construction projects, in which the Group has already invested considerable sums, should be halted. This issue potentially concerns all the Group's nuclear assets.

Such events would have material adverse consequences on the outlook, financial position, results and image of the Group, which would lead the latter to request compensation that it is not certain to obtain.

#### **The Group's nuclear business is subject to particularly detailed and demanding regulations that may become more stringent.**

The Group's nuclear business is subject to detailed and demanding regulations with, particularly in France, a system in place that monitors and periodically re-examines basic nuclear facilities, which focuses, firstly on nuclear safety, protection of the environment and public health, but also on security considerations regarding malicious acts (terrorist threats, in particular). These regulations may be significantly tightened by national or European authorities (see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities"). Furthermore, stricter regulations or possible non-compliance with current or future regulations could result in the temporary or permanent shutdown of one or more of the Group's plants or financial penalties as stated in Article L. 596-4 of the French Environment Code. Cases of non-compliance with regulations are also likely to be used by third parties against EDF and brought before the courts. Increased number of requests emanating from the French Nuclear Safety Authority and enhanced controls may increase EDF's compliance costs and risks.

Such events may result in a significant increase in the costs of the Group's nuclear assets, which may have an adverse impact on its financial position.

#### **The nuclear power plants that the Group operates may require significant or costly repairs or modifications.**

The Group of nuclear facilities that the Group currently operates in France is highly standardised (see section 1.4.1.1.1 "EDF's nuclear fleet"). This enables the Group, in particular, to achieve economies of scale in equipment purchases and engineering, to apply improvements made to its newest power plants to all plants and, in the event of a malfunction in a facility, to anticipate the measures to be taken in other plants. However, such standardisation carries the risk of a malfunction that is common to several power plants or series of power plants (see section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet"). The Group cannot guarantee that it will not be required to make significant or costly repairs or modifications to all or some of its plants, or that events will not occur that may have an impact on the operation of its plants or their output or cause a temporary or permanent shutdown of all or some of its plants.

Thus, at the time of the periodic reviews conducted during the ten-year inspections and following the Fukushima accident, the Group was led, both on its own and as a result of the requirements of the French Nuclear Safety Agency, to draw up a substantial work programme. This programme, called the "Grand Carénage" is intended to renovate existing plants, increase the safety level of reactors and, if the conditions are met, extend their operating life. This programme, which was approved in principle by the Board of Directors, involved additional investments as from 2015 and the upcoming years and bringing forward certain expenditures that were already planned before the Fukushima accident (see section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet" and section 1.4.1.1.5 "Preparing for the future of the nuclear fleet in France"). Industrial implementation of these works in power generation facilities will involve increased costs and a greater use of internal resources and the industrial fabric, and may also result in a loss of availability in future years. Implementation-related uncertainties affecting the Grand Carénage programme include possible delays in the examination of the authorisations required to initiate operations, in particular as regards the authorisations to be granted by the French Nuclear Safety Agency. Such uncertainties may also concern the manufacture and delivery on site of new equipment or work carried out on-site in a situation where a large number of industrial operations are being carried out at the same time.

(1) *Exploitation of standards and feedback from the International Atomic Energy Agency and the World Association of Nuclear Operators (WANO).*

In France, additional inspections carried out to check compliance or confirm nuclear safety, and non-programmed security upgrades to increase security margins, led to a loss of production of more than 6TWh in 2017. This had led, and could lead in the future, to the Group's nuclear production and/or financial targets being revised downward (see section 1.4.1.1 "Nuclear electricity generation"). Furthermore, the Group operates or holds equity interests in nuclear power plants elsewhere in the world, in particular the United Kingdom, Belgium, China and the United States, and it may also be required to make costly repairs or modifications to these units or it could be faced with events that may impact their performance, power generation or availability. Like in France, the nuclear safety authorities in these countries may take decisions that require additional works or controls, in particular as regards exploiting feedback from international experience and anticipating potentially precursory events.

Furthermore, despite the quality of operations and the changes made by the Group to its power stations, it cannot be ruled out that some of these power stations will be subject to special operating conditions to reinforce the operating safety margins at the initiative of the nuclear operator responsible for nuclear safety or at the request of the Nuclear Safety Agency.

All such events may have an adverse impact on the Group's financial position and activities.

**A further serious nuclear accident anywhere in the world may have significant consequences for the Group.**

Any event adversely affecting nuclear power at the global level is likely to have a greater impact on the Group's image, activities, productivity, financial position, results and outlook than for its competitors who use this source of energy proportionally less.

Despite the measures taken during their design or operation, a serious accident at a nuclear facility cannot be ruled out, such as the nuclear accident in Japan, on the Fukushima Daichi site, following the earthquake and tsunami of 11 March 2011. The way in which the feedback from this accident was taken into account in France is described in section 1.4.1.1.5 "Preparing for the future of the nuclear fleet in France, chapter on additional safety assessments following the Fukushima accident". A further accident like this anywhere in the world could turn public opinion against nuclear power and lead the competent authorities to tighten power plant operating requirements substantially or to refuse authorisation for proposed extensions of the operating life of power plants, leading to a temporary or permanent suspension of the operation of one or more nuclear facilities, or leading the authorities to consider a moratorium on the use of nuclear power to generate electricity and, therefore, to suspend or cancel all on-going nuclear power plant development projects. Such decisions were taken in Germany (suspension of nuclear power generation) and Italy (suspension of nuclear power plant construction projects) following the Fukushima accident. Such decisions could be taken even if no such accident occurs.

If such an accident were to occur near one or more of the Group's facilities, it could also contaminate the environment and thus jeopardise their operation.

Such events would have a major adverse impact on the business model, strategy, activities, results, financial position and outlook of the Group.

**The Group may not be able to obtain authorisation to continue the operation of its reactors beyond the period currently planned, or it may not even be authorised to exploit them up to the end of this period.**

In France, in connection with the studies associated with the third ten-year inspections of the 900MW units, in early July 2009 the ASN publicly stated that it had not detected any generic problem calling into question EDF's ability to ensure the nuclear safety of its 900MW reactors for up to 40 years. As required by the regulations, the ASN's position has been supplemented by a decision made for each reactor following each of the third ten-year inspections (see section 1.4.1.1.5 "Preparing for the future of the nuclear fleet in France"). Accordingly, at the end of 2017, more than 85% of the 900MW segment units have undergone their third ten-year inspection and, for 11 of them, the ASN has already submitted its final advice to the Minister and has not objected to their continued operation, subject to their complying with additional requirements that it has enacted.

To postpone the construction of new units and the related investments, and to continue to benefit from the low-carbon production and cash flows coming from its existing fleet, the Group aims to extend the operating lifespan of its nuclear fleet in France beyond 40 years. In 2012, the ASN had the improvement proposals submitted by EDF reviewed by the permanent "reactors" group, which judged these proposals positively, although it recommended that they be supplemented and, in certain cases, reinforced. Discussions with the ASN are continuing on this basis. The French Nuclear Safety Agency (ASN) clarified in a letter dated 20 April 2016 its opinion regarding the generic guidelines for the periodic re-evaluation associated with the fourth ten-year inspections of the 900MWe reactor (VD4-900), which was the subject of the permanent "Guidelines" group meeting of April 2015. This periodic re-evaluation, like previous ones, will include, on the one hand, verifying that the facilities comply with the current standards and, on the other hand, carrying out a safety reassessment in order to further improve the level of safety by taking into account best international practices and the state of the facilities, the experience gained during operation and developments in knowledge and rules which might apply to similar facilities. The French Nuclear Safety Authority (ASN) will examine, reactor by reactor, the continuation of operation based on a report giving the conclusions of the periodic re-examination, taking into account the results of inspections and requalification tests. The first concluding report on the fourth re-examination of the 900 reactor series should be available in February 2020 for Tricastin 1. In addition, the Chairman of the French Nuclear Safety Authority (ASN) confirmed that the generic opinion would be given in 2020 (instead of 2019) and that binding instructions applicable to EDF would be presented in 2021 by the ASN. The ASN would base its opinion on the following key elements: Memorandum on Response to Objectives which was transmitted on 28 February 2018 to the ASN and which give an assessment of the measures proposed by EDF in the context of the fourth periodic re-examination of the 900 reactor series, the results of the public consultation on the generic phase of the re-examination, which will be launched in the second half-year of 2018 under the supervision of the High Committee for Transparency and Information on Nuclear Safety, the conclusions of the permanent "reactors" group currently planned for 2020 and the first concluding report on the fourth periodic re-examination, which should be submitted by EDF in February 2020 for the first reactor concerned. For each reactor and for each authorisation stage, the ASN will decide on the measures taken by the operator and may give additional instructions. Solutions are being studied to demonstrate the capacity of non-replaceable equipment such as the containment building and reactor vessels, to ensure their operation up to 60 years. These studies, which rely on data available in France and internationally<sup>(1)</sup> aim to confirm the safety margins available for the operating lifespans that are being investigated beyond 40 years.

In 2016, all the technical, economic and governance conditions necessary for the amortisation period of France's nuclear fleet with the Group's industrial strategy to match were met (see notes 1.3.2 "Management judgments and estimates" and 3.1 "Extension to 50 years of the depreciation period of the 900MW PWR series in France" to the consolidated financial statements as of 31 December 2017). The consolidated financial statements dated 31 December 2017 incorporate the extension from 40 to 50 years of the amortisation period of the 900MW PWR units (except Fessenheim), without prejudice to any decisions which might be made by the French Nuclear Safety Agency following each ten-year inspection regarding authorisations to continue operations, unit by unit, following each ten-year inspection.

The accounting period of the other series of France's nuclear fleet (1,300MW and 1,450MW), which are more recent, currently remains at 40 years, because the conditions for an extension have not been met. The future extension of these other series remains one of the Group's industrial objectives, undertaken in line with the orientations of its energy policy.

However, the Group cannot guarantee that it will receive the expected operating lifespan extension from the competent authorities. Furthermore, such extensions could also be obtained under certain conditions, the financial impact of which, in particular in terms of investments, could affect the Group's strategy with respect to extending the operating life of its power plants or the Group's ability to pursue its global investment strategy.

(1) The Nuclear Regulatory Commission (NRC) staff has defined subsequent license renewal (SLR) to be the period of extended operation from 60 years to 80 years. <https://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html>.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

In the United Kingdom, the current projected operating life of EDF Energy's nuclear power plants ranges between 41 and 47 years for advanced gas-cooled reactor ("RAG") power plants and is 40 years for the pressurised water reactor (PWR). Since EDF Energy acquired them, the operating lifespan of the AGR power plants has been extended by 10 years on average and the objective is to increase the operating life of the PWR power plant by 20 years after the currently planned 40 years (see section 1.4.5.1.2.1 "Nuclear generation"). However, in light of the nuclear safety rules applicable in the United Kingdom, the Group cannot guarantee that EDF Energy will obtain the necessary authorisations at the appropriate time to operate its existing nuclear power plants until the end of their currently projected operating life, or that such authorisations will not be obtained subject to conditions that entail significant expenditures or investments for the Group.

For nuclear power plants where EDF is not responsible for the operation, but in which it has financial interests (United States, Belgium, Switzerland), the Group is exposed to the same risks financially: loss of revenue and depreciation of assets in the event of a stoppage or requirement to make additional investments to continue to operate. However, the Group cannot guarantee that these power plants will be actually operated for the periods currently anticipated, particularly in the event of an incident affecting the safety or availability of the facilities.

If any of these events occur, they may have a material adverse impact on the Group's financial position.

#### **The construction and operation of the first EPR could encounter difficulties that might affect other projects.**

The Group has initiated the construction of the European Pressurised water Reactor (EPR) (see section 1.4.1.2 "New Nuclear Projects") in order to renew its nuclear fleet in France and to enable construction of new facilities in Europe and internationally. This "third generation" reactor was designed based on experience gained from the existing fleet, to provide significant progress in safe operation. No reactor of this design is yet in operation anywhere in the world and the industrial and financial challenges associated are very great for the Group. The commercial commissioning of a reactor is preceded by a long period of start-up tests, which begin with the first tests enabled by the completion of the first electro-mechanical assemblies and which continue with the full-scale commissioning tests. This period is punctuated by authorisations from the Safety Authority, notably including the authorisation to load nuclear fuel which precedes the authorisation for start-up and the first criticality of the reactor itself.

If any generic measures to be taken may be anticipated from feedback on EPR projects, difficulties may occur during the start-up tests and at the beginning of operation of each of the EPR projects, and have an impact on the other projects. These difficulties may be such as to raise further questions about the authorisation conditions of the safety authorities of the countries concerned, or to compromise the economic performance or even the return on investment expected from the various projects. This could have an adverse impact on the Group's financial position. These various difficulties could slow or prevent the implementation of other EPR projects which the Group may undertake.

In France, the continuation of the start-up tests of the Flamanville 3 reactor could encounter new uncertainties. In September 2015, EDF submitted a new timetable and updated construction costs for this project for a total amount of 10.5 billion euros<sup>(1)</sup>. The implementation timetable and the budget for the project have not changed since 2015. The cold functional testing was carried out successfully. The hot functional testing and loading the nuclear fuel is planned for 2018. The state of progress of the project is given in section 1.4.1.2.2 "Update on the Flamanville EPR project".

Sticking to this timetable and this budget nevertheless depends on the success of the start-up tests that are still to be done and on obtaining the various permits that must still be delivered by the ASN. The three expert Committees mandated by the ASN help bring together all of the technical requirements the EPR must satisfy. At the end of 2017, 95% of the dossier for the commissioning application had been investigated and a permanent experts' group will be set up in 2018 to enable the

ASN to make a decision on the authorisation to load nuclear fuel. The Group might have to cope with new uncertainties, might not obtain the expected permits or they might be compromised by judicial or administrative decisions.

In China, the Group has a 30% stake alongside its Chinese partner CGN within TNPJVC (Taishan Nuclear Power Joint Venture Company Limited), which will operate two EPR reactors currently undergoing start-up tests in Taishan. The profitability of these two reactors remains subject to obtaining favourable conditions for the purchase of electricity. The timetable for the start-up of the two reactors was reviewed in 2017 by the majority shareholder (CGN) and commercial commissioning of the first reactor is planned for 2018, and that of the second reactor in 2019. Taishan 1, which has successfully completed its hot functional testing, is waiting for the authorisation of the Chinese safety authority to load its nuclear fuel into the reactor, and could be the first EPR reactor in the world to undergo this stage (see sections 1.4.1.2.3.2 "Taishan EPR" and 1.4.5.3.6.1 "Activities in China").

In the United Kingdom, control of the design and bringing the manufacturing and the construction site under control will determine the profitability of the Hinkley C project and the financing of any future projects in the United Kingdom. The Group has a 66.5% stake in the Hinkley Point C project, alongside its Chinese partner CGN for 33.5%. The milestone for pouring the first nuclear safety concrete for the building in unit 1 is planned for mid-2019, providing that the final design has been determined by the end of 2018. Meeting these milestones will determine the deadline for the commercial commissioning of the first reactor, which is planned for the end of 2025 (see sections 1.4.1.2.3.1 "Hinkley Point C EPR" and 1.4.5.1.2.5 "Nuclear New Build Division"). The costs to finish the project are now estimated at £19.6 billion (2015 values)<sup>(2)</sup>, up by £1.5 billion (2015 values) compared to previous valuations. This estimate depends on the success of operational action plans, in partnership with the suppliers. The estimated cost overruns, net of action plans, result essentially from a better appreciation of the design, which have been adapted to meet regulatory requirements, the volume and sequencing of work on the site and the gradual implementation of supplier contracts with management controls that are appropriate to the challenges. The forecast rate of return (IRR) for EDF is now estimated at about 8.5%, compared with around 9% initially. In addition, the risk of a postponement of commercial commissioning is estimated at 15 months for unit 1 and nine months for unit 2. This risk would entail potential additional cost of around £0.7 billion (2015 values). In this case, the IRR for EDF would be about 8.2%<sup>(3)</sup>. The IRR for the project is sensitive to exchange rates and could be reduced if the pound sterling continues to drop in relation to the euro.

EDF has also signed two other contracts with CGN relative to studies on two nuclear construction projects in the United Kingdom, Sizewell C and Bradwell B. Agreements that secure the income of Hinkley Point C specify a price revision to the contract for difference in the event of an investment decision concerning Sizewell C. The ability of EDF to take a final investment decision and to finance these projects beyond the development phase could depend on the management of the Hinkley Point C project, the existence of partners and an appropriate regulatory and financial framework.

#### **The Group depends, for its nuclear business, on a limited number of players for specific skills.**

Although the Group has adopted a policy of diversifying its suppliers and service providers for its nuclear business, it is currently dependent on a limited number of contractors and individuals who have the specific skills and necessary experience. This limits competition in markets in which EDF is a buyer and exposes the Group to the risk of a default of one or more of these suppliers or service providers with specific expertise, which could have an adverse impact on the Group's results and financial position. This is especially the case for Orano, Westinghouse, GE and Alstom, but also for most nuclear industry manufacturers and the principal maintenance service providers (see section 2.3 "Dependency factors"). Changes to the shareholding or governance of these various providers may also have an impact on the cost, the operational continuity of ongoing contracts and the cost of services provided or delivered products.

(1) In 2015 euros, excluding interim interest.

(2) Excluding interim interest and excluding exchange-rate effects in relation to a reference exchange rate for the project of £1 = €1.23.

(3) IRR calculated at the July 2017 exchange rate (£1 = €1.16). Any changes to the exchange rate could affect the IRR.

### The creation of Edvance and the successful integration of Framatome into the Group could enable new synergies and strengthen the industrial efficiency and competitiveness of the sector

Control of the design, by the nuclear operator, of nuclear reactors is a nuclear safety issue. The creation of Edvance comes within the integrated producer-supplier concept, which has been proven in several countries for industrial reactors for electricity generation, and which has contributed to enabling EDF to become currently the number one nuclear operator worldwide. On 17 May 2017, the Board of Directors of EDF approved the creation of Edvance, which concluded the merger of EDF's Engineering Departments and AREVA NP. It was an essential milestone in the overhaul of the French nuclear sector that was announced in June 2015. Edvance takes charge of basic design and implementation projects (studies, assistance with supply, assembly and commissioning) for nuclear islands and the command and control systems of new reactors under construction, in France and internationally. EDF holds 80% of the share capital of the company and Framatome holds 20%. This new entity was created independently of the acquisition by EDF of New NP on 31 December 2017, which became Framatome on 4 January 2018. The success of this transformation will determine the competitiveness of the nuclear sector, the success of the ongoing and future EPR projects and the financial performance of the Group (see section 1.4.1.2.3.4 "The creation of Edvance").

Following the approval of their respective Boards of Directors on 13 and 14 December 2017, AREVA SA and EDF signed, on 22 December 2017, the final binding agreements fixing the terms of the transfer of an equity holding giving EDF exclusive control of Framatome. The contracts for the EPR Olkiluoto 3 project and the resources required to complete the project, as well as certain contracts relating to components forged in the Le Creusot plant, stay within AREVA NP, in AREVA SA's scope. This signature took place following the positive opinion issued by the ASN on the commissioning of the Flamanville 3 reactor vessel. This also followed on from the implementation and satisfactory conclusions of the quality audits carried out in the plants at Le Creusot, Saint-Marcel and Jeumont, concerning contracts taken over by Framatome. For these contracts, in any case, EDF remains guaranteed by AREVA SA against any residual risk resulting from these audits.

A 75.5% stake in the share capital of New NP was acquired on 31 December 2017. New NP, which became Framatome on 4 January 2018, is the entity formed from the AREVA Group, which brings together industrial activities, design and supply of nuclear reactors and equipment, fuel assemblies and services to the installed base. (See section 1.4.1.3 "Framatome").

EDF is continuing its comprehensive review of the manufacturing records of the components coming from the Le Creusot Forge plant (71), installed on its nuclear reactors in operation. This project falls within AREVA's quality plan that has been ongoing since 2015, in association with EDF and under the control of the French Nuclear Safety Authority. The in-depth examination of these records resulted in a list of findings concerning traceability and the transcription of documents, as well as the performance of manufacturing operations. Each of these records is analysed to demonstrate the ability of the equipment concerned to function in complete safety. The comprehensive review of the Le Creusot Forge manufacturing records will continue until 31 December 2018. It cannot be ruled out that the conclusions of these analyses might have a negative impact on the availability of EDF's nuclear reactors or on the financial performance of the Group. Neither can it be ruled out that a quality issue in manufacture for nuclear operators other than EDF might also have an impact on the financial performance of the Group.

The success of the integration of Framatome within the EDF group, which involves convergence on the approach to nuclear projects and the development of synergies arising from this, should enable the French nuclear industry to be more efficient, responsive and effective in carrying out major work such as the "Grand Carénage" programme to overhaul the fleet in operation and the implementation of new nuclear projects. The non-achievement of these objectives could compromise the competitiveness of the nuclear sector in France and that of the Group in its international development.

### The Group is exposed to changes in the conditions for procuring uranium and conversion and enrichment services.

The Group's operating costs include nuclear fuel purchases.

For its nuclear power plants in France and the United Kingdom, EDF purchases uranium and conversion and enrichment services through long-term contracts containing hedging mechanisms that mitigate and smooth price fluctuations over

time. Its main supplier is the Orano group, but EDF pursues a diversification policy by also buying supplies from other industrial companies (see section 2.3 "Dependency factors" and section 1.4.1.1.4 "The nuclear fuel cycle and related issues"). Prices and availability of uranium and conversion and enrichment services are subject to fluctuations due to factors that are *inter alia* political and economic and that the Group cannot control (in particular, the profitability outlook of mining investments, imbalances between supply and demand or supply shortages associated with, for example, an operating accident in a uranium mine or a combined cycle plant, delays in commissioning new mines or events leading to political instability in a uranium producing country).

However, the Group cannot guarantee that its contracts, in France and abroad, will completely protect it from sudden or significant price increases. The Group cannot guarantee that when these long-term contracts expire, it will be able to renew them, in particular at an equivalent price. This could have an adverse impact on the Group's financial position.

### To operate its nuclear reactors, the Group relies on the proper functioning of road and rail transport, in particular for the transport of fuel.

The transport of new or spent nuclear fuel is a very particular operation that requires specific and restrictive safety and security measures. These constraints could become more stringent, generating additional difficulties and costs for the Group. Furthermore, several factors that are beyond the Group's control (such as opposition by local residents or anti-nuclear associations, for example, in the form of manoeuvres to prevent nuclear material from being shipped) may slow these operations. Operations may also be interrupted, in particular, in the event of an accident. In such case, the Group may be required to slow or halt some or all power generation at the relevant sites, either due to non-delivery of new fuel assemblies or the saturation of onsite storage facilities, which may have an adverse impact on the Group's financial position (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues").

### The Group is responsible for most spent fuel and radioactive waste from its nuclear power plants, especially Long Life Medium- and High-level waste from spent fuel.

The back-end part of the nuclear fuel cycle is described in section 1.4.1.1.4 "Nuclear fuel cycle and related issues". In France, as an operator of nuclear power plants and radioactive waste producer, EDF is legally responsible for spent fuel from the time it leaves the power plant and for radioactive waste processing and long-term management operations. EDF assumes this responsibility both on the technical and financial levels in accordance with guidelines laid down by the public authorities and under their supervision. EDF is also responsible for all radioactive waste generated during plant operations and decommissioning.

The Group's liability may be alleged, in particular as a nuclear power operator or producer of radioactive waste within the meaning of applicable legislation on waste, in the event of an accident or any damage to third parties or the environment from spent fuel or waste, even if they are handled, transported, kept, warehoused or stored by contractors other than the Group (especially, in France, the ORANO group and the French National Agency for the Management of Radioactive Waste (ANDRA)), in particular in the event of a breach by such contractors.

In France, the long-term management of radioactive waste has been the subject of various initiatives under the programme Acts no. 91-1381 of 30 December 1991 on research on radioactive waste management and no. 2006-739 of 28 June 2006 on sustainable management of radioactive materials and waste (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues" – "High-Level Long-Lived Waste ("HAVL")"). The Group cannot guarantee that all long-life high- and medium-level waste will constitute "final radioactive waste" within the meaning of Article L. 542-1-1 of the French Environment Code and, therefore, that such waste may be directly stored in deep geological layers, especially as the nuclear order of 10 February 2016 adopted pursuant to Law no. 2015-992 on the Energy Transition for Green Growth empowers the administrative authority to reclassify radioactive material as radioactive waste and radioactive waste as radioactive material. Furthermore, the Group cannot guarantee the timeframe in which the public authorities will authorise such storage, or predict certain technical instructions related to such authorisations, which creates uncertainties about the future of the waste, the resulting liability and costs for EDF (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues" – "Storage of packaged residual waste").

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

In the United Kingdom, when British Energy was restructured, agreements were entered into with the authorities concerning the management of certain radioactive waste from existing nuclear power plants (see section 1.4.5.1.2.1 "Nuclear generation"). Under the terms of these agreements, the liability and certain costs associated with the management of certain radioactive waste are transferred to the British government. However, EDF Energy Nuclear Generation Ltd. remains financially, technically and legally liable for the management, storage and processing of waste that does not come within the scope of the aforementioned agreements.

Directive no. 2011/70/Euratom of 19 July 2011 confirms the Council's intention to establish a shared European framework for the responsible and safe management of spent fuel and radioactive waste (see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities").

For nuclear power plants which EDF does not operate, but in which it has financial interests (United States, Belgium, Switzerland, China), the Group is exposed financially in proportion to its shareholding to contributing to future expenditures related to the management of spent fuel and waste.

The Group cannot guarantee that it will have available, in a timely manner and under acceptable financial conditions, long-term storage and treatment solutions for the radioactive waste generated by the power plants which it operates in the relevant countries, which could have an adverse impact on the Group's financial position.

**Provisions booked by the Group for spent fuel processing operations, recovery and packaging of waste and long-term waste management may increase significantly in the event that the assumptions for the costs and work time sequencing are revised.**

In France, EDF has booked provisions for spent nuclear fuel management operations (transport, processing, conditioning for recycling) (see note 29.1.1 to the consolidated financial statements for the financial year ended 31 December 2017) based on the price and volume conditions of the master agreement signed with AREVA in December 2008 and broken down in the successive implementation agreements. The implementation agreement for the period from 2016-2023 was signed in February 2016 (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues"). The amount of provisions currently booked to cover the period not covered by the current agreement should be reassessed if the terms under which this agreement is renewed prove more onerous than those currently applicable.

EDF has also booked provisions for long-term waste management based on an assumption of geological storage, and on a reasonable interpretation of the work conducted in 2006 by a working group comprising ANDRA, the public authorities and radioactive waste producers (see note 29.1.2 to the consolidated financial statements for the financial year ended 31 December 2017 and section 1.4.1.1.4 "The nuclear fuel cycle and related issues"). Following new calculations of the costs of deep storage under the supervision of the DGEC in conjunction with EDF, the Minister of Ecology, Sustainable Development and Energy, in an order of 15 January 2016, set the new reference cost at €25 billion under the economic conditions of 31 December 2011. This cost was included in the accounts of the Group at the end of 2015 (see note 29.1.2 to the consolidated financial statements for the financial year ending on 31 December 2017). The current estimate is based on the preliminary design assumptions and will be regularly revised based on the progress of the project, as stated in the Ministerial order. Opinion n°2018-AV-0300 from the French Nuclear Safety Authority dated 11 January 2018 relative to the safety options file presented by Andra for the Cigeo project to store radioactive waste in a deep geological layer specifies that the project has achieved satisfactory overall technological maturity at the stage of the safety options file. The reservations that remain and the supplementary investigation that will be carried out for Andra to obtain construction approval for the geological storage area may lead to a revision of the provisions for long-term waste management.

However, the amount of current provisions is likely to change in the next few years. Determining the amount of these provisions is sensitive to assumptions made in terms of costs, inflation rate, long-term discount rate and payment schedules. Pursuant to the French Environmental Code, the amount of these provisions may be controlled by the administrative authority formed jointly by the Ministry for the Economy and the Ministry of Energy, which shall verify in particular the adequacy of the provisioned expenses and imposes a cap on the discount rate for the provisions. Given these sensitivity factors, changes in certain parameters may require significant adjustments of the provisions booked. In such case, any insufficiency of provisions for long-term nuclear commitments may have a material adverse impact on the Group's financial position (see note 29.1.5 to the consolidated financial statements for the financial year ended 31 December 2017).

Note 29.1.5.2 "Analyses of sensitivity to macro-economic assumptions" of note 29.1 "Nuclear provisions in France" to the consolidated financial statements as of 31 December 2017 indicates the connection between "costs based on year-end economic conditions", which represent estimated amounts as at 31 December 2017, and "provisions made at present value". With regards to the management of spent fuel, the expenses at year-end economic conditions are evaluated at €19,058 million and the corresponding provision is €10,786 million. Concerning the long-term management of waste and the recovery and packaging of waste, the expenses at year-end economic conditions are evaluated at €30,599 million and the corresponding provision is €9,540 million, as the discounting effect is very significant due to distant waste storage maturities. Note 29.1.5.2 "Analyses of sensitivity to macro-economic assumptions" indicates the analyses of sensitivity of provisions and Group's results to a discount rate change, for the different types of provisions.

**Provisions booked by the Group for decommissioning operations for nuclear facilities may increase significantly if assumptions are revised. In particular, decommissioning existing nuclear facilities may present currently unforeseen difficulties or be much costlier than currently anticipated.**

Operations ongoing concerning the power plants that were built and operated before the current nuclear fleet, as well as the Superphenix power plant ("first generation" power plants). These operations cover four different reactor technologies: heavy water reactor (Brennilis), sodium-cooled fast reactor (Superphenix at Creys-Malville), graphite-moderated and gas-cooled reactor (UNGG reactors at Chinon, Saint Laurent and Bugey) and the PWR at Chooz. These operations were firsts for EDF and with the exception of the PWR, they concern reactor technologies for which international feedback is low or non-existent. They therefore require the development of new methods and technologies which involve greater risk than technologies for which feedback is already available. The decommissioning of the PWR at Chooz does benefit from some feedback (essentially American and of a limited nature) but it has the innovative specific feature of being located in a cave, which also makes it an unusual operation for which experience is not immediately transferable and which includes specific risks.

The feedback from the PWR at Chooz will enable consolidation, as far as possible, of the studies and estimates on the future costs of decommissioning the nuclear fleet currently in operation (power plants of the "second generation"). However, neither EDF nor any other operator has currently begun a decommissioning programme on a scale comparable to that of the current PWR fleet and the estimates therefore involve risks that are associated in particular with this scale effect (see section 1.4.1.1.6 "Decommissioning of nuclear power plants").

In France, the Group has booked provisions to cover the anticipated costs of decommissioning and managing the last cores. However, the amount of current provisions is likely to change in the next few years. Indeed, determining the amount of these provisions is sensitive to assumptions made in terms of technical processes, costs, inflation rates, long-term discount rates and payment schedules. The amount of these provisions, in accordance with the French Environment Code, is subject to control by the administrative authority, which verifies in particular the adequacy of the provisioned expenses and imposes a cap on the discount rate for the provisions. The timeframe and costs of these works also depend on administrative authorisations and the availability, at required times, of radioactive waste storage centres or other facilities required for conditioning or storing waste packages (see section 1.4.1.1.6 "Decommissioning of nuclear power plants"). The act no. 2006-739 dated 28 June 2006 provided for a dedicated storage centre for Low-Level Long-Life waste (FAVL), such as graphite. ANDRA submitted a progress report in July 2015 under the national plan for the management of radioactive materials and radioactive waste (PNGMDR). This report assesses several storage concepts and allows for the possibility of storage of graphite waste on the Soulaines site. An overall industrial scheme for the management of all FA-VL radioactive waste is planned by the PNGMDR before the end of 2019. (See section 1.4.1.1.4 "The nuclear fuel cycle and related issues".) Given these sensitivity factors, changes in certain parameters may require significant adjustments of the provisions booked and, therefore, the Group cannot guarantee that the provisions booked will equal the costs actually incurred at the relevant time, which would have an adverse impact on the Group's financial position (see note 29.1.3 to the consolidated financial statements for the financial year ended 31 December 2017). The Group regularly conducts an update of the key assumptions underlying the provisions (see note 29.1.5 to the consolidated financial statements for the financial year ended 31 December 2017). Accordingly, in 2016, the Group revised quotations and the provisions arising from them for the decommissioning of the operating fleet, making it possible to take into account the recommendations of the audit of these provisions made at the request of the administrative authority formed jointly by the Ministry for

the Economy and the Energy Ministry whose conclusions had been made public in January 2016 by the aforementioned authority. The annual review carried out in 2017 did not lead to any significant adjustment of the provision.

With regards to the provision for decommissioning the nuclear electricity generation fleet in France, the costs at year-end economic conditions are evaluated at €27,035 million and the corresponding provision is €14,920 million. As for the last core provision, costs based on year-end economic conditions are estimated at €4,332 million and provision at present value amounts are valued €2,387 million, as the discounting effect is very significant due to distant waste storage maturities. Note 29.1.5.2 "Analyses of sensitivity to macro-economic assumptions" to the consolidated financial statements for the fiscal year ended on 31 December 2017 indicates the analyses of sensitivity of provisions and Group's results to a discount rate change, for the different types of provisions.

The provisions of Framatome and SOCODEI in relation to the basic nuclear facilities in France stand respectively at €81 million and €43 million (see note 30 "other provisions for decommissioning" to the consolidated financial statements for the fiscal year ended 31 December 2017). In the United Kingdom, under the agreements concluded in connection with the restructuring of British Energy, the costs of decommissioning EDF Energy Nuclear Generation Group Ltd.'s existing nuclear power plants will be paid by the Nuclear Liabilities Fund. If the assets of this Fund prove insufficient, these costs will be borne by the UK Government (see section 1.4.5.1.2.1 "Nuclear Generation").

For nuclear power plants which EDF does not operate, but has financial interests (United States, Belgium, Switzerland), the Group is exposed financially in proportion to its participation to contribute to future decommissioning costs.

**The amount of dedicated assets in France allocated by the Group to cover the costs of its long-term nuclear business commitments (radioactive waste and decommissioning) might need to be revised upwards and require additional expenditures.**

In France, as of 31 December 2017, the market value of EDF's portfolio of dedicated assets was €28.1 billion, compared to €25.7 billion on 31 December 2016 (see sections 1.4.1.1.7 "Assets available to cover long-term nuclear-related commitments outside the operating cycle" and 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities" and note 47.3 to the consolidated financial statements for the financial year ended 31 December 2017).

In the event of a significant change in the provisions determining the reference base of the dedicated assets, it might prove necessary to make additional allocations to adjust the value of these assets, which could have a material adverse impact on EDF's financial position. Moreover, stricter regulations at the national level (in particular those that impact the base for determining the dedicated assets to be constituted by EDF) or European level may lead to more stringent requirements regarding the constitution of dedicated assets and have a significant impact on EDF's financial position.

Lastly, although these assets are constituted and managed in accordance with strict prudential rules, the Group cannot guarantee that price fluctuations in the financial markets or changes in valuation will not have a material adverse impact on the value of these assets (see section 5.1.6.1.6 "Management of financial risk on EDF's dedicated asset portfolio" for a sensitivity analysis), which could require EDF to allocate additional amounts to restore the value of these assets; such events could have a material adverse effect on the Group's financial position.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Risks to which the Group is exposed

In the United Kingdom, funds to finance nuclear commitments are managed by an independent organisation created by the UK government (Nuclear Liabilities Fund – NLF). Operators therefore have no assets to manage for this purpose (see section 1.4.5.1.2.1 “Nuclear generation”).

#### **Due to its nuclear activities, the Group is exposed to significant liability risks and potentially significant additional operating costs.**

Although the Group has adopted strategies and procedures to control risks and incorporate international feedback for its nuclear activities that are consistent with best international standards<sup>(1)</sup>, such activities, by their nature, still present potential risks. Therefore, the Group may face significant liability as a result of *inter alia* incidents and accidents, security breaches, malicious or terrorist acts, aircraft crashes, natural disasters (such as floods or earthquakes), equipment malfunctions or problems in the course of storing, handling, transporting, processing or packaging nuclear substances and materials. Such events could lead to significantly stricter operating requirements for the Group’s industrial sites, or to a partial or total halt of the operation of the Group’s power generation plants, and may have serious consequences, especially in the event of radioactive contamination or irradiation of persons working for the Group, or the general population and the environment, as well as a material adverse impact on the Group’s activities, strategy, outlook and financial position.

Indeed, a nuclear operator is responsible for the nuclear safety of its facilities.

The nuclear civil liability scheme that applies to nuclear facility operators of States Parties to the Paris Convention, and the insurance applicable thereto, are described in section 1.5.6.2.2 “Specific regulations applicable to basic nuclear facilities” and section 2.5.6 “Specific insurance for nuclear facility operations”. This scheme is based on the principle of the operator’s strict liability. Accordingly, if an event occurs that causes nuclear damage, the Group would be automatically liable up to a monetary maximum set by the law applicable in the country, regardless of the

source of the event that caused the damage and any safety measures that may have been taken.

The Group cannot guarantee that in countries where it operates nuclear facilities the maximum liability set by law will not be increased or cancelled. For example, the protocols amending the Paris Convention and the Brussels Convention, not yet in force (see section 1.5.6.2.2 “Specific regulations applicable to basic nuclear facilities”), provide for these maximum amounts to be increased and a substantial expansion of the damage to be covered. The new amounts are applicable as of 18 February 2016 under Act no. 2015-992 of 17 August 2015 on the Energy Transition for Green Growth and the amount of the operator’s liability in France now amounts to 700 million euros in the event of a nuclear accident in a facility and 70 million euros for nuclear accidents during transport. The entry into force of the other changes laid out in these protocols is likely to increase yet again the cost of insurance and the Group cannot guarantee that insurance covering this liability will always be available or that it will always be able to maintain such insurance. The insurance cover for the Group’s civil liability as a nuclear operator is described in section 2.5.6.1 “Civil liability of nuclear facility operators” and for insurance coverage for transport of nuclear materials in section 2.5.6.2 “Civil liability for transport of nuclear substances”.

Property damage to EDF’s nuclear facilities is covered by insurance programmes (see section 2.5.6.3 “Damage to nuclear facilities”). Despite this cover, any event that may cause significant damage to a nuclear facility of the Group could have an adverse impact on the Group’s business and financial position.

Lastly, the Group cannot guarantee that the insurers that cover both its liability as a nuclear plant operator and property damage to its facilities will always have available capacity or that the costs of cover will not significantly increase, particularly in light of the impacts on the insurance market of events such as the nuclear accident in Japan that occurred in March 2011.

(1) Exploitation of standards and feedback from the International Atomic Energy Agency and the World Association of Nuclear Operators WANO.



## 2.2 CONTROL OF GROUP RISKS AND ACTIVITIES

The objective of this section is to focus on control procedures related to activities or risks deemed significant, and on the main long-term procedures in place in 2017, highlighting changes and key initiatives developed during 2017. These internal control and risk management procedures come within the framework defined by the corpus of Group policies put in place in 2017. They also obey the general principles set out in the AMF's risk management and internal control reference framework (published on 22 July 2010) and they are based on the changes made to the main international reporting guidelines, in particular COSO-2013.

### 2.2.1 CONTROL ENVIRONMENT

#### 2.2.1.1 Objectives and principles of control of the risks and activities of the Group

##### Objectives

The system for controlling the risks and activities of the Group is defined in the policy "Group functioning principles/Risk management and internal control" validated following the meeting of the Executive Committee. The objectives are as follows:

- identify and reinterrogate periodically the significant risks overview and opportunities likely to impact the targets of the Group, in order to ensure the existence and control of existing actions plans;
- constantly ensure:
  - compliance with laws and regulations,
  - compliance with Group policies,
  - the correct functioning of internal processes, notably those contributing to the protection of the Group's assets,
  - the reliability of financial information,
  - and generally the control of risks and activities of any kind.

##### Principles

The fundamental principles of execution are based on the three lines of control model:

- first control line: each of the managers at every level, for the missions that are assigned to them, is responsible for: identifying and managing the main risks related to their activities; ensuring this control for the missions that they assign to their staff; ensuring that the measures for controlling identified risks are proportionately supported; formally and regularly reporting, to their own manager, on risks identified and on control measures through self-evaluations;
- second control line: the support functions define common requirements for the Group and supervise their control. Their contribution to controlling the activities of the Group is specified in section 2.2.1.3. Amongst them, the risk and internal-control functions organise the overall control measures and prepare reports intended for the Group's governing bodies. The specific measures aiming to control risks and activities are detailed in section 2.2.2;
- third control line: the independent audit system can check the appropriateness and effectiveness of the measures for managing the risks and activities of the Group's entities; check management of the main cross-functional processes and major projects of the Group; and more generally, check the level of control of the Group's risks. (see section 2.2.1.4).

All of these measures based on the three control lines provide the managers and governing bodies of the Group with "reasonable assurance" concerning the identification and coverage of the main risks.

##### Scope

With regards to the scope that is controlled (excluding regulated subsidiaries), these objectives and principles are implemented by the departments or subsidiaries managed by the members of the Executive Committee, who make sure, themselves, that they are implemented in the Divisions, operational units or subsidiaries that they control.

With regards to the other subsidiaries of the Group (regulated subsidiaries and significant shareholdings), the representatives of EDF within the governing bodies make sure, for each subsidiary, that a system for controlling activities and risks is put in place, provide regular information on the map of risks, internal control and audit activities (programme and main results); they can also check the efficiency and appropriateness of each of these measures through a periodic audit. The applicable principles are nevertheless adapted for the operators of regulated network and infrastructure, to ensure compliance with obligations relative to their independence of management.

#### 2.2.1.2 The management bodies

The organisation of the Executive Management of EDF is described in section 4.3.1. Each member of the Executive Committee is responsible for implementing all actions necessary to controlling the risks within their scope.

##### Risk Committee

The Executive Committee meets regularly in the Risk Committee configuration. The Risk Committee examines the map of the Group's risks and the appraisal of internal control activities. It identifies the priority risks for the Group, shares their strategy for mitigation with regard to the strategy of the Group and designates the members of the Executive Committee who are its sponsors. The Risk Committee also examines the audit activities (annual programme, results). The Risk Committee meets at least twice a year.

#### The Group Executive Committee Commitments Committee

To strengthen the appraisal and monitoring of projects, an Executive Committee's Commitments Committee<sup>(1)</sup> (CECEG) thoroughly examines the most significant projects in terms of the extent of the commitments or the risks incurred before decisions are made by the Executive Committee (see section 2.2.2.2.3 "Approval of commitments").

#### 2.2.1.3 The second line of control of risks and activities: players and missions

The second line is composed of all the support functions of the Group (Purchasing, Communication, Sustainable Development, Ethics and Compliance, Finance, Real Estate, Legal, Human Resources, Risks, Security of Assets, General Services and Information Systems). In liaison with the Operational Managers, these Departments operate a system of management and overall coordination of their functions within the Group. In particular, these support functions are responsible for organising and coordinating the implementation of Group policies.

This section focuses on the support functions coordinating the specific systems for the control of risks and activities.

Note: the aspects relative to the Group's human resources, including the control of risks relative to the health and safety of employees and service providers, are detailed in section 3.6.2 of the Reference Document.

##### 2.2.1.3.1 Group Risk Department

The Group Risk Department (reporting to the General Secretary) has the following tasks:

- deploy the risk and internal-control policy, organise the internal control function and, in particular, prepare and update the consolidated map of major risks and the assessment of the Group's internal control (see the detailed system in section 2.2.2.1.1);
- alert the Chairman and CEO and the Executive Committee on emerging risks and risks that have not been sufficiently observed;

(1) The composition of the Executive Committee's Commitments Committee is the same as that of the Executive Committee.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Control of Group risks and activities

- ensure the control of energy markets risks by deploying the energy markets risk policy (see section 2.2.2.2.1);
- define and deploy the control of financial risks (interest rates, foreign exchange, liquidity, equities, credit) and the risk of counterparty default (see section 2.2.2.2.2);
- verify the comprehensiveness and relevance of the risk analyses carried out for long-term investment and commitment projects which are submitted to the Executive Committee-level bodies for decision (see section 2.2.2.2.3);
- deploy the crisis-management and business-continuity policy and ensure that the crisis-management organisation is maintained in an operational condition for the Group level (see section 2.2.2.1.2).

#### 2.2.1.3.2 The Financial Department

The Financial Department contributes to controlling the activities of the Group, notably through the following missions:

- Performance Management<sup>(1)</sup>:
  - contributing to the management of the performance of the Group's entities by helping define the Group's performance plans and by challenging the measures implemented by the entities and business lines. To this end, the Financial Department sets up a set of management indicators appropriate to the economic model of each activity of the Group, within the framework of the policy on Management of Economic and Financial Performance,
  - contributing to monitoring the implementation of the budget through performance reviews generalised within the Departments and the subsidiaries that are controlled,
  - conducting portfolio reviews and economic and financial optimisation analyses,
  - developing and disseminating financial management methods and processes, contributing to the dissemination of the management culture within the Group;
- Reporting:
  - overseeing the processes of the Group's management cycle (budgets, revisions of forecasts and medium-term plans), summarising them and proposing choices at the level of the departments and subsidiaries, within the framework of the Accounting and Financial Reporting policy. The Financial Department's role is to alert and make propositions in the pre-decision-making analysis of the financial consequences of the operations envisaged, or the performance levels proposed,
  - developing medium- and long-term financial trajectories;
- Accountancy:
  - preparing EDF's parent company financial statements and the Group's consolidated financial statements,
  - ensuring the compliance of the accounting system *via* Group standards that apply to accounting standards and the chart of accounts to be applied,
  - organising the Group's accounting and financial internal control system as defined in the Group "accounting and financial internal control" instruction, according to a system detailed in section 2.2.2.3;
- Taxation:
  - ensuring the coherence of the tax practices within the Group; the Group tax policy specifies Group requirements in the tax field; the precise arrangements for this are addressed in section 3.1.4 of this document,
  - ensuring the proper implementation of legal and declarative obligations, notably by monitoring the subject,
  - ensuring the accounting follow-up of the deferred tax position and the periodic justification of the accounts,
  - identifying and controlling the Group's tax risks;
- Finance and Investments, Insurance:
  - ensuring that the Group is financed within the context of the policy on financing, cash and financial risk control,

- coordinating all the actions inherent in the Group's balance sheet and financial result, with the aim in particular of controlling the exposure of the Group's hedging assets, debt and the Group's overall balance sheet to financial risks,
  - managing the investments and acquisitions and disposals as well as the listed or unlisted dedicated assets,
  - appraising the investment projects presented to the Executive Committee Commitment Committee meetings to anticipate impacts and improve the reliability of the financial trajectories on the Group's balance sheet and profit and loss accounts, as defined by the Commitments policy,
  - developing and implementing innovative insurance coverages at the best market standards designed to support the development of the Group in all its dimensions, as defined by the insurance policy (see section 2.5);
- Financial communication of the Group according to the requirements of the Financial Communication policy (see section 2.2.2.3.4);

- Finance Information System (IS): the Finance IS comprises a common basis for all the Group's departments, as well as tools specific to each of the entities or subsidiaries according to the specificities of the country or activity and raises several important issues in terms of data integrity and application availability. The Financial Department acts as the project owner.

#### 2.2.1.3.3 The Legal Department and the Contract Management Department

The Legal Department, which reports to the General Secretary, is tasked with protecting the Group's interests and securing its activities, by providing support, advice and expertise. The legal function of the Group is composed of the Group Legal Department of EDF SA and of the Legal Departments of the subsidiaries. The Group Legal Director organises the legal function.

The legal function's missions include the following:

- it is systematically called upon, as early as possible, with cases and projects involving challenges;
- it manages the main disputes in which the Group is a plaintiff or defendant<sup>(2)</sup>;
- it performs monitoring of legislative and regulatory changes, raises alerts and carries out actions to raise awareness;
- it intervenes to support and coordinate setting up and deploying actions for compliance with the rules on the independent management of regulated subsidiaries;
- it supports the divisions in protecting their brands, know-how, data, inventions and must, in particular, be associated with drafting the clauses on intellectual property in industrial agreements where there are issues at stake, and in negotiating licensing agreements.

The Legal Department also organises a secure process of listing and digitising the major contractual commitments of EDF SA and of certain subsidiaries known as the "contract library", to ensure that knowledge and control of EDF's sensitive contractual assets is guaranteed.

The Legal Department specifies, *via* the policy on governance of the subsidiaries and shareholdings, the conditions for the creation of each new legal entity, the procedures for appointing the corporate officers and expectations in terms of quality of governance within the Group.

Improved management of contracts entered into by EDF is a major issue in controlling operations, delays and associated costs. It is the role of the Contract Management function which aims to improve the management of risks and create opportunities in the management of its contracts. This function calls upon Contract Managers positioned in the business lines throughout the contractual process. It is an additional line of defence in the management of contracts organised between corporate and the divisions. The Contract Management Department, which was created in August 2014 and reports to the Group Legal Director, is responsible for organising this support function, managing the Contract Management unit, measuring its performance and professionalising the Contract Management stakeholders.

(1) This policy applies to all entities of EDF SA and subsidiaries, with the exception of regulated infrastructure operators, for whom shareholders' rights are exercised in the economic supervision framework specified by Directives 2009/72/CE and 2009/73/CE.

(2) Excluding (i) disputes related to tax law, managed by the Financial Department, (ii) certain disputes related to employment law managed by the National Employment Law Division of the human resources department.

#### 2.2.1.3.4 The Group's Ethics and Compliance Department

The Group Code of Ethics, which has been deployed since 2013, defines the rules and principles that must guide the actions and conduct of Group employees on a daily basis. It has been translated into 12 languages. Since December 2015, the Ethics and Compliance plan has been strengthened with the creation of a Group Ethics and Compliance Division (DECG) which supports the executive directors and, more generally, all employees, in setting up a Group Ethics and Compliance Programme. This programme is created to meet the requirements of national and international regulatory authorities and local practices.

On 17 May 2016, the Executive Committee adopted the Group Ethics and Compliance policy (PECG), which combines the requirements that the executive directors must know, comply with and enforce within their entities, in accordance with the risks to which these entities are exposed. This document supplements the Group Code of Ethics, which is itself accompanied by instructions applicable at the scale of the Group. The Group Ethics and Compliance Division (DECG) has the task of organising and coordinating the implementation of the Group Ethics and Compliance policy. The entities of the Group are responsible and liable for the implementation of the requirements of the Group Ethics and Compliance policy and associated instructions. The system was supplemented in 2017 with the publication of the Code of Conduct, which requires all employees to comply with regulatory instructions on the main compliance subjects.

Moreover, the Group Ethics and Compliance Division reports to the Group's Executive Committee and to the Governance and Corporate Social Responsibility Committee of the Board of Directors. It responds to any internal or external consultations and any alerts at the Group level addressed to it.

#### 2.2.1.3.5 The Sustainable Development Department

The EDF group takes into account the issues relating to sustainable development and includes them in its overall strategy. The CAP 2030 strategic project aiming to make EDF "an efficient and responsible electricity producer, champion of low-carbon growth" has set new prospects for the Sustainable Development and Environmental approach of the Group, including six corporate social responsibility objectives explained in section 3.1.2 of this document.

The Sustainable Development Committee (SDC) serves as the Environmental Management Board at the Group level and is in charge of coordinating the environmental management system in accordance with ISO 14001.

The EDF group maintains its ISO 14001 certification obtained for the first time on 9 April 2002. The scope of certification encompasses EDF SA, several French subsidiaries (including Dalkia, Électricité de Strasbourg, EDF Énergies Nouvelles, Citelum, etc.), and a number of international subsidiaries including EDF Energy, EDF Luminus, EDF Trading, Edison. The processes implemented as part of this certification help to reinforce the control of the Group's environmental risks, in particular with regard to regulatory aspects and environmental issues at stake by assuring its stakeholders of a structured and tailored organisation.

In 2017, all of the requirements relative to sustainable development at Group level were specified in the Group Sustainable Development policy, including, in particular, the requirements related to the challenges of climate change. The Sustainable Development Department has the task of organising the management, coordination and control of this policy, for which the implementation and control are the responsibility of the divisions and entities of the Group.

#### 2.2.1.3.6 The Group Information Systems Department

Amongst its various tasks, the Group Information Systems Department controls the implementation of the Group's Information Systems Security policy and is in charge of organising the internal control and coverage of the associated risks (see section 2.2.2.2.4).

Also, the Group Information Systems Department co-organises, with the Legal Department, the Group instructions on the protection of personal data. The entities are liable for the application of this instruction pursuant to the application of the Ethics and Compliance policy of the Group.

#### 2.2.1.3.7 The Security and Economic Intelligence Department

The organisation of security within the EDF group aims to ensure compliance with the requirements defined in the Security of Assets policy in coping with malicious acts. The Security and Economic Intelligence Department has the task of organising the management, coordination and control of this policy and in particular for preparing and providing to the entities the explanatory notes, practical guides and methodologies for applying the requirements of the policy.

#### 2.2.1.4 The 3<sup>rd</sup> line of control, the Group's audit unit

The Group's Audit unit is composed of all of the audit resources of the Group exercising an internal audit activity. Pursuant to a decision of the Chairman and CEO this function is supervised by the Group Audit Director. The Group audit unit includes the Audit Department and audit teams specific to each of the main French and foreign subsidiaries. Relations between the Audit Department and the various audit teams, and their respective powers, take into account whether the teams belong to EDF SA or to regulated subsidiaries, for which the relationships are adapted to ensure compliance with the principle of independence of management. The Audit Department carries out functional supervision of the business line (co-appointment and peer assessment of Audit Directors of the subsidiaries by the Audit Department – excluding RTE and Enedis –, exchanging best practices, training, sharing tools and methods, etc.). At the end of 2017, the Group audit unit consisted of 58.5 FTE<sup>(1)</sup>

#### Performance standards for EDF SA and the controlled subsidiaries

The Audit Department applies international standards defined by the Institute of Internal Auditors, promotes these standards and monitors compliance.

The missions, powers and responsibilities of the auditors as well as the rights and duties of the audited parties are set out in a charter which was updated in May 2016. This charter, signed by the Chairman and CEO reiterates the independent nature of the audit function and specifies the missions and commitments of the internal audit function, the duties and rights of the auditors and audited parties. It includes a code of ethics applicable to all the Group audit unit as a whole. This code is intended to promote a culture of ethics and serves to reiterate that the auditor must comply with and apply certain basic principles relevant to the profession and the conducting of internal audits.

The Audit Department reports to the General Secretary; the Director of the Audit Department enjoys direct access to the Chairman and CEO and reports on audit works to the Audit Committee to which it provides with information necessary to determine the adequacy of the audit staff with regard to the implementation of the supervision missions it has to carry out.

All of the auditors are trained in the same methodology, compliant with international standards. They are recruited from the various businesses of the Group as well as from external audit firms. The auditors are evaluated at the end of each mission.

The key processes relevant to the proper functioning of the Audit Department for the entire chain of its activities (from the drafting of the audit programme up to monitoring of the implementation of recommendations) are set out and coordinated.

The audit unit regularly submits voluntarily to evaluation by IFACI<sup>(2)</sup>. The last evaluation of 2014 stated, as previously, that the audit practices were compliant with the international standards of the profession.

#### Functioning procedures

The Group's audit unit carries out complete audits of the entities of EDF SA and controlled subsidiaries. These audits include the examination of the robustness of their internal control and are carried out at a rate of three to five years according to their extent. The Audit Department carries out cross-functional corporate audits, while the Audit Departments of the subsidiaries perform audits within their scope of responsibility. The Audit Department is the sole entity empowered to carry out audits of subsidiaries for corporate-level risks.

The audit programme is reviewed by the Chairman and CEO, the Risk Committee, and thereafter by the Board of Directors. It is drawn up to reflect:

(1) Full-time equivalent in 2016 at constant scope compared to end 2015.

(2) Institut français de l'Audit et du Contrôle Interne (French Institute of Audit and Internal Control).

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- the need to audit the main Group entities at intervals suited to their importance in order to assess in particular that their internal control is correctly implemented;
- the main accounting and financial processes and "Group Head" processes (human resources, information systems);
- major projects;
- risks of the Group's risk mapping which were not addressed by the aforementioned audits at intervals suited to the critical nature of the risk;
- monitoring of Executive Management decisions.

Digital tools have been developed to support the auditors in exploiting bulk data and targeting discrepancies.

All audits give rise to recommendations which, once validated by the audited parties and their management, become the subject of action plans drafted by the aforementioned management and audited parties and are sent to the Audit Department. In the next 12 to 18 months, the Audit Department will ensure the application of these corrective actions or any other action decided by management in order to put a halt to any irregularities detected. The audit is deemed to be concluded satisfactorily only when the irregularities have been corrected. Conversely, any unsatisfactory conclusion or conclusion with reservations will result in an appropriate management alert. These principles are applied in the same terms by the entire audit unit.

A half-yearly summary report is prepared. It summarises the significant events of the audits carried out by the unit, the main findings of the corporate audit and the corresponding recommendations, as well as the final results of the corporate audits carried out during the period. Furthermore, it identifies any recurring or generic problems observed in several audits and which merit special attention on the part of Management. It provides an audit-based vision of the level of control of the Group's risks. This report is presented to the Chairman and Chief Executive Officer, the Risk Committee and thereafter to the Audit Committee and the Board of Directors.

#### 2.2.1.5 External control

Like all listed companies, the EDF group is subject to review by the AMF (French Financial Markets Authority). As a company majority owned by the French State, EDF is also subject to control by the Cour des comptes (French Court of Auditors), State Controllers, the Inspectorate of Finance, Economic Affairs Committees or *ad hoc* Committees of inquiry of the French National Assembly and Senate.

According to law, the Statutory Auditors certify the annual financial statements (parent company and consolidated financial statements) and perform a limited review of the Group's half-yearly condensed consolidated financial statements. Their report includes the verifications on the information on corporate governance required by the article L. 225-237-3 and seq. of the French Commercial Code.

In the light of its activity, EDF is also subject to control, in France, by the Energy Regulation Commission (CRE) and the French Nuclear Safety Authority (ASN).

#### 2.2.1.6 Delegations of authority and technical authorisations

The Chairman and CEO delegates some of his/her powers to the members of the management team, in coherence with the organisation of the Group and with the responsibilities assigned to the heads of these entities

The organisation put in place for procurement is designed to ensure proper control of the processes. Procurement contracts are signed, depending on the thresholds, either by the Chairman, a Group Executive Director or any of their delegates following signature by the Procurement Department Director or any of their delegates. Signature by the Procurement Department Director or their delegates formally recognises that the instrument complies with the procurement process. Each Group Executive Director is expected to reinforce the internal control system for procurement instruments submitted for their signature and those procurement instruments directly handled by their Management.

The Chairman and CEO has delegated the nuclear operator liability to the Group Executive Director for the Nuclear and Fossil-fuel Fleet Department and the Group Executive Director for the New Nuclear Engineering and Projects Department, who then sub-delegated it to the Directors of the divisions involved which have, in their turn, sub-delegated it to unit managers.

Authorisations are issued by each facility manager, who must ensure beforehand that the associated skills have been assessed. These requirements apply to all persons carrying out work, both for staff of EDF and service providers.

The Legal Department prepares and updates delegations of authority. In addition, a "Group delegation of powers" instruction was updated in 2017 and aims to inform and educate EDF entities on the nature, consequences and management rules for delegations of powers.

### 2.2.2 IMPLEMENTATION OF SYSTEMS FOR THE CONTROL OF RISKS AND ACTIVITIES

#### 2.2.2.1 General control systems

##### 2.2.2.1.1 Risks mapping and the report on internal control, security of assets, ethics and compliance

- Each entity of the Group (65 entities in 2017 covering the scope of EDF SA and the controlled subsidiaries) prepares an annual internal control report, mainly consisting of a self-assessment of risk management and activities that concern them, and the description of the actions for making progress. Each internal control report gives rise to a commitment by the Director of the entity on the level of control achieved and the actions undertaken.

In 2017, the internal control report template was extended to give rise to a single report including internal control, reporting on security of assets and ethics and compliance reporting. Particular attention was therefore paid to these two subjects in the 2017 fiscal year.

- The part relative to ethics and compliance fulfils the requirements of the Group Ethics and Compliance policy, including: the ethics alert system, prevention of the risk of corruption (control of the integrity of business relations, supervision of gifts and invitations); financial ethics (prevention of the risk of money laundering and financing of terrorism, prevention of market abuse, compliance with the EMIR<sup>(1)</sup> regulation); prevention of breaches of competition law; prevention of conflicts of interest; compliance with rules on the protection of personal data; fraud prevention; preventing bullying and discrimination; compliance with sectoral regulations (REMIT<sup>(2)</sup> regulations on integrity and transparency in energy markets, regulations concerning dual-use goods); compliance with international sanctions programmes.
- The part relative to security of assets fulfils the requirements of the policy on security of assets in coping with malicious acts, including: the safety of individuals during international travel, the security of material assets and the security of intangible assets (identification, classification and protection of sensitive information).

Other than these topics, self-evaluations report more generally on the control of all of their "business" activities and all of the requirements of the other cross-functional areas listed in the Group policies, with the aid of an internal control guide updated each year, in coherence with the AMF reference framework. Lastly, self-evaluations report requirements relative to accounting and financial internal control (see section 2.2.2.3).

(1) European Market Infrastructure regulation (EMIR): European regulation on market infrastructures.

(2) Regulation on Wholesale Energy Market Integrity and Transparency (REMIT<sup>®</sup>).

Furthermore, these entities produce a map of risks every year based on a methodology common to the whole of the Group. The process of constructing the map of risks for the entities is based on:

- the principle of responsibility of management mentioned in section 2.2.1.1 above,
- the typology of risks, for identification that is as broad as possible, including internal and external risks, and operational and strategic risks, as well as opportunities,
- a qualitative evaluation method of the impact, the probability and the level of control of each risk,
- the description of action plans for dealing with risks and the evaluation of their effectiveness.

In support of this approach, a methodological guide is available to the entities. In addition, a Risk Management Information System (SIGR) has been deployed since 2016 and was made generally available to the whole Group in 2017.

Numerous discussions have taken place between the Group Risk Department and the entities, with the aim of querying the relevance of risks and the soundness of the control actions undertaken;

- based on these reports, the EDF group prepares the consolidated map of its major risks including the overall assessment of internal control, with the aim of providing the directors and governance bodies with a consolidated, regularly updated view of major risks and the level of control<sup>(1)</sup>. These documents, prepared at the end of the year, are validated by the Risk Committee and are presented to the Board of Directors after examination by the Audit Committee.

Since 2015, the Risk Committee has identified within the Group risk mapping a smaller set of "priority risks" selected as a result of their operational or strategic importance. The connection between these risks and the strategic project CAP 2030 has been given priority so that, as far as possible, risk control action plans may be included in the corresponding projects.

### 2.2.2.1.2 Crisis management and business continuity

The crisis-management and business-continuity policy defines the organisation principles for crisis management and business continuity and specifies the entire system necessary to its implementation. This policy consists in particular of:

- making sure of the existence of organisations for crisis management and permanent systems for raising alerts;
- checking the existence and regular update of relevant crisis-management procedures, with regard to the risks involved;
- defining, for periods of crisis, coordination procedures with all stakeholders;
- ensuring feedback from crises and crisis exercises is systematically applied in order to avoid or reduce the consequences of similar crises;
- checking the existence of business continuity plans within each entity;
- checking the implementation of professional development actions for all players in the crisis.

A crisis exercise programme allows these mechanisms to be tested in terms of their effectiveness and overall consistency.

### 2.2.2.2 Specific control systems excluding accounting and financial information

#### 2.2.2.2.1 Control of energy market risks

Each year, the Executive Management validates the entities' hedging strategies, as well as the associated risk limits, submitted for its approval by the Group Risk Management Department. These strategies are based on the Group's energy markets risk policy. This policy sets out the management of these risks and specifies

all the mechanisms necessary for its implementation and the monitoring of its enforcement. It describes:

- the governance and measurement system, clearly separating the risk management and control responsibilities and making it possible to monitor exposure over the scope defined above;
- the risk control processes involving the Group's Executive Management in the event that risk limits are exceeded; a strengthened control system has been put in place for the EDF Trading subsidiary in the light of the specific nature of trading activities;
- the two-tiered organisation of the energy markets risk control unit, the entities carrying out operational control and the Group Risk Management Department ensuring second-level control.

The Audit Committee gives an opinion to the Board of Directors on the implementation of the policy and on the changes proposed by the Group Risk Department. The expectations, main provisions and procedures for implementing this policy are described in section 5.1.6.

#### 2.2.2.2.2 Control of financial risks

The policy on financing, cash and the control of financial risks requires all entities of the Group to continuously and systematically identify financial risks (in particular, liquidity, interest rates, foreign exchange and counterparty). The Group Risk Department exercises 2<sup>nd</sup> level control of these risks *via*:

- verification that the principles of the policy have been properly applied (preparing work management frameworks, methodology, monitoring exposures, regular calculation of risk indicators and checking compliance with risk limits);
- the control of positions in the trading room in charge of cash management. For these activities, a system of indicators and risk limits checked on a daily and a weekly basis is in place. The Markets Committee (a body that brings together the Finance and Investment Department and the Group Risk Department) checks and reviews on a quarterly basis, where necessary, requests for exemptions to the work management framework and requests for investment in new financial products;

The policy on the constitution, management and control of the financial risks involving dedicated assets of EDF SA applies to the portfolio of dedicated assets which are managed by the Financial Department. It was updated and approved by the Board of Directors in 2015. The Group Risks Department writes an annual risk mandate and specific working frameworks which define the principles for managing risks and the risk limits that are acceptable for this portfolio.

#### 2.2.2.2.3 Approval of commitments

The Commitments policy establishes that the Commitments Committee examines all of the commitment projects of the Group, excluding regulated subsidiaries, covering:

- investment, divestment, and merger and acquisition projects exceeding €50 million;
- expenditure covering supplies, works or services of an amount exceeding €200 million over the entire duration of contracts;
- long-term purchase or energy and emission credits and CO<sub>2</sub> quotas for annual volumes or amounts exceeding 5TWh for electricity, 10TWh for gas and €150 million for coal, oil, emission credits and CO<sub>2</sub> allowances;
- the multiannual programme to supply back-end reactors and services of the nuclear fuel cycle;
- The annual programmes of commitments relative to decommissioning (including operations for the transfer of obligations) or those at the back-end of the nuclear fuel cycle;
- strategic projects likely to commit the Group over the long term through several investments below amounts of €50 million each.

The projects presented include an in-depth analysis of risks according to a methodological standard for the analysis of defined risks.

(1) Group risk mapping notably includes environmental risks and risks related to climate change (physical risks and transition risks). These risks are described in section 2.1 ; the strategic response to the challenges of climate change is described in §3.3.

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Whenever necessary, the proposed commitments are then reviewed by the Board of Directors as described in section 4.2.2.4. "Strategic disposal projects" are investigated separately and supervised by the Disposals Committee to preserve confidentiality and responsiveness.

#### 2.2.2.2.4 Security of Information Systems (IS)

The security of information systems is governed by the Information Systems Security Policy focusing on: strengthening the involvement of managers and the protection of assets associated with the information system; management of information systems security risks; taking new regulatory obligations into account (European regulations on the protection of personal data, Law on Military Programming, etc.).

The standard for the internal control of information systems is based on the external COBIT standard (Control Objectives for Information and related Technology).

Internal control and cover of the risks specific to IS issues is coordinated by the Group Information Systems Department at two levels in the unit's organisation based:

- on the IS Group Committee (which groups the EDF SA information systems department and the CIO of the main subsidiaries) to approve the cross-functional risk mapping and control actions to be implemented;
- and on the Group's Information Systems Security Managers, for the consistency, coordination and monitoring of control actions following on from the various checks and audits of information systems security.

The main actions implemented in matters of information systems security are:

- the continuation of actions to educate users and players in the information system, notably in 2017 through the deployment of a new charter on the use of IT and telecoms resources;
- the identification and priority securing of the most critical assets;
- the enhancement and extension of cyber surveillance capabilities by upgrading the Security Operational Center (SOC);
- setting up Group insurance relative to cybersecurity;
- actions to prevent, detect, monitor and react to cope with security incidents (e.g.: viruses, intrusions, targeted attacks) mainly on targeting administrative data processing;
- performing tests on the disaster recovery plan.

Also note that the new IS security policy applies to all functions of the Company and to suppliers and partners.

#### 2.2.2.3 The internal control procedures relating to reliability of financial and accounting information

##### 2.2.2.3.1 Reporting Guidelines

The internal control manual was entirely restructured in 2011 with regard to control of accounting and financial information in order to bring it into line with the AMF (French Financial Markets Authority) reference framework as revised in 2010. It was also revised in 2015 and 2016 to fit into the Group's new internal control dynamic. The fundamentals of governance, roles and responsibilities remain unchanged.

The accounting standards used by the EDF group (the scope of the consolidated financial statements are included in the notes to the consolidated financial statements (see section 6)) comply with the international standards published by the International Accounting Standards Board ("IASB") approved by the European Union and applicable as at 31 December 2016. These international standards include the IAS (International Accounting Standards), IFRS (International Financial Reporting Standards) and the SIC and IFRIC interpretations. The accounting rules and methods are described in the Financial and Accounting Reporting policy, specified in the Group accounting principles manual and summarised in the notes to the consolidated financial statements. The measures to be taken concerning the control procedures are described in the Accounting and Financial Internal Control instruction. In particular they cover, for the management control area, the management cycle and steering – monitoring of investments – and for the accounting and tax area, the reliability of the accounting and tax information and the fight against fraud.

The Finance Management Directors of the Departments of the business lines and Subsidiaries sit on the Management Committee of the entities to which they belong. With the exception of the regulated subsidiaries, they are appointed and evaluated jointly by the operational management and the management of the Management Control function. For subsidiaries, accounting internal control policies are the responsibility of each corresponding legal structure. A network of correspondents from the operational Departments and subsidiaries facilitates dissemination of the instructions and harmonised implementation throughout the various Group entities.

##### 2.2.2.3.2 Procedures for preparing and controlling the consolidated financial statements

The consolidated financial statements are prepared by the Group Accounting and Taxation Department on the basis of the data entered locally by each entity (entities of the parent company and subsidiaries) in accordance with the Group standards and closing instructions, according to a single plan of charts. The scope of consolidation is closed after noting all companies of significance that are controlled, jointly-controlled or under significant influence. The non-significant nature of entities for which EDF holds an interest and which might fall within the scope of consolidation is examined regularly and submitted annually for the assessment of the Statutory Auditors.

The half-year consolidated financial statements are presented to the Audit Committee and then approved by the Board of Directors. The annual consolidated financial statements are reviewed by the Audit Committee, then closed at 31 December of the fiscal year by the Board of Directors and lastly approved by the Shareholders' Meeting.

Each annual and semi-annual results in the drawing up of instructions specifying the key deliverables expected from each stakeholder to the publication of the financial statements, the management report and the Reference Document for the annual closings. Meetings with EDF departments and the subsidiaries facilitate the preparation of these financial statements and make it possible to anticipate changes with regard to certain treatments thereby increasing the reliability of the accounting and financial information published. An analysis of the conditions of preparation (compliance with deadlines, quality of information, etc.) after the event allows for regular improvement of the consolidated financial statements preparation and analysis process.

Monthly reporting of information on the balance sheet accounts and the income statement can anticipate the processing of complex operations and contribute to making the results more reliable.

Forecasts and management acts are implemented using a single reference framework and tools shared between accounting and management. This system contributes to the coherence of Group management and facilitates dialogue at all levels of the organisation and helps promote exchange of information between actors and the quality of the information produced.

##### 2.2.2.3.3 Procedures for preparing and controlling the financial statements

The financial statements are prepared annually and semi-annually by the Parent company Financial Statements Department of the Accounting Consolidation Division. The annual financial statements are closed on 31 December of the fiscal year, approved by the Board of Directors of EDF and then approved by the Shareholders' Meeting.

The condensed half-year financial statements are closed on 30 June of the fiscal year by the Board of Directors. EDF's transactional accounting (excluding Nuclear Fuel Division, EDF Island Power Systems Division, Decommissioning and Waste Projects Department, and Executive Managers Department for the accounting component of payroll) is entrusted to the shared "Accounting" service centre of the Tertiary Services Department. The processing of the transactional accounting is organised by process. "Governance pacts" set the respective responsibilities of the operational Departments, the shared "Accounting" services centre or, where applicable, the accounting operators in the operational businesses and the Accounting Consolidation Division.

Meetings are organised on a quarterly basis with the EDF SA departments to prepare the financial statements and anticipate changes with regard to certain treatments thereby increasing the reliability of the accounting and financial information published.

Each operational and functional Director makes a commitment each year with regard to the quality of the Internal Control system in the Accounting and Financial fields, the improvement goals for the coming period and the truthfulness and exhaustiveness of the accounting information for which they are responsible by preparing a commitment letter sent to the Group Accounting and Taxation Director.

The internal control system in the accounting field is integrated into the Group internal control system as a whole. An indicator reference framework is used within EDF. It makes it possible to measure areas of conformity of the accounting information for each process.

#### 2.2.2.3.4 Financial communication

The financial communication policy defines the rules to be complied with to ensure the reliability and consistency of the financial information disseminated by the Group. The financial communication controlled by the Investors and Markets Department aims to fulfil the two fundamental objectives of ensuring the provision of financial information that is of high quality, consistent and offers the same substance to different audiences, and to ensure the compliance of the financial information with the laws and regulations in force. Furthermore, the EDF group has adopted a code of market ethics reiterating the principles and rules applicable to transactions involving securities of the EDF or listed companies of the EDF group. Alongside the dissemination of this code, awareness-raising actions on exchange rules have been carried out among Group employees, especially as regards precautions and obligations related to inside information and black-out periods during which leaders and certain employees holding inside information must refrain from making transactions involving the Company's shares.

### 2.2.2.4 Specific business provisions

#### 2.2.2.4.1 The nuclear field

The nuclear safety policy of the EDF group specifies that nuclear safety is the first priority, under all circumstances, in the nuclear activities of the EDF group. Safety is based on a clear principle of responsibility and control. Each company of the Group operating nuclear facilities acts within the framework of the legal and regulatory instructions specific to the country in which it is located and has the obligation to comply with them. Each one ensures the nuclear safety of its facilities and constantly improves the level, based on its methods, skills and values. The Group develops common principles aiming to obtain the best level of prevention of incidents and protection of workers, the public and the environment. These principles apply to all stages of the activity, both for new projects and for the existing fleets. The Group closely involves its industrial partners with the achievement of these objectives.

Each company is responsible for the proper performance of its nuclear activities and fixes the appropriate delegations at each level of decision or action. The Group ensures that the necessary resources are allocated to nuclear safety.

An internal entity in charge of an independent safety evaluation is put in place at the level of each site, each company and of the Group (IGSNR<sup>(1)</sup>). Each one reports to the manager concerned, independently of other managerial functions; furthermore, each one has the duty to alert the superior hierarchical level if the reaction of the level directly involved is not what is expected.

The nuclear operating companies of the Group regularly receive international evaluation teams (WANO Peer Review<sup>(2)</sup>, OSART from the AIEA<sup>(3)</sup>).

Clear and honest communication on the events and their possible impacts are promoted within the Group. This high-quality dialogue is sought and maintained with the salaried personnel and its representatives, subcontractors, the supervisory authorities (Nuclear Safety Authority in France, Office for Nuclear Generation in the United Kingdom), local communities and all other stakeholders in nuclear safety.

The Nuclear Safety Council, which the Chairman and CEO of EDF chairs, meets several times a year and, in February, examines the annual assessment of nuclear safety for the EDF group. A General Inspector for nuclear safety and radiation protection is appointed by the Chairman and CEO to whom he/she reports. He/she carries out inspection missions on all of the nuclear activities of the EDF group. Each year, it gives an opinion on safety within EDF. Its report is presented and debated in the Nuclear Safety Council. It is then made public.

#### 2.2.2.4.2 The hydropower field

Hydropower safety comprises all the measures taken when designing and operating plants to reduce risks and hazards to people and property associated with water and the presence or operation of facilities. Hydropower safety is the major and permanent concern of the producer. It involves three main activities:

- measures to address the major risk associated with dam or reservoir failures, through the regular monitoring and maintenance of facilities under the supervision of public authorities, mainly the French regional environment, land use and housing authorities (Directions Régionales de l'Environnement, de l'Aménagement et du Logement – DREAL). Of the largest dams, 68 of them are subject to a special administrative procedure implemented by the competent prefect;
- the management of facilities during periods of exceptionally high water levels, in order to ensure safety at the facilities and for the surrounding communities;
- control of operational risks: changes in the level of the water bodies or the flow of watercourses downstream of the works.

EDF regularly monitors and maintains its dams, including through continuous monitoring. The real-time readings and analysis, at each site, of multiple data (settlement, pressure, leakage measurements, combined with the visual inspection of the concrete and an inspection of the mechanical parts, etc.) enable EDF to conduct a regular assessment on the state of its dams. In Grenoble and Toulouse, EDF teams can analyse the largest dams or those dams that are the hardest to access, remotely and in real time, using a series of sensors.

Furthermore, for each of the 150 large dams, a danger study including a complete technical examination is carried out every ten years. This examination requires draining or an inspection of the submerged parts with sub-aquatic equipment. These operations are carried out under the supervision of public authorities (the DREAL office at the regional level as well as the Service technique de l'énergie électrique des grands barrages et de l'hydraulique, and STEEGBH, the central French government agency specifically responsible for large dams and hydropower facilities).

At the organisational level, the Hydropower Safety Inspector prepares an annual report for the Chairman and CEO of EDF, to which he or she reports directly, as well as to those involved in hydropower safety. Issued after analyses, inspections and assessments carried out by the Hydropower Safety Inspector, this report aims to give an opinion on the level of hydropower safety of the Group's installations and provide a basis for reflection and progress to ensure its improvement and consolidation. This report is made public on the Group's website.

(1) IGSNR: The General Inspector for Nuclear Safety and Radiation Protection.

(2) WANO: World Association of Nuclear Operators.

(3) OSART: Operational Safety Analysis Review Team, International Atomic Energy Agency (IAEA).

### 2.3 DEPENDENCY FACTORS

The EDF group does not consider itself to be dependent on any single customer.

With regard to suppliers, EDF used 12,880 in 2017 (against 12,333 suppliers in 2016 and 12,806 in 2015). In 2017, the top five suppliers of EDF represented 17.5% (16.4% in 2016 and 16.4% in 2015) of the total amount ordered by EDF (excluding fuel purchases), and the top ten represented 23.9% (22.5% in 2016 and 22.6% in 2015).

Certain suppliers and subcontractors that provide products or services that the Group purchases in conjunction with its operations cannot be replaced.

The issue of EDF's dependency *vis-à-vis* its suppliers arises primarily in the nuclear sector and, to a lesser extent, in IT and telecommunications in respect of specific and secure means of transmission.

The EDF group has developed expertise as an architect-builder of its power generation plants and as a nuclear fuel cycle integrator, which gives EDF technical expertise that is independent of that of its suppliers.

Lastly, the EDF group historically had very important commercial relations with the AREVA group, which worked on each stage of the nuclear fuel cycle and in the design, construction and maintenance of the nuclear boilers in EDF's fleet. In France, the AREVA group was EDF's main supplier in the nuclear sector and EDF was the AREVA's group's main customer. Since 31 December 2017, the activities of AREVA have been split in two: they are carried on partly by Orano, for the fuel cycle and by Framatome, a subsidiary of EDF, for the design, manufacture and maintenance of the boilers in the nuclear generation fleet. The situation of interdependency in relation to the entities of the Orano group remains today.

#### 2.3.1 NUCLEAR FUEL CYCLE

The relationship between EDF and the AREVA-Orano group with respect to the fuel cycle is governed by multi-year contracts.

For the front end of the nuclear fuel cycle (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues – Front end"), EDF relies to a large extent on the AREVA-Orano group, which accounted for approximately 52% of EDF's purchases in 2017 (52% in 2016):

- for its natural uranium requirements, EDF pursues a policy aimed at diversifying its sources of supply in terms of origins and suppliers; the AREVA-Orano group remains an important supplier to EDF in this field;
- in terms of the nuclear conversion process, a significant share of the requirements of EDF are met by AREVA NC-Orano, in competition with other worldwide suppliers;
- in the field of uranium enrichment, EDF has also diversified its supply sources and now uses several major worldwide suppliers. The Georges Besse II plant belonging to AREVA NC provides a significant share of these services (see section 1.4.1.1.4 "Nuclear fuel cycle and associated issues").

For the manufacture of fuel assemblies, EDF uses two suppliers: Framatome and Westinghouse. Since the parent company of Westinghouse was put into chapter 11, EDF, in direct communication with this supplier, is constantly vigilant to ensure the operational continuity and legal security of all of the ongoing contracts. For the back-end nuclear fuel cycle (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues – The back-end cycle"), the AREVA NC-Orano group has been appointed to perform all operations in France:

- spent fuel management operations (removal, storage and treatment) are carried out in the AREVA NC-Orano plant at La Hague. The terms and conditions for these operations, as well as the recycling of processing by-products, have been agreed for the 2008-2040 period in the EDF-AREVA master agreement of 19 December 2008 and included in successive application contracts (see note 29.1.1 to the consolidated financial statements for the fiscal year ended

31 December 2016). The contract for 2016-2023 was signed in February 2016 (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues" – "Front end");

- recycling, which covers the manufacture of MOX fuel, is carried out, for its part, in the MELOX plant belonging to AREVA NC-Orano.

#### 2.3.2 POWER PLANT DEVELOPMENT AND MAINTENANCE

Framatome is EDF's main supplier of power plant construction and maintenance services. In particular, Framatome supplies nuclear boilers, their spare parts and the corresponding safety studies. In 2011, EDF signed two major contracts with Framatome, one for the production of 32 of the 44 steam generators for the 1,300MW segments, and the other for the renovation of the control-command systems for the 1,300MW reactors at the time of their third ten-year inspection. The production of the steam generators covered under the first contract is underway, although quality defects in the projects delay the installation of new components on the installations. With regard to the second contract, the first facilities for the second segment of the Paluel power plant was begun in 2015 but could not be completed due to an unforeseen that occurred in March 2016 on this installation (fall of a used steam generator during its handling, see section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet"). The renovation of the control-command systems, covered under the contract, has since been successfully carried out on the Paluel 1 and Cattenom 1 units. Moreover, a diversification programme has been under way for several years, in particular, with Westinghouse and Mitsubishi, for the replacement of certain major components of the boiler (12 of the 44 steam generators for the 1,300MW series will be provided by Westinghouse) and for maintenance services.

To prepare for the renewal of its power generation facilities, EDF has decided to use the EPR technology developed with Framatome, and has initiated construction of the Flamanville EPR power plant. In connection with this project, in 2007, EDF signed a contract with Framatome for the supply of the EPR boiler.

EDF also has a relationship with the ALSTOM group for the maintenance of certain components of nuclear and fossil fuel-fired power plants. In addition, ALSTOM is supplying the engine room for the Flamanville 3 EPR. Goods and services that ALSTOM supplies to EDF are particularly important for the maintenance of the nuclear power plants' turbo-generators and of certain major components of fossil fuel-fired generation facilities.

EDF does not consider itself to be dependent on the ALSTOM group, which is subject to competition with regard to most of its activities. EDF has nonetheless sought to maintain its interests in the nuclear field following the purchase by General Electric of ALSTOM'S Energy division. The main challenge for EDF is twofold:

- ensure, at an acceptable cost and until the end of each unit's lifespan, the industrial capacity necessary to maintain under operational conditions and extend the lifespan of the nuclear generation fleet operated by EDF in France and the United Kingdom including the Flamanville 3 and Hinkley Point C EPR reactors;
- ensure the availability for future EDF nuclear projects of turbine offers under excellent technical and economic conditions.

Preservation of these strategic interests relies on framework agreements and the creation of a joint GEAST subsidiary dedicated to nuclear power plant machine rooms activities. The agreement between the French State, ALSTOM and General Electric (GE) signed on 21 June 2014 provides for a joint venture between GE and ALSTOM (GEAST), of which ALSTOM will hold 50% of the stake less one vote. GEAST is expected to develop ALSTOM's nuclear activities on an exclusive and worldwide basis, as well as ALSTOM's steam (non-nuclear) business in France alone. The French State holds a "golden share" in the joint venture, is represented therein by a director and has veto rights on certain governance issues.



## 2.4 LEGAL PROCEEDINGS AND ARBITRATION

In the ordinary course of its business, the Group is involved in certain legal, arbitration and administrative proceedings. Charges that result from such proceedings are only provided for where such charges are likely and can be either quantified or assessed within a reasonable range. In the latter case, the amount of the provision is calculated on a case-by-case basis, based on the best possible estimate. The amounts of any provisions made depend on the case-by-case risk assessments and do not depend primarily on the status of the proceedings; however, developments in the proceedings may nonetheless lead to a reassessment of such risks.

To the knowledge of the Company, except for the proceedings set out below, there are no other administrative, legal or arbitration proceedings (including pending or threatened proceedings), likely to have or having had in the past 12 months a material impact on the financial situation or the profitability of the Company and/or the group.

### 2.4.1 LEGAL PROCEEDINGS CONCERNING EDF

#### French Utilities Network (Réseau d'alimentation général – "RAG")

In October 2002, the European Commission initiated proceedings against France, claiming that State aid had been granted to EDF when its balance sheet was restructured on 1 January 1997. By a decision dated 16 December 2003, the European Commission set the principal amount of aid to be repaid at €889 million. On 11 February 2004, the French State issued a collection note for €1,224 million which covered the principal amount and interest. This amount was paid by EDF. On 27 April 2004, EDF initiated an action before the European Union General Court, at the time known as the European Court of First Instance, to annul the European Commission's decision. The European Union General Court issued, on 15 December 2009, a ruling annulling the European Commission's decision of 16 December 2003, holding that when making its decision, it should have applied the informed market economy investor test to determine whether or not the action constituted State aid. As this ruling was binding on both parties, the State repaid €1,224 million to EDF on 30 December 2009. On 26 February 2010, the European Commission filed an appeal against the European Union General Court's ruling before the Court of Justice of the European Union. By order dated 5 June 2012, the Court of Justice rejected the appeal by the European Commission and confirmed the order of the European Union General Court of 15 December 2009.

On 2 May 2013, the European Commission decided to reopen its investigation in order to check whether the State had acted as an informed market economy investor under the tests established by the European courts. On 22 July 2015, the European Commission issued a new decision ruling that the tax treatment of the provisions created between 1987 and 1996 for the renewal of the RAG facilities constituted incompatible State aid, considering that the tax exemption granted to EDF could not be treated as an investment for economic reasons. Following this decision, the State ordered EDF to repay the amount of the aid granted plus interest in accordance with the terms decided by the European Commission, corresponding to a total amount of €1.38 billion.

EDF has formally acknowledged this decision and repaid the sums demanded. However, the Group disputes the existence of unlawful State aid and on 22 December 2015, it initiated a new action for annulment before the European Union General Court. On 19 April 2016, the State became involved in these proceedings, in support of EDF. By a ruling dated 16 January 2018, the European Union General Court rejected this action and confirmed the decision of the European Commission. EDF takes note of this decision and will examine whether it is appropriate to appeal to the European Court of Justice.

#### Competitive bidding for hydroelectric concessions in France

The Directorate-General for Competition of the European Commission (EC) has issued proceedings against the French State with respect to hydroelectric

concessions in France, under Article 106, chapter 1 of the Treaty on the Functioning of the European Union (TFEU) combined with Article 102 of the same treaty.

The European Commission therefore sent a formal notice to the French State on 22 October 2015, stating that it considered the fact that most hydropower concessions in France are attributed to and reserved for EDF as a violation of the above articles, since these measures reinforce EDF's dominant position on the French retail electricity markets.

The State had a period of two months to reply to the formal notice, which marked a new adversarial exchange between the State and the EC, which does not affect the final decision that will be adopted by the EC. As the principal interested party, EDF received a copy of this notice. It sent the EC its observations in response to the notice on 4 January 2016, firmly contesting the EC's analysis and the grounds on which it is based.

Discussions between the European Commission and the French State are still ongoing.

#### Asbestos

In the past, EDF has used products containing asbestos. Thus, certain employees, in particular those working in fossil-fired power plant maintenance, may have been exposed to asbestos, principally before such asbestos was replaced or protective measures were implemented by EDF from the late 1970s.

Between 1997 and 31 December 2016, EDF and Enedis have been party to 648 inexcusable fault (*faute inexcusable*) actions in France in relation to the alleged exposure of its employees to asbestos in their workplace. Establishing a liability in such an action could lead to the payment of additional compensation by the employer to the victims or their legal successors.

As at the end of January 2018, there were 109 ongoing litigation cases, 90 for EDF and 19 for Enedis.

The cumulative amount of the final judgments against EDF in litigation cases relating to the inexcusable fault of the employer amounted to around €28.9 million as at 31 December 2017.

The number of cases of litigation initiated has stabilised since 2010 and since 2016 has been trending down (less than 20 new cases each year). Accordingly, there should not be any significant variations in the financial burden for the CNIÉG (Pension fund for Electricity and Gas Industry companies). A €30 million provision was created in EDF's financial statements to cover the financial risk.

#### Solaire Direct

On 17 December 2013, the Competition Authority (ADLC) fined the EDF group €13.5 million for practices constituting an abuse of dominant position which, the ADLC felt, allowed it to favour its subsidiaries operating in the photovoltaic sector to the detriment of other market players. The ADLC criticised the fact that EDF had made various material and non-material resources available to its subsidiaries which could not be reproduced by competitors (in particular, the Bleu Ciel® brand, trademark and logo and customer data), thereby creating confusion among customers between its role as an electricity supplier subject to regulated rates and the role of its subsidiaries operating in the photovoltaic sector. EDF had lodged an appeal against this decision before the Court of Appeal in Paris.

On 21 May 2015, the Court of Appeal in Paris partially reversed the ADLC's decision and set aside the fine relating to the use of EDF's trademark and logo for the 2009-2010 period along with the increased fine for repeated breaches. Ultimately, the fine has thus been reduced from €13.5 million to €7.9 million.

The ADLC and EDF appealed to the Court of Cassation. By a ruling dated 27 September 2017, the Court of Cassation rejected EDF's arguments on appeal and annulled the 2015 ruling of the Paris Court of Appeal in that it dismissed the aggravating circumstance arising from repeated breaches. The Court of Cassation therefore referred the case back to the Paris Court of Appeal on the single question of determining the increase in the fine due to repeated breaches. A decision should be made during 2018.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Legal proceedings and arbitration

#### Litigation by photovoltaic operators for compensation

On 13 May 2014, Solaire Direct issued proceedings against EDF, EDF EN, EDF ENR and EDF ENR Solaire before the Commercial Court in Paris seeking compensation for the damage it claims to have suffered as a result of the practices condemned by the ADLC in its decision issued on 17 December 2013, assessed by Solaire Direct at €8.7 million. On 16 December 2014, the Court ordered a stay of proceedings pending the judgment to be issued by the Court of Appeal in Paris on EDF's appeal against the above-mentioned ADLC decision. In a judgement dated 21 February 2017, the Commercial Court ordered a new stay of proceedings until the ruling of the Court of Cassation on the appeal filed by the ADLC against the decision dated 21 May 2015. The Court of Cassation gave its ruling (see the "Solaire Direct" dispute above) and the case was re-entered on the case list and Solaire Direct estimates its damages at €5.2 million. No date for the hearing has currently been fixed.

On 11 December 2014, Apem Énergie, Arkeos, Biosystem-AD, Cap Eco Énergie, Cap Sud, Isowatt, PCI-m, Photen and Sol'Air Confort started proceedings against EDF, EDF ENR and EDF ENR Solaire before the Commercial Court in Paris on the same grounds. They claim alleged damages of €18.3 million. By judgement dated 27 September 2017, the court rejected the action of the plaintiffs on the grounds of limitation of action by lapse of time. Only six of the eleven companies appealed the decision. Total damages and interest claimed now stand at €9.4 million.

#### Photovoltaic producers litigation

The announcement by the public authorities in autumn 2010 of an upcoming decrease in the photovoltaic electricity purchase prices triggered a massive increase in requests for connections (this rush being explained by the fact that the date on which a full application was submitted would then determine the applicable price). Several successive ministerial orders were then issued reducing purchase prices.

As these reductions were not sufficient to stem the rush of applications for contracts, the government, by decree dated 9 December 2010, suspended the conclusion of new contracts for a period of three months and stated that if the financial and technical proposal for a request had not been approved before 2 December 2010, a new connection request would need to be submitted at the end of this three-month period.

In this context, a certain number of producers, who had lost the entitlement to benefit from the mandatory purchase prices before the moratorium, brought legal proceedings for damages against EDF, as the distribution network manager (GRD) in non-interconnected island areas (ZNI) and Enedis GRD, as the network manager in Mainland France, on the grounds that the network managers had failed to issue technical and financial proposals for connection in a timely manner, which would have allowed them to enjoy the more attractive electricity purchase conditions (see section 2.4.2 "Legal proceedings concerning EDF's subsidiaries and holdings").

Although some first instance courts dismissed all of their claims, others have awarded compensation to them.

EDF and Enedis solicited the benefit of their Civil Liability insurance policy. Insurers refused to apply their guarantee. The Court of Cassation ruled in a decision dated 9 June 2015, (Green Yellow) that Enedis' liability was to be covered by its insurers and that Enedis was liable. However, insurers keep refusing their guarantee for other pending cases.

In addition, by order dated 15 March 2017, the European Court of Justice confirmed that the orders of 10 July 2006 and 12 January 2010 fixing the purchase prices of electricity of photovoltaic origin constituted "intervention by the State or through the resources of the State", one of the four criteria for qualifying as state aid. It reiterated that such aid measures implemented without having been previously notified to the Commission are illegal. It is now for the national jurisdictions to implement the consequences of this, particularly by ruling out the application of these illegal orders.

The commercial courts and courts of appeal will have to give a ruling in the forthcoming months.

Disputing their liability, EDF and Enedis:

- decided to bring an insurance action to combine the claims related to a single harmful event having the same technical cause (requests for connection issued between 24 and 31 August 2010), known as a serial claim against the insurers;

- appeal against the harshest judgments issued at first instance;
- rely on the order from the European Court of Justice to argue that the harm suffered by the producers is based on illegal orders and is therefore non-repairable.

#### SUN'R

On 21 June 2012, SUN'R filed a complaint against EDF and Enedis, along with an application for protective measures (mesures conservatoires), with France's ADLC. SUN'R accused Enedis of delays in the procedure for the connection of its photovoltaic facilities and EDF of delays in the implementation of the mandatory purchase contracts and the payment of the related invoices. In addition, according to SUN'R, EDF ENR benefited from special treatment for the connection of its facilities by Enedis and the payment of its invoices by EDF.

In a decision of 14 February 2013, the ADLC issued a decision rejecting all the applications for protective measures made by SUN'R but the proceedings on the merits are still ongoing.

On 12 January 2018, ADLC's investigation services sent to the parties a discharge proposal, concluding that there were no anti-competitive practices by EDF, Enedis and RTE. However, this proposal does not prejudice the final decision, which will be adopted by the ADLC.

At the same time as its complaint before the ADLC in 2012, SUN'R filed on 29 August 2012 a petition at an urgent applications hearing for expert assessment and provisional damages before the Administrative Court in Paris including a claim for provisional compensation of €1 million for EDF and €2.5 million for Enedis. By order of 27 November 2012, the urgent applications judge (*juge des référés*) at the Administrative Court in Paris dismissed this petition.

On 30 April 2015, SUN'R issued proceedings against Enedis and EDF SA before the Commercial Court in Paris seeking compensation for the loss allegedly caused to it by the delays in the procedure for the connection of its proposed solar energy plants to the electricity distribution network. It has asked the Court to stay the proceedings and claims, pending ADLC's decision on the merits of the case, a provisional amount of €10 million to be applied against its loss. In a judgment issued on 7 November 2016, the Commercial Court in Paris dismissed SUN'R's application for provisional damages and issued a stay of proceedings pending ADLC's decision on the merits of the case.

On 24 November 2015, Sun West, Azimut 56 and JB Solar started proceedings against Enedis and EDF SA before the Commercial Court in Paris on the same grounds. They are currently claiming almost €4 million to compensate their alleged loss but have asked the Court to stay the proceedings pending ADLC's decision on the merits of the case. In a judgement dated 4 December 2017, the Paris Commercial Court dismissed the application by Sun West, Azimut 56 and JB Solar for provisional damages and issued a stay of proceedings pending ADLC's decision on the merits of the case.

#### Eole Miquelon

On 20 July 2015, Eole Miquelon filed a complaint with ADLC on the practices implemented in the electricity industry in Miquelon.

Eole Miquelon operates a wind farm on the island and claims that EDF has restricted the use of wind energy produced from its facilities in order to give preferential treatment to the electricity it produces directly. Eole Miquelon claims it will be forced to close its operations on the island because of these practices.

#### Xélan

On 17 October 2016, Xélan brought a claim before the French Competition authority (Autorité de la concurrence) alleging mainly that EDF's refusal to share the consumption data of clients at regulated selling prices prevented Xélan from designing its own electricity supply offers based on energy consumption management. Following the filing of this claim, the Competition authority carried out on 22 and 23 November 2016 search and seizure operations at the premises of EDF and several of its affiliates. These operations do not in any way, however, prejudice the question as to whether there exists a violation that could be attributed to the EDF group. EDF and its subsidiaries filed appeals with the Court of Appeal of Versailles to challenge these search and seizure operations. The hearings concerning these claims took place on 22 February 2018 and a decision will be made during the first half of 2018.

## CSPE ceiling investigation

On 27 March 2014, the European Commission opened an in-depth investigation into the reductions on the Contribution to the Public Electricity Service (CSPE) granted to large energy consumers and self-generators based on State aid rules. As an interested third party, EDF submitted its comments on the decision to the European Commission, following its publication in the Official Journal of the European Union on 3 October 2014.

## Labour litigation

EDF is a party to a number of labour lawsuits relating in particular to working time. EDF does not consider that any of these lawsuits, taken individually, is likely to have a significant impact on its financial results or its financial position. However, as these disputes relate to situations that could involve a significant number of EDF's employees in France, if they were to multiply, they could then potentially have a significant negative impact on the Group's financial position, even though this risk is mitigated by the signature in 2016 of the agreement on the annualised calculation of working time by days.

## Environmental litigation

Due to its industrial activities, the Group is a party to various environmental lawsuits, in particular, regarding ground decontamination. As of the date of the filing of this Reference Document, the Group does not believe that any of these lawsuits, individually, is likely, in the event of an unfavourable outcome, to have a material negative impact on the Group's financial position.

## Tax disputes

Following audits of its accounts for previous financial years, the authorities disputed the tax deductibility of the Company's provisions for benefits for work-related accidents and sicknesses (*accident du travail et maladies professionnelles* – "AT/MP"). This also concerns RTE, Enedis and Électricité de Strasbourg particularly, since this issue is linked to the nature of Electricity and Gas Industry companies. By two orders dated 22 November 2017, the Council of State definitively validated the position of the Company and recognised that these provisions were tax-deductible, thus ending all related litigation.

For the period 2008 to 2015, EDF received proposals for adjustments related notably to the tax deductibility of certain long-term liabilities. This adjustment, reiterated each year, represented a combined corporate tax financial risk of around €536 million at the end of 2017. By two judgements in September 2017, the Administrative Court of Montreuil recognised that these liabilities were tax-deductible and validated the position adopted by the Company.

For the 2012 and 2015 fiscal years, the tax authorities notified the Company of certain recurrent adjustments concerning the contribution on value added by companies and challenged the deductibility of certain long-term provisions.

## Vent de Colère

Following an appeal lodged by an association, Vent de Colère, against the order issued on 17 November 2008 fixing the price at which wind-generated electricity is purchased, the Council of State stayed the proceedings and submitted a reference for a preliminary ruling to the European Court of Justice on whether the mechanism for financing the obligation to purchase electricity based on CSPE (*Contribution au service public de l'électricité* – Contribution to the Public Electricity Service) is to be regarded as an intervention by the State or through State resources within the meaning of and for the application of the provisions of the TEU relating to State aid.

On 19 December 2013, the Court issued its decision and confirmed that "the new mechanism for offsetting in full the additional costs imposed on undertakings because of an obligation to purchase wind-generated electricity at a price higher than the market price that is financed by all final consumers of electricity (...) constitutes an intervention through State resources".

In a judgment issued on 28 May 2014, the Council of State set aside the order issued on 17 November 2008 on the ground that the prices it fixes constitute State aid that had not been notified to the European Commission prior to its implementation. As an alternative, on 17 June 2014, the Ministry of the Environment, Energy and the Sea signed an order setting the conditions for the purchase of wind-generated electricity produced on land. This new legislation restates the conditions for the purchase of wind-generated electricity stated in the 2008 order and the impact on the CSPE remains the same. The order of 17 June 2014 was appealed before the Council of State, which dismissed the appeal in a judgment handed down on 9 March 2016, in which the court held that this new order did not need to be notified to the European Commission and also dismissed

the claim that the rate of return awarded to wind-power producers for their tied-up capital was too high.

In an opinion issued in the Praxair case on 22 July 2015, the Council of State ruled that the income from the CSPE does not have a direct impact on the amount of the aid granted to producers using renewable energy. It inferred that the CSPE could not be treated as an integral part of the mechanism used to support the wind-power sector that was held to be unlawful in the Vent de Colère judgment issued on 28 May 2014 or any other mechanism used to support renewable energy. In a judgment issued on 23 February 2016, the Administrative Court of Appeal in Paris, applying the opinion issued by the Council of State, dismissed the CSPE repayment claims filed by Praxair. The company Messer France, representing the interests of Praxair, appealed this decision. The Council of State, in a decision dated 22 February 2017, decided to stay the proceedings until the decision of the Court of Justice of the European Union (CJEU) on the prejudicial questions submitted to it, regarding the compatibility of the CSPE with the Directives establishing general arrangements for excise duties (92/12/CEE of 22 February 1992, and 2008/118/CE of 16 December 2008) and the common framework for the taxation of energy products and electricity (2003/96/CE of 27 October 2003). On 7 March 2018, the Advocate General delivered his Opinion, considering that the CSPE can be qualified as a direct taxation pursuing specific purposes compatible with EU law, only for the percentage of its income intended to finance the production of electricity from renewable energy sources. The decision of the ECJ is expected by the end of the first half of 2018. It will then be for the Council of State to rule on Messer's appeal, taking account of the answers given by the Court of Justice. Other than the Messer dispute, numerous bodies also seeking to obtain the return of the CSPE from the French State are currently pending before the administrative courts and are waiting for the ruling by the Council of State that will follow the decision by the European Court of Justice.

In addition, in a decision issued on 15 April 2016, the Council of State ordered the State to pay a €10,000 penalty for non-compliance per day late, if it failed to prove, within 6 months, that it had done everything necessary to enforce the decision issued on 28 May 2014 by sending an invoice to each producer that had received support between the date of the order (17 November 2008) and the date of the decision issued by the Commission (27 March 2014) for the interest calculated on the state aid paid during this period.

The collection notes have been received by the relevant SPVs within the remit of EDF EN and on 15 December 2016, €4.5 million (for EDF EN's fraction) was paid as interest on the sums held to constitute state aid.

## SHEM

In order to ensure water supplies for the Canal des Nestes, concessionaires and operators of facilities located upstream (EDF and SHEM) are bound by regulatory obligations requiring them to release certain volumes of water each year ("agricultural releases"). Under an "agricultural releases agreement" dated 1 December 2003, EDF and SHEM agreed the technical and financial arrangements for the releases to be carried out by SHEM, on behalf of EDF and against payment.

From October 2010 onwards, as the allocation of the facilities between EDF and SHEM had been modified by the State in SHEM's favour following the renewal of hydroelectricity concessions, the State modified the allocation of the facilities currently affected by agricultural release obligations. As none of the facilities currently operated by EDF are affected by these obligations, EDF felt that the above-mentioned agreement dated 1 December 2003 had ceased to serve any purpose and therefore it rejected SHEM invoices for a total amount of €14.9 million exclusive of tax.

In October 2016, SHEM issued proceedings against EDF with the Commercial Court in Paris to obtain the payment of these invoices, as the administrative court had ruled that it lacked jurisdiction to hear the dispute. The next procedural hearing will take place on 12 April 2018 to put forward conclusions in response to the EDF following the submission of the summary conclusions no.3 of SHEM.

## Action against the European Commission's decision to authorise the HPC contract for difference

On 6 July 2015, Austria brought an action before the European Union General Court against the European Commission's decision authorising the contract for difference negotiated with the UK government in respect of Hinkley Point C. The hearings were held on 5 October 2017 and the ruling is expected during 2018.

Simultaneously, on 15 July 2015, a group of German and Austrian operators led by Greenpeace Energy (and other players such as Ecotricity, UK electricity supplier) also

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brought an action before the European Union General Court against the European Commission's decision. On 26 September 2016, the Court dismissed the second action on the grounds that the applicants had failed to show that they were individually affected by this decision or that it could have a significant adverse effect on the competitive position of the companies in question in the electricity market in the EU. On 9 December 2016, Greenpeace Energy appealed against this ordinance before the European Union Court of Justice. This order was confirmed by the European Court of Justice on 10 October 2017.

As these applications have no suspensive effect, EDF, the UK government and CGN (China General Nuclear Power) signed all of the HPC-related agreements, including the contract for difference, on 29 September 2016.

#### Action against the final investment decision for the project Hinkley Point C

##### Application to the Regional Court in Paris by EDF SA's Central Works Council

Authorised in an order issued on 20 June 2016, EDF SA's central works council (hereinafter the "CCE") filed an urgent application against EDF with the Presiding Judge of the Regional Court in Paris, to be heard on 22 September 2016. In particular, the CCE asked the Presiding Judge of the Regional Court in Paris, ruling in urgent proceedings, to order EDF to provide a certain number of documents and/or information to the CCE, to extend the consultation period for EDF's CCE and to order EDF not to implement the Hinkley Point C project, and this was challenged by EDF. In a decision issued on 27 October 2016, the Presiding Judge of the Regional Court in Paris, ruling in urgent proceedings, held that the applications filed by the CCE were inadmissible and ordered it to pay €1,500 to EDF SA under Article 700 of the French Code of Civil Procedure. The CCE appealed this decision and a hearing took place before the Court of Appeal in Paris on 9 March 2017. A preliminary ruling on constitutionality (*question prioritaire de constitutionnalité* – QPC) challenging the compatibility of the law n° 2013-504 dated 14 June 2013 regarding employment protection which sets the conditions under which procedures for the information and consultation of employees representatives have to be conducted in this type of cases has been filed by the CCE. By decision dated 17 May 2017, the Court of Appeal ruled that the QPC raised by the appellants was not lacking in serious character, but did not send it to the Court of Cassation, as it had already had a QPC referred to it on the same question and therefore decided to stay the proceedings while waiting for its decision. Note that the Constitutional Council, in its decision of 4 August 2017, validated the provisions of the French Labour Code that were disputed relative to the prearranged deadline. The procedure has therefore resumed before the Paris Court of Appeal. A decision should be given during 2018.

##### Greenpeace

Greenpeace declared that on 24 November 2016, it lodged a complaint against EDF and its Chairman & Chief Executive Officer with the National Financial Prosecutor for market-related offences, claiming that they presented an inaccurate balance sheet and disseminated misleading information. This complaint was lodged following the work conducted by AlphaValue on EDF's position, at the request of Greenpeace.

EDF challenged AlphaValue's findings and noted that its accounts had been audited and certified by its Statutory Auditors and that the cost of decommissioning its operational nuclear facilities had also been audited on behalf of the Ministry of the Environment, Energy and the Sea, a summary of which had been published on 15 January 2016, which on the whole backed up the Company's estimates.

EDF lodged a criminal complaint on 25 November 2016 to draw the consequences of these false allegations and misleading information.

##### Application to the Commercial Court in Paris filed by AET

Within the framework of a 20-year basic electricity supply agreement entered into on 20 December 2007, for an annual capacity of 70MW, Azienda Elettrica Ticinese ("AET"), a public company of the Canton of Ticino asked the court to order a renegotiation of energy prices, claiming that the market prices had fallen below the prices agreed in the agreement since 2014 and at certain periods.

As the prices in the agreement were non-negotiable and there was no hardship clause, EDF proposed to adjust the prices, in compliance with the original economic balance, stressing that it was under no obligation to renegotiate the prices.

On 12 April 2016, AET issued proceedings against EDF with the Commercial Court in Paris, after the negotiations failed to result in a settlement. The Paris Commercial Court gave a decision on 4 December 2017 in favour of EDF. The claims of AET were dismissed in their entirety. AET has a period of 3 months from notification in Switzerland to lodge an appeal.

Also, AET summonsed EDF on 9 November 2017 in relation to the same contract to claim a share in the benefits of the capacity mechanism.

##### AMF investigation

On 21 July 2016, AMF (French Financial Markets Regulator) conducted a search of EDF's premises, during which EDF provided it with certain documents. This search was part of an AMF investigation into the financial information reported to the markets by EDF since July 2013. It does not in any way mean that an offence has been committed that could be attributed to the EDF group.

##### CRE/REMIT investigation

On 1 December 2016, the CRE (Energy Regulation Commission) launched an investigation into whether EDF and its subsidiaries EDF Trading Limited and EDFT Markets Limited were guilty of engaging, since 1 April 2016, in practices that could constitute breaches of the provisions of regulation (EU) no. 1227/2011 of 25 October 2011 on wholesale energy market integrity and transparency (REMIT).

On the same day, the CRE opened another investigation aiming to determine whether EDF and its subsidiaries EDF Trading Ltd. and EDFT Markets Ltd. engaged in practices, from 1 January 2014, that could constitute breaches of the provisions of the REMIT regulation.

On 14 December 2017, the CRE opened a third investigation aiming to establish whether EDF and any other person that may have been related to it engaged in practices, from 1 January 2017, that could constitute breaches of the provisions of regulation (EU) no. 1227/2011 dated 25 October 2011 on wholesale energy market integrity and transparency (REMIT).

They do not in any way mean that an offence has been committed that could be attributed to the EDF group.

##### CNIL investigation

On 18 October 2016, CNIL (French Data Protection Authority) conducted an on-the-spot check at EDF's premises, using its general inspection powers under the 1978 French Act. During this inspection, it asked for information on EDF's processing of personal data collected from Linky meters, transferred by the distribution network manager Enedis to EDF, and on the methods used to collect and retain proof of customer consent to the processing of detailed data. EDF provided the requested elements. The CNIL closed the procedure by letter sent to the Chairman of EDF on 9 November 2017.

##### Restarting of the Gravelines 2, Dampierre 3 and Tricastin 3 nuclear reactors

Since 2015 and following the detection of a flaw in the domes of the Flamanville EPR vessel, EDF has tested its operational nuclear reactors, at the request and under the supervision of ASN. These tests were designed to ensure that the channel heads (meaning the bottom part) of the steam generators used for the 18 reactors of the 900 or 1,450MWe series operated by EDF are not affected by flaws similar to those discovered in the Flamanville EPR vessel, namely a high carbon content that could affect their mechanical toughness. During the inspections of the steam generators, carbon content was detected in certain components, and affecting certain areas only, of twelve reactors fitted with channel heads manufactured by a Japanese company called JCFC (Japan Casting and Forging Corporation), including those used at the nuclear power station in Gravelines (reactor 2), Dampierre (reactor 3) and Tricastin (reactor 3). After several controls conducted by EDF during scheduled shutdowns of these reactors and the provision of additional technical information to ASN proving the fitness for service of the channel heads of these steam generators, ASN consented to the restarting of each of the above-mentioned reactors.

In three urgent applications filed with the Council of State on 23 December 2016 along with an *ultra vires* application (*recours en excès de pouvoir*), the Observatoire du Nucléaire association asked the court to suspend the effects of the ASN's consent to the restarting of the three reactors referred to above. As per ordinance dated 18 January 2017, the Council of State dismissed these urgent applications. The examination on the merits of the *ultra vires* application by the Council of State is still ongoing.

### Flaws affecting nuclear power stations

Following the discovery of a flaw affecting a steam generator in Fessenheim reactor 2 manufactured at the factories in Le Creusot (AREVA NP), Greenpeace and six other associations lodged a complaint against EDF and AREVA NP with the Public Prosecutor's Department in Paris on 14 October 2016 for four offences, including use of falsified documents, reckless endangerment and late reporting of an incident. In parallel, on 4 May 2016 the Observatoire du Nucléaire association filed a complaint with the Public Prosecutor's Department in Chalon-sur-Saône for forgery, use of falsified documents and endangerment against AREVA following the audit conducted on the activities of the factory in Le Creusot which revealed, in particular "irregularities in the manufacturing control process for approximately 400 parts produced since 1965, around fifty of which appear to be in service in nuclear power stations in France." ASN also declared that on 25 October 2016, it had reported the irregularities discovered at the factory in Le Creusot to the Public Prosecutor's Department in Chalon-sur-Saône under Article 40 of the French Code of Criminal Procedure (*Code de procédure pénale*).

### Flamanville 3 – action against the modified decree giving construction approval

Three appeals have been filed against the amended construction authorisation decree for Flamanville 3. The first two were filed on 23 May 2017, before the Council of State, and were initiated by several non-profit organisations (one by CRILAN and the other by "Notre Affaire à tous") directly against the decree of 23 March 2017 amending the construction authorisation decree for Flamanville 3 and changing the commissioning time limit. At the hearing held on 8 March 2018, the public rapporteur concluded that both appeals had been dismissed.

The third appeal was filed on 21 August 2017, also before the Council of State, by several non-profit organisations including Greenpeace, CRILAN and "Notre Affaire à tous" against the implicit refusal of the Prime Minister to revoke the amended construction authorisation decree for Flamanville 3.

### Flamanville 3 – request for a judicial appraisal concerning the anomaly on the steel and the bottom of the reactor vessel

By petition brought before the Paris Regional Court on 24 August 2017, the Observatoire du Nucléaire requested the appointment of a court expert, notably to obtain an opinion on the anomaly in the reactor vessel at Flamanville 3. By order dated 31 October 2017, the Regional Court dismissed the petition. As it was not appealed, this judicial decision became definitive.

### Flamanville 3 – action against the opinion of the Nuclear Safety Authority dated 10 October 2017

On 30 November 2017, several associations, including the "Sortir du nucléaire" network and Greenpeace France, introduced proceedings before the Council of State to request the cancellation of the opinion by the Nuclear Safety Authority dated 10 October 2017 relative to the anomaly in the steel in the bottom and lid of the Flamanville 3 reactor vessel. The Nuclear Safety Authority considered that this anomaly was not likely to compromise the commissioning of the reactor vessel providing specific checks were carried out during the operation of the facility.

### Fessenheim

On 14 March 2017, the Association Trinationale de Protection Nucléaire (ATPN), represented by Ms Corinne Lepage, began proceedings before the Council of State to request the cancellation, firstly, of decision no. 2016-DC-0551 by the Nuclear Safety Authority dated 29 March 2016, fixing the instructions relative to the procedures for the sampling and consumption of water, the discharge of effluents and monitoring the environment at the Fessenheim power plant and, secondly, decision no. 2016-DC-0550 by the Nuclear Safety Authority fixing the limit values for discharges to the environment of effluents from the same facility.

In addition, two trade union organisations (FO and CFE-CGC) as well as several local authorities, including the municipality of Fessenheim, began proceedings respectively in May and July 2017 before the Council of State to request the cancellation of decree no. 2017-508 dated 8 April 2017, repealing the authorisation to operate the nuclear power plant at Fessenheim.

### Regulated electricity sales tariffs – appeal against the decision of 27 July 2017

On 24 August 2017, ENGIE began proceedings before the Council of State against the decision dated 27 July 2017 relative to regulated electricity sales tariffs. On

27 September 2017, the national association of retail energy operators (ANODE) also brought a summary petition against this decision, which it supplemented by an additional supporting statement on 22 December 2017.

ENGIE and ANODE are requesting that the Council of State cancel the decision of 27 July 2017 on the grounds that it was taken based on legislative provisions that are contrary to European Union law. More particularly, according to these two companies, the regulated electricity sales tariffs do not fulfil the cumulative conditions laid down by Directive 2009/72/CE dated 13 July 2009 concerning the common rules for the internal electricity market, as they were interpreted by the European Court of Justice (Federutility decision of 20 April 2010 and ANODE decision of 7 September 2016) and the Council of State (ANODE decision of 19 July 2017).

The decision of the Council of State should be made in the first half of 2018.

## 2.4.2 LEGAL PROCEEDINGS CONCERNING EDF'S SUBSIDIARIES AND HOLDINGS

### RTE

#### Tax disputes

RTE was subject to several audits of its accounts for the previous financial years. The main grounds for adjustment concerned the deductibility of provisions for benefits for work-related accidents and work-related illnesses. By a ruling dated 28 December 2017, the Council of State definitively validated the position of the Company and recognised the tax-deductibility of these provisions. This subject is therefore definitively closed.

### ENEDIS

#### Tax disputes

The tax authority was contesting the tax deductibility of provisions for benefits for work-related accidents and work-related illnesses.

The rulings of the Council of State of November and December 2017 relative to the same subject for other companies of the Group provide an identical solution for the Company, confirming the tax-deductibility of these provisions and ending these disputes.

#### Photovoltaic producers litigation

In 2010, announcements of cuts in electricity purchase prices led to a considerable surge in the number of connection requests received by Enedis units, primarily in August 2010 (due to the fact that at that time, the date on which a full request was filed determined the applicable prices). Three months later, the moratorium decree issued on 9 December 2010 suspended the conclusion of new contracts for a period of three months and stated that if the financial and technical proposal for a request had not been approved before 2 December 2010, a new connection request would need to be submitted at the end of this three-month period (see section 2.4.1 "Legal proceedings concerning EDF").

At the end of this moratorium, new electricity purchase provisions were introduced. Within this framework, a system of invitations to tender was developed and, moreover, a new order set the new mandatory purchase price for photovoltaic electricity. This order, issued on 4 March 2011, led to a significant drop in photovoltaic electricity purchase prices.

The judgment handed down by the Council of State on 16 November 2011 dismissing the various appeals lodged against the moratorium decree issued in December 2010 led to a considerable surge in the number of proceedings issued against Enedis at the end of 2011, which continued in 2012, 2013, 2014 and 2015. The limitation period for issuing claims for compensation connected to this moratorium expired in March 2016. These proceedings were mainly issued by producers forced to abandon their projects as the operating conditions are less attractive than before due to the new electricity purchase prices. These producers believe that this situation was caused by Enedis, on the ground that Enedis failed to issue technical and financial proposals relating to connection in a timely manner, which would have allowed them to enjoy the more attractive electricity purchase conditions. The judgments issued at first instance, and by the Court of Appeal, contain diverging reasons and findings, with some courts dismissing all of the claims filed by the claimants while others award them compensation, but on the whole the compensation awarded is lower than requested.

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Enedis solicited the benefit of its Civil Liability insurance policy. Insurers refused to apply their guarantee. The Court of Cassation ruled in a decision dated 9 June 2015, (Green Yellow) that Enedis' liability was to be covered by its insurers and that Enedis was liable. However, insurers keep refusing their guarantee for other pending cases.

In December 2015, the Court of Appeal in Versailles decided to submit a reference for a preliminary ruling to the Court of Justice of the European Union (CJEU) on the compliance of the 2006 and 2010 pricing orders with European State aid laws.

The CJEU dismissed this reference for a preliminary ruling for procedural reasons. On 20 September 2016, the Court of Appeal in Versailles submitted a new reference for a preliminary ruling to the CJEU relating to the compliance of the 2006 and 2010 pricing orders with European state aid laws and stayed the proceedings. Since this decision, Enedis or the insurer routinely applies for a stay of proceedings pending the CJEU's decision. Various lower and appeal courts have upheld this application.

By order dated 15 March 2017, the European Court of Justice confirmed that the orders of 10 July 2006 and 12 January 2010 fixing the purchase prices of electricity of photovoltaic origin constituted "*intervention by the State or through the resources of the State*", one of the four criteria for qualifying as state aid. It reiterated that such aid measures implemented without having been previously notified to the Commission are illegal. It is now for the national jurisdictions to implement the consequences of this, particularly by ruling out the application of these illegal orders.

The commercial courts and courts of appeal will have to give a ruling in the forthcoming months.

#### ENGIE

On 23 December 2016, ENGIE issued proceedings against Enedis with the Commercial Court in Paris in relation to supplier remuneration for management costs for customers holding a single contract (see section 1.4.2.1.4 "Electricity supply contracts"). These proceedings are pending.

#### Quadlogic Corporation Controls

On 24 February 2016, Enedis received a claim form issued by an American company, Quadlogic Corporation Controls ("QCC"), before the Regional Court in Paris, in relation to an alleged infringement of a European patent held by QCC. Enedis strongly contests both QCC's inventive input and the alleged infringement. In November 2017, the Paris Regional Court gave a decision favourable to Enedis and cancelled, for France, the European patent of QCC.

#### TURPE 5

On 2 February 2017, Enedis filed a claim with the Council of State for the rescission of CRE's decisions regarding TURPE 5 Distribution dated 17 November 2016 and 19 January 2017, published in the Journal Officiel on 28 January 2017. This dispute relates to the level of remuneration of the network operator, the pricing method, the tariff structure and the incentive regulations put in place.

On 3 February 2017, EDF, acting as a shareholder of Enedis, also filed a request for annulment with the French Council of State against the same deliberations by the Energy Regulation Commission (CRE). Subsequently (10 March 2017), the Minister of the Environment, Energy and the Sea also brought action for nullification, as did CFE-CGC Energie (April 2017). These proceedings gave rise to statements of defence from the CRE (July and October 2017), and an intervention statement by the association UFC – Que Choisir (August 2017).

By a judgment dated 9 March 2018, the French Council annulled the TURPE 5 deliberations in so far as they did not apply the "risk-free rate" to the corresponding assets in determining the cost of capital invested, to works for which provisions for renewal have been allocated during the tariff period covered by the so-called "TURPE 2" tariffs (for their as yet unamortized fraction), and to works handed over by the licensing authorities to the grid operator during the same tariff period (for the same fraction). Such annulment shall not take effect until 1 August 2018. The CRE shall resume a TURPE deliberation taking effect on that date.

#### EDF International

##### Tax disputes

The tax inspections of EDF International for fiscal years 2009 to 2014 resulted in a challenge to the valuation of the convertible bonds put in place to refinance the acquisition of British Energy for a total amount of around €345 million. EDF International disputed these grounds for adjustment, against which it considers its chances of success to be likely in litigation.

#### EDEMSA arbitration

EDF International initiated CIRDI arbitration in 2003 against the Argentine State for non-performance of contractual commitments taken under the concession agreement for electricity distribution in the province of Mendoza. An arbitration decision was given in favour of EDF International by the arbitration tribunal on 11 June 2012. The Argentine State then brought action for nullification of the arbitration decision before the *ad hoc* Committee of the CIRDI in 2012. On 5 February 2016, the *ad hoc* Committee of the CIRDI confirmed the arbitration decision in favour of EDF International.

On 5 December 2017, EDF International signed a settlement agreement with the Argentine authorities concerning the payment of damages that were granted to it by the arbitration decision of 11 June 2012. This payment was made in the form of Argentinian Treasury bonds, which EDF International sold on 12 December 2017.

#### EDF Énergies Nouvelles

##### Silpro

Silpro (Silicium de Provence) went into court-ordered liquidation on 4 August 2009. EDF ENR group held a 30% minority shareholding in this company along with the main shareholder, the German company Sol Holding. On 30 May 2011, the liquidator brought action against the shareholders and executives of Silpro, with joint and several liability, to make up for the shortfall in assets resulting from Silpro's liquidation, amounting to €101 million.

In a judgement issued on 17 December 2013, the Commercial Court in Manosque ordered, without joint and several liability, the EDF ENR Group to contribute €120,000 to Silpro's shortfall in assets and €200,000 to Sol Holding's shortfall in assets. The EDF ENR group appealed this decision. In a judgement issued on 19 March 2015, the Court of Appeal in Aix-en-Provence invalidated this judgement and dismissed all of the liquidator's claims.

The liquidator has lodged an appeal with the Court of Cassation challenging the appeal decision issued on 19 March 2015.

The Court of Cassation, by a ruling of 20 April 2017, rejected the part of the decision of the Court of Appeal invalidating the judgement sentencing Sol Holding to pay €200,000 to the liquidator due to the shortfall in assets. The dispute is now closed.

#### SOCODEI

The low-activity waste processing and packaging centre (Centraco) operated by SOCODEI, a subsidiary wholly owned by EDF, is used to process weakly radioactive waste either by smelting or by incineration. On 12 September 2011, the explosion of a waste smelter caused a fire, killing one and injuring four. The accident did not cause any chemical or radioactive discharge. The ASN rated the accident as an INES level-1 accident and decided, on 27 September 2011, to only permit the smelters and incinerators stopped shortly after the accident to be re-started with prior authorisation. On 29 June 2012, ASN authorised SOCODEI to restart the incinerator subject to prior filing with ASN of the full report on the checking operations relating to the compliance of the facilities necessary for the furnace to be safe. Following the accident, several investigations were opened. On 16 September 2011, the Public Prosecutor's Department in Nîmes opened an inquiry against X for homicide and involuntary injuries and the inquiry is ongoing. The results of the investigations by the Labour Inspectorate and ASN were sent to the Public Prosecutor's Department and a court expert was appointed. Once the court-ordered expert assessment operations had been completed, the examining magistrate authorised the removal of the seals on the smelter, which meant that the repairs could commence.

Pursuant to its decision adopted on 14 January 2014 setting new technical requirements to be met before resuming operations, ASN authorised the restarting of the smelters in a decision issued on 2 April 2015. Following a summons served on its representative to appear before the examining magistrate on 16 September 2015, SOCODEI was placed under investigation for manslaughter. On 13 July 2016, the Public Prosecutor's Department in Nîmes drew up a brief to the examining magistrate asking for SOCODEI to be committed for trial before the Criminal Court in Nîmes. An initial hearing was set for 17 November and later postponed to 23 February 2017. At the end of the hearing, the Public Prosecutor's department requested a fine of €300 thousand be imposed on SOCODEI for homicide and involuntary injuries. The judgement has been adjourned until 16 March.

## Edison

### Legal action initiated by ACEA SpA concerning Edison's shareholding in Edipower

In May 2006, ACEA SpA (ACEA), Rome's municipal utility, addressed a complaint to the Italian government and to Italian regulatory (AEEG) and competition (AGCM) authorities, alleging that the joint takeover of Edison by EDF and A2A SA (formerly AEM SpA) had crossed the threshold of 30% of the share capital of Edipower held by State corporations (limit set forth by a decree of the President of the Italian Council of Ministers, dated 8 November 2000 defining the rules applicable to the privatisation of companies (called "Gencos") then held by Enel SpA).

On 7 July 2006, the AGCM rendered an opinion (segnalazione) supporting ACEA's position and officially requiring the Italian Government and Parliament to take measures to comply with the provisions of the 8 November 2000 decree.

In August 2006, ACEA initiated an action against EDF, IEB and WGRMH Holding 4 (along with Edison, A2A SA, Delmi, Edipower, AEM Turin, Atel and TdE) before the Civil Court in Rome.

According to ACEA, crossing this threshold is a violation of the applicable laws and constitutes an act of unfair competition which could adversely affect the competition on the energy market and the consumers' interests.

ACEA therefore asked the court to acknowledge the unfair behaviour of EDF and A2A SA, and force EDF and A2A SA to sell their stakes in order to remain under the 30% limit and prohibit them from taking and using energy in excess of the 30% threshold, and, finally, to compensate ACEA for the prejudice suffered that it has not been able to precisely evaluate at this stage, the valuation being subject to distinct proceedings.

ACEA also indicated that it would request the court to take protective measures to protect its interests until the court rules on the merits. In January 2007, Endesa Italia joined ACEA in its legal action.

The judge has rejected the addition to the file of a note from ACEA (new evidence) which assessed the prejudice that ACEA would have suffered at €800 million.

In December 2010, Endesa Italia, now named E.ON Italia, and EDF signed a settlement agreement in which E.ON Italia undertakes to drop the case and all other claims against EDF in connection with EDF's indirect investment in Edipower. The judge has acknowledged this agreement in an order dated 19 May 2011.

On 19 September 2013, the Civil Court in Rome issued a judgment in favour of EDF, dismissing all of ACEA's claims. The Court excluded all liability under competition or tort law for EDF as all of EDF's acts had been authorised in advance by the relevant regulatory bodies and it had not breached any rules. ACEA appealed against this judgment on 23 September 2014.

At a preliminary hearing before the Court of Appeal in Rome on 15 June 2015, the case was listed for a procedural hearing on 21 March 2016. At this hearing, the judge ruled that the statements of case had to be filed by 20 May and 9 June. In its judgment, handed down on 17 October 2016 and notified to the parties on 15 December 2016, the Court of Appeal dismissed all of the applications filed by ACEA and ordered it to pay the legal costs. The decision has been served, triggering the 60-day period in which an appeal may be lodged before the Court of Cassation (expiring on 20 February 2017). This deadline having passed, the judgement favourable to EDF is definitive.

### Proceedings concerning the sale of Ausimont (Bussi)

Further to a preliminary investigation initiated by the Public Prosecutor of Pescara (Abruzzo region) in relation to a suspected case of water pollution and ecological disaster affecting the river Aterno basin at Bussi sul Tirino, which for more than a century has been the site of an industrial complex belonging to Ausimont SpA that was sold to Solvay Solexis SpA in 2002, the Public Prosecutor of Pescara notified certain former Directors and managers of Solvay Solexis and Edison that the case

would go to court on charges of water poisoning, ecological disaster and fraud to the prejudice of the site's purchaser, Solvay Solexis.

On 15 December 2009, the proceedings against Montedison (now Edison) for fraud were abandoned. The proceedings on the matters of environmental disaster and poisoning of water or foodstuffs continued and, on 18 April 2013, the competent judge decided to bring action against Montedison's former managers before the Assize Court in Chieti. In a decision issued on 7 February 2014 by the Assize Court, the case against Edison was dismissed and accordingly, it is no longer a party to the criminal proceedings. In a decision issued on 19 December 2014, the same Court acquitted all of the defendants. The Public Prosecutor referred the case to the Court of Cassation, which issued a decision on 18 March 2016 ruling that the appeal was inadmissible and referring the case back to the Assize Court of Appeal in L'Aquila. The decision, given in February 2017 by the Appellate Assize Court, was appealed to the Court of Cassation. The next hearing will take place on 13 March 2018.

In this context, a large quantity of industrial waste was found on a plot of land belonging to Edison adjacent to the plant, an attachment order has been placed on that land, and on 4 October 2007, the President of the Italian Council of Ministers appointed a deputy special commissioner empowered to undertake urgent measures: identification, safety and rehabilitation measures for the land. The commissioner has ordered Edison to prepare a survey of the zone, take urgent measures to make it safe and present proposals for decontamination of the ground and ground water. Edison, which has never used this site for its business, filed an appeal with the Regional Administrative Court in June 2008. The Regional Administrative Court rejected this appeal in March 2011 and Edison challenged this judgment before the Council of State.

Following the hearing of 15 January 2015, the Council of State definitively set aside the decision of the deputy special commissioner in a judgment handed down on 5 March 2015.

### Action by the Public Prosecutor of Alessandria

In 2009, the Public Prosecutor of Alessandria (Italy) sent certain managers and former Directors of Ausimont SpA (now named Solvay Solexis SpA, a company sold by Montedison to the Solvay group in 2002) notification of the conclusion of investigations related to the possible poisoning of water from the spring on the industrial site of Spinetta Marengo and surrounding sites, and the lack of any action for site rehabilitation. The investigation was closed on 16 January 2012.

The judge entertaining jurisdiction decided, on 16 January 2012, to bring action before the Assize Court in Alessandria against a number of former Montedison executives for behaviour that could constitute environmental and public safety offences. The trial before the Assize Court began on 17 October 2012.

At the end of the proceedings before the Assize Court on 18 December 2015, Ausimont's former managers and Montedison were acquitted of the water poisoning charges. Accordingly, Edison has not been held civilly liable, in any manner whatsoever. The judgment was published on 6 June 2016 and has been appealed to the Assize Court of Appeal in Turin. The hearings before the Court began in February 2018. The sentence is expected in the first half of 2018.

In addition, an administrative decision ordered Solvay Solexis to rehabilitate the Spinetta Marengo site. Edison voluntarily intervened in the proceedings to defend its interests in relation with the claim filed by Solvay Solexis for the cancellation of this administrative decision, notably because the administrative decision doesn't impose any obligation on Edison to rehabilitate the site (this obligation is imposed exclusively on Solvay Solexis). The procedure is ongoing.

### Carlo Tassara

The company Carlo Tassara, Edison's main minority shareholder, brought legal proceedings on 12 July 2012 before the Regional Administrative Court in Latium (Rome) requesting on the merits an increase in the price of the mandatory takeover bid launched by the EDF subsidiary Transalpina di Energia (TdE), following the acquisition of control of Edison on 24 May 2012. The parties against which the plaintiff brought these proceedings are CONSOB, the Italian financial market authority, EDF, as well as its Italian subsidiaries (MNTEC, WGRM4 and TdE), Edison, Delmi and A2A.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Insurance

At the same time, the plaintiff filed with CONSOB in May 2012 a request to increase the price of the mandatory takeover bid based on practically identical arguments to those filed for the proceedings on merits before the Administrative Court. CONSOB dismissed this request on 25 July 2012. The plaintiff did not appeal against this decision.

In March 2015, the plaintiff also issued civil proceedings before the Court in Milan seeking damages from EDF, A2A and Edison on the basis of a similar fact-based line of reasoning as that used for the administrative proceedings. The proceedings were served on EDF on 27 March 2015.

In this case, the plaintiff claims that the negotiations between EDF and A2A that led to the takeover of Edison and Edipower were not conducted in line with Edison's sound management principle and harmed the interests of its minority shareholders. The plaintiff alleges that it was forced to sell its shares under the mandatory takeover bid launched following the acquisition of control of Edison as otherwise its holding in approximately 10% of Edison's share capital would have lost all liquidity. For the record, the bid price was €0.89 per common share. The plaintiff alleges a loss caused by a drop in value of approximately €294 million in the Edison securities recorded on its balance sheet as at 31 December 2011. However, it has not given an exact figure for the damages it claims and asks the court to appoint a court expert to assess the exact amount of its loss.

On 26 January 2016, a procedural hearing was held before the Civil Court in Milan. The court decided that replies must be filed by 29 March and 18 April. In a decision issued on 5 May 2016, registered and notified to the parties on 2 November 2016, the Court dismissed the procedural pleas and the applications to strike out filed against the plaintiff and set the date of the first directions hearing (20 December 2016). At this hearing, the timetable for the submission of the parties' statements of case was decided. The next hearing will take place on 10 April 2018.

#### Measures taken by employees concerning exposure to asbestos or other harmful chemical substances

Over the last years, Edison has faced a significant increase in the number of claims for damages arising from the death or illness of employees that were allegedly

caused by exposure to several forms of asbestos at factories owned by Montedison, or other judicial cases assumed by Edison as a result of corporate acquisitions.

Furthermore, Edison is involved in several criminal proceedings filed by former employees of companies belonging to the Edison group or their legal successors, arising from exposure to harmful chemical substances emitted by Montedison's facilities (since transferred to Enimont which became Enichem, a subsidiary of ENI).

#### Environmental litigation

Edison is involved in several criminal proceedings currently underway concerning damages caused by the operation of Montedison's chemical factories (petrochemical facilities in Porto Marghera, Crotona, Mantua and Cesano Maderno) prior to their sale to Enimont. These criminal proceedings also include actions brought by third parties concerning personal injuries related to the alleged environmental damage.

### 2.4.3 LITIGATION HAVING ARISEN AFTER THE CLOSING OF THE 2017 FINANCIAL YEAR

Appeal of the ruling by the European Commission authorising EDF's takeover of Framatome

On 3 February 2018, the company Teollisuuden Voima (TVO) filed with the General Court of the European Union an application for annulment, on the basis of merger control, of European Commission dated 29 May 2017 authorising EDF's takeover of Framatome. The notice of appeal, which is expected to contain the grounds and main arguments raised by TVO, the content of which EDF is unfamiliar with, has not yet been published in the European Union's Journal Official.

## 2.5 INSURANCE

To protect its assets and limit the impact of certain events on its financial position, the EDF group has dedicated insurance programmes that cover its major risks in terms of property damage, civil liability and insurance of persons. Nuclear risks are subject to the specific civil liability regime described below.

### 2.5.1 INSURANCE ORGANISATION AND POLICY

The Group Insurance Division is responsible, while respecting the independence of management of the regulated infrastructure operators, for preparing the insurance policy of the EDF group and organising its implementation throughout the Group, in order to continuously optimise the overall costs of its insurable risks<sup>(1)</sup>.

Its duties are to:

- continuously analyse cover for the EDF group's risks in conjunction with the Group Risk Department: analysis by business line, entity and project;
- establish rules for the Group's entire scope that enable covering all risks that can and must be covered, as well as optimising the total cost thereof and reducing volatility;
- promote and apply these rules to all Group entities, using appropriate means and in compliance with governance rules; and

- develop and manage the tools necessary to perform the above tasks, including within the subsidiaries that report to the Insurance Department: EDF Assurances and the Group's captive insurance companies (see section 2.5.2. "Use of captive insurance companies and mutual insurance funds").

The Insurance Managers of entities and controlled subsidiaries that join the Group's programmes are responsible for:

- ensuring that all risks are insured;
- scheduling prevention inspections and overseeing implementation of the resulting recommendations;
- reviewing cover strategies and amounts declared (risk quantification);
- analysing losses and participating in claims handling.

This work, which is carried in close conjunction with the Group Insurance Division, continuously improves the quality of information about insurable risks as programmes are renewed and prevention inspections are carried out (assessment of maximum possible losses – "MPL"). In connection with prevention actions, the Insurance Division establishes and oversees implementation of the site inspections programmes.

The Group insurance policy, updated in 2016, was approved by the Executive Committee in January 2017. Its implementation is presented annually to EDF's Audit Committee.

(1) Risks that can be transferred to the insurance markets and the alternative markets.



## Objectives

The insurance policy stipulates the risks that the Group decides to transfer to the market and the general principles for optimising such transfers: grouping purchases by setting up Group insurance programmes, allocating risks between traditional markets and other types of cover (specialised mutual insurance funds, transfers to the financial markets, etc.), individual and Group excesses (in general, only major risks are transferred), optimising intermediation costs.

## Implementation methods

Since 2004, the Audit Committee is presented with an annual update on the costs of covering EDF's risks through insurance or by transferring risks to the financial markets.

Since 2011, a Strategic Insurance Policy Committee ("COSA"), currently chaired by the Finance and Investments Director, provides an opportunity for the business lines and financial stakeholders to reflect on changes to and procedures for implementing the insurance policy, in particular the main characteristics of insurable risks hedging programmes.

Each year, the Insurance Division carries out an analysis of the risk mapping at the Group level in order to identify solutions, even partial solutions, to cover these risks. Based on this shared view, EDF is in a position to improve, and, where necessary, extend the coverage of insurable risks in accordance with the principles established by the Group in this area.

EDF has set up its Group insurance programmes and extended them broadly to its controlled subsidiaries, in order to, firstly, harmonise risk cover and rationalise its management and, secondly, control the corresponding insurance costs.

The French Energy Code has gradually caused RTE to transfer to the insurance market the covers provided under the EDF group's insurance programmes. RTE completely withdrew from the EDF group insurance programmes as at 31 March 2015.

Insurance contracts, according to market practice, include exclusions, limits and sub-limits.

## 2.5.2 USE OF CAPTIVE INSURANCE COMPANIES AND MUTUAL INSURANCE FUNDS

Like all major French and foreign groups, EDF uses captive insurance companies and mutual insurance funds to supplement coverage provided by the traditional insurance markets.

The EDF captive insurance companies are:

- Wagram Insurance Company DAC, an insurance company founded in 2003 in Dublin, which is involved in the majority of the Group's insurance programmes;
- Océane Re, a reinsurance company established in 2003 in Luxembourg, to reinsure EDF's nuclear civil liability.

EDF is a member of the Oil Insurance Limited (OIL) mutual insurance fund, which covers the risk of damage (other than to aerial networks) to the Group's own property or property managed under concession (by EDF and its consolidated subsidiaries). OIL is an insurance mutual fund dedicated to the needs of businesses in the energy sector and provides its members with cover for property damage. The scope covered includes *inter alia* nuclear power plants (the conventional portion), fossil fuel-fired power plants, hydropower facilities, network substations and exploration and production assets.

The Group's damage insurance programmes combine this cover provided by OIL and covers provided by market insurers.

EDF is also a member of the European Liability Insurance for the Nuclear Industry (ELINI), the European Mutual Association for Nuclear Insurance (EMANI), the Nuclear Industry Reinsurance Association (NIRA) and Blue Re, which are mutual insurance funds that manage cover in this area for European nuclear power operators.

The captive and mutual insurance companies enable EDF to reduce the cost of its insurance schemes and the total sum of premiums paid.

## 2.5.3 CIVIL LIABILITY INSURANCE (NOT INCLUDING NUCLEAR CIVIL LIABILITY)

EDF holds general civil liability insurance covering EDF, Enedis and their controlled subsidiaries against the financial consequences of civil liability (not including nuclear damage) that they may incur in doing business as a result of damage caused to third parties. In particular, this programme covers the risks of civil liability associated with the operation of structures (hydroelectric dams, fossil fuel-fired power plants, substations and other network facilities), risks associated with development of the Group's renewable energy activities (wind, solar, etc.), as well as risks associated with environmental damage (emissions of solid, liquid or gaseous substances).

This cover is purchased to the extent of available capacity under acceptable financial terms on the insurance and reinsurance markets. Maximum cover is €1 billion. For this programme, the share of risk retained by the Group with regard to an insurable accident ("retention"), including the share of Wagram Insurance company DAC, does not exceed €5 million per insurable accident. Subsidiaries generally opt for lower deductibles that are more in line with their financial capacity.

## 2.5.4 CIVIL LIABILITY INSURANCE FOR CORPORATE OFFICERS AND DIRECTORS

EDF holds civil liability insurance covering corporate officers and directors of EDF, Enedis and their controlled subsidiaries against the financial consequences of their civil liability incurred in performing their management functions.

## 2.5.5 DAMAGE INSURANCE (NOT INCLUDING NUCLEAR ASSETS)

### 2.5.5.1 Conventional damage programme

The scope of the conventional damage programme includes almost all subsidiaries of EDF, notably Enedis, EDF Energy, Edison and Dalkia.

Wagram Insurance Company DAC, the Group's captive insurance company, together with other insurers and reinsurers, provide extensions of cover (property damage and business interruption) in addition to the covers provided by OIL, bringing the maximum up to €1 billion.

For this conventional damage programme, the Group's retention per claim, including the deductible (which varies by subsidiary) and the share of the risk retained by Wagram Insurance Company DAC, does not exceed €15 million.

This programme provides cover for business interruption for most subsidiaries in the event of property damage, but not for EDF, which does not benefit from this cover. The actions and measures taken to prevent industrial and environmental risks and limit their impact are described in section 2.2.2 "Group risk management and control".

RTE has taken out specific property damage insurance for its own assets.

### 2.5.5.2 Cover for "construction" risks

EDF has taken out insurance policies covering specific construction risks (construction all-risk and erection/testing all-risk policies). These policies are not included in any Group programme but are purchased on an *ad hoc* basis for major construction projects, such as the Flamanville EPR and Hinkley Point C, the construction of combined cycle power plants, dams, etc.

These covers are specifically monitored and are renegotiated if unforeseen events occur during the construction projects.

## 2. RISK FACTORS AND CONTROL FRAMEWORK

### Insurance

#### 2.5.5.3 Storm cover

In connection with the renewal of the storm insurance coverage, Enedis signed with Swiss Re on 27 June 2016 a parametric insurance contract covering the aerial transmission network against the consequences of exceptional storms.

With a term of five years and total cover of €275 million, this innovative insurance contract triggers, in the event of a claim, parametric compensation based on a composite index for wind speeds recorded by Météo-France stations weighted by the vulnerability of the distribution network in each region of the Enedis concession area.

#### 2.5.5.4 Cyber risk cover

Since 1 July 2017, cyber risk cover has been put in place. It is €100 million coverage policy underwritten for two years, which covers all entities of EDF SA and the subsidiaries of the Group.

Its purpose is to cover the expenses necessary to handling major disorders caused by a cyber-attack against the group's information systems.

### 2.5.6 SPECIFIC INSURANCE FOR NUCLEAR FACILITY OPERATIONS

#### 2.5.6.1 Civil liability of nuclear facility operators

In France, EDF's current insurance policies are in compliance with French Act no. 68-943 of 30 October 1968, Act no. 90-488 of 16 June 1990, and Act no. 2006-686 of 13 June 2006 (known as the "TSN" Act), now codified in the French Environmental Code and which codified the civil liability obligations imposed on nuclear facility operators by the Paris Convention (see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities").

The Law on Energy Transition for Green Growth enacted on 17 August 2015 subsequently amended the provisions of Articles L. 597-28 and L. 597-32 of the French Environmental Code and in particular the limits on the civil liability of nuclear operators which, since 18 February 2016, were brought to €700 million for nuclear installations (€70 million for low-risk installations) and €80 million for risks during transport.

In order to comply with the new statutory ceilings, EDF issued a contract notice on 10 August 2015 entitled "EDF SA Nuclear Liability Insurance Programme" to obtain and set up appropriate insurance coverage for nuclear civil liability and the related claims management.

The insurance coverage obtained following this invitation to tender allows the Group to meet the new obligations while controlling their financial impact. The insurance is shared between the nuclear insurance market (AXA, reinsured by the French nuclear pool Assuratome) the Group's captive insurance companies, and the nuclear mutual insurance company ELINI.

This cover took effect on 18 February 2016 for a three-year term. In view of the likely evolution of the obligations imposed on the operator during the period (notably the entry into force of the Protocols amending the Paris and Brussels Conventions (see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear installations"), clauses allowing an exit from the contract have been included.

Claims management has been entrusted to the mutual insurance company ELINI, for its computerised claims processing system, and to the company EQUAD which has the necessary human and network resources.

In the United Kingdom, where EDF Energy operates nuclear power plants, the nuclear operator's civil liability rules are similar to French rules. The UK Parliament

approved on 4 May 2016 the "Nuclear Installations Order" (order transposing the above-mentioned amending Protocols of February 2004), which makes substantially the same changes as the French TSN Act in 2006 but which, for the most part, shall enter into force only in conjunction with the Protocols.

This Order will raise the British operators' obligations from the current limit of £140 million to the equivalent of €700 million, and they will be progressively increased over a five-year period to reach a cap of €1.2 billion.

Currently, EDF Energy is insured by ELINI and Wagram Insurance Company DAC. The captive insurer Océane Re also carries the risk *via* a reinsurance contract for Wagram Insurance Company DAC.

For further information on the legislation concerning nuclear operators' civil liability, see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities";

#### 2.5.6.2 Civil liability for transport of nuclear substances

Under the Paris Convention, the operator that is the "shipper" is civilly liable for transport of nuclear substances (unless stipulated otherwise). On 18 February 2016, this liability limit was increased to €80 million with an unchanged scope of damages (for more information see section 2.5.6.1 "Civil liability of nuclear facility operators" and section 1.5.6.2.2 "Specific regulations applicable to basic nuclear installations"); the scope of damages admissible for compensation will then be widened when the amended Paris Convention comes into force. This liability is as of now covered by the aforementioned nuclear operator civil liability policy.

#### 2.5.6.3 Damage to nuclear facilities

In addition to the cover obtained through EDF's membership in the OIL mutual insurance fund, property damage (including following a nuclear accident) to EDF's nuclear facilities in France and to EDF Energy's nuclear facilities in the United Kingdom, as well as nuclear decontamination costs, are covered by a joint insurance programme underwritten primarily by the NRI British insurance pool, AXA and Allianz (reinsured by Assuratome, the French nuclear pool) and EMANI (nuclear mutual insurance association) (see section 2.5.2 "Use of captive insurance companies and mutual insurance funds" and section 2.5.7. "Premiums") for a total capacity of €1,760 million, over and above an amount of €240 million. The Group programme covering power plants in France and the UK was renewed on 1 April 2015 for a period of three years up to 30 March 2018.

Furthermore, EDF Inc. is a member of NEIL (Nuclear Electric Insurance Limited) – a mutual nuclear insurance association in the United States, so as to cover the activities of CENG (Constellation Energy Nuclear Group) in the United States.

### 2.5.7 PREMIUMS

The total amount of insurance premiums for Group programmes for all types of cover amounts to €199.4 million in 2017.

EDF deems that policies taken out under the Group Insurance Policy are in line with the insurance market's current supply capacity for players of similar size and activities in the world, particularly with regard to cover limits and deductibles. The nature, insured amounts and prices of insurance cover in place may be amended at any time based on market condition and the assessment of EDF's Board of Directors regarding risks and suitability of coverage.

# 3 ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

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# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Defining and implementing corporate responsibility

For 2017, pending the legislative and regulatory provisions arising from the process of transposition into French law of European Directive 2014/95/EU of 22 October 2014 coming into effect, this chapter contains the information that the EDF group is obliged to publish in accordance with the provisions of Article L. 225-102-1 of the French Commercial Code and the Decree of

24 April 2012 implementing the Grenelle 2 Law, which require companies to disclose how the social and environmental consequences of their activities are taken into account and report on their commitments to society in favour of sustainable development.

## 3.1 DEFINING AND IMPLEMENTING CORPORATE RESPONSIBILITY

The Corporate Social Responsibility Goals (CSRG) defined pursuant to the CAP 2030 strategy (section 3.1.2) set the priorities for our goals in the area of corporate responsibility. Our actions as a responsible company are defined by a number of Group policies, among them: the new Group Sustainable Development Policy (section 3.1.3), the Procurement Policy (section 3.5.7), the Ethics and Compliance Policy (section 3.1.4) and the Nuclear Security Policy (section 3.2.4.1), complemented by a policy of tax transparency (3.1.5), the drawing up of a vigilance plan (section 3.1.6) and commitments in the area of human rights (section 3.1.7).

We have carried out an entirely new materiality analysis, in a more open and wider exercise, in order to give it more meaning, while at the same time taking care to see that it remains consistent with the Company's strategic challenges and compliant with legal requirements. We have chosen to start, following the disclosures recommended by the TCFD (Task Force on Climate-related Financial Disclosures), to characterise risks and opportunities linked to climate.

### 3.1.1 MATERIALITY MATRIX: PRIORITISING ISSUES

Evolving standard <sup>(1)</sup> are leading to greater importance being attached to materiality analyses, thus responding to the expectations of the various stakeholders: customers, investors, non-financial rating agencies, public authorities, etc. In 2014, on its own initiative and voluntarily, the EDF group had already published an initial materiality analysis. In view of how the situation is evolving, this analysis was updated in 2017 and a new matrix defined, with the material issues identified, defined and prioritised. From now on this matrix will contribute to guiding the approach to non-financial reporting.

#### 3.1.1.1 Materiality analysis

A materiality analysis consists of defining what may have a significant impact on a company, its activities and its ability to create value for itself and its stakeholders. The analysis must identify the important and pertinent issues likely to have an impact on the Company's performance, then rank them according to their potential impact on the Company and its environment. The methodology principles governing the materiality analysis are the AA1000 standard as regards the involvement of stakeholders in identifying, understanding and responding to problems and concerns relating to sustainable development, and the GRI 101 standard which covers the quality and content of reporting, in order to respond to stakeholders' expectations.

The 2017 analysis was carried out with the support of a specialist firm and underpinned by these international standards on the basis of documentary studies, interviews and workshops conducted with about one hundred people forming a representative cross-section of the Group's stakeholders. The list of issues analysed was defined so as to cover all the subjects reflecting the current and future risks and opportunities for the Group's business. However, the materiality matrix is not intended to include all the issues that came to light during the process of preparing it, but only the most material ones, resulting from the highest and most commonly held expectations between the Group and its stakeholders.

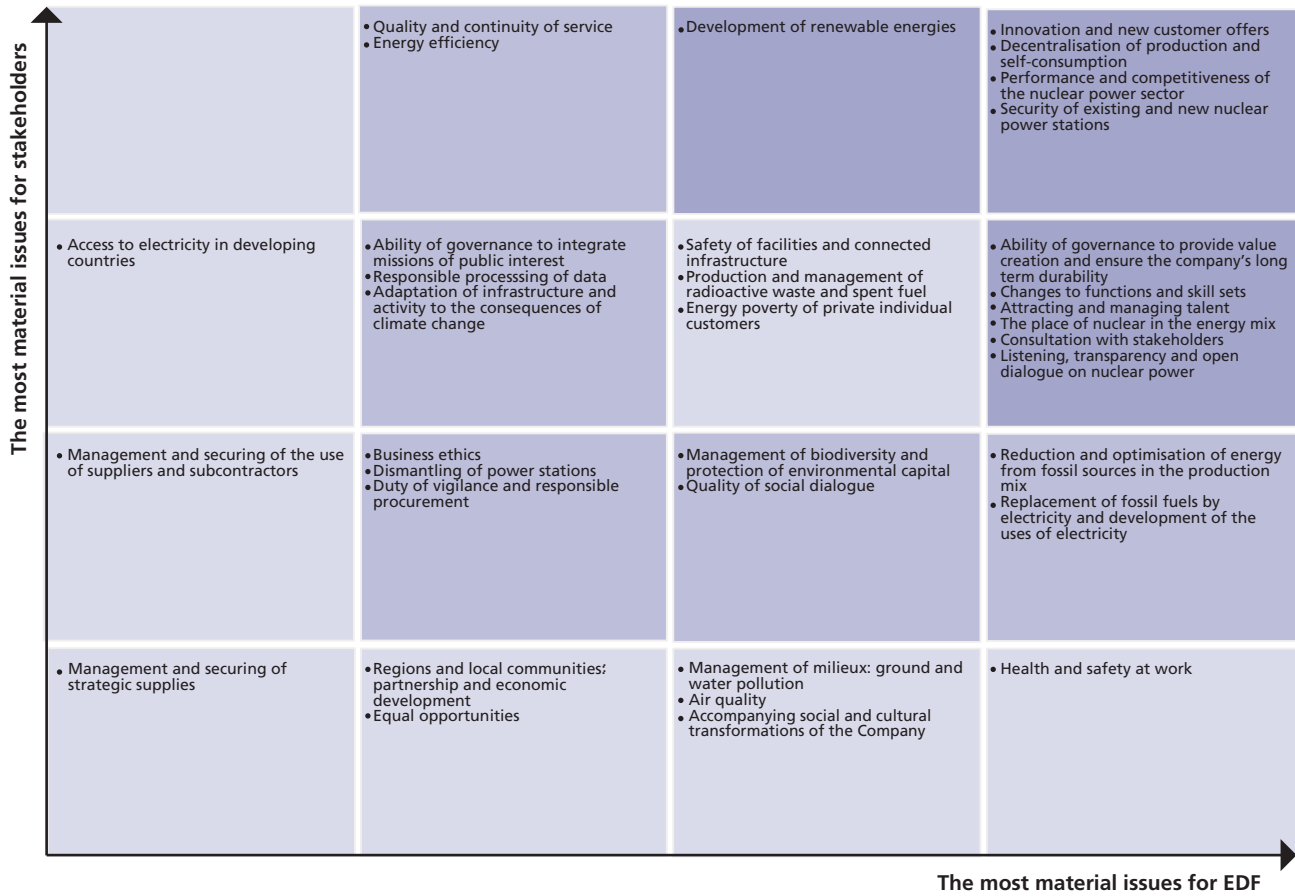
The project was carried out in three phases: identification of issues, prioritisation of issues and validation of results. The external stakeholders included internationally recognised experts as well as representatives of the Group's main stakeholders (authorities, administrations, shareholders, banks, customers, partners, subcontractors, suppliers, NGOs, etc.); internally, members of the Executive Committee were involved in the process, as were managers from the Group's main divisions and subsidiaries. The matrix was examined in a meeting of the EDF stakeholders panel and the Sustainable Development Board <sup>(2)</sup>, and then validated by the Executive Director, Innovation Strategy Planning.

(1) Order no. 2017-1180 of 19 July 2017 on the publication of non-financial information by certain large undertakings and groups, amending Article L. 225-102-1 of the French Commercial Code, in application of Directive 2014/95/EU of 22 October 2014 in disclosure of non-financial and diversity information by certain large undertakings and groups and its implementing Decree no. 2017-1265 of 9 August 2017.

(2) This concerns a panel of external EDF stakeholders which contributes to challenging Group issues submitted to it (see section "3.5.1.3 Stakeholders' panels").

3.1.1.2 Materiality matrix

This matrix reflects the 35 most material issues for EDF and its stakeholders.



3.

3.1.1.3 Correspondence between the materiality matrix and the 2017 Reference Document

#	Priorities	Description of the issues
1	Governance	Ability of governance to provide value creation and ensure the Company's long term durability
2		Ability of governance to integrate missions of public interest
3	Business ethics	
4	Business models	New customer offers
5		Decentralisation of production and self-consumption

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Defining and implementing corporate responsibility

#		Priorities	Description of the issues
6		Management and securing of strategic supplies	Refers to the challenges relating to EDF's risk of dependency on its strategic supplies and to the management of the risks associated with fluctuations in commodity prices.
7		Development of renewable energies	Refers to the development of the renewable energy areas, notably wind, solar and biomass, and to the maintaining of hydroelectric capabilities; it also refers to the detection of disruptive technological developments and to the means of financing renewable energy projects.
8		The place of nuclear in the energy mix	Refers to nuclear's contribution to decarbonised growth, in relation to the conditions regarding security, plant renewal, maintaining of skills, presence in the international markets, modularity and competitiveness.
9	Decarbonisation by production and its uses	Reduction and optimisation of energy from fossil sources in the production mix	Refers to a reduction in the proportion of carbon-based sources in the energy mix and to the improvement of efficiency and cleanliness of existing fossil fuel-based technologies (modernisation of thermal power stations, development of carbon capture and storage techniques, management of isolated sites, etc.)
10		Energy efficiency	Refers to services for controlling electricity consumption (notably by means of digital energy efficiency solutions) and to awareness-raising measures taken with a view to promoting the responsible use of electricity. This challenge also refers to optimisation of the grid.
11		Replacement of fossil fuels by electricity and development of the uses of electricity	Refers to the use of electricity to replace energy from fossil sources, and in particular to the development of electric vehicles, new types of electrical infrastructure and services contributing towards sustainable cities, and increased market share for heating.
12	Nuclear	Security of existing and new nuclear power stations	Refers to all the technical, organisational and human arrangements aimed at preventing accidents or limiting their effects.
13		Performance and competitiveness of the nuclear power sector	Refers to the strategic choices made and to the measures taken with a view to ensuring the nuclear sector's operational performance and competitiveness.
14		Listening, transparency and open dialogue on nuclear power	Refers to informative and consultative actions aimed at responding to the concerns of public opinion and certain stakeholders on nuclear energy and to the quality of the dialogue on this subject.
15		Management and securing of suppliers and subcontractors	Refers to the challenges involved in the risk of dependency on a limited number of subcontractors with key skills and to retaining control of the entire value chain.
16		Production and management of radioactive waste and spent fuel	Refers to the technical, environmental and financial challenges associated with the processes for treating spent fuel, the long term management of waste, and support for the treatment and recycling business lines.
17		Dismantling of power stations	Refers to the challenges involved in the regulatory, financial and technical responsibility for dismantling definitively decommissioned power stations while complying with operator's liability.
18	Infrastructure and continuity of service	Quality of service and supply continuity	Refers to the ability to provide a constant supply of electricity, and to the management of all serious dysfunctions that could lead to problems for customers and citizens, with a view to ensuring continuity of service. It also refers to the quality of the service.
19		Adaptation of infrastructure and activity to the consequences of climate change	Refers to the adaptation of infrastructure to natural disasters, climate change (in particular an increase in water temperature or lower rainfall), or to significant events of a magnitude that it is difficult to foresee.
20		Safety of facilities and connected infrastructure	Refers to the protection of facilities against the risk of malicious (including terrorist) attacks and in particular to the protection of the information systems that are essential to conducting commercial and industrial activities.
21	Environment	Management of biodiversity and protection of environmental capital	Refers to the practices put in place to protect and promote the biodiversity present at the sites.

#		Priorities	Description of the issues
22		Management of milieux: ground and water pollution	Refers to the management of the risks of pollution and contamination likely to cause biological, physical and chemical alterations in the terrestrial and aquatic milieux, and to their effects on health.
23		Air quality	Refers to the management of atmospheric emissions from the Group's facilities (SO <sub>x</sub> , NO <sub>x</sub> , fine particles, toxins, etc.) and their effects on health.
24	Responsible employer	Changes to functions and skill sets	Refers to the preparation and accompaniment of the transformation of functional skills in a context of transformation and digitisation of the production, distribution and sale of electricity; also refers to the Company's ability to support this transition by developing new skills and transforming managerial practices.
25		Accompaniment of the Company's social and cultural transformation	Refers to management's ability to share its project and motivate its employees in its transformation plans; also refers to the organisational, social and cultural measures taken to support organisational or cultural changes and enable a quality of life in the workplace that favours employee wellbeing.
26		Health and safety at work	Refers to the protection of employees' and service providers' health and safety.
27		Attracting and managing talent	Refers to EDF's ability to attract and retain talent in a context in which young graduates' expectations are evolving.
28		Quality of social dialogue	Refers to the social dialogue between employee representatives and management, at both business unit and corporate level and their ability to strike constructive compromises.
29		Equal opportunities	Refers to the taking into account of diversity and equal opportunities, notably in combating discrimination based on gender, disability, age, social origin and national culture.
30	Responsible partner	Responsible processing of data	Refers to protection of the Group's data and in particular of customers' and employees' personal data (limits on data collection, non-disclosure, transparency, etc.) in a context of increasing cybercrime.
31		Access to electricity in developing countries	Refers to the offering of technical and economic solutions (innovative partnerships and business models) for improving access to electricity in developing countries.
32		Energy poverty of private individual customers	Refers to social schemes of any kind for reducing energy poverty in the various countries in which the Group operates.
33		Consultation with stakeholders	Refers to the effective taking into account of the Group's stakeholders' needs and expectations by means of active and sustained dialogue aimed at defining solutions in response to common problems. This involves arrangements for consulting and involving stakeholders throughout projects and taking into account the interests of local communities with a view to a good integration of the business and facilities.
34		Duty of vigilance and responsible procurement	Refers to the EDF group's duty of vigilance all along the value chain, the social and environmental impacts of the products and services procured (particularly as regards respect for human rights), and responsible relations with suppliers.
35		Regions and local communities: partnership and economic development	Refers to the Company's ability to take part in the economic life of regions, creating value for them by contributing to the creation of jobs and local wealth.

The great majority of these issues are the subject of specific attention in the context of the Corporate Social Responsibility Goals, and are detailed in the content of this Reference Document. These issues are examined here in six sections: defining and implementing our corporate responsibility (3.1); offering sustainable, safe and efficient energy (3.2); responding to the challenges of climate change (3.3); optimising the use of natural resources and preserving the environment (3.4); acting positively in the regions and strengthening dialogue (3.5); paying particular attention to our employees and making a success of our internal transformations (3.6).

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Defining and implementing corporate responsibility

### 3.1.2 CORPORATE SOCIAL RESPONSIBILITY GOALS

The Corporate Social Responsibility Goals are based both on the CAP 2030 corporate strategy and on the Sustainable Development Goals (SDGs). They describe the chosen path required to deliver the strategic plan and take into account the UN's 17 Goals, which, while not directly addressed to companies are not attainable without their active contribution. Six major themes have been adopted.

Three of them are linked to the environment and to natural resources: climate, which requires the Group to drastically reduce its CO<sub>2</sub> emissions; biodiversity, consideration of which we wish to further integrate into all our projects, and energy efficiency, an area in which room for innovation has increased with the digital transformation.

Two others serve to confirm our commitment to society, through support for the most vulnerable communities and the systematic implementation of consultation mechanisms for our major projects worldwide. The sixth goal is a social one: it concerns human development to ensure our employees' safety and equal treatment.

EDF fully subscribes to the overall approach of the SDGs, while being well aware that it is just one of many players in this movement; a committed and responsible player.

#### 3.1.2.1 The six Corporate Social Responsibility Goals

##### **Goal no. 1: to go beyond the requirements of the 2°C target set by the COP 21 climate conference by drastically reducing our CO<sub>2</sub> emissions**

At the Paris climate conference, the international community reaffirmed the crucial aim of limiting the rise in temperatures to less than 2°C. Greenhouse gases, particularly CO<sub>2</sub> emissions, are recognised as the main culprits of climate change. EDF is the only large low-carbon electricity producer and it is committed to generating electricity with ever-lower carbon levels. The Group has set itself the ambition of going even further in cutting CO<sub>2</sub> emissions by 2030.

EDF is a leader in the production of low-carbon electricity among the major European and global electricity producers. But its direct emissions are substantial in absolute terms, in France and around the world. In France, the ambition is to continue reducing carbon emissions, even though EDF already emits about thirteen times less than the European average<sup>(1)</sup> and even though the integration of our subsidiary Dalkia will lead to a significant<sup>(2)</sup> increase in our GHG emissions in France. Internationally, the Group's development often leaves it facing demands for production based on carbon fossils or gas. We therefore plan to define a trajectory for CO<sub>2</sub> emissions which is consistent with our ambitions, but also compatible with the reality of our business lines.

This ambition finds expression in a goal established on the basis of the principles of the CDP<sup>(3)</sup> the UN Global Compact, the WRI and the WWF Science Based Targets initiative (SBTi). EDF envisages making a formal commitment so as to form an integral part of this initiative<sup>(4)</sup>. This goal contributes to the attainment of SDGs no. 13 (climate action) and no. 7 (renewable energy) set by the UN on 25 September 2015<sup>(5)</sup>.

The details concerning this goal are shown in section 3.3.1 "EDF group's decarbonisation strategy".

##### **Goal no. 2: to adopt industrial groups' best practices in people development: health & safety, gender equality, and social advancement**

In an environment that is undergoing rapid, far reaching changes, the human aspect is more than ever a core component of the CAP 2030 strategic plan, itself a key factor in the Group's performance. To tackle the industrial and commercial challenges it faces, EDF must remain a socially responsible and committed employer and a benchmark in terms of its employees' health and safety, professionalism and commitment, by building their skills and fostering greater workforce diversity. EDF is committed to incorporating the best personnel development practices of industrial groups in order to maintain strong employee commitment.

This target goes towards attaining sustainable development goals no. 3 (access to healthcare) and no. 5 (gender equality) set by the UN on 25 September 2015. In 2017, these goals were pursued by means of drafts for a new health and safety policy and a new agreement on social responsibility (in the process of being negotiated).

Details of the means deployed to attain this goal are shown in section 3.6 "Pay close attention to our co-workers and make our internal transformations as success"

##### **Goal no. 3: to offer all vulnerable people information about and support with energy use and energy benefits**

The radical changes taking place in the world are leaving the most vulnerable by the wayside, and this phenomenon is tending to intensify. For almost 30 years, EDF has been working with the government, social services, and local authorities and associations to help combat fuel poverty. The digital transformation allows us to envisage a new way of establishing relations with the customers concerned, of reaching a wider public without sacrificing close relations with local players. With a view to supporting the most vulnerable, EDF works to help them consume more efficiently and to know their rights (access to assistance schemes, information on payment methods, energy savings, etc.)

This goal contributes to the attainment of SDG no. 10 (reduced inequalities) set by the UN on 25 September 2015.

Details of the means deployed to attain this goal are shown in section 3.5.4 "Contribution to the fight against energy poverty".

##### **Goal no. 4: to innovate through digital energy efficiency solutions to enable all customers to use energy better**

In a finite world it is necessary to reduce the consumption of natural resources, and this imperative applies in particular to the production of energy, which makes use of scarce resources, even if the energy is from renewable sources and even in the case of storage solutions.

First and foremost, it is a matter of using as little energy as possible and at the right times. The digital revolution opens up new prospects in this area, offering customers the possibility of being more actively involved in the consumption and indeed production of energy. Electricity, is increasingly positioning itself as "smart energy", with the development of new, more effective offerings, most notably smart meters allowing more accurate and detailed analysis of consumption.

This trend seems bound to intensify as technology continues to evolve. The main offerings are presented in sections 3.3.1.3 "Helping customers consume less, more efficiently" and 3.2.1 "Innovative customer offers".

(1) CO<sub>2</sub>/kWh of electricity (gCO<sub>2</sub>/kWh) in "CO<sub>2</sub> Emissions from Fuel Combustion Highlights", International Energy Agency, 2017 edition.

(2) Data of the subsidiary Dalkia are accounted for in the scope of the Group's "Other business lines".

(3) Carbon Disclosure Project.

(4) EDF will complete the form of the SBTi (Science Based Targets initiative) commitment letter and is on the point of committing to setting an objective based on the criteria of this initiative. The participating businesses are recognised on [www.sciencebasedtargets.org](http://www.sciencebasedtargets.org).

(5) On 25 September 2015, countries had the option to adopt a set of sustainable development goals to end poverty, protect the planet and ensure prosperity for all within the framework of a new sustainable development agenda. Each goal has specific targets to be met in the next 15 years. Governments, the private sector, civil society and individuals are invited to play an active role in attaining these goals.



### Goal no. 5: to systematically organise a process of transparent and open dialogue and consultation for every new project around the world

Industrial projects contribute to the shaping of regions and landscapes and their lasting transformation. These projects create jobs, activity and value. Listening and conducting dialogue upstream of a project provides a better understanding of the issues involved for the region so that the project can be better accommodated. For the EDF group it is ultimately a matter of always moving forward in the way it operates locally and in the way it cooperates over time with the region.

EDF's aim is to renew and make systematic its practice of engaging in dialogue so as to better take into consideration the aspirations of inhabitants and other stakeholders in the different regions. This dialogue is intended to be transparent and two-sided, constructive and open; not to carry out the projects jointly, but to contribute to the sustainable development of the regions.

The EDF group undertakes to implement the rules governing dialogue, as prescribed by international standards with regard to stakeholder participation, and to ensure that such consultations are publicly reported. Details of the means deployed to attain this goal are shown in section 3.5 "Act positively within communities and strengthen dialogue".

### Goal no. 6: to launch a positive approach to biodiversity. Not to confine itself to understanding and reducing the impacts of our activities in the long run, so as to have a positive effect on biodiversity

The Group intends to go further in its biodiversity approach and develop a positive approach, by understanding what it can do better and by avoiding as much as possible irreversible damage to the natural environment. EDF does not want to limit itself to a defensive approach to biodiversity, solely focusing on reducing the impacts of its industrial operations on ecosystems.

Biodiversity issues concern all the Group's facilities and projects. In France, EDF is a landowner and a manager of natural resources of great importance. Improving our knowledge of these assets, reducing the impacts of our activities, and even enriching local biodiversity are paths of excellence to be imagined and developed with partners with specialist knowledge of these matters, while at the same time bearing in mind the industrial nature of the sites concerned.

This target goes towards attaining SDG no. 14 (life below water) and no. 15 (life on land) set by the UN on 25 September 2015.

Details of the means deployed to attain this goal are shown in section 3.4.5 "Management of biodiversity and protection of environmental capital".

#### 3.1.2.2 Integration of the corporate responsibility goals into the Group's strategic process

The six Corporate Social Responsibility Goals (CSRGs) are long term (2030) ambitions, attainment of which requires milestones and monitoring. For each objective, there are roadmaps and, if necessary, qualitative and quantitative monitoring indicators are set. These shared roadmaps are drawn up with the representatives of the various Group business lines, including its various subsidiaries, in order to specify the contribution of each of the Group's entities and subsidiaries to the achievement of the common objective.

Once the specific means of reporting on progress against the Corporate Social Responsibility Goals have been defined, the system is incorporated into the Group's strategic planning loop. The Medium Term Plan (MTP) actually constitutes the natural vehicle for defining, contractualising and monitoring each of these contributions.

#### 3.1.3 SUSTAINABLE DEVELOPMENT POLICY

The EDF group's new Sustainable Development Policy was published in April 2017<sup>(1)</sup> in an external context characterised by expectations as to companies implementing

the COP 21 agreement and contributing to the Sustainable Development Goals published by the UN in September 2015.

Internally, the Group's commitments are established in the CAP 2030 strategy and the Sustainable Development Goals. The policy was designed as the common basis for the deployment of Sustainable Development within the Group. It reflects the direction of CAP 2030 and the Corporate Social Responsibility Goals. It is complementary to Group policies that already cover certain aspects of Sustainable Development (HR Policies, Procurement Policy, Ethics and Compliance Policy and Nuclear Security Policy).

Its implementation is based on the principle of subsidiarity. The Group's performance will consist of the positive contributions reported by the Group's various business lines and subsidiaries in the areas in which they are concerned; the Group Sustainable Development Policy sets out the common principles and the means of achieving consistency.

The requirements of the Sustainable Development Policy respond to three priorities: regulatory compliance, the means of implementing the Corporate Social Responsibility Goals, and the control and coverage of other major Sustainable Development issues such as air or water quality. Because Sustainable Development is also a response to the expectations of society, not all of which have yet been reflected in regulatory obligations, the policy also includes some recommendations associated with the anticipation of and preparation for the future (for example, the practical integration of the principles of the circular economy).

The policy is set out in four sections covering the main aspects of sustainable development: responding to the challenges of climate change; optimising the use of natural resources and conserving the environment; paying particular attention to people; dialogue with stakeholders and reporting on our activities.

#### 3.1.4 ETHICS AND COMPLIANCE

The materiality matrix identifies business ethics as a material issue (see issue no. 3, business ethics). This refers in particular to the Group's ability to effectively combat active and passive corruption and unfair competition, and to oversee that contracts are complied with and that ethics regarding lobbying is respected.

##### 3.1.4.1 The EDF group's commitment to ethics and compliance

In order to protect its reputation, the EDF group promotes a culture of integrity and, as a matter of principle, promotes a zero tolerance towards fraud and corruption. An ethical conduct in accordance with the law must therefore be the absolute rule for all Group employees, worldwide, at all levels of the organisation, without exception.

#### A Group ethics and compliance programme and a dedicated division

In line with this approach, in December 2015, the EDF group's ethics and compliance plan was strengthened with the creation of a Group Ethics and Compliance Division and the setting up of a group ethics and compliance programme build up to meet the requirements of national and international regulatory authorities as well as market practices. The programme places all EDF executive directors and more generally all employees at the heart of the compliance system. The programme is signed off by the Chairman of EDF.

The main missions of the Group Ethics and Compliance Division are to consolidate an analysis of the Group's ethical and compliance risks, to coordinate the network of Heads of Ethics & Compliance in Group entities, to provide support to executive directors and Heads of Ethics & Compliance for the diffusion of appropriate rules, to develop training and awareness-raising of employees, to oversee the handling of any breach that are detected and produce regular reports for the Group's governance bodies.

#### A Group ethics and compliance policy in place since 2016

In 2016, the EDF group Executive Committee adopted the EDF group Ethics & Compliance Policy (PECG), which brings together the main rules that executive directors must imperatively know, observe and enforce within their entities, which are strictly aligned with the risks of these entities.

(1) During the preparation process, this policy was examined by the EDF Sustainable Development Board, meeting jointly with the Sustainable Development Committee, the sustainable development governing body at Group level.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Defining and implementing corporate responsibility

This is a single document forming the overarching reference for the Group's Code of Ethics Charter (launched in 2013) and Code of Conduct (published in 2017), updated as new applicable rules are published and subjected to audit.

The Group Ethics & Compliance Policy covers nine subject areas:

- preventing the risk of corruption (integrity checks on business relations, limitations on gifts and hospitality);
- financial ethics (prevention of the risk of money laundering and the financing of terrorism, prevention of market abuse, compliance with EMIR rules);
- preventing breaches of competition law;
- preventing conflicts of interest;
- protection of the security of personal data;
- the fight against fraud;
- the fight against harassment and discrimination;
- compliance with sector regulations (REMIT, dual-use goods);
- and compliance with international sanctions programmes.

### A Group Code of Ethics constructed around the Group's three values

The Group Code of Ethics, constructed around the Group's three values (respect, solidarity and responsibility) has been rolled out since the end of 2013. It sets out the rules and principles which must guide the actions and behaviour of Group employees on a daily basis. It is accessible in French and English on EDF's website.

The Code is also available in ten other languages: Chinese, Dutch, German, Hungarian, Italian, Polish, Portuguese, Russian, Spanish and Vietnamese.

### A Code of Conduct Ethics and Compliance that aims to ensure the safeguarding of our culture of integrity

The law of 9 December 2016 on transparency, the fight against corruption and the modernisation of the economy brought France and French businesses up to the level of international standards regarding the fight against corruption. Building on its ethical commitments, EDF fully complies with the law's requirements thanks to the publication of its Code of conduct in the second half of 2017.

Integrated with the Company's internal regulations, the Code of Conduct Ethics and Compliance is the cornerstone of the Group's anti-corruption mechanism. It applies to the employees of EDF SA and is adapted in its subsidiaries.

The Code establishes the rules to be followed and enables employees to identify situations of risk and to conduct themselves accordingly.

### A strengthened governance

The structure of the Group ethics and compliance function is approved by the Group's Executive Committee. The Group Ethics and Compliance director reports to the General Secretary, who is a member of the Group Executive Committee. He proposes, manages and coordinates, in liaison with the other division concerned, the implementation of the Group's ethics and compliance action plans both within France and abroad.

In 2016 the Group Ethics and Compliance Division set up a network of 47 Heads of Ethics and Compliance in the French entities and internationally. The Heads of Ethics and Compliance report directly to the directors of the entities and take part in Management Committee meetings on ethics and compliance matters and the associated action plans. They have the means and powers necessary to implement the Group Ethics and Compliance Policy and to make sure that it is complied with.

The Group Executive Committee, led by the EDF Chairman and CEO, is responsible for determining the orientations and priorities of the compliance programme, allocating the necessary energy and resources and ensuring the monitoring and control of its implementation. In 2017, the Group Ethics and Compliance Division took part in two meetings of the Group Executive Committee to validate the action plan, report on progress and validate the code of conduct.

The Board of Directors of EDF, through its Corporate Governance and Social Responsibility Committee, oversees the Company's incorporation of ethical and compliance considerations into its works and management.

### Checks and controls on the programme

The rules of the Group Ethics & Compliance Policy define the requirements covering the areas of ethics and compliance. Their implementation is subjected to the annual risk mapping exercise and to evaluation by the EDF group's internal controls. It allows the Group Ethics and Compliance Division to evaluate the degree of deployment of each key requirement and to obtain assurance as to the implementation of the actions decided on and their effectiveness.

The Group Ethics and Compliance Division works closely together with the Internal Audit Division. Salient points from the audits in the area of ethics and compliance are shared regularly.

### 3.1.4.2 Respect for the Group's values

#### Group Code of Ethics

The Group Code of Ethics rolled out in the business lines and Group companies between 2013 and 2014. The Group wanted the Code to be championed at the managerial level, so presentations to the Executive Management Committee were held, as well as team meetings and integration training. The Code has been widely circulated by managers or via the Group's many communication tools (intranets, noticeboards, newsletters, emails, etc.).

#### Non-financing of political parties

The EDF group complies with the laws and regulations in force concerning the financing of political parties. The EDF group's Ethics Code states that the Group "respects the beliefs and opinions of everyone as well as those of political organisations, trade unions and religious organisations without providing support to any in particular". Thus, such financing may take place only in those countries that authorize it, and then only with due regard to the principle of neutrality.

In accordance with the legislation in force in France, EDF SA makes no payments to political parties.

The Group's Italian and UK subsidiaries have written directly into their codes of conduct the prohibition of financing political parties. This is the case of subsidiaries Edison and Fenice in Italy and EDF Energy in the UK. In Belgium, EDF Luminus has made no contribution to political parties. In the United States, certain subsidiaries have made token contributions transparently and publicly to political action Committees in full compliance with US law and within the framework of rigorous managerial validation.

#### Public Affairs

In-depth discussions were held with the European Commission, the Parliament and the Council on the Clean Energy Package, the framework for all the major legislative texts for the future of the European electricity sector. On this occasion, numerous meetings and events were held to raise awareness and inform the Brussels public of the priority stakes for the Group. Among these, the Group had the opportunity of reaffirming the importance it attaches to long term solutions for confirming the security of supply in Europe and of raising the profile of its future decarbonised investments (renewables, nuclear and energy efficiency) and of the setting of a fair price for CO<sub>2</sub>.

The Group pointed out the need to hold a steadfast course towards the goal of reducing CO<sub>2</sub> emissions and improving coordination among European policies (renewables, energy efficiency and combating global warming); the Group also stressed the opportunity presented by the development of electric vehicles to combat air pollution more effectively and to limit the carbon footprint of the transport sector, complementing the actions undertaken by the energy sector.

EDF is listed on the Transparency Register of the European<sup>(1)</sup> Parliament and the European Commission, and applies the related code of conduct. In France, EDF is listed on the register of lobbyists of the National<sup>(2)</sup> Assembly and of the Senate, and has undertaken to adhere to their code of conduct. In application of the law known as "Sapin II", Group employees mainly or regularly involved in lobbying are listed on the published register of lobbyists.

(1) <http://ec.europa.eu/transparencyregister/public>.

(2) [http://www2.assemblee-nationale.fr/representant/detail\\_representant\\_interet/2177](http://www2.assemblee-nationale.fr/representant/detail_representant_interet/2177).

### Fighting against fraud

Within the priority actions defined by the Group, the fight against fraud is a major concern: a "zero tolerance" policy has been enforced since the end of 2010. Within the framework of the internal control system, managers have drawn up and adopted anti-fraud measures locally.

In 2017, a memorandum of instructions and an operational support guide were distributed with the aim of explaining to managers and those immediately responsible, the Heads of Ethic and Compliance, the main checks to be carried out in order to contribute to keeping the risk of fraud under control. This guide will be updated regularly.

### Prevention of harassment and discrimination

As part of its policy of respect for persons, the Group does not tolerate any form of discrimination, harassment or violence in the workplace. This commitment is part of the regulatory and judicial context which, in many countries, incriminates not only the actions and behaviours themselves, but also employers who fail to implement sufficient preventative measures. Respect for people is one of the key commitments of the Group Code of Ethics, and it is upheld by every Group employee, irrespective of his or her position within the Group.

More specifically, directors take all necessary measures to prevent discrimination, harassment and physical and emotional violence in their entities by striving to make employees aware of the risks of harassment and discrimination, raise awareness among managers on ways of preventing and fighting harassment and discrimination, communicate regularly on the ethics and compliance whistleblowing system and apply the appropriate sanctions in the event of proven wrongdoings. All cases reported via the whistleblowing system are processed in accordance with the Group's zero tolerance policy.

#### 3.1.4.3 Preventing the risk of corruption

The law of 9 December 2016 on transparency, the fight against corruption and the modernization of the economy, known as the "Sapin II" law, which introduced new measures. Eight pillars are thus prescribed for businesses meeting the criteria of size and annual turnover: a code of conduct, an internal whistleblowing system, a risk mapping, procedures for assessing third parties, accounting controls procedures, a training programme, disciplinary sanctions and internal control procedures to assess the efficiency of the measures.

### The Code of Conduct Ethics and Compliance

The Code of Conduct Ethics and Compliance is the cornerstone of the anti-corruption arrangements required by the law. Integrated with the Company's internal regulations, it constitutes the reference text for the prevention of corruption, describing the conduct required and setting the rules to be followed by all employees.

EDF SA Code of Conduct Ethics and Compliance. Its purpose is to protect employees by clearly setting out what is allowed and what is prohibited, enabling them to identify situations of risk and showing them the proper behaviour to adopt. It aims to ensure the preservation of EDF's culture of integrity.

The Code of Ethical Conduct Ethics and Compliance was delivered to all employees of EDF SA in the second half of 2017.

The roll-out of the Code of Conduct Ethics and Compliance was accompanied by a programme of awareness-raising.

### Whistleblowing system

EDF already had a whistleblowing system, but it was reinforced to meet the requirements of the "Sapin II" law (see section 3.1.4.6 "Whistleblowing system").

### Risk mapping

This instrument allows the Group entities to identify the risks associated with their activities and then to view them on a map of the ethics and compliance risks. Based on this, the entities draw up action plans appropriate to their operational contexts to prevent and mitigate these risks. This work meets the requirements of the regulations applicable to the Group<sup>(1)</sup>, the recommendations of international<sup>(2)</sup> organisations, and the best practice identified among groups comparable to EDF.

### Integrity checks on business relations

Integrity checks on business relations is the subject of a specific memorandum of instructions in application of the Group Ethics & Compliance Policy. Applicable since 1 January 2017, it defines the third party evaluation procedures to be implemented by the Heads of Ethics and Compliance of the entities before any commitment and throughout the course of the relationship.

### Accounting controls

The control procedures defined in EDF are presented in its supporting guide to the fight against fraud accompanying the memorandum of instructions on the fight against fraud of 18 April 2017. The control procedures defined for the various processes (procurement, sales, treasury, personnel, fixed assets-stock, accounting) meet the objective of the "Sapin II" law.

### Training

The Group Ethics and Compliance Division has designed a specific training programme on the prevention of corruption, and provides deployment tools for all employees. (see section 3.1.4.5 "Training and professionalisation of players").

### Disciplinary sanctions

In the framework of its policy of zero tolerance, any employee of EDF SA breaking the rules laid down by the Code of Conduct Ethics and Compliance is liable to the sanctions provided by Article 6 of the Statutes for Electricity and Gas Industry employees and in the provisions of the French Labour Code. Depending on the circumstances and situations, the penalty may range from a warning to dismissal, including different stages (with or without an entry in the file, with or without suspension, with or without demotion).

### The internal control and evaluation system

In order to make sure of the appropriateness and effectiveness of the measures for preventing and detecting any breach of ethics or failure of compliance, in 2016 the Group Ethics and Compliance Division put in place a dashboard enabling entities to evaluate the degree of deployment of each key requirement. The exercise meets the internal control requirements defined by the Group Ethics and Compliance Policy by allowing the implementation of the measures to be controlled, breaches to be identified and corrective measures established.

The Group Ethics and Compliance Policy having established the prevention of the risk of corruption as a priority, the Group Ethics and Compliance Division has defined a specific complementary mechanism for the following two high-risk practices:

### Guidance on gifts and hospitalities

The Ethics & Compliance Policy obliges managers to put in place in their entities a system governing gifts and hospitalities appropriate to their activities.

### Conflicts of interest

The Group Ethics & Compliance Policy obliges Group senior executives to implement a system to prevent conflicts of interest and raise employee awareness of high-risk situations, provide a system for employees to declare their links to bodies in which they have a personal interest (elective mandates, corporate mandates, etc.), and an obligation to withdraw from an activity in the event of a potential conflict of interest.

The Group Ethics & Compliance Division has developed internal instruments for raising awareness of all employees to situations of conflict of interest.

#### 3.1.4.4 Compliance with other regulations

The EDF group's Ethics & Compliance Policy covers other compliance subjects or programmes, the operational implementation of which is carried out by expert divisions within the Group. Some of these subjects were completed in 2017 by memoranda of instructions designed to underpin their roll out in the Group's entities. They relate to financial ethics, the protection of personal data and the fight against fraud.

### Financial ethics

The EDF group's Ethics and Compliance Policy sets out the requirements to be adhered to prevent market abuse, the risk of money laundering and the financing of

(1) Federal Corrupt Practice Act in the US, United Kingdom Bribery Act in the UK, Law no. 2016-1691 of 9 December 2016 known as Sapin 2 in France.

(2) World Bank, OECD, Organisation for Economic Co-operation and Development, International Chamber of Commerce (ICC), Transparency International.

## 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

### Defining and implementing corporate responsibility

terrorism, and those concerning compliance with the European EMIR regulation. A Stock Exchange Ethics Code, updated in February 2017, complements this Policy.

Actions to raise awareness of stock market rules are conducted with Group employees, concerning particularly the precautions and obligations for holders of inside information.

#### Preventing breaches of competition law

EDF group is making awareness of and adherence to competition law an absolute priority for its employees. With this in mind, the Group has implemented a Competition Compliance Programme since 2010. The programme aims to ensure that all operations of subsidiaries and entities of the Group in France and worldwide comply with competition law. It applies to all Group employees, particularly as regards their relations with customers, competitors, partners and suppliers.

This Competition Compliance Programme covers all aspects of competition law: abuse of dominant position, anti-competitive agreements, concentrations and state aid. The programme entails a number of training sessions, either online or face-to-face. It has given rise to the preparation of numerous training and awareness-raising instruments.

After rolling out an e-learning module between 2010 and 2015 which trained over 5,400 employees, in France and overseas, the Legal Department's Competition Law Unit devised a new general e-learning competition module with a more interactive format.

This online offering is completed by tailored face-to-face training for some Group subsidiaries and entities.

At the same time, a best practice guide, as well as regular notes and publications on developments in competition law are circulated widely.

#### Personal data protection

Personal data protection is now governed in France by the "Loi Informatique et Libertés" (Data Protection Act) no. 78-17 of 6 January 1978, as amended. In response, EDF appointed as of 2006 a Personal Data Officer (PDO) responsible for ensuring personal data protection for both customers and employees and for enforcing this law within the Company.

Work has started on preparing the Group for the application from May 2018 of the new provisions of the European General Data Protection Regulation (GDPR).

#### Compliance with industry regulations

In application of the EDF group's Ethics & Compliance Policy, the entities concerned must put in place a REMIT compliance system, the purpose of which is to ensure the transparency and integrity of the functioning of the wholesale energy market, notably by prohibiting insider trading based on privileged information and market manipulation.

This Policy also requires entities involved in exporting products on the list of dual-use products appended to EC regulation no. 428/2009 of 5 May 2009 (including exports within the EU) to implement a compliance procedure.

#### Compliance with international sanctions programmes

The Group Ethics and Compliance Policy requires the executive directors of Group entities concerned to implement a system to prevent the risk of international sanctions within their entities. The system involves a clause being inserted into each contract entitling EDF to terminate a business relationship with immediate effect in the event of failure to adhere to an international sanctions programme.

EDF has put in place a procedure for checking on the integrity of business relations (see Point 3 above) and in support of this has made tools available for the Heads of Ethics and Compliance to verify that there is no risk of international sanctions. The

mapping of these sanctions drawn up by the European Union is posted online on the ethics and compliance intranet.

#### 3.1.4.5 Training and professionalisation of players

The Group Ethics and Compliance Division is developing prevention and training actions and provides deployment tools for all employees. It coordinates a network of professionals in the various entities and has a dedicated forum on the Group intranet.

##### Training sessions on "ethics and compliance" topics

The Group Ethics & Compliance Division has put in place a training course on "Prevention of the Risk of Corruption" thus meeting the requirements of the "Sapin II" law. It has been specifically defined as of mid-2016 for directors and managers. This digital training course, which is mandatory for managers, was rolled out in 2017 to managers and exposed personnel.

Furthermore, the Group Ethics and Compliance Division has produced awareness-raising videos on the nine subject areas of the Group Ethics & Compliance Policy and made them available on the ethics and compliance intranet. The nine subject areas are: privileged information; international sanctions; harassment and discrimination; the fight against corruption; the fight against fraud; sector regulations; security of personal data; competition law and conflicts of interest.

Complementary to this, the Group Legal Division and Group HR Division offer an e-learning module called "Preventing corruption" designed for all employees: this programme deals operationally with the right conduct to adopt in situations involving business relations, conflicts of interest and gifts.

#### 3.1.4.6 Whistleblowing system

In 2016, the existing ethics alert system was strengthened and expanded. It now includes issues associated with compliance.

EDF's whistleblowing system, managed by the Ethics and Compliance Division, enables any employee acting in good faith to flag up a violation of the Group Code of Ethics, the Group Ethics and Compliance Policy and, from 2017, the Code of conduct Ethics and Compliance, confidentially and securely. Since it meets the conditions provided by the "Sapin II" law it benefits from special protection and immunity from criminal liability.

The input interface is a page of the EDF website<sup>(1)</sup> allowing the whistleblower to indicate the subject of the alert and to describe its main features. The whistleblowing system is accessible 7 days a week, 24 hours a day and whistleblowers receive an acknowledgement within 72 hours, notifying them that their alert is being processed. In line with the zero tolerance policy, each warning is processed.

The aggregate annual results are presented to the Corporate Governance and Social Responsibility Committee of the Board of Directors.

In 2017 the Group Ethics and Compliance Division worked on bringing its whistleblowing system into line with both the requirements established as of the beginning of 2018 by the "Sapin II" law and those relating to EU developments, notably the new General Data Protection Regulation (GDPR) from May 2018 onwards.

In 2017 the Group identified 60 "significant breaches" of the Group Ethics & Compliance Policy, 20% less than in 2016. Geographically, 85% of the breaches were in France, reflecting the maturity of the mechanism in the home country.

(1) <https://www.edf.fr/edf/alerte-ethique>

Theme	Number of important cases detected			Geographical distribution 2017					
	Total 2015	Total 2016	Total 2017	EDF SA	France excl. EDF	Europe excl. France	Africa	America	Asia
<b>Group ethics Charter</b>	11	23	3	2	1	-	-	-	-
- Non-respect of persons	-	-	3	2	1	-	-	-	-
- Violations of Human Rights	-	-	-	-	-	-	-	-	-
- Others	-	-	-	-	-	-	-	-	-
<b>Fight against corruption</b>	-	-	-	-	-	-	-	-	-
- Checks on the integrity of business relations	-	-	-	-	-	-	-	-	-
- Control of gifts and hospitalities	-	-	-	-	-	-	-	-	-
<b>Financial ethics</b>	-	-	-	-	-	-	-	-	-
- Prevention of the risk of money laundering and the financing of terrorism	-	-	-	-	-	-	-	-	-
- Prevention of market abuse	-	-	-	-	-	-	-	-	-
- Compliance with EMIR	-	-	-	-	-	-	-	-	-
<b>Competition law</b>	1	-	-	-	-	-	-	-	-
<b>Conflicts of interest</b>	-	3	3	2	-	-	-	1	-
<b>Security of personal data</b>	-	1	7	6	1	-	-	-	-
<b>Fight against fraud</b>	29	23	21	12	2	4	-	1	2
<b>Harassment &amp; discrimination</b>	19	25	26	19	6	-	-	-	1
<b>Sector regulations</b>	-	-	-	-	-	-	-	-	-
- REMIT	-	-	-	-	-	-	-	-	-
- Controls on export of dual-use goods	-	-	-	-	-	-	-	-	-
<b>International sanctions</b>	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>	<b>60</b>	<b>75</b>	<b>60</b>	<b>41</b>	<b>10</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>3</b>

### 3.1.5 TAX TRANSPARENCY

EDF has implemented a Group tax policy to define the applicable principles, in terms of taxation, to all of the Group's relations with its financial or business partners and the government or tax authorities. The tax policy is applied by the Group Executive Director responsible for the Group's Financial Management. It was validated by the Executive Committee in January 2017 (material issue no. 3, business ethics).

#### 3.1.5.1 Group tax policy

##### A wide scope

The policy covers all the Group's taxes: direct and indirect taxes, duties, contributions, tax or customs deductions which are the ultimate liability of the Company or its customers (when EDF merely acts as a collector on behalf of third parties).

It must be applied throughout the Group, by all controlled entities regardless of their nature or geographical location, with the exception of regulated infrastructure managers, for whom it constitutes a guide. All Group staff must comply with this policy which aims to protect the Group's reputation and to reduce any tax risks to which it may be exposed through its activities.

##### Clear directions

- strengthen the tax performance of the Group in strict compliance with national and international tax laws and regulations;
- control tax risks through continued, systematic improvement, in all Group entities, of the identification and management of fiscal risks;

- implement the tools, reporting and actions necessary for the continued, optimum, forward-looking management of tax cash flows<sup>(1)</sup>, as well as attentive and proactive monitoring of the Group's effective tax rate;

- ensure the conditions necessary for obtaining constructive relations with the tax and government authorities of all kinds by maintaining a transparent, professional relationship with them.

##### Ethical principles

In the context of the distribution between countries of operating margins internal to the Group, EDF strives to apply a transfer price policy in accordance with the principles of the OECD to justify the resulting revenues. EDF has no legal implantation (company, branch or office of representation) in a territory listed as a non-cooperative state or territory as defined by French and international legislation which is not determined by economic activity reasons and under no circumstances purely by tax reasons. Similarly, cash flow via these countries is prohibited where it is for tax reasons only.

##### Presence in Luxembourg and Ireland

Like all major French and international groups, EDF relies on captive and mutual insurance companies to supplement the cover provided by traditional insurance markets. The captive and mutual insurance companies enable EDF to reduce the cost of its insurance schemes and the total sum of premiums paid. EDF has two captive insurance companies which are based in Ireland and Luxembourg:

- Wagram Insurance Company DAC Ltd. (wholly owned by EDF), insurance company founded in 2003 in Dublin which is involved in the majority of the Group's insurance schemes;
- Océane Ré (EDF 99.98%), a reinsurance company founded in 2003 in Luxembourg to reinsure EDF's nuclear civil liability risk.

(1) Tax cash: tax actually paid or recovered.

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Defining and implementing corporate responsibility

#### 3.1.5.2 Taxes paid by the Group

In 2017, the EDF group's tax expense was €3,541 million <sup>(1)</sup>, a 3.1% decrease (€115 million) compared with 2016 (-2.3% in organic terms). Income taxes paid by the Group amounted to €771 million in 2017 (€838 million in 2016); the €67 million decrease in corporation tax paid is essentially due to the significant fall

in taxable profits of the subsidiaries in the UK and Italy. The effective tax rate (ETR) was 4.3% in 2017 <sup>(2)</sup>. The decline in the effective tax rate in 2017 was basically due to the favourable outcome of claims in France in respect of the 3% withholding tax on dividends paid (non-taxable income), reductions in tax rates in the US and Belgium, and the disposal of certain equity interests at a reduced tax rate.

In 2017 the Group uploaded its first country-by-country report (of data for financial year 2016) to the French tax authorities, in accordance with the provisions of Article 223 (5) c) of the French General Tax Code which follows the OECD's recommendations.

#### DETAILS OF TAX PAID IN ALL THE COUNTRIES WHERE THE GROUP HAS SUBSIDIARIES

<i>(in millions of euros)</i>	2017	2016	2015
France	488	445	1,041
Italy	13	117	47
UK	29	151	157
Egypt	76	46	30
Belgium	84	70	168
Norway	(34)	(62)	(38)
China	2	n/s	7
Hungary	60	20	17
Poland	18	8	12
Brazil	2	31	33
Portugal	-	(1)	4
US	9	(4)	5
The Netherlands	-	5	5
Canada	(2)	(5)	16
Mexico	13	-	n/s
Luxembourg	(1)	(1)	1
Chile	(2)	7	n/a
Vietnam	1	1	2
Singapore	-	2	2
Greece	6	3	n/s
Japan	-	-	n/s
Ireland	n/s	n/s	n/s
Switzerland	n/s	-	n/s
Germany	1	3	1
Spain	8	-	n/s
Austria	-	-	n/s
Denmark	n/s	-	-
Israel	-	-	-
Russia	n/s	n/s	n/s
Turkey	n/s	n/s	-
Bulgaria	-	n/s	-
India	-	-	-
South Africa	(1)	-	-
<b>TOTAL</b>	<b>771</b>	<b>838</b>	<b>1,508</b>
Laos (entity accounted for using the equity method)	6	2	3
<b>TOTAL</b>	<b>778</b>	<b>840</b>	<b>1,511</b>

n/a: not applicable; n/s: not significant.

(1) See note 11 Taxes and Duties in the notes to the Consolidated Financial Statements.

(2) See note 16 Taxes on Income in the notes to the Consolidated Financial Statements.

### 3.1.6 THE VIGILANCE PLAN

The materiality matrix identifies the duty of vigilance among its material issues (issue no. 34 Duty of vigilance and responsible procurement).

Law no. 2017-399 of 27 March 2017 on parent companies' and ordering companies' duty of vigilance requires companies with more than 5,000 employees in France to develop and effectively implement vigilance plans.

For EDF, which falls within the scope of application of this law, this involves going through an initial stage aimed at raising awareness throughout the Group, making an inventory of all the policies and mechanisms implemented, and putting in place procedures for constructing the EDF group's vigilance plan. Next year a dashboard will be drawn up showing progress in implementing the plan, and it will then be possible to complete the risk mapping.

This section sets out the main characteristics of EDF as regards the law on the duty of vigilance<sup>(1)</sup>, defines the scope of the plan and the methodology used to develop it, and provides the initial components of its actual content as defined by the law.

#### 3.1.6.1 Main characteristics of EDF as regards the law

The EDF group is present in all electricity business lines and has strong positions in Europe, notably in France, the UK, Belgium and Italy. The EDF group also supplies gas and provides energy related services.

As regards fundamental rights and freedoms, the EDF group currently operates essentially in OECD countries. It also has assets and carries out projects in countries that can be considered "at risk", such as: Egypt, Southeast Asia, Latin America, etc. and which require particular attention. As for the supply chain, although 97% of tier-one suppliers dealt with by the Group Procurement Department are located in France or elsewhere in the European Union, there is room for improving our knowledge of subsidiaries' suppliers and of suppliers involved in international projects.

As far as the health and safety of persons are concerned, the analysis of the risks associated with the EDF group's activities covers the health and safety of both employees and subcontractors as well as possible effects on residents and local communities. Health issues in the supply chain are the subject of close scrutiny (e.g. in the case of chemical products, etc.)

The environmental impacts of the Group's activities are identified and monitored, notably in the context of the environmental management system. Supplier's environmental performances are the subject of contractual clauses accompanied by self-assessments and possible audits.

#### 3.1.6.2 Scope of the vigilance plan and methodology for developing it

##### Scope

The scope of the vigilance plan covers the parent company EDF SA and its subsidiaries within the meaning of Article L. 233-1 and the companies that it controls within the meaning of Article L. 233-3 of the French Commercial Code.

As regards suppliers, the plan covers those with which the Group maintains established commercial relations. This mainly concerns the tier-one suppliers handled by the Group Procurement Department and the fuel suppliers dealt with by the Nuclear Fuels Division or EDF Trading Logistics on behalf of the Upstream/Downstream Optimisation & Trading Division (DOAAT in the French abbreviation). Information on other suppliers (direct suppliers of subsidiaries<sup>(2)</sup> or projects) is provided by the respective customer companies.

The law on the duty of vigilance provides that subsidiaries exceeding certain thresholds are covered by the parent company's vigilance plan. Such is the case of Dalkia, a subsidiary of EDF). It has nevertheless been decided that Enedis will develop and publish its own vigilance plan, and that EDF may refer to it in the Group's vigilance plan.

(1) Without including an exhaustive list of all the items contained in this Registration Document.

(2) Except for those managed by the Procurement Department.

#### Methodology for developing the plan

The preparation of the plan brings involves all the parties in the EDF group concerned by the subject, and in particular:

- the Corporate departments: Sustainable Development, Legal, Group Risk Control and Group Procurement;
- Group entities conducting international projects (EDF Énergies Nouvelles, International Division, the Hydraulic Engineering Production Division (DPIH in the French abbreviation, etc.);
- the business line and Group companies (including their subsidiaries and suppliers).

The plan is based on the existing corpus as regards:

- Group Policies: risk management and internal control, governance of subsidiaries and associates, project management, ethics and compliance, procurement, sustainable development, health and safety, etc.;
- internal commitments: Ethics Charter, Suppliers' Sustainable Development Charter, code of conduct;
- external commitments: UN Global Compact, Bettercoal, Responsible Supplier Relations label, CSR agreement.

On a complementary basis the "vigilance plan" theme was added to the Internal Control Guide in the form of a questionnaire addressed in the summer of 2017 to 70 EDF group entities.

The law also specifies that the plan must be drawn up with the companies' stakeholders:

- a presentation of the law was made to the Dialogue on CSR Committee ("CDRS" in the French abbreviation), and reference will be made to the plan in the new international framework agreement negotiated with the EDF group trade unions and two international trade union federations, IndustriAll and Public Services International. If a new agreement is signed, a progress report on implementation of the vigilance plan will be presented every year to the CDRS;
- the vigilance plan was also the subject of exchanges with other businesses in the context of EDH ("Entreprises pour les droits de l'homme", or "Businesses for human rights", a non-profit association).

#### 3.1.6.3 Content of the EDF group's vigilance plan

The vigilance plan fits into a process of continuous improvement aimed at identifying and minimising the risks that the activities of EDF, its subsidiaries and their suppliers might cause their stakeholders to incur in the area of human rights and fundamental freedoms, the health and safety of people, and the environment.

For this first exercise, the content cannot be exhaustive; as a first step we have to make an inventory of, and fill in any gaps in, the policies, mechanisms and actions at every level of the EDF group that allow us to identify the risks associated with its activities or those of its suppliers and to confirm that they are either well under control or that existing arrangements need to be strengthened.

##### 3.1.6.3.1 Mapping risks in order to identify, analyse and prioritise them

Risks are mapped by the Group Risk Control Department. This mapping identifies and covers risks in the areas of the environment, human rights and fundamental freedoms and health and safety.

Environmental risks are clearly identified and incorporated into the Group's environmental management system (EMS) and internal control system. They are linked in particular to our industrial activity, and mainly concern GHG emissions, impacts on water, air and soil and the production of conventional and radioactive waste. Particular attention is given to the conservation of biodiversity, the services rendered by the ecosystems and the management of water resources. In this regard the EDF group, with the help of the WCMC (World Conservation Monitoring Centre) has undertaken an inventory of sensitive sites as regards biodiversity in France and in its international subsidiaries and projects, including those still on the drawing board, under construction or being dismantled. The results will be known during the course of 2018.

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## Defining and implementing corporate responsibility

Risks associated with human<sup>(1)</sup> rights and fundamental freedoms are assessed by reference to the countries in which the Company, its subsidiaries and its suppliers operate. Particular attention is paid to projects in countries at risk. EDF Energy has also carried out a risk mapping of the risks of forced labour, which it has reported in its statement as required by the UK Modern Slavery Act 2015.

Regarding health and safety risks, this concerns first and foremost the risks affecting our employees and service providers (accidents at work, occupational diseases) and our suppliers' employees, but also potentially neighbours and local communities.

For French and international projects, risks are identified by sifting for projects of more than €50 million examined by the Group Executive Committee's Commitments Committee ("CECEG" in the French abbreviation). The international management was also involved in analysing the compliance of all its new and most advanced projects with the IFC's performance standards on environmental and social risk management. Apart from this, EDF Énergies Nouvelles projects financed by green bonds or development banks are the subject of reporting to the financiers on social and environmental matters.

The section on responsible procurement (3.5.7 "Responsible purchasing") sets out the details of the system implemented by the Group Procurement Department for identifying and controlling risks in the supply chain. The risks are assessed by means of a system for evaluating the purchasing segments (16 of the 253 are considered major risks and 33 high risk), self-assessment questionnaires (at the end of 2017, 1,500 suppliers had been questioned and 730 assessed and checked) and targeted audits (51 in 2017). The subsidiaries (Dalkia, EDF Energy, etc.) also have mechanisms for integrating social and environmental criteria into their contracts. Among the suppliers at risk not handled by the Procurement Department we also identify the suppliers of fuel (coal, oil, uranium, etc.) For example, for uranium the risks identified concern the environment and the protection of employees from radiation. EDF Energy has also carried out a study of the risks associated with conflict minerals.

### 3.1.6.3.2 Procedures for regular evaluation of the situation of subsidiaries, subcontractors and suppliers with whom established commercial relations are maintained, as regards the mapping of risks

In 2016 and 2017, the EDF group reviewed and completed all the Group policies (some 40 of them) to which all the controlled entities and subsidiaries are subject. We note in particular the policy on Governance and equity interests, one of the principles of which is strict compliance with applicable regulations as well as with Group policies. It is rounded out by the policy on Control of Integrity in business relations (particularly partners and suppliers), the Ethics and Compliance Policy, the Group Procurement Policy, the Group Sustainable Development Policy (including respect for the environment and human rights) and the Group Health & Safety Policy (which applies to all persons involved in its activities). All the requirements of these policies are currently included in the internal control system and the performance reviews.

For environmental issues, the Group has put in place a coordination system overseen by a Sustainable Development Committee and implemented a Group EMS which has been ISO 14001 certified since 2002. The performance of the entities and subsidiaries is assessed annually with the aid of internal control and performance review questionnaires. They are the subject of an action plan (see section 3.1.8.2 "Management and prevention of environmental risks"). Furthermore, the CSR Goals are now integrated into the strategic loop.

For checking on suppliers and subcontractors, the responsible procurement approach (see section 3.5.7.3 "Assessment of suppliers") also includes self-assessment questionnaires, which are checked, and audits. In the event of non-compliance, an action plan is drawn up with the supplier. Implementation of the required corrections is monitored.

### 3.1.6.3.3 Actions designed to mitigate risks and prevent serious damage

For environmental risks, the EMS is permanently monitored and continuously improved; personnel training and stakeholder awareness-raising programmes are in place. As well as inspections, audits and crisis drills are conducted regularly at the production sites.

For risks attributable to our suppliers, the responsible procurement approach allows action plans to be put in place in the light of the results of the self-assessments and audits, in order to correct the non-conforming issues identified. In the event of a serious breach, the contractual relation may even be terminated. By way of example we may refer to the ICOVET project, which involves working together with all the suppliers of workwear in order to better identify the environmental, social and economic risks, opportunities and stakes using a life-cycle approach. In 2010 EDF signed the Responsible Supplier Relations Charter, and in 2015 it obtained the "Responsible Suppliers and Purchasing" label. One of the objectives set is the improvement of our suppliers' CSR performance, particularly in sharing our commitments vis-à-vis their subcontractors. The subsidiaries (Dalkia, EDF Energy, etc.) also have mechanisms for integrating social and environmental criteria into their contracts.

With regard to coal, EDF is a founding member of Bettercoal, an initiative launched in 2011 that brings together energy providers, port institutions and coal-fired terminals. It is a mechanism that aims to promote CSR in the coal supply chain, particularly at mining sites, and to ensure that the fundamental rights (human rights, working conditions, workers' and communities lives, protection of the environment, etc.) are respected. EDF Trading's coal trading and freight business was acquired by JERA Trading (JERAT) in April 2017. With the coal purchasing contracts being taken over by JERAT from 2018, and JERAT joining Bettercoal, EDF decided not to renew its membership in 2018. EDF, which was one of the founder members of Bettercoal, remains an active promoter of Bettercoal and has expressed the wish that its supplies continue to be covered by Bettercoal.

As for uranium, EDF mainly obtains its supplies through diversified contracts in terms of sources and suppliers. In order to ensure good environmental, social and societal conditions for the extraction and processing of the mineral, in 2011 EDF initiated a system of mine audits based on a method developed with the WNA (World Nuclear Association) consisting of a standardised framework and recognised by all players in the sector. It takes account of the issues of human rights and fundamental freedoms: human rights, register of warnings, rights of indigenous peoples, freedom of association. The question of safety in the context of mining is given particular emphasis (safety of process, protection from radiation), and the environment is taken widely into account, notably as regards matters relating to water, biodiversity, waste and the rehabilitation of sites after exploitation. EDF carries out at least two audits per year. Following the audits, monitoring is carried out. The clauses listing EDF's expectations in terms of enforcement of the fundamental rights and main international standards by suppliers and sub-contractors have progressively been inserted in contracts signed by EDF. EDF envisages developing self-assessment tools to round out its arrangements.

Lastly we may note that the introduction of the vigilance plan will be the subject of awareness-raising with regard to environmental questions and respect for human rights, the first priority being to address management and the positions most directly concerned, such as buyers and auditors. It will find expression in particular in enhancement of the training programmes on responsible procurement, human rights and the environment, notably by making e-learning modules available to all personnel in France and in the subsidiaries.

### 3.1.6.3.4 A mechanism for issuing warnings and picking up signals relating to the existence or materialisation of risks, established in consultation with the representative trade union organisations in said company

In order to respond to the requirements of the Sapin 2 law, EDF has further developed its existing ethics and compliance whistleblowing system: a single mechanism for all signals covered by the Sapin 2 law and wherever possible<sup>(2)</sup> by the Duty of Vigilance law, should be made available to all Group employees in

(1) By way of example, risks identified included the risk of forced labour in the transport of fuel-oil and the risk of violation of the rights of indigenous peoples in the context of industrial projects.

(2) Subject to authorisation by the CNIL (French data protection authority) for opening the system to the outside.



France and abroad (except for subsidiaries in the regulated sector) as of 30 April 2018.

The design of the mechanism was the subject of a series of consultations with the trade union organisations and the institutions representing personnel and of a formal presentation to the CWC on 18 January 2018. Apart from this, some subsidiaries have their own whistleblowing systems, which will remain in place <sup>(1)</sup>.

### 3.1.6.3.5 A system for monitoring the measures implemented and evaluating their effectiveness

Over the course of 2018, the risk mapping will be completed and the internal control system adapted to prepare the plan implementation dashboard starting in 2019. Apart from this, the worldwide framework agreement on the EDF group's CSR <sup>(2)</sup> provides for the presentation of the vigilance plan dashboard at EDF group level in the context of the arrangements for monitoring the agreement.

## 3.1.7 HUMAN RIGHTS

By reason of its industrial activities and those of its subsidiaries in France and abroad, particularly in carrying out new projects internationally, as well as those of its suppliers, EDF may be exposed directly or indirectly to risks of human rights violations.

To identify and control these risks, EDF meets the regulatory requirements applicable to it in France and internationally and has made additional commitments in its policies and in participating in collective initiatives. Furthermore, EDF trains its employees and raises their awareness of the risks associated with human rights, takes reasonable diligence measures at every stage of its projects and by monitoring the activities of its subsidiaries and suppliers. Lastly, it provides for stakeholders to relay information through a whistleblowing system, and reports on any controversies it is likely to face.

### 3.1.7.1 Policies and commitments on human rights

In its Group Sustainable Development Policy of March 2017, EDF reaffirms that it will not tolerate "any human rights violation in any of its activities or suppliers"; to which end it guarantees compliance with the national laws and regulations that concern it: for the whole EDF group and its suppliers, in the framework of the law on the duty of vigilance of parent companies and ordering companies published in 2017 and on the question of forced labour, in the framework of the UK Modern Slavery Act 2015 for its UK subsidiaries EDF Trading and EDF Energy. The policy refers also to the benchmark international standards in this area <sup>(3)</sup>.

EDF has subscribed to the UN Global Compact since 2001 and reached "advanced" level in 2012. At the end of 2017, its subsidiaries EDF Energy, Edison, EDF Luminus and Dalkia also attained the "advanced" level.

Other commitments, notably those relating to respect for the fundamental conventions of the ILO have been made by the EDF group in its Ethics Charter and in its CSR Agreement signed in 2009. This agreement also includes the commitment "to comply and ensure compliance" with the fundamental conventions of the ILO in all the companies that it controls, and in particular Conventions 87 and 98 guaranteeing freedom of association and the principles of collective bargaining. In 2012, EDF entered into a collective agreement in China <sup>(4)</sup>; EDF China's trade union Committee (seven members elected for five years) represents EDF China's employees in accordance with Chinese laws, and also the principles and values of the EDF group.

### 3.1.7.2 Reasonable diligence measures

The question of respect for human rights in each employee's activity is addressed by awareness-raising and training activities in the form of an e-learning module, available in French and English, as well as in classroom format; for example, project heads and buyers, for whom the e-learning on human rights is actually a prior requirement for going on to the responsible procurement course.

The Group takes into account impacts on human rights in its investment screening criteria, and in the support for its projects, particularly when these investments are made in countries considered to be at risk.

Respect for human rights by suppliers is part of the responsible procurement approach. For fuel supplies a special mechanism is implemented, particularly for coal and uranium (audits of the mines).

### 3.1.7.3 Warning and reporting mechanism <sup>(5)</sup>

The Duty of Vigilance law requires the setting up of a whistleblowing system open not just to EDF group employees but also to all people wishing to issue a warning. Warnings concerning violations of human rights will be sent to the Sustainable Development Department, which will deal with them and report on them annually. The subsidiaries also have their own ethical whistleblowing systems <sup>(6)</sup>.

## 3.1.8 ORGANISATION AND DEPLOYMENT OF ACTION

### 3.1.8.1 The Sustainable Development Department

The Sustainable Development Department reports to the Innovation Strategy Planning Director, a member of the Executive Committee.

Its actions are carried in three main areas:

- contributing to the Group's strategic transformation by accompanying business lines and projects in specifically taking into account environmental and social issues in their business decisions and conduct; this aspect finds expression in the integration of the six priorities constituting the Corporate Social Responsibility Goals into the process of strategic screening of new projects from the point of view of sustainable development;
- strengthening and raising the profile of our non-financial performance, in other words assuring the quality of information while at the same time taking into account the expectations of our stakeholders (investors, customers, agencies, NGOs, etc.), and also increasing the visibility of the Group's contribution to the energy transition;
- coordinating sustainable development in the Group: corporate coordination of the business lines and subsidiaries through the Sustainable Development Committee, coordination of the dedicated internal networks such as the EMS and the predictive watch networks, coordination of relations and dialogue with external partners.

The Sustainable Development Department relies on a Group Sustainable Development Committee composed of representatives appointed by the members of the Executive Committee to provide guidance and monitoring of the Group's main sustainable development issues; for example, taking climate change into account within the Company, overseeing the Group's EMS and monitoring the CSR Goals presented to the Shareholders' Meeting in May 2016. It is also a place to share experience and for exchanges between Group businesses.

(1) See for example, for EDF Energy, the "Confidential Reporting of Serious Concerns procedure" open to all employees and to those of its subcontractors. Major projects also have their own complaint channels (Nachtigal Dam in Cameroon: [www.nachtigal-hpp.com/index.php/gestion-des-requetes-et-des-plaintes.html](http://www.nachtigal-hpp.com/index.php/gestion-des-requetes-et-des-plaintes.html)).

(2) It is to be signed in 2018.

(3) The UN Guiding Principles on Business and Human Rights (UNGPs), and the OECD Guidelines for Multinational Enterprises. Furthermore, in its Ethics Charter, the EDF group refers explicitly to the Universal Declaration of Human Rights, the International Labour Organisation (ILO) Conventions guaranteeing the fundamental principles and rights at work and fighting against discrimination, the Declaration on the elimination of all forms of discrimination against women and the Declaration in the rights of the child.

(4) Note on the China collective agreement: The collective agreement was implemented in 2013 for employees of our holding company in China. Its main objectives were the continuous improvement of working and employment conditions for employees, and to promote social dialogue.

(5) see section 3.1.4.6. « Whistleblowing system ».

(6) See section 3.1.6.3.4 "A mechanism for issuing warnings and picking up signals relating to the existence or materialisation of risks, established in consultation with the representative trade union organisations in said company".

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Defining and implementing corporate responsibility

Integration of the Sustainable Development Department within innovation strategy planning ensures that the Group's sustainable development issues are taken into consideration during the decision-making process both when screening investment projects (via the CECEG process), and in the strategic process.

### 3.1.8.2 Management and prevention of environmental risks

If they are not adequately managed, the Group's activities could have a significant impact on the environment. For this reason, and as a responsible Group, EDF implements a risk management policy for its operational, financial and organisational risks in compliance with current legislation.

Environmental risks, including those associated with climate change, are fully integrated into the Group's EMS and internal control system in coordination with the Group risk management function. They are subject to action plans resulting from strategic priorities in the Group's sustainable development policy.

The 2017 risk mapping update<sup>(1)</sup> reconfirmed the risk analysis and did not highlight new environmental risks. At the end of 2017, taking into account the sale of the Polish business and the stoppage of the fuel-oil fired power station at Porcheville, the Group had 9 SEVESO high-threshold sites and 26 low-threshold sites<sup>(2)</sup>; Dalkia acts as service provider at 81 sites Seveso low-threshold sites.

In 2017, as in previous years, the most significant factors in terms of the economic and financial challenges related to environmental risks pertain to the following subjects: climate change and GHG emissions; the roll-out of energy efficiency initiatives; the impacts of EDF's activities on the air, water and soil and the production of waste; protection of biodiversity and services provided by ecosystems and the management of water resources.

#### Preventing risks and pollution

In order to control risks of industrial incidents or accidents that could harm the natural environment or public health, EDF has implemented:

- a Group environmental management system that is constantly monitored and improved in the entities and at the sites;
- an active investment policy and an industrial asset decommissioning programme for assets no longer in operation, which includes decontamination operations<sup>(3)</sup> where necessary;
- an employee training programme and awareness-raising programme for all stakeholders;
- inspections and audits at the generation sites;
- a crisis management policy which requires the regular testing of crisis systems through an annual programme of crisis response drills (see section 2.2.2.3 "Crisis management and business continuity").

In order to reduce these risks, the Group's entities have also implemented a programme to eliminate or substitute certain substances (PCBs, chemical products) with more environmentally-friendly products. This work focuses as a priority on CMR (carcinogenic, mutagenic, or toxic for reproduction) substances or those considered extremely worrying. For some years now Dalkia has had a programme aimed at replacing CMR products with water analyses and soda ash in treating fuel pool water and biomass. Some examples of products that have been replaced:

formaldehyde (amoeba measurements), PU41 diluent (CEIDRE, EDF's nuclear engineering unit), additive for sealing concrete shells after agreement with ANDRA (national agency for the management of radioactive waste) (nuclear power stations). Other studies are under way, notably at EDF Energy and EDF SA in order progress further, particularly in hydraulic fluids, potassium chromate (a rust inhibitor), formalin (insulation) and environmentally acceptable oils to replace mineral oils (Hydraulic Engineering Production Division (DPIH)).

Locally, each of the Group's operational units and companies identify events that could have an environmental impact, manage emergency situations that could result from them, conduct corresponding crisis response drills, implement monitoring and communicate on environmental events under its responsibility.

There were no high-stakes environmental events<sup>(4)</sup> during 2017. There were a few incidents, without any major environmental or health impacts, which mainly concerned leaks or spillages of hydrocarbons or acid. They were controlled according to the emergency procedures in effect which considerably limited their impact on the natural environment. Two events need to be highlighted however: the discovery of a historical waste storage at the Flamanville construction site, dating from the construction of the first reactors, and the death of a royal eagle (an emblematic protected species) in a collision with a wind turbine at the Aumelas site operated by EDF EN. Apart from that, after the passage of Hurricane Irma, the strongest ever recorded in the Atlantic, the electricity systems on the islands of Saint Martin and Saint Barthelemy were practically destroyed and those of Martinique and Guadeloupe were seriously affected by the passage of Hurricane Maria.

Some of these events may be followed by litigation arising from complaints filed by NGOs or associations or formal warnings from national regulatory authorities (the French Nuclear Safety Authority (ASN), Prefecture, etc.) No definitive rulings were handed down against EDF in France in 2017.

#### The environmental management system (SME)

In order to coordinate all the objectives and actions resulting from its commitments and its sustainable development policy, EDF group has put in place Group-wide coordination managed by a Sustainable Development Committee (SDC) and implemented as regards the environmental component (including aspects associated with climate change) with the aid of an environmental management system (EMS).

The EDF group's EMS is ISO 14001 certified for a scope representing almost all the consolidated revenue of EDF and its subsidiaries (excluding Enedis) and associates<sup>(5)</sup>. This ISO 14001 certification even exceeds the Group's consolidated scope with new subsidiaries such as IFOPSE also being ISO 14001 certified. The EDF group has maintained its certification, with the fifth renewal for the 2017-2020 period obtained in May 2017 and the certificate presented to the Chairman of EDF by the CEO of AFNOR (the French national standards organisation).

In 2017, in the context of the continuous improvement of the EMS, the Group headquarters and numerous divisions and subsidiaries were certified on the basis of the new (2015) version of ISO 14001. Following the decision by certain subsidiaries to forego ISO 14001 certification, an analysis of the organisation of the EMS confirmed the importance of the Group EMS in guaranteeing the control of environmental risks in projects and activities, as well as the advantages of ISO 14001 certification at Group level, which is doubly justified as regards stakeholders' expectations and the internal motivation lever that this recognition provides.

(1) See section 2.1 on mapping of the EDF group's risks.

(2) Upper and lower threshold: industrial establishments are "Seveso" classified according to their technological risk depending on the quantities and types of hazardous products they handle. There are two different thresholds which classify establishments as "Seveso low-threshold" or "Seveso high-threshold". The requirements vary significantly between these two types; they are very restrictive for the high-threshold, particularly with regard to the safety management system, informing the public and the prevention plan, etc.

(3) These decontamination operations may concern contamination and denaturing prior to EDF's operational phase.

(4) High-stake environmental event: an event causing serious environmental damage (areas, resources and natural environments, sites and landscapes, air quality, animal and plant species, biological diversity and balance) combined with extensive media coverage or a financial impact of more than €3 million. An event causing environmental damage and likely to affect human health falls within the scope of a high-stake environmental event for the EDF group.

(5) See results of environmental indicators.

83% of engineering and generation sites<sup>(1)</sup> (nuclear, thermal and hydropower plants) maintained their OHSAS 18001 certification in 2017, with the audit conducted by the external expert Afnorm, which carried out 20 OHSAS 18001 audits in 2017 on behalf of EDF.

A few significant actions illustrate the improvements during the recent period:

- implementation of the migration of certified entities to the 2015 version of ISO 14001, with optimisation of their EMS;
- review of operational processes and environmental analyses from a life-cycle perspective and incorporation of ecodesign considerations;
- integration of the Corporate Social Responsibility Goals and of the new Group Sustainable Development Policy into entities' action plans;
- implementation of the new HSE compliance tool in the GREEN organisation of regulatory compliance watch;
- improvement in environmental performance in managing chemical and radioactive waste;
- decommissioning of carbon-fuelled assets (fuel-oil tranches);
- ongoing adaptation of hydraulic works to ecological continuity;
- reduction of light pollution and energy savings;
- re-use of conventional and radioactive waste;
- continuation of action programmes to promote biodiversity in numerous entities and land inventory;
- new "electric green" offers to private individual customers with energy from renewable sources;
- optimisation of the energy mix in the regions with the development of energy from renewable sources and energy efficiency;
- increased integration of the responsible procurement approach in purchasing specifications and documents;
- dematerialisation and optimisation of travel (web conference) and fleet of electric vehicles;
- new research programmes (biodiversity, artificial intelligence, batteries, etc.);
- continued environmental awareness-raising of employees and communication of our commitments to customers and stakeholders.

### 3.1.8.3 Sustainable development monitoring networks

Changes to national and regional environmental and energy policies, and in particular increased regulatory requirements, are a source of risks that need to be anticipated, and also opportunities for EDF. Accordingly, in the 1990s EDF implemented a predictive watch system in order to best mobilise and coordinate internal resources.

It acts as far upstream as possible:

- strengthening detection and classification of the risks and opportunities;
- facilitating sharing among business lines, geographical divisions and Group companies on transversal issues so as to maximise synergies;
- improving managers' visibility of the risks and opportunities;
- contributing to increasing the effectiveness of actions in defence of the Group's interests, in France and internationally.

The predictive watch and lobbying system is based on the work of thematic groups known as "networks", which include water, waste and soil, air, biodiversity, industrial risks, energy efficiency, energy poverty, health and climate change. Each network comprises fifteen members from different Group businesses that meet every quarter to share an overall vision. The aim is not only to anticipate changes to come, but to strengthen the Group's advisory capacity. Each network works closely with the Legal, Public Affairs and European Affairs Departments. The pilots of each network meet every month a Sustainable Development Agency which monitors the transversality of approaches and ensures that the Group's challenges are optimally taken into consideration with an overall, long-term view.

(1) 3 nuclear sites (Cattenom, Dampierre and Saint-Alban); Four thermal sites (Le Havre, Blénod, Cordemais and Aramon); One hydropower site (DTG); Two engineering centres (CNEPE and CNEN); and several subsidiaries (ES, SOCODEI, EDF EN Services, PEI, Dalkia France and Groupe Tiru).

(2) See section 1.6 "Research & development, patents and licences".

This system addresses three fundamental challenges for the Group:

- the challenge of regulatory compliance, to assure managers of our ability to demonstrate that we take regulations of every kind into account;
- a business challenge as regards the creation or destruction of value implied by the various regulatory provisions;
- a reputational challenge, all stakeholders (including the financial and non-financial rating agencies) being increasingly involved in these aspects.

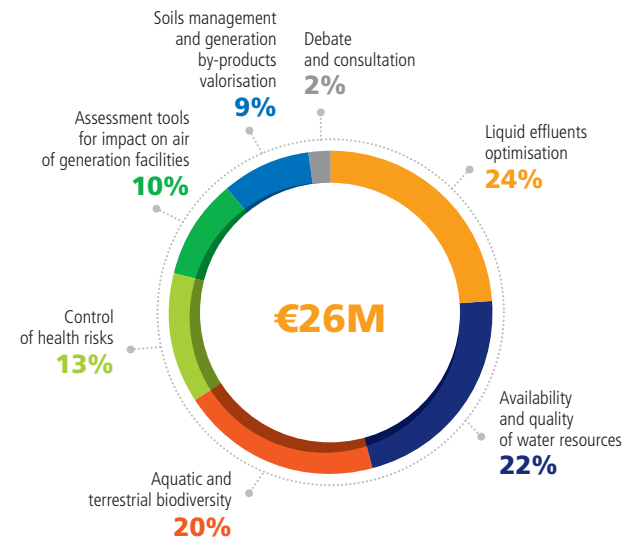
### 3.1.8.4 R&D for sustainable development<sup>(2)</sup>

New expectations from society, changes in technologies or the rules of the game in the electricity sector stimulate innovation and place R&D questions at the heart of the Group's success. As part of the CAP 2030 strategy and the Sustainable Development Policy, R&D activities contribute to optimising its economic, environmental and corporate performance over the medium to long terms, both upstream and downstream of the Group's businesses.

EDF's R&D contributes to achieving the medium to long term energy and climate objectives of energy transition, and to developing new technologies in renewable energies and storage solutions. The aim is to fill the gaps in renewable energies, integrate digital and new information technologies into the electricity system and the world of connected objects, and to enrich our offer of energy services with new digital technology solutions for all our customers. EDF also strives to protect natural resources and human health through the reduction of pollutant discharges to the air, water and soil, in line with the circular economy.

In France, around 19% of EDF's R&D budget is dedicated to protecting the environment (see section 1.6.1 "R&D organisation and key figures").

In particular, EDF's R&D programme looking at the management of interactions between its generation facilities and the environment, in particular air, water, soil, health and biodiversity, received a budget allocation of €26 million in 2017, broken down as follows.



For other illustrations of the R&D commitment to major sustainable development challenges, see for example sections 3.3.1 "EDF group's decarbonisation strategy", 3.3.2 "Adapting the Group's business to climate change", 3.4.5 "Management of biodiversity and protection of environmental capital"; 3.5 "Act positively within communities and strengthen dialogue" and 3.2.3 "Development of renewable energies".

## 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

### Offer sustainable, safe and efficient energy

In 2017 the commitment of EDF's R&D was further strengthened by various actions in the area of sustainable development, as shown by the following examples.

- Preparation and launch of two new research programmes: the "Biodiv" project, developed in support of Corporate Social Responsibility Goal no. 6 "A positive approach to biodiversity" and constituting one of EDF Lab's most ambitious projects, with an investment of more than €5 million per year to make biodiversity a trump card for responsible electricity production integrated with its region; a project to combine artificial intelligence and environmental databases so as to generate new knowledge, new methods and new tools for anticipating and taking into account global changes including;
- participation in the European EU-SysFlex project launched in November 2017, for which EDF R&D provides the technical coordination. This programme aims to demonstrate the potential for integrating a high degree of variable renewable energy into a robust electricity system. To do so, the optimisation and coordinated management of flexibility services (centralised and decentralised storage, demand, services of conventional and renewables-based units, etc.) will be developed and tested at six innovative demonstrator sites spread around Europe;
- Implementation by the R&D Applied Meteorology group of an internal Weather Service in support of all the Group entities confronted by the impacts of climate change: provision of localised data adapted to needs on climate change in the 21<sup>st</sup> century, dynamic processing and analysis tools, support from experts on climate related issues;
- establishment of a new "Regions & Circular Economy" R&D group whose research focuses on making the most of resources by optimising the integration of local multi-energy systems and soil and waste management;

- creation of "ZnR Batteries", a spin-off from the EDF group dedicated to the development of zinc-air batteries. This technology uses easily accessible and non-polluting materials to make rechargeable batteries avoiding the risks of overheating and even explosion.

R&D in the field of sustainable development also has a Group dimension. For example, EDF Energy UK Centre forms an integral part of the Group's R&D network. It is responsible for research and development activities in the UK and is involved in projects dealing with a large number of topics including nuclear, offshore wind, the integration of variable energy from renewable sources, smart cities, networks of the future, electrification of transport, electric vehicles, energy efficiency, smart meters and digital innovation.

In the area of decarbonisation of energy practices, for example R&D UK:

- contributes to the government's "Smart Systems and Heat" programme, which aims to draw up a roadmap and to demonstrate innovative technologies and business models that would supply low-carbon heat to 28 millions homes in 2050;
- develops large-scale demonstrators of "vehicle to grid" (V2G) in order to evaluate the ancillary services provided to the grid by electric vehicles and the new sources of revenue for consumers allowing them to improve the business model and accelerate the development of EVs.

Synergies are developed with the EDF group's R&D Department. For example, EDF Energy UK Centre manages the "Offshore Wind" project for the whole Group. It has also carried out an analysis, together with EDF R&D, of the functioning of the UK electricity system for a high degree of penetration of variable renewable energy. This study threw light on the impact of different market designs and incentive mechanisms for renewables on the safety of the system and on the revenues from the various production technologies.

## 3.2 OFFER SUSTAINABLE, SAFE AND EFFICIENT ENERGY

### 3.2.1 INNOVATIVE CUSTOMER OFFERS

In an evolving energy market marked by digitisation and inter-connectivity, development of intelligent systems, intensification of competition and the emergence of disruptive players, providing innovative service is a strategic challenge for meeting our customers' expectations (see materiality issue no. 4, Innovative customer offers).

#### B2C market

In France, the EDF subsidiary ENR markets the "Mon Soleil et Moi" self-consumption offer, which is a response to the desire of some of our customers to take an active role in their energy use by producing and consuming electricity produced by photovoltaic panels,

Since the end of 2016, Soweel has marketed its connected Station to private users. It is an object and application specially designed to manage energy consumption, optimise comfort, and control everyday connected objects remotely.

Combined with the Soweel natural gas and electricity range, the connected Station allows Soweel customers to use a service to monitor their individual gas and electricity heating to the nearest euro or degree and monitor their energy consumption everyday.

In October 2017, EDF launched the "Gamme Vert Électrique", a range of green electricity offers that focuses on Private Users who wish to contribute to energy transition and is also a response to new ways of using electricity.

The e.équilibre solution is accessible from the customer accounts section of edf.fr and on the EDF & MOI app and currently has more than two million users.

In 2017, new solutions were added to make customers more aware of ways to save energy and encourage their participation in monitoring them:

- "Mon fil d'Actu", on the EDF & MOI app, allows customers with a Linky communicating meter, to monitor their day-to-day electricity consumption in

kilowatt hours or euro and to be informed about eco-friendly gestures to lower their consumption and reduce their bill;

- since May 2017, all EDF customers have been receiving the "Bilan Ma Conso & Moi", a personalised consumption report, as well as an annual summary of their bills. This report is sent in either digital or paper form.

2017 also saw the launch of Electriscore. This online platform guides Internet users in their purchase of high-performance electrical appliances.

In addition, to help private individuals carry out energy renovation work in their homes, EDF launched its "Prime Energie" digital platform in 2017. The website [www.prime-energie-edf.fr](http://www.prime-energie-edf.fr) shows Internet users how to obtain subsidies to help finance the work they want to do.

The website [edf.fr](http://edf.fr) also offers several tools to assist with renovation plans:

- for example, several simulators allow Internet users to measure their home's energy label, estimate the cost of their renovation plans and find out if they can get any help to finance them;
- in that same area, under the heading "Find a Pro", the EDF Home Solutions Partners page, one can consult the opinions of other customers.

Finally, the EDF Pulse&You platform enables EDF to construct future products and offers with the help of internet users. Since the launch of this platform in 2016, more than 6,000 Internet users have taken advantage of it and have shared more than 40,000 contributions. Many of these contributions have focused on testing and improving connected objects that will improve consumer comfort in future. Objects such as the "Hydrao" connected shower head, which is designed to save water and energy, were offered with the help of ten start-up partners.

In Italy, Edison launched a new range of services in March 2017 call Edison World to meet three objectives: automated living (Edison Smart Living) and safe and protected living (Edison Casa Relax) with transparent energy costs powered by green energy (Edison World Luce e gas and Edison my Forest). Edison Smart Living is a "starter kit" that transforms any home into smart home that can be managed remotely using an app, thus making it more comfortable and helping customers consume more efficiently. The strengths of this starter kit are that it is extremely flexible, which means that users can adapt it to their homes to meet their needs, and it is very easy to use and does not require an installer.

In July 2017, Edison launched "My comfort", an offer for families who want to replace their boiler with a high-efficiency model that can save up to 30% on gas consumption. My Comfort offers ready-to-use solutions that are modulated according to three levels of connected services (installation, four years of maintenance, five year extended warranty, smart thermostat, etc.)

In the United Kingdom, Blue Lab is working on a range of products for their residential customers. With the deployment of smart meters, a Computer Aided Device (CAD) is being tested and should be offered to customers with an app (REVI) that will show their consumption in real time and suggest energy-saving measures. Blue Lab has also deployed an app (HAWK) that allows customers to learn more the consumption of various devices. It allows them to understand the reasons for high bills, and it is being tested by the customer complaint team. In future, it will be available to all online customers via the My Account app. With R&D, Blue Lab also developed the feature Alexa for Amazon Echo, which allows customers to access their EDF Energy account using voice control. A new tariff called "Control and Connect" includes Amazon Echo in the offer and has major demand.

In Belgium, EDF Luminus launched the "My consumption" platform in December 2016, and all residential customers can now access their enhanced consumption data. This means that they have a monthly overview of their gas and electricity consumption, shown separately by meter type. Consumption is evaluated based on the customer's profile, along with the corresponding costs, and a comparison with previous years and similar homes is offers, along with tips for savings.

### B2B market

As it did in the B2C segment, EDF has just launched a self-consumption offer on the B2B market to enable corporate customers to play an active role in their electricity generation and consumption. Though ESG questionnaires, more and more key account customers have asked EDF to give them more information about EDF's Sustainable Development performance, including the "carbon"<sup>(1)</sup> focus. For example, EDF answers questionnaires from several dedicated platforms<sup>(2)</sup>.

As a result, EDF is authorised by AFNOR to conduct mandatory energy audits for its customers, in accordance with regulations and the NF EN 16247 standard. In addition to regulatory compliance, EDF's goal in this new offering is to help customers improve their energy efficiency and their performance and competitiveness along with it. Moreover, EDF Marché d'Affaires' latest innovation is the launch of the first 100% digital energy audits. This innovation will enable EDF Marché d'Affaires to be in closer contact with our tertiary customers and support them in their energy transition.

EDF Marchés d'Affaires also offers its customers an online tool that allows them to identify their consumption profiles and benchmark themselves in comparison with people in their line of business to determine if they are able to go further in their energy savings. This service is being promoted and will be expanded in 2018.

In 2013, Dalkia established the DESC (Dalkia Energy Savings Center), an interactive platform to monitor building energy consumption.

Since then, Dalkia has been working on the NewDESC, which will develop new applications and algorithms for the DESC, and experimenting with artificial intelligence so that analysts will be able to focus more on pursuing energy savings.

In 2016, Dalkia signed a contract with Webinage (digital solutions offer) to create a new platform for managing Dalkia's customer relations. This platform allows customers to track their consumption and bills, schedule visits, etc. using a single interface.

Citelum proposed and signed an initial Indoor contract with Renault to optimise consumption on industrial sites (10 sites representing 100,000 street lights), with the aim of reducing the number of street lights by 20% and a commitment to reduce current site consumption by 70 to 75%.

In China, the Sanmenxia heating network relies on smart digital tools (including sensors, AI, etc.) to achieve the best possible service and optimise the efficiency of the network as a whole.

R&D has produced many of the monitoring, consulting and diagnostic algorithms and energy-efficient innovative service offerings.

In 2017, these included the development of new features aimed at explaining to customers why consumption differences from one year to the next or compared to a population with the same characteristics as they may have occurred and the development of algorithms to estimate the impact of a heat wave on a customer's consumption and bill, based on their profile. In the business customers market, R&D has designed a connected object (Konto) for communication between an electricity meter and a smartphone to allow consumption information to be tracked in real time. With the help of a mobile app, Konto helps customers understand their consumption while saving energy. It allows users to see their consumption in real time along with their consumption history, receive consumption analyses and be alerted in the event of unusual consumption.

The innovative offers presented above align perfectly with the Corporate Social Responsibility Goal no. 4 (CSRG no. 4): "Innovating through digital energy efficiency solutions so that customers can better manage their usage".

## 3.2.2 PERFORMANCE AND COMPETITIVENESS OF THE NUCLEAR FLEET

The materiality matrix identifies the performance and competitiveness of the fleet among its material priorities (materiality issue no.12 Performance and competitiveness of the nuclear fleet). This refers to the strategic choices made, as well as the measures taken to guarantee the operational performance and competitiveness of the nuclear fleet (see section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet").

## 3.2.3 DEVELOPMENT OF RENEWABLE ENERGIES<sup>(3)</sup>

As a player in energy transition and the fight against climate change, EDF is deploying a global strategy aimed at providing or giving access to low-carbon energy by acting on several levers: development of renewable sources of energy and recovery, development of energy storage and services, inclusion of renewable energies in the electricity generation mix, innovation, research and development, a renewable energy aggregator and electricity supply from renewable energies.

EDF is Europe's leading producer of renewable energies (hydropower, wind power, solar power, biomass, etc.) and will significantly accelerate their development. Accordingly, by 2030, the Group aims to double (compared with 2014) the net installed capacity of the renewable energy fleet from 28GW to over 50GW, mostly through wind power, solar power and hydropower as part of its CAP 2030 plan. In December 2017, the EDF group announced the launch of a "solar plan" for the massive development of an installed capacity of 30 gigawatts in France between 2020 and 2035. This project represents a total investment of €25 billion and will be promoted with partners.

(1) Especially since the Paris Agreement.

(2) Ecovadis.

(3) The materiality matrix identifies the development of renewable energies among the most material issues (see materiality issue no. 7, Development of renewable energies). This issue refers to the development of renewable sectors, including wind, solar and biomass, and the maintenance of hydropower capacities; it also refers to the detection of technological breakthroughs and the financing modalities of renewable energy projects

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Offer sustainable, safe and efficient energy

EDF group plans to achieve this in four ways:

- roll out a global renewable energies and low-carbon strategy to strengthen its positions in France and worldwide;
- optimise the performance of the facilities;
- develop new projects to support a country's energy transition;
- prioritise the most competitive technologies (hydropower, onshore wind power, photovoltaic), by contributing to improvements to the most promising, but as yet costly, technologies (offshore, CSP, etc.), by investing in innovation in the right places, in line with EDF group's international strategy (USA, China and others), with the right mix.

The percentage of renewable energies in the EDF group electricity capacity mix stood at 23.8% in 2017 compared with 22.1% in 2016, 21.9% in 2015 and 20.8% in 2014.

#### Investments and their financing

For the past six years, the Group has dedicated a large part of its gross operating investments for development to the development of renewable sources and strengthened its positions in strategic countries. In 2017, the net investments (excluding new development) in renewable energies represented €1.3 billion (see section 1.3.3.1 "Investments in 2017").

In 2013, EDF innovated by becoming the first large corporate to issue a Green Bond (€1.4 billion raised). In 2015, the Company launched its second Green Bond worth €1.25 billion, followed by a third in 2016 worth €1.75 billion (EDF's new Green Bond Framework, extended to the financing of investments to renovate and modernise hydroelectric assets in mainland France, in addition to the construction of new wind power and solar power projects already eligible under the first two issues). On 20 January 2017, EDF became the first major industrial player to issue a Green Bond in yen by raising ¥26 billion in two tranches with 12 and 15 years' maturity. Therefore, overall, EDF issued Green Bonds amounting to close to €4.5 billion to support its renewable energy development.

Furthermore, on 20 April 2016, the French financial markets authority approved the partnership entered into in October 2014 between EDF and Amundi. The resulting asset management company, Amundi Transition Énergétique (ATE), 40% of which is owned by EDF, aims to raise funds from institutional investors and private individuals for the production of renewable energies (wind power, photovoltaic, small hydropower works), and to develop systems for improving energy efficiency and to manage on behalf of third parties funds designated for energy transition projects. In 2017, ATE completed its first financing transaction for the energy transition by finalising the acquisition of a majority stake in a portfolio of gas-fired cogeneration facilities from Dalkia, a leading French energy services company.

With a value of more than €150 million, this first transaction represents more than 330MW of electrical power distributed over 132 facilities that produce electricity and heat for the needs of industrial or public customers.

#### Hydropower

EDF group is the European Union's largest hydroelectricity producer and has 21.5GW installed worldwide.

In France, the possibilities for hydroelectric development are limited, but the EDF group, through its subsidiaries in particular, responds to calls for tenders launched by the Energy Regulation Commission. As a result, on 27/04/2017, two subsidiaries of the EDF group won the April 2016 call for tender for small-scale hydropower: SHEMA (two projects) and Électricité de Strasbourg (one project).

In France, EDF's hydropower fleet underwent a significant modernisation and maintenance programme. Through some 2,000 annual maintenance operations, EDF adapts its resources to performance and regulatory requirements, thereby protecting its hydropower generation potential. In 2017, maintenance and operation investments amounted to €300 million, and those for development amounted to nearly €100 million. Large-scale maintenance projects were underway in 2017, such as the penstocks projects in Passy, Aston and la Coche, the renovation of the Revin pumped-storage hydropower plant with an increase in capacity for the three reversible pump turbines, or the renovation of the Bathie power plant to increase the capacity of the six facility units.

The extension of the "Green Bond Framework" to hydropower France in 2016 made it possible to finance numerous investment, development and performance improvement projects, thus contributing to the energy transition objectives for metropolitan France's fleet.

Outside of metropolitan France, EDF invested €13 million in maintenance and operations via its entity Direction des Systèmes Électriques Insulaires. It also launched studies for the construction of a STEP for the Sampolo (Corsica) hydropower concessions, and the optimisation of the Takamaka 1 concession (La Réunion). It also launched studies for the renovation of the Saut Maripa hydropower plant in Saint-Georges-de-l'Oyapock, the purpose of which will be to make this French Guiana town the first to be self-sufficient in the supply of renewable energies (pairing with a private biomass power plant).

Outside Europe, the EDF group is interested in hydropower facility projects in areas where the hydroelectric potential could make reliable electricity available to populations and the local economy, in particular South America, Africa and South-east Asia. EDF's engineering teams have renowned skills and expertise in taking technical, environmental, social and societal aspects into consideration in projects, particularly following the completion of the Nam Theun dam in Laos, which integrated all aspects of sustainable development in conjunction with the local populations. Through its Brazilian subsidiary EDF Norte Fluminense, EDF owns 51% in the Compagnie Énergétique de Sinop responsible for building and operating the hydropower facilities on the Sinop dam. Work is continuing on this 400MW project, which began in 2014. Its commissioning for commercial operations is scheduled for the end of 2018. Further, EDF is currently a 40% partner with the Government of Cameroon (30%) and the SFI (30%) in the development of a 420MW dam on the Sanaga river, 60 kilometres north of Yaoundé within the Cameroonian company Nachtigal Hydro Power Company (NHPC). The Electricity Generation Concession Agreement was signed on 20 April 2017 between the Minister of Water and Energy and the CEO of NHPC, making NHPC the concession holder of the upstream Nachtigal Hydroelectric facility for a period of 35 years and thus transferring the land rights to the Project site. In addition, 2017 saw the start of the implementation of the environmental and social plans approved in 2016.

#### Wind power, solar power and storage

In order to develop its installed capacities in wind and solar power, the Group is primarily relying on EDF Énergies Nouvelles (EDF EN), a leading producer of renewable energy. The company develops, builds and operates green electricity power plants in 21 countries, for itself and on behalf of third parties, particularly in wind power and solar photovoltaic power, mature and competitive technologies. Attentive to future developments in other segments, the Company is also present in decentralised energy, energy storage and marine energy.

Its strengths lie in four areas:

- low carbon energy: continue investments in our principal segments, onshore and offshore wind farms and photovoltaic solar energy;
- international: strengthen our international positions by concentrating our development and strengthening in each key country, including France;
- innovation: participate in the emergence of new technologies in marine energies (floating wind turbines, tidal turbines), energy storage or solar energy, contribute to the technological optimisation of mature renewable energies and the development of industrial sectors;
- partnerships: focus on local partnerships to conquer new markets and promote local economic activity.

For the "Solar power plan" and EDF EN, refer to section 1.4.1.5.3 "EDF Énergies Nouvelles".

Moreover, the EDF group also supports the emergence and development of renewable electricity generation methods adapted to Island Energy Systems. Island territories have the distinction of forming "small isolated systems" that are not interconnected to a continental power grid, or, in the case of Corsica, they are connected to a limited degree. That is why EDF dedicated an entire entity to them: the Island Energy Systems Division (DSEI). In these territories, EDF consolidated all business lines that provide public electricity service.

The methods favoured are those that provide guaranteed energy at competitive generation costs, but also sustainable in the long term, in such a way as to position them as credible alternatives to thermal generation: biomass, marine and river energies, waste recovery, biogas. EDF contributes to the advancement of technical capacities to integrate intermittent renewable energies through participation in development projects.

- Therefore, PEI (Production Électrique Insulaire), a subsidiary of EDF, participates in the development of the Grand-Rivière Éolien Stockage Services project in Martinique, alongside EREN and NW Energy, which consists of installing seven 2MW wind turbines, coupled with 5MW Li-ion batteries that stabilise power generation and the network.
- In La Réunion, the DSEI, the start-up Powidian and the Syndicat d'Électrification de la Réunion are deploying a 100% solar micro-grid along with completely independent hydrogen storage, with no time limit. This experiment is a world first. It makes a solution for isolated sites possible in a highly protected environmental context. In the villages of the Cirque de Mafate, which are not connected to the electricity grid, this experiment will allow several public buildings and individual houses to be connected.
- Communities on the islands of Sein, Molènes and Ouessant have a specific ambitious goal: replace the fuel oil that gives them electricity today with 100% renewable energies by 2030. EDF SEI is assisting them in this energy transition, which has already begun. As a result, EDF is working towards energy autonomy for Île de Sein in 2030, for example, with the installation of an innovative micro-grid in 2017 for a huge influx of renewable energies. The EDF group has mobilised its skills and has installed, since this summer, an innovative and intelligent system for controlling the electricity grid by combining centralised storage and innovative algorithms. Innovative, miniature and automated dispatching is the key for remotely controlling all energy producers and storage. This tool will use EDF's R&D and Store & Forecast custom algorithms to optimise the inclusion of the renewable energies while preserving the electricity system's supply and safety quality. This innovation ensures constant supply demand balance in a constrained system and will gradually eliminate diesel engines.

**Biomass and geothermal energies**

Since the beginning of 2015, the Group has implemented a biomass sustainability policy that aims to foster growth in the use of solid biomass for the generation of electricity and heat, supporting and securing current and future investments in this domain. This policy is based on the principles of reducing greenhouse gases over the entire life cycle, preserving natural resources and biodiversity, respecting human rights and collaborating with stakeholders.

With Dalkia, the EDF group is one of the leaders in energy services and a benchmark player in biomass energy in France. One of Dalkia's major priorities to date has been the development of EnR&R (Renewable and Recovered Energies) including biomass and geothermal: the acquisition of Dalkia Biogaz and Tiru in 2017 will boost this development, for biogas and heat recovery in particular. One of Dalkia's other major Sustainable Development priorities is the greening of heating networks.

Dalkia's medium to long-term strategy is to develop the use of renewable energies as much as possible, in particular biomass, geothermal energy, biogas and recovered energies, through the development of Dalkia Biogaz and Tiru and to combine the heat recovery from household waste incineration units with the heating network, recover industrial heat and develop seawater heating.

- Tiru continues its efforts in energy recovery from waste, through the development of new treatment processes (production of SRF Solid Recovered Fuel) that combine energy services and recovered energy generation.
- Dalkia Biogaz has a strategy to develop a biomethane production fleet that will replace fossil gas with renewable gas while contributing to the circular economy by recycling waste (the Energy Transition Law stipulates that biogas must account for 10% of gas in natural gas networks by 2030).

Some examples of biomass and geothermal projects:

- several major heating networks are under construction/in the process of being launched: start of the Toulouse Métropole heating network; work to create a second 7.4km wood fired heating network in Alençon (heating network with biomass cogeneration; extension of the Lyon Métropole heating network;
- following the call for tender for Le Mans Métropole that was won in 2016, Dalkia launched work to interconnect networks, connect to the energy recovery unit and renovate the boiler room;
- in October 2017, EDF's Chairman and Chief Executive Officer inaugurated Massileo© in Marseille, a temperate water network that supplies heating and cooling networks of buildings in the Marseille eco-district with 100% renewable energy: seawater heating, or marine heat energy;
- Dalkia Biogaz has signed a partnership with the L'Oréal group to carry out a biomethanation project producing and supplying 34GWh of biomethane to the Group's factories in the north of France.

**Innovation and research**

The EDF group has made innovation and research one of its distinctive features, developing initiatives approved by stakeholders and by investing heavily in research, through renewable energy R&D programmes. As part of CAP 2030, the EDF group intends to increase its R&D on energy storage, photovoltaic power, electric mobility and new networks.

**Societal innovation**

EDF group has innovated by developing crowdfunding initiatives for projects or technically and financially supporting the development of projects in the valleys where its hydroelectric facilities are located:

- crowdfunding of projects: after the first few crowdfunding campaigns launched in France by EDF Énergies Nouvelles in 2015 and 2016, several crowdfunding initiatives were implemented for wind power projects in France;
- "One river, one territory" programme: to deliver on EDF's commitment to economic development and innovation in the hydropower valleys where it operates, EDF continues to support local economic development via its seven "One river, one territory" agencies. This programme, launched in 2012, is the result of a joint constructive approach bringing together local socio-economic players, multidisciplinary experts and EDF representatives.

**Commercial innovation**

Finally, to contribute to the development of renewable energies, EDF launched, in September 2017, its new subsidiary Agregio, an aggregator serving electricity producers with renewable generation capacities, and companies with load shedding capacities. For electricity producers, Agregio offers tailored solutions to optimise and sell their production on the markets and secure income over time. This is a strong expectation of renewable electricity producers, who no longer benefit from purchase obligations. Agregio is also aimed at industrial and tertiary consumers, who are willing to reduce or shift their consumption in exchange for compensation, according to the needs of the electricity system. Agregio will finally position itself as a local optimisation platform for regional projects to optimise production and consumption in a region. Agregio hopes to be the benchmark player in this sector and aims for a market share of 20% to 30% by 2020.

**Technological innovation**

The EDF group has an ambitious R&D policy around renewable energies and storage, amounting to €80 million per year. Research programmes are based on four objectives: reducing costs, improving the performance of mature technologies and optimising resources; promoting the major technological breakthroughs and the emergence of innovative solutions; modernising and adapting its facilities; contributing to the integration of EnR in the electricity systems.

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Offer sustainable, safe and efficient energy

In 2017, the main areas of research were:

- increase in the performance of **EDF's hydropower plant**, by developing tools for the optimisation of maintenance and monitoring of the hydropower structures;
- improved operation of **onshore wind power plants** increasing the residual lifespan in most cases: the topics examined concern tools for testing the blades, anticipating failure of key components, particularly the generator, best control of extreme constraints such as frost or repeated lightning;
- the operation of larger **off shore wind turbines** remains an important cost cutting factor. The use of Alstom's innovative technology 6MW Halliade turbine was the first major leap in the offshore segment. EDF EN has tested this technology on several prototypes, in collaboration with the supplier GE, and will install these turbines on the first major offshore wind farm sites in France in 2018-2020, for a total volume of 1,500MW. This power series is already exceeded with a 8MW series. This year, EDF EN has installed 5 Vestas turbines with this power capacity on the Blyth site in the United Kingdom;
- **improving the efficiency of photovoltaic cells**, extending the lifespan of the panels, seeking the best performance with bi-facial modules (increased ground generation capacity of 5 to 25%); these continued efforts in PV to offer particularly low electricity prices: less than \$18/MWh in sunny regions like Saudi Arabia.

The Group also has to meet the challenge of **integrating renewable energies** that are intermittent in nature into the grids while studying it from various angles.

EDF's R&D participates in the **European programme EU-SysFlex** launched in November 2017. This four years program aims to demonstrate the potential of integrating a high rate of variable REs into a robust electricity system. To do this, the optimisation and coordinated management of flexibility services (centralised and decentralised storage, demand, conventional group and renewable energy services, etc.) will be developed and tested on six innovative demonstrators spread across Europe. EDF R&D provides technical coordination of the project in partnership with Irish transport network operator EirGrid and 32 other European partners.

As part of the **national call for projects** for smart electricity grids and the regional project Flexgrid, EDF wants to use hydropower for the development of other renewable energies, photovoltaic energy, in particular. In this context, So Flexy is the virtual power plant project on Durance, whose role will be to compensate for the production that is not ensured by other renewable energies, and photovoltaics, in particular. In addition, a research programme is underway focusing on energy storage with, in particular, an analysis aimed at characterising and optimising the potential of systems that couple pumped-storage hydropower plants and batteries.

In the field of **photovoltaic plants** on land, EDF EN has implemented new test versions of the photovoltaic plants to reduce the intermittency of photovoltaic power, regulate the voltage, and finally modulate the capacity. This command and control was approved for a test power plant owned by EDF EN. It is presently being deployed on the Fouilloux PV power plant. Furthermore, as a provider of system services, including frequency tuning, EDF EN initiated plant qualification with RTE.

However, a full contribution to **frequency regulation** requires energy storage. Lithium ion electrochemical batteries are a good solution for this, as they perform efficiently and have a good response time. Their current price makes them competitive for this function in many types of electricity system. A key aspect of the performance of these systems is the development of very high performance command and control, to enable an optimum response in the shortest time to capacity demands on the electricity system. The command and control is provided by EDF Store and Forecast, an R&D spin off of EDF. Furthermore, this year EDF EN installed a 49MW battery in the United Kingdom to provide frequency control and capacity reserve services (Call for tenders won in 2016).

In 2017, EDF EN launched a project to control its wind and solar power assets in real time, for system service. First proofs of concept were implemented, showing that it is possible to remotely control the setpoint of several works in different PV plants, wind power plants, battery storage in real time.

In terms of networks, one of the focus areas of Enedis' R&D programme is: "Design a way of managing local systems which facilitates the inclusion of renewables and sustainable development". It aims to develop solutions to increase the integration capacity of new producers on the distribution network. Progress made in 2017 includes:

- the continuous rollout of the first components of the "contingency management" tools in the regional agences de conduite, particularly tools for optimising the programming and preparation of network projects (using constantly improved photovoltaic and wind power output forecasting tools);
- development of new tools for coordination between Enedis (Agences de Conduite) and the producers, notably the test of producers' energy reduction actions via the e-DEIE (mechanism for the Exchange of Operational Information) to mitigate network overload;
- continued experiments on alternative solutions to reinforcement when connecting producers;
- development of innovative solutions to regulate voltage in primary areas of deployment of the industrial solutions Smile and Flexgrid smart grids;
- prospective R&D work to assess the economic interests of flexibilities as an alternative to network investments, notably in areas heavily affected by the development of decentralised output.

Additionally, Enedis has tested or is testing some of these solutions in smart grid prototypes: Smart Grid Vendée, SMAP, and the European project Inteflex (with its French prototype Nice Smart Valley).

#### 3.2.4 SAFETY OF INDUSTRIAL EQUIPMENTS

Nuclear safety is EDF group's first priority. It guides decisions and investments, (materiality issue no. 12: Safety of the existing nuclear fleet and new nuclear investments).

##### 3.2.4.1 Nuclear safety

In the EDF group, each one shares the conviction that we must accord first priority to nuclear safety, under all circumstances. It is the indispensable condition so that this energy can be one of the answers to the needs of man.

The operational safety of nuclear facilities is taken into consideration from the initial design stage, and is regularly monitored, together with the implementation of an employee motivation policy and large-scale investment programmes. The Group's nuclear safety policy is incorporated into training for both EDF employees and subcontractors.

Nuclear safety is subject to internal controls (annual reviews, internal control plans and nuclear inspection audits in France) and external controls (peer reviews between corporate members of WANO<sup>(1)</sup> and OSART<sup>(2)</sup> audits conducted by experts from the International Atomic Energy Agency (IAEA)).

In France, safety of nuclear facilities is controlled by the ASN. In the United Kingdom, the Office for Nuclear Regulation (ONR) is the independent watchdog authority for safety in the civil nuclear sector. It monitors compliance with safety rules, including for transportation of radioactive matter.

The nuclear safety policy of the EDF group was redefined in 2017<sup>(3)</sup>.

(1) World Association of Nuclear Operators.

(2) Operational Safety Review Team.

(3) See section 1.4.1.1.3 "Environment, nuclear safety, radiation protection" in France and 1.4.5.1.2.1 "Nuclear generation" in the UK.



### 3.2.4.2 Hydropower safety

EDF operates 433 hydropower plants and manages the reservoirs of 239 large dams in France. The average age of the French hydropower fleet is 72 years. Hydropower safety aims to control risks of the structures rupturing, risks associated with managing structures during flood periods, as well as risks associated with water flow and water level variations during operation. Like the nuclear safety policy, the hydropower safety policy aims for a high level of safety and continuous improvement.

See section 1.4.1.5.1.2 "Hydropower safety".

### 3.2.5 SECURITY OF CONNECTED INFRASTRUCTURE (INCLUDING RESPONSIBLE DATA)

Information is an asset that has an essential value for the EDF group, especially in its digital form in our information systems. These must be fully protected and thus contribute to data confidentiality and integrity, continuity of business processes, and compliance with existing laws and regulations. The digital transformation of the Company and its new uses (collaboration, mobility, Cloud, Big Data, Internet of Things, etc.) are both a source of opportunities and risks in the security of information systems. A failure of the information systems, whether of malicious or accidental origin, that results in unavailability, leaks, theft, destruction or alteration of certain information and business processes can be highly damaging for the EDF group: deterioration of image, financial losses, competitive loss, civil and criminal penalties, damage to production tools.

In 2017, the Group redefined three additional policies: an "Information Systems Security" policy, a "Security of Assets against Malicious Acts" policy and a "Data Management" policy.

The Information Systems Security policy was redefined in 2017 to ensure the protection of information systems, which are essential for the management of the Company's assets, while enabling businesses to open up and seize opportunities related to Digital technology. Thus, by permitting operation as an "extended enterprise", this policy plays a crucial role in the success of the Group's industrial projects. This policy specifies the requirements, responsibilities and security standards necessary to effectively protect the Group's Information Systems. The management of each EDF group entity is responsible for ensuring the deployment of this policy in its organisation, with resources adapted to the challenges and risks of its business lines. The EDF group's Director of Information Systems, assisted by its Information Systems Security Officer, and in conjunction with the Business Line Information Systems Directors and Entity Representatives, supports the entities in implementing the policies. It reports on the security status of EDF's group's information systems to IS security risk sponsors within the COMEX framework.

The Security of Assets against Malicious Acts policy defines the principles, rules and organisation aimed at detecting threats, preventing the risk of malicious acts likely to harm the Group's assets and limit their consequences. This policy is based on a global approach that aims not only to protect people, the material assets of the Group but also, and with growing priority, its intangible assets. In line with the focus on accountability closer to the ground, each entity of the Group deploys this policy relying on the Security and Economic Intelligence Department, which is responsible for defining reporting guidelines, establishing the "Security" sector and ensuring that the plans put in place are effective and shared.

A data management policy completes the system in a spirit of value creation; more focused on the opening and valuation of data; it aims to promote sharing, transversality, and reconciliation of data to produce new knowledge. A 2017 instruction specifies the framework of the requirements applicable to the processing of personal data, the device applicable to meet these requirements, the procedures for monitoring compliance with these requirements, as well as the modalities for running the Group's subsidiaries.

### 3.2.6 QUALITY OF SERVICE AND SUPPLY CONTINUITY

In 2017, the average outage time, excluding exceptional events, complies with the goal of incentive regulation. Guaranteeing the quality and continuity of the electricity supply is one of the essential duties of Enedis<sup>(1)</sup>. Supply quality is assessed firstly in relation to the continuity of the routing service, whose incentive regulations were made stricter during the inauguration of TURPE 5. In addition to the average outage time per LV customer, these include introduction of regulation for HVA customer outages and monitoring of average frequency of HVA and LV outages. Enedis addresses these new challenges by increasing the targeting of its investment actions on higher-risk structures, using a Big Data-type statistical approach, while reinforcing its automation program (installation of 12,000 new remote control points over five years). (See section 1.4.4.2 "Distribution – Enedis").

### 3.2.7 MANAGEMENT AND SECURITY OF STRATEGIC SUPPLIES

The materiality matrix identifies the management and security of strategic supplies among the most material priorities (materiality issue no. 6 Management and security of strategic supplies). This refers to the priorities relating to the risk of EDF's dependence on its strategic supplies, as well as to the management of risks associated with raw material price fluctuations.

For this priority, see section 2.1 "Risks to which the Group is exposed".

(1) Enedis is a fully independent subsidiary.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Meeting the challenges of climate change

### 3.3 MEETING THE CHALLENGES OF CLIMATE CHANGE

EDF group is aware of both the impact of its operations on climate change, and the impact of climate change on its operations. That is why, as a responsible company and as part of CAP 2030, it is rolling out an ambitious strategy to fight against climate change. This is a transformational strategy which aims to address climate change risks, contribute to the main sustainability challenges and grasp the opportunities this new context offers.

With CAP 2030, EDF group aims to be a flagship electricity generator in global terms and an efficient, responsible electricity company that champions low-carbon growth. To achieve this, the Group has a strategy designed to anticipate climate change risks (both to operations and the asset portfolio) and to seize the opportunities offered by this new context. Our aim is to provide tomorrow's energy solutions today.

#### Priorities

Anthropogenic emissions of greenhouse gases (GHG), and CO<sub>2</sub> emissions in particular, are the main causes of climate change (IPCC, AR5). In the near future, we will have to confront more frequent, longer-lasting heat waves, more extreme weather events in many regions of the world, and a rise in average sea levels (IPCC, AR5). Energy production now accounts for 60% of global anthropogenic greenhouse gas emissions, 40% of which are linked to electricity and heat generation (IEA, 2016).

Electricity industry operations have an impact on climate change; the electricity and heat generation sector alone produces 25% of anthropogenic CO<sub>2</sub> emissions (IPCC, AR5). However, due to the heavy use of low-carbon energy sources in its generation mix, the EDF group's direct impact on climate change is ultimately relatively low<sup>(1)</sup>.

CO <sub>2</sub> emissions due to heat and electricity generation <sup>(1)</sup> (gCO <sub>2</sub> /kWh)	2017	2016
EDF group	82	77
EDF	25	19

(1) Direct emissions, excluding life cycle analysis of generation plants and fuel.

Use of this low-carbon electricity is a major positive contribution in terms of avoided emissions.

The global average is 506gCO<sub>2</sub>/kWh<sup>(2)</sup> (2015) and the average of the main European electricity providers is 275gCO<sub>2</sub>/kWh<sup>(3)</sup> (2016).

Climate change is already impacting the electricity sector; the EDF group must anticipate and tackle three series of major changes which affect its operations:

- regulatory changes: global electricity demand is set to grow by nearly 80% by 2050<sup>(4)</sup>; with this in mind, a consensus has been formed around decarbonising electricity generation as an effective way of reducing CO<sub>2</sub> emissions; this involves for example setting targets in the Energy Transition for Green Growth Law in France, those of the Climate Change Act in the UK, and those of the 2020 and 2030 Climate and Energy Packages of the European Union. The 2015 Paris agreement, seeking to keep the rise in temperatures "well below 2°C compared to pre-industrial levels" sums up this underlying trend; regulatory changes tending towards an increase in CO<sub>2</sub> prices represent an opportunity for EDF, which is likely to increase the profitability of the Group's largely carbon free generation facilities;
- changes in technology and competitive positioning: energy is increasingly decentralised, low-carbon and digital. Customers are playing an increasingly active role in their consumption and generation of electricity; new economic models are emerging that throw the competitive positioning into question;
- climatic changes likely to impact the Company's assets and change physical operating conditions.

#### Strategy for fighting climate change

In this context, EDF group's strategy for fighting climate change focuses on two areas: decarbonising and adapting to climate change<sup>(5)</sup>.

#### 3.3.1 EDF GROUP'S DECARBONISATION STRATEGY

EDF group's decarbonisation strategy is first and foremost based on an ambitious industrial policy focused on a low-carbon generation. This policy entails action to promote increased electrification as a way of removing carbon from the economy. Finally, EDF is innovating to enable its customers to optimise their energy consumption.

##### 3.3.1.1 Decarbonising electricity generation

To maintain its leadership, EDF is making a new emission reduction commitment<sup>(6)</sup>, in line with current scientific understanding, and is putting the necessary resources in place.

(1) Direct CO<sub>2</sub> emissions by kWh generated are low compared with industry averages. The combustion of gas sold by the Group to end customers makes up a large part of its indirect emissions.

(2) Most up-to-date statistic available for CO<sub>2</sub> emissions generated by power plants and combined cycles, CO<sub>2</sub> Emissions from Fuel Combustion, International Energy Agency, 2016, data for 2014.

(3) Climate Change and Electricity, European carbon factor Benchmarking of CO<sub>2</sub> emissions by Europe's largest electricity utilities, PWC, 2018 (data for 2016).

(4) Energy Technology Perspectives 2016, International Energy Agency.

(5) With a number of drivers, such as a high-performance electricity mix which is competitive and already low-carbon, a robust process for identifying risks and opportunities and for managing priorities at the very highest corporate levels, a strategy for fighting climate change at the very heart of EDF's strategy which is embedded in the Group's businesses, R&D which helps attain the medium and long term energy and climate targets of the energy transition, an investment policy in line with priorities, suitable human resources and an appropriate remuneration policy, etc.

(6) The Group's aim is to set a quantitative emissions reduction target for scopes 1 and 2 by using the Sectoral Decarbonisation Approach developed as part of the "Science-based targets" initiative.

### EDF group, the leader in low-carbon electricity

EDF group is one of the world's leading electricity producers, not only in terms of net installed capacity and electricity generation, but also in terms of carbon performance with direct emissions currently at 82gCO<sub>2</sub>/kWh<sup>(1)</sup>, a carbon intensity six times less than the global average in the sector.

EDF group's leadership in reducing emissions has also been recognised by the Global 500 Greenhouse Gases Performance study for 2010-2015 by Thomson Reuters, which ranked the Group 12th out of the 500 largest companies in the world, in terms of emissions reductions.

To maintain its leadership, EDF made a new emission reduction commitment, compatible with current scientific understanding

The CAP 2030 strategic project aims to make EDF "an efficient, responsible electricity company that champions low-carbon growth", Related to CAP 2030, the first Corporate Social Responsibility goal (CSRG no. 1: go beyond the requirements of the 2°C goal set by the Paris Agreement by drastically reducing our CO<sub>2</sub> emissions) outlining the Group's determination to cut its emissions was formulated in May 2016. This ambition will be embodied by a target to reduce Group emissions that includes the goals set by the Paris Agreement. In order to set this target, EDF mainly uses the Sectoral Decarbonisation Approach (SDA) developed by the CDP initiative, United Nations Global Compact, WRI and WWF "Science based targets (SBTi)".

### EDF group is implementing the resources necessary to meet this ambitious carbon reduction target

It aims to further cut CO<sub>2</sub> emissions from its generation asset portfolio and make wise investment decisions, in order to maintain a balanced, low-carbon generation mix, combining renewable and nuclear generation and thus maintaining its leading position in low-carbon electricity generation. This also involves preserving good nuclear flexibility, in order to strengthen its compatibility with the development of renewable sources. Furthermore, R&D helps prepare the future generation fleet and energy system, by recommending measures for optimising thermal power plants<sup>(2)</sup>, integrating intermittent renewable energies, or through work on smart electricity systems.

### Incorporating climate change priorities into its investment strategy and policy

Climate change represents a major financial challenge for EDF. In the context of its investment policy, EDF uses medium-long term scenarios that include carbon prices<sup>(3)</sup> enabling it to assess the profitability of future investments and plan the Group's strategy; financial commitments are scrutinised in line with the CAP 2030 strategy<sup>(4)</sup> and commitments made by the Group, including a two degree decarbonisation objective. Scenarios including a high carbon price enable the Group to focus its investments on low-carbon assets, increasing the profitability of its largely low-carbon generation facilities. The description of the scenarios used in this respect, as well as their consequences, remain confidential.

### Maintaining its position as a leader in renewable energies

See section 3.2.3 "Development of renewable energies".

### Relying on nuclear power, the cornerstone of EDF's low carbon strategy

Nuclear power generation has made a clear contribution to low-carbon growth (materiality issue no. 8 Position of nuclear power in the energy mix). It must be assessed in line with requirements regarding safety, fleet renewal, skills maintenance, presence in international markets, modularity and competitiveness.

EDF's nuclear power contributes to carbon efficiency in France and Europe. It is difficult to evaluate CO<sub>2</sub> emission reductions in the French economy, but it is worth pointing out that average emissions in the sector are around fifteen times higher in

Europe compared to those of EDF in France. In addition to this carbon efficiency, nuclear power is a useful way of supporting the development of renewables by further developing its load-following abilities (between 20% and 100% of the capacity of a unit in thirty minutes).

### Drastically reduce CO<sub>2</sub> emissions from the fossil asset portfolio

EDF is committed to reducing CO<sub>2</sub> emissions from its energy mix both in France and abroad (materiality issue no. 9 Reducing fossil-fuel emissions)

In France, EDF changed its fossil generation resources by closing 10 of its 13 coal-fired units (2,835MW), and by closing the fuel oil power plant in Aramon (1,370MW). Pursuant to the decision of the Central Works Council dated 21 September 2016, EDF shut down the last oil-fired units. Units 1 to 4 in Porcheville and unit 2 in Cordemais were permanently shut down in 2017 (2,975MW). The closure of unit 3 in Cordemais (700MW) is scheduled for 2018. Pursuant to the PPEs<sup>(5)</sup> in Corsica and French Guyana, the closures of power plants in Vazzino (Corsica) and Dégrad des Cannes (French Guyana) are scheduled for 2023. The shutdown of the last coal units in metropolitan France (three of which are EDF generation units) is planned for 2023 in accordance with the current PPE.

In the UK, EDF Energy still operates almost 4GW of coal-fired power plants, which are currently essential to the UK's supply and demand balance. These power plants are to be closed by 2025, according to the decisions of the UK government. Furthermore, EDF Energy, as part of its "better plan" is aiming to lower its emissions to 50gCO<sub>2</sub>/kWh in order to maintain its position as UK's leading low-carbon producer. EDF Energy intends to make strategic investments in renewable energies and nuclear power in order to reach this ambitious target.

In Belgium, in 2017 EDF Luminus closed the Ghent-Ham gas-fired power plant. The gas-fired power plants in Angleur, Izegem and Seraing will be closed over the next two years, pursuant to an internal decision made by the Company. In the rest of continental Europe, excluding France, EDF is implementing the results of the strategic review of its fossil fuel-based energy generation assets.

The increase in greenhouse gas emissions observed between 2016 and 2017 mainly relates to lower hydropower capacity, the improved but lower than expected availability of French nuclear power plants and the improved availability of the Group's remaining coal-fired power plants (which, given market rules and prices, were despatched in preference to gas-fired power plants). EDF therefore advocates a minimum CO<sub>2</sub> price in order to limit the use of coal-fired power plants before they are definitively shut down or partly replaced with biomass. More generally, the Group is working to optimise the performance of all of its thermal fleet.

### Generating a comprehensive GHG report

Although the Group historically publishes its direct CO<sub>2</sub> emissions, since 2011 EDF has performed annual GHG reporting also covering its indirect emissions (scopes 1, 2 and 3) thus going above and beyond its regulatory obligations. Since 2013, a gradual initiative has been in place to also carry out GHG reporting at Group level, using a harmonised methodology, based on the GHG Protocol Corporate Standard. The work already begun gives a good idea of the direct and indirect emissions of the Group as a whole. Direct emissions by EDF group are almost all caused by fossil-fuelled electricity generation, and amounted to around 50 million tonnes of CO<sub>2</sub>, with very few other sources of direct emissions. Indirect emissions are now higher than direct emissions, given the electricity generation decarbonisation policy and the relatively low level of direct emissions: most indirect emissions come from the combustion of gas sold by EDF, the electricity purchased to serve our end customers, upstream fossil and nuclear fuels used in the power plants, and the amortisation of the emissions associated with the construction of our power plants. Other indirect emissions, such as emissions associated with purchasing goods and services, employee travel and electricity consumed for our own use are, proportionally, very limited. Any emissions relating to the Group's investments in non-consolidated assets were not included.

(1) Direct emissions, excluding life cycle analysis of generation plants and fuel.

(2) See section 3.3.2 "Adapting the Group's business to climate change".

(3) In addition to other regulated commodities and variables.

(4) This is done within EDF's commitment Committee.

(5) PPE: multi-year energy plan.

## 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

### Meeting the challenges of climate change

In light of the new regulations set by Article 173 of the Energy Transition Law, which requires information to be disclosed on the main sources of greenhouse gas emissions generated by the Group's operations, EDF considered that the total direct CO<sub>2</sub> emissions from generation power plants (scope 1) and emissions from the combustion of gas sold to our end customers (scope 3) meet the regulatory requirement of importance in that these two emissions sources represent over 75% of the Group's direct and indirect emissions.

#### Involving employees in the fight against climate change

EDF indirectly incorporates climate-related performance indicators into the remuneration of its employees. For example, as part of its profit-sharing criteria, EDF includes an environmental criterion that promotes the use of digital tools during meetings rather than requiring employees to physically attend. Executive variable remuneration is tied to the nuclear fleet's availability level, as this means of electricity generation does not generate direct CO<sub>2</sub> emissions.

#### 3.3.1.2 Contributing to the process of removing carbon from the economy through low-carbon electricity <sup>(1)</sup>

While the electricity in France today is among the lowest carbon in the world, and the political will in the majority of countries is to continue with the process of decarbonising electricity generation upstream, accelerating the process of electrifying end uses is desirable, particularly in countries where carbon intensity of electricity is already very low, in order to decarbonise the whole economy. It is particularly essential to act on the main sources of CO<sub>2</sub> emissions which generate climate change namely buildings and mobility. This leads to favouring the following electric solutions in buildings: heat pumps, thermodynamic water heaters, "Smart Joule", and developing electric vehicles.

As part of the CAP 2030, EDF is working actively on this final priority, through a range of offers covering every market:

- charging solutions (plugs or stations) in individual or shared parking spaces that can be controlled locally or remotely, plus associated services (maintenance, breakdown of costs);
- solutions offered to businesses and local authorities, together with SODETREL, covering the installation (in public car parks or on-street parking), operation and maintenance of charging stations and related services (operation, smartcharging, roaming, etc.);
- solutions offered to local authorities that wish to electrify their public transport: installation of charging infrastructure at depots or at the end of the line with Optimal Solutions, battery hire with NEoT Capital.

Enedis <sup>(2)</sup> continues to connect public charging stations to the network, in concession zones. In the space of one year, 5,498 public charging stations were added in France, an increase of 36%. As far as the vehicle fleet is concerned, Enedis, the network operator, had 1,650 electric vehicles in September 2016, representing 10% of its fleet of light vehicles, which generate most of its direct emissions. As part of its new vehicle strategy, Enedis intends to comply with the obligations set forth by the Energy Transition for Green Growth Law, prioritising the allocation of electric vehicles at sites that may be impacted by traffic restrictions during times of high air pollution, i.e. sites in large cities. The company is also experimenting with charging controls on its fleet, making it possible to spread out power demand over time when charging vehicles, and thus avoiding major impacts on the network.

#### 3.3.1.3 Helping customers consume less, more efficiently <sup>(3)</sup>

The EDF group aims to help all of its residential, corporate and local authority customers reduce and optimise their consumption and, ultimately, to reduce their CO<sub>2</sub> footprint, in line with CSRG no. 4: innovating through digital energy efficiency solutions enabling all customers to manage their use better;

EDF has developed a number of innovative solutions that meet this goal, described in section 3.2.1 "Innovative customer offers" above.

EDF action is in line with the framework of the French energy savings certificates (CEE) programme which encourages energy providers to promote energy efficiency with energy consumers, making EDF the leading CEE provider in France.

EDF is set to meet its obligation for the third CEE period, which ends at the end of 2017.

In 2017 EDF stepped up support for its residential, corporate and local authority customers in their energy savings initiatives, in order to prepare for the highly ambitious fourth period of the programme, set to begin in 2018, with an obligation that has almost doubled.

As such:

- in June 2017, EDF launched the prime-energie-EDF.fr online platform, offering direct financial assistance to households that complete energy efficiency improvements;
- EDF launched the "Coup de Pouce Économies d'Énergie" initiative intended for low income households, offering them additional financial assistance as part of the CEEs;
- EDF also strengthened its support of industrial players, service companies and local authorities in order to help them achieve their energy efficiency goals;
- in particular, EDF has signed a number of agreements with "Positive energy territories for green growth" (Territoires à Énergie Positive pour la Croissance Verte) in order to help finance their energy efficiency initiatives.

For customers that meet the eligibility criteria for the Energy Company Obligation (ECO) government initiative, EDF Energy contributes to the replacement of gas-fired boilers, or the insulation of lofts and walls. Green Hub, a customer service team comprising specialised energy efficiency advisors, manages all calls relating to energy efficiency. As part of the ECO plan <sup>(4)</sup>, 73,932 energy efficiency initiatives were completed thanks to EDF Energy's financing of ECO systems in the UK.

#### Fostering energy transition in towns and communities

The materiality matrix identifies the development of new electricity uses as one of its key priorities (materiality issue no. 11 Development of new electricity uses). This refers to the use of electricity instead of fossil fuels, and specifically the development of electric mobility, as well as the development of new electric infrastructure and services contributing to sustainable cities.

The EDF group is committed to the energy transition of towns and communities. These play a vital role in combating climate change. EDF develops tailor-made solutions to assist local authorities in their energy-related projects. EDF's support focuses on strategic energy planning and advice, energy generation from local resources, the energy and environmental performance of buildings and facilities, street lighting and mobility.

(1) Refers to the use of electricity instead of fossil fuels, and specifically to the development of electric mobility, new electric infrastructures and services contributing to sustainable cities, and to the increased market share in heating.

(2) Enedis is a fully independent subsidiary.

(3) The materiality matrix identifies energy efficiency as one of its key priorities (materiality issue no. 10 Energy efficiency). This refers to services aiming to control electricity consumption (specifically using digital energy efficiency solutions) and awareness-raising initiatives carried out in order to promote moderate use of electricity. This priority also refers to the optimisation of grid output.

(4) From January 2015 to October 2017.

In France, EDF meets the requirements of local authorities and their elected representatives, who have to reconcile local appeal, compliance with environmental requirements, controlling urban sprawl, and for whom energy is a major concern.

EDF performs energy studies in order to assist local authorities define their regional energy strategy (study of potential renewable energy sources, the most suitable energy solutions, the residential renovation strategy, etc.) by using its ISEO and MONSTER tools, helps local authorities with their TEPCV files, and undertakes numerous communication campaigns. EDF also distributed over one million LEDs in eligible regions.

With the extension of the Lyon's urban heating and cooling networks, Dalkia developed the first low-carbon smart thermal grid in France, using state-of-the-art digital technology for urban modelling and strategic planning, by making use of local partnerships. This is an ambitious project, promising economic development and the creation of jobs. The network will reach a RES (renewable energy source) rate of 65%, with a significant reduction in CO<sub>2</sub> emissions.

In the Nanterre Cœur Université eco-neighbourhood in the Hauts-de-Seine region, Optimal Solutions, a Dalkia subsidiary, is developing the first private dual smart grid in France, both thermal and electric, in partnership with Bouygues Immobilier. The grid is smart in two ways: first, it is a thermal smart grid, as it connects separate buildings (offices, housing, shops), pools the needs of occupants and enables buildings to share heat. secondly, it is an electric smart grid as it generates part of the electricity required for its own operation.

SEI launched the Sunny Mouv project in Reunion, involving charging management based on a dispatch signal, aiming to promote the charging of electric vehicles during low-carbon generation periods and by avoiding demand spikes, and opened the Mafate (POWIDIAN) hydrogen microgrid. SEI is also preparing to develop 100% renewable microgrids in other locations (Sein, Ouessant, St Georges de l'Oyapock, Maripasoula, etc.)

SEI is also assisting Bouillante in Guadeloupe in entirely overhauling its street lighting, in favour of high-efficiency LED lighting, through crowdfunding. This initiative, which comprises 1,000 lights, will enable the city to halve its street lighting electricity consumption.

The Thermal Generation Department is actively contributing to the Clean-tech Vallée project in the Gard region, alongside other Group players and regional stakeholders: following the definitive shutdown of the Aramon power plant in April 2016, a regional assessment performed by EDF has revealed the development potential in "Clean tech" in the region. This assessment has given rise to a revitalisation programme centred around three priorities: Industrial development, energy transition and the development of local projects, in close connection with the nearby Tricastin power plant.

Électricité de Strasbourg, as part of the Eurométropole de Strasbourg's sustainable development strategy, specifically looked at quai-side supply for excursion boats, in order to launch projects that will have a significant impact on air quality.

One of Citelum's major priorities is the energy efficiency of public and indoor lighting. In order to achieve energy savings in this area, Citelum implements dimming and remote management solutions, demand analysis software, and offers its customers its MUSE lighting management platform.

A consortium comprising Bouygues and Citelum won a highly innovative contract in Dijon. Digital operating data for all of the public services will be reported in real-time to a single command centre. Users will be able to report any problems, engage support functions, and will be informed of the results.

Enedis<sup>(1)</sup>, the network operator, started developing a smart grid programme in 2011. The specific aim of this programme is to gain experience from a system perspective of the different aspects of smart grids. The goal is to actively help with the energy transition by continuing to integrate renewable energies in the electricity distribution network, developing new uses such as electric mobility and favouring the development of actions for demand side management of energy and capacity.

Regarding the "Réseaux Electriques Intelligents" (REI) smart grid project launched by the French government, 2017 was marked by the implementation governance structures for the three winning projects coordinated by regional authorities: SMILE (Brittany and Pays de la Loire), Flexgrid (PACA) and You&Grid (Hauts-de-France). The SMILE project's stakeholders therefore formed an association in February 2017.

These smart grid showcase projects are structured around:

- regional project portfolios focusing on self-consumption, data, electric mobility, etc.;
- large-scale deployment of smart grid technology on electricity grids, in which Enedis is set to invest €40 million between 2018 and 2020, specifically in the SMILE and Flexgrid zones.

Furthermore, the association Think Smartgrids, chaired by Philippe Monloubou, Chairman of the Enedis Executive Board, today boasts 100 members (20 new recruits in 2017). The association has continued its initiatives abroad through numerous trips and meetings with foreign offices. In particular, trips to Asia have enabled it to formalise cooperation with Singapore and Indonesia, as well as an agreement for the launch of a microgrid demonstrator in the bay of Singapore.

Lastly, Enedis and ADEeF (Association of electricity distributors in France), performed a study on smart grid solutions in 2030, in order to assess costs and benefits for the region. This study gave rise to an initial assessment of smart grid solutions, particularly of the contribution of flexibility to the region's distribution network.

In Belgium, EDF Luminus is involved in a number of projects in Flanders and Wallonia:

- Smart city Genk: EDF Luminus performed a comprehensive audit of street lighting in Ghent, serving as the basis of the future lighting plan presented to residents in 2017, helping to reduce costs and improve comfort, through changes in the lighting system. In the long term, LEDs will be installed, thus reducing CO<sub>2</sub> emissions;
- Smart city Gand: EDF Luminus continues to expand its heating network project, with the connection of new sites;
- Smart City Liège: EDF Luminus is assisted by the Province of Liège in the development of public charging stations.

In Italy, Edison recently acquired Comat Energia Srl, which provides urban biomass heating solutions to villages. The business is geared towards the optimisation and promotion of local energy resources. Discussion with regions is also growing, thanks to strategic cooperative agreements with local and national stakeholders. For example, an agreement was signed with Politecnico di Torino for the creation of an "Energy Centre" and Master's degree in energy efficiency.

### 3.3.2 ADAPTING THE GROUP'S BUSINESS TO CLIMATE CHANGE <sup>(2)</sup>

Climate change has direct impacts on the physical conditions for performing the Group's activities, as well as indirect impacts such as changes in energy demand and the competitive environment. Since 2010, the EDF group has been implementing a climate change adaptation strategy which aims to provide a solution to the expected climatic conditions, in order to reduce or avoid their harmful effects and to seize the beneficial effects. This strategy, in the process of being revised, firstly concerns the involvement of the R&D services, to tailor the data required to model the future climate to anticipate impacts as well as solutions; on this basis, this then means anticipating the measures to be taken with regard to existing industrial facilities and for the design phases, as well as planning for the generation/consumption maximisation measures; it also means adapting internal know-how, as well as the products and services offered by the Group to its customers.

(1) Enedis is a fully independent subsidiary.

(2) The materiality matrix identifies the adaptation of infrastructure and operations to the consequences of climate change as one of its key priorities (materiality issue no. 19 Adaptation of infrastructure and operations to the consequences of climate change). This refers to the adaptation of infrastructure to natural disasters, climate change (particularly rising ocean temperatures and declining rainfall), or any major weather event, the scale of which is difficult to predict.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Meeting the challenges of climate change

The four main priorities, which focus on physical risks and transition in relation to climate change, are:

- assessing the current and future impacts of climate change on facilities and business activities;
- adapting the installations concerned to make them less sensitive to the expected climatic conditions and increase their resilience to the extreme changes and situations that are the most difficult to predict;
- taking into consideration future weather conditions in the facilities' design;
- adapting the Group's solutions, internal operations and know-how in light of climate change.

Through its R&D Department, EDF has methods and tools to model and alleviate the impacts of climate change and to anticipate the direction in which energy systems might evolve in a context of energy transition developments.

- In order to manage the physical risks of climate change, EDF created a "Climate Department" tasked with creating a database of expert and "ready-to-use" climate projections. Intended for Group managers and experts, this initiative helps implement the strategy throughout the Company. Furthermore, EDF launched a research programme on the robustness of nuclear and thermal power plant heat sinks in operation; this programme includes results obtained from assessments of water availability in the main French watersheds. Nuclear power plants have been designed to withstand extreme weather <sup>(1)</sup>;
- The Group has also launched research projects to anticipate the developments of energy systems, discover the decisive factors and constraints which they will face, identify the disruptive factors, and produce global energy market forecasts that guide the Company's strategy.

Adapting to the physical effects of climate change mainly concerns structures with a long life cycle: nuclear and thermal power plants, hydropower dams, hydrocarbon platforms at sea. As wind and solar power plants are intended to be operated for a shorter period (approx. 20 years), they are relatively unaffected, especially as they are lightweight facilities with easy-to-replace equipment. This means taking measures on existing assets and designing future assets by taking into account climate change.

In order to increase the efficiency of nuclear and thermal power plants when operating in hot and cold weather, refurbishment work (almost €400 million by 2019) is being carried out on French power plants. An important milestone was reached in 2017, involving the completion of the first phase of "extreme heat" modifications on the 900MW CP1 and CP2 units.

In order to provide hydropower facilities with stronger protection against extreme weather risks, some plants have been reinforced by installing spillways. This is the case of the Record Dam, the last EDF dam to benefit from the "Piano Key Weirs" spillway technology. This technology was developed by EDF's hydropower engineering and R&D divisions, in collaboration with HYDROCOOP, the École polytechnique fédérale de Lausanne and the University of Liège. On 2 December 2015, EDF received the Large Group Award for the "Adapting to the effects of climate change" category of the Climate Solutions Trophy.

In the United Kingdom, in addition to the Group's adaptation strategy, EDF Energy has reassessed its risks, and particularly those associated with increased air and sea temperatures, and the United Kingdom's national plan is incorporated within EDF's climate change adaptation plan.

In terms of design, for example, a potential increase in the level of the sea and oceans has been built into the design of the Group's new EPR nuclear power plants, thus factoring them in at the design phase of the most accurate and most recent future studies.

In its climate change adaptation plan, Enedis <sup>(2)</sup> has formalised the measures intended to reduce the vulnerability of networks (1.3 million kilometres in length) and shorten the time it takes to reconnect customers in the event of a power cut. It also covers risks of flooding and summer heatwaves. The plan essentially consists of putting high-voltage overhead lines underground to avoid risks of falling trees, wind, snow and frost, beginning with the most exposed and significant facilities for customer connection. Within this context, in 2017, Enedis took down 3,449 kilometres of high-voltage overhead lines, including 1,000 with known weather risk. Furthermore, 98% of new high-voltage networks are underground and 80% of new low-voltage networks use more discreet and reliable techniques.

In addition to this investment programme, the Rapid Intervention Electricity Task Force (Force d'Intervention Rapide Électricité – FIRE) was called upon following hurricanes Egon, KLM, Zeus and Irma. This task force has the ability to mobilise up to 2,000 people, 24 hours a day, seven days a week, both in France and abroad. In 2017, an innovative substation kit, ready in 96 hours (compared to nine months for reconstruction) was successfully tested in south-east France and now bolsters the range of FIRE solutions.

### 3.3.3 COMMITMENT AND TRANSPARENCY

As part of its CAP2030 strategy, EDF aims to be a responsible and efficient electricity company that champions low-carbon growth. EDF is committed to exceeding the requirements of the 2°C limit set forth in the Paris Agreement, and to maintaining its leading position amongst European companies that generate electricity using renewable energy sources. EDF therefore develops its strategy by taking climate change into account, in every respect.

In addition to its own commitments, for several years EDF has been involved in a number of voluntary corporate climate initiatives, such as complying with the Global Compact's Business Leadership Criteria for Carbon Pricing, or its contribution to the climate commitment made by French companies during COP 21. The Group's assessment in 2017 of the Science Based Target initiative also forms part of this commitment. Furthermore, the not-for-profit InfluenceMap lists EDF amongst the 16 most influential organisations in terms of climate policy <sup>(3)</sup>.

When the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) published its recommendations, on 29 June 2017, on voluntary disclosures of financial risks relating to climate change, for use by companies in their communications to investors, lenders, insurers, and other stakeholders, EDF was one of the first organisations worldwide to adopt the recommendations <sup>(4)</sup>.

EDF's financial and non-financial communication is already in line with the TCFD's key guidelines; with regards to the governance section of the TCFD's recommendations, information relating to the Board of Directors' approach <sup>(5)</sup> to risks and opportunities generated by climate change is specifically included, as well as a description of the role of management in the understanding and management thereof (see sections 2.2, 3.1.8 and 4.2); with regards to the strategy component, information relating to the description of the effects of climate change on EDF's strategy, climate-related risks and opportunities, as well as information relating to EDF's scenario-creation process are available in sections 1.3, 2.1, 1.6.2, 3.2, and 3.3; regarding risk management, information on the description of the Group's risk identification, assessment and management process (also including climate change risks, included in the Group's risk map reviewed by the Audit Committee of the Board of Directors), and on the description of the process for managing these risks, can be found in sections 2.2 and 3.1.8; lastly, information relating to the Group's existing indicators and objectives, in order to assess climate-related risks and opportunities, are available in the table of environmental indicators presented in sections 3.7 and 3.1.

(1) Such as flooding, fire, etc.

(2) Enedis is a fully independent subsidiary.

(3) The Carbon Policy Footprint Corporate impact on climate policy may be more important than physical emissions – introducing the 50 Most Influential, InfluenceMap September 2017.

(4) [https://www.fsb-tcfd.org/wp-content/uploads/2017/06/TCFD-Supporting-Companies-28\(28\)June-2017-final.pdf](https://www.fsb-tcfd.org/wp-content/uploads/2017/06/TCFD-Supporting-Companies-28(28)June-2017-final.pdf).

(5) Through its various Committees.

In order to further increase climate change transparency, over the next few years EDF will undertake a comprehensive alignment process of its climate change-related financial risk disclosures with the recommendations of the TCFD, in order to stay

up-to-date with the requirements of financial markets with regard to climate change-related risks.

## 3.4 OPTIMISING THE USE OF NATURAL RESOURCES AND PRESERVING THE ENVIRONMENT

### 3.4.1 A CIRCULAR ECONOMY PRINCIPLE

Against the backdrop of the scarcity of natural resources, the circular economy aims to respond to the increase in needs by uncoupling the use of these resources, and by breaking free from the linear industrial model of extraction – output – use – waste. It is a matter of reconciling growth, wellness and comfort with the planet's limits, in a logical extension of the principle of sustainable development. This is done through a number of levers of actions, such as repairing, re-using and recycling objects. The eco-design of products is also encouraged.

EDF pursues this approach. Electricity and heat generation is an industrial activity which requires means of generation that themselves result from a process of transformation of natural resources to build them, then operate them and manage their end of life. EDF's integrated industrial model: being a designer – builder – operator – decommissioner of its generation facilities, places the EDF group in a privileged position to contribute to the development of this new form of economy through eco-design, improving the yield and lifespan of its facilities and properly managing the materials and waste generated by their operation. Electricity is also a means of transforming economies through the development of new patterns of use which provide improved comfort while reducing the use of natural resources (electric mobility, new energy services).

In accordance with the requirements of the energy transition, the Group makes optimum use of reclaimed natural resources through its value chain – a central element of its corporate responsibility and has included this area in its sustainable development policy. It represents a very important expectation on the part of the Group's stakeholders, and its objective goes well beyond waste management alone<sup>(1)</sup>. The principles of the circular economy guide the Company's management<sup>(2)</sup>. We are carrying out concrete actions on the ground, particularly in the area of energy recovery within our processes or the processes of our customers, and also by promoting the reuse of our materials and equipment on our major construction or decommissioning sites (thermal and nuclear power plants) and as part of our waste processing activities like the manufacture of biological protection elements from metallic waste at SOCODEI. Eco-design becomes crucial in the engineering entities as seen in the consideration of the "design phase recommendations to facilitate decommissioning" during the definition of the basic design of future nuclear reactors. A dedicated group was set-up within the R&D Department which focuses its research on the promotion of resources by optimising the integration of local multi-energy systems, waste and soil management in a circular economy.

### 3.4.2 WATER

Global demand for energy and water is intensifying against a backdrop of climate change. The entire energy sector, from primary energy production to electricity generation, is entirely dependent on water. Water is needed to produce energy (with the exception of wind power and photovoltaic power); this is the quantitative aspect of water. For the qualitative aspect, the materiality matrix identifies water as a major material issue (issue no. 22 Management of milieu: soil and water pollution). This refers to the management of pollution and contamination risks that are likely to cause biological, physical and chemical changes in land and aquatic milieu, and to their effects on health.

As a network manager and major user of water, EDF must protect, manage and share water throughout the regions in which it operates by fully integrating the local dimension of water management. The EDF group has included "water" risk in its risk management policy. Each investment decision undergoes a detailed risk analysis, as well as an in-depth impact assessment.

#### 3.4.2.1 Water: a resource for energy production

Water is a fundamental element in energy production. Water power is the raw material that drives hydroelectric output. Water is also required for cooling thermal power plants and for the extraction and refinement of oil and gas products.

Hydroelectricity, and therefore water, also plays an important role in electricity systems. Large dams and pumped-storage hydro-power plants provide storage capacity for water which can be quickly transformed into electrical power. As such, large reservoirs still serve as the only form of large scale electricity storage today (14GW can be made available in around 10 minutes in France), which is indispensable during peak demand periods, for the development of intermittent renewable energy sources, and to cope with emergency situations in order to prevent blackouts. In 2017, the launch of the STEP project studies were validated in Sampolo in Corsica.

In France, EDF manages 7.5 billion cubic metres of water stored in its reservoirs (representing around 75% of the country's artificial reserves). At Group level, around 50 billion cubic metres of water (including sea water) are used for cooling thermal power facilities, of which 99% is returned virtually instantaneously to the natural environment; as such, EDF is a significant user, but negligible consumer, of water.

#### Controlling the use and consumption of water

The Group is committed to continuing to improve performance in terms of water withdrawal and consumption at existing power plants and to researching the most efficient way to use water across territories and major river basins.

The breakdown of the water used to cool the EDF's group's thermal power plants is 53% saltwater, 34% freshwater and 13% brackish water. In France, this consists of 44% saltwater, 40% freshwater and 16% brackish water.

Exposure of the Group's generation resources to water stress has been assessed and controlled. Most of the water withdrawal from its facilities is carried out in France (77%) and the UK (18%) in areas where there is no permanent water stress; the nuclear and thermal facilities are mainly established in coastal locations and therefore do not use fresh water. Moreover, in situations where a specific, potential risk has been identified, suitable measures have been taken either during design or operation. Therefore, the Lunax reservoir was constructed from the outset upstream of the Golfech nuclear plant to overcome a possible water shortage from the Garonne used for its cooling in periods of serious drought. Accessibility to water for generation needs is therefore ensured even under special, or even extreme conditions. Particular attention is paid to water stress when screening any new project presented to the Group Executive Committee's Commitments Committee (CECEG).

(1) Note that with regard to food waste, as mentioned by the Decree of 19 August 2016 in application of Article L. 225-01 of the French Commercial Code, EDF may be concerned for example through employee canteens; their management is mainly entrusted to the EDF CVC and at this juncture, EDF does not consider this information as being material.

(2) The circular economy is one of the new requirements of ISO 14001 which is used as the basis for on the ground management action.

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Optimising the use of natural resources and preserving the environment

Worldwide, 66% of the water withdrawn for cooling purposes by the Group comes from marine or estuary environments, where resource availability is not an issue. This percentage rises to almost 59% in France, over 99% in the United Kingdom and close to 92% in Italy.

This data on water abstraction is down by 4%, notably due to a reduction in nuclear thermal generation in France and the increase in generation from combined-cycle gas turbine power plants. Taking account of expected changes in the fleet, freshwater withdrawals and consumption, which were stable, will decrease in future years.

#### WATER WITHDRAWN AND RETURNED BY THE GROUP

(in billions of cubic metres)

	2017	2016	2015
Cooling water withdrawn	47.6	47.4	49.3
of which fresh water	16.0	16.2	18.3
of which brackish (or estuary) water	6.4	6.1	5.2
Cooling water returned	47.0	46.8	48.7
of which fresh water	15.5	15.7	17.8
of which brackish (or estuary) water	6.4	6.1	5.2
Evaporated water <sup>(1)</sup>	0.54	0.54	0.60

(1) Water consumed.

Please note that the quantity of freshwater sourced from groundwater is marginal, about 0.004% of the freshwater is obtained from the surface.

France is witnessing a fall in the temperature sensitivity of its thermal plants as old coal- or oil-fired plants near rivers are shut down (such as the Aramon plant which was closed in 2016). New thermal power stations are now built by the sea (Martigues CCGT plant), or equipped with air cooling (Blénod 5 and industrial commissioning of the high performance Bouchain CCGT plant), which reduces their dependence on water.

Almost 99% of water withdrawn is returned to the environment. In accordance with local discharge regulations, the Group's companies take the necessary measures to comply with water quality and temperature requirements, and take immediate corrective action in the event of non-compliance.

Specific consumption of evaporated water per kilowatt-hour of electricity generated by the Group's fossil fuel-fired, gas and nuclear power plants is 1.03 l/kWh. The use of open circuits and the use of seawater in certain power plants means that these values are well below the average for the sector, as shown in the scientific literature, from 1.8 to 2.8 l/kWh according to the IAEA <sup>(1)</sup>.

(in l/kWh)

	2017	2016	2015
Water consumed/thermal generation	1.03	1.03	1.06

By integrating renewable energy generation that does not consume any water, the specific ratio can even be reduced to 0.94 l/kWh.

In terms of water quality, EDF reviews the results of the monitoring of various parameters concerning water on a monthly basis. This is done by EDF laboratories, all accredited by the ASN, specialising in the environment surrounding nuclear power plants. Each of them is able to stop the discharge or pumping of water at their own plant.

#### Examples of water consumption reduction and withdrawal limitation measures

The EDF group works in a number of ways to optimise its water usage and to reduce pressure on the environment:

- research into the most efficient way to use water across regions and major river basins
- reducing water consumption with cooling systems adapted to the geographical area and the water resources available on site:
  - thermal power plants with open circuit cooling: withdrawal of 150 to 180 l/kWh and negligible water consumption (close to 0.1 l/kWh);
  - thermal power plants with closed circuit cooling due to less abundant water resources: lower water withdrawal (6 to 8 l/kWh) than an open circuit but with higher water consumption through evaporation via an air cooling tower (2 to 3 l/kWh);
  - thermal power plants with cooling via dry air cooling systems with air instead of water (leading to deteriorated efficiency of the facility). In French overseas departments, where EDF is investing in new thermal power stations, R&D teams have designed dry air cooling systems for engine cooling, which reduce water withdrawal by 700,000 cubic metres per year per power plant (equivalent to the annual water consumption of a town

with approx. 10,000 inhabitants). Now, EDF PEI's power plants are no longer cooled with saltwater;

- limiting withdrawals of freshwater by recycling the water as part of the process or by desalinating sea water;
- the contribution of research programmes, in-house R&D in particular.

In Belgium, EDF Luminus has modified the operating instructions for Seraing's auxiliary water pumps during a certain period of the year (from April to October during the non-strategic reserve period) from 24/7 to 2x1h/day. This action led to a 90% decrease in the consumption of water from the river in 2017 and also a significant reduction in water taxes paid for this plant.

The installation of a "chilled water" unit to cool the compressors of two climatic chambers on EDF's TEGG site was tested in 2017. Previously, these climatic chambers were cooled by a filtered water network consuming about 100 m<sup>3</sup>/day. During the hot summer months of July 2017, the chilled water unit, commissioned in April 2017, saved 3,000 m<sup>3</sup> of water.

In China, the implementation of a new river water intake (Yellow River water station) for the Shiheng thermal power plant reduced the consumption of water previously pumped from the water table by 11m<sup>3</sup> per year.

In France, EDF is committed to reducing its consumption of drinking water across its entire real estate portfolio and in its green spaces by 5% per year until 2020 for its 137 sites operating with automatic remote-read meters. Specific measures have been implemented and even if the volumes are much lower than those of the generation facilities, it shows our will, at all levels of the Company are contributing to the preservation of this essential resource.

In 2017, the -5% reduction target was achieved and actually exceeded with a saving of 6% compared to 2016. Remote measurement was the main reason why the target was achieved in 2017, since it enabled action to be taken earlier on any leaks detected, leading to a significant reduction in consumption.

(1) Extract from : "Efficient water management in water cooled reactors, International Atomic Energy Agency, 2012".



**Recycling water**

Water recycling is an important topic and there are numerous challenges to be met. In June 2017, the World Business Council for Sustainable Development (WBCSD) published the “Business guide for the circular management of water resources” under the guidance of the EDF group and Arcadis. Objective: to highlight the “5 R” approach – reduce, restore, reuse, recover, recycle – this blue gold, by not limiting itself to the industrial sites themselves, but more broadly to a collective action within the same region.

The recycling of process and cooling water is growing throughout the Group, where appropriate. In Brazil, the EDF thermal power plant, Norte Fluminense, installed a system for the recovery and use of rainwater a few years ago, enabling it to reduce its annual withdrawals from rivers by 2%. In Italy, treated waste water from certain power plants is reused, resulting in a 1% saving in overall withdrawals. In some cases, the supply of part of the water from the heated cooling circuit of certain nuclear power plants for different uses (agricultural, industrial, etc.) is authorised within the framework of precise regulatory requirements. In France, EDF’s thermal power plants in Cordemais and Martigues recover rainwater or recycle their effluents so as to reduce their consumption of tap water, resulting in a saving of 150,000 cubic metres of water out of the 300,000 cubic metres previously consumed. In 2017 in Guadeloupe, rainwater recovery tanks were installed to reduce water withdrawals.

**Desalinating water**

The Martigues plant is also running a pilot project for sea water desalination, as is the EPR Flamanville 3 site, where the installation of a desalination unit is in progress to complete the means of producing demineralised water for the process. In southern Corsica, EDF has designed the cold water source for a thermal power plant by installing a sea water inlet, which reduces the consumption of fresh water significantly. In Guadeloupe, the TAC power plant in Jarry Sud also has a sea water desalination facility, which has made it possible to stop using tap water and save around 50,000 m<sup>3</sup> of fresh water per year. At the end of 2016, Edison had one CCGT plant (Simeri Crichi) in Italy with sea water desalination systems to replace their freshwater withdrawal.

As part of the EPR NM demineralisation station studies, for a site with already existing units, the water use of a neighbouring WWTP, the reuse of rainwater and the use of mobile desalination as a complementary source of water is being studied for the consumption of tranches (EPR NM) to reduce the impact on the withdrawal of freshwater and to target, as much as possible, a level of withdrawal remaining within the withdrawal permits for the site.

**Innovating for sustainable water use**

The new Group SD policy includes a water requirement: “Managing water in an integrated, inclusive and sustainable manner” and results in a specific indicator: “Each energy generation site shall plan, evaluate and report the sustainability of its water use using an internal EDF method (pending a recognised international method)”. Since the existing methodologies for calculating water footprint were not appropriate or relevant to the energy sector, the EDF group led work between 2012 and 2015 to develop specific terminology and a methodological framework that is consistent with the characteristics of the energy sector as part of the World Water Forum. Following these developments, EDF launched an internal 3-year project at the end of 2016, involving the principal Group entities, called SUREAU for “Soutenabilité de nos Usages de la Ressource en Eau” (Sustainability of our Uses of Water Resources). This project aims to propose a profile of indicators of sustainability for our water uses to feed into dialogue with local stakeholders. These indicators are to be adapted to the context, and can range from a development level to a set of developments, from a sub-basin to a river basin.

**3.4.2.2 Water and climate**

Water is core to the implications of climate change: as a resource, it is one of the most vulnerable to climate disturbances whilst also being a risk factor for regions and their inhabitants in view of the increasing frequency and intensity of extreme climate events, such as flooding and drought. Climate change will have a material

impact on the availability, quantity, distribution and location of water resources and will exacerbate competition among different users of water.

Accordingly, EDF has had a permanent system in place for many years for monitoring meteorological phenomena and their impact on the sources from which it collects water (subterranean groundwater, rivers or the sea). Continuous data analysis makes it possible to predict and monitor risky hydro-meteorological phenomena. The teams responsible for the monitoring and forecasts work seven days a week, 24 hours a day.

In France, 2017 will remain a year with aggregate (water) shortage in most of the months of the year (with the exception of March) with deterioration from January, worsening gradually from April and especially in the autumn, when there were severe low water conditions over a large part of the south (and the Rhône basin in particular). The water shortage (France aggregate) is estimated at about 20% over the year and places 2017 as the 5<sup>th</sup> driest year since 1948.

2017 was also marked by an exceptional level of drought in Corsica (Prefectural Orders for limiting water consumption). Despite strong pressure on various uses, close management of the reserves allowed EDF’s hydropower generation to reach 86% of the generation capability at the end of November and the heavy December rains allowed full capacity storage in reservoirs at the end of the year.

It must be noted that poor flows from the Rhône obliged EDF to ensure a flow  $\geq 60$  m<sup>3</sup>/s in the Miribel canal for 340 days (a necessary measure to support the water table for Drinking Water Supply). Since this overflow happened at the Lons dam due to a discharge of 30 m<sup>3</sup>/s, the production loss is estimated at approximately 20GWh over the year.

A new auxiliary water intake was constructed at the Norte Fluminense thermal power plant in Brazil to cope with a continuous decline in water levels over the past 12 years in the Macae River where water is withdrawn for cooling the plant.

**3.4.2.3 Governance and water sharing**

**Governance**

The optimisation of water used in EDF’s generation activities is vital to ensure management of water resources and, in particular, to honour our commitment to guarantee multi-purpose water resources (drinking water, water for irrigation, tourism, etc.) and the needs of local authorities.

EDF is represented at meetings of each of the river basin authorities (the Water Agencies’ reservoir Committees) by a basin coordination delegate. The new master plans for water development and management (SDAGEs) for the period 2016-2021, drawn up under the aegis of the River Basin Committees, were validated in each basin at the beginning of 2017. EDF’s actions are fully engaged within this new framework.

**Water management and sharing**

To cope with the particular climatic situation described above, various levers were activated within EDF to both optimise production and meet the expectations of other stakeholders (including water releases to preserve the fish population in the lower Ain Valley). This represents 911 hm<sup>3</sup> of volumes removed from storage, including 341 hm<sup>3</sup> for internal optimisation and 570 hm<sup>3</sup> to meet external demands in the context of the specifications of hydropower concessions or agreements. Two hydropower plant reservoirs were under special management between end July and end August (Serre-Ponçon, Vouglans) to address the obligations with regard to multi-purpose water resources.

Production losses due to environmental constraints, related to temperatures and/or river flows, are slightly lower than those of 2015 (year relatively similar with a hydrological deficit of 20% also).

Overall, and despite difficult weather conditions, EDF was able to meet its commitments to stakeholders in terms of low-water replenishment and agricultural support, as well those concerning flow rate restitution or observance of water levels for tourist related purposes.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Optimising the use of natural resources and preserving the environment

### Creating local value

The Group is committed to creating local value in all of its electricity generation projects, to preserving water resources and to assessing the sustainability of its hydroelectric projects by drawing on the Sustainability protocol of the International Hydropower Association (IHA) which came into force in 2017, through:

- the continued application of the IHA protocol and the active contribution to the biennial international conference of the IHA in May 2017 in Ethiopia;
- the application, in France, of the "One river, one region" programme, with the participation of seven branches; The creation of a new agency is being studied in French Guyana;
- Presentation at World Water Week held in Stockholm in 2017 of EDF's work and commitment in the areas of water and climate;
- Contribution to the first COP 23 Water Day with the PFE (French partnership for water).

### 3.4.3 SOIL POLLUTION

The materiality matrix identifies soil pollution among the most material issues (issue no. 22 Management of milieux: soil and water pollution). This refers to the management of pollution and contamination risks that are likely to cause biological, physical and chemical changes in land and aquatic milieux, and to their effects on health.

As part of its industrial and tertiary activities, the Group owns, or uses under concession, large land assets. This is why the environmental policies of the various Group entities aim to optimise the use of this land and protect soil and groundwater against any impact. The use of soil is the subject of a detailed description of actions related to biodiversity (see section 3.4.5 "Management of biodiversity and protection of environmental capital").

#### 3.4.3.1 Preventing impacts

The prevention of impacts is based on an "in-depth defence" approach. The following protection methods are in place at all industrial sites, specifically:

- maintaining the integrity of means of protection to provide a barrier between circuits containing or carrying radioactive or chemical substances and the environment;
- control of operations, management of effluents, their transfer and storage prior to release;
- maintaining and inspecting ultimate structures such as sumps, retention systems, unloading areas and pipes;
- ensuring that the soil surface remains free from radiological and/or chemical contamination at industrial sites;
- monitoring the physico-chemical and/or radiological properties of groundwater directly beneath sites;
- building retention tanks at storage sites for products and materials that could pollute the soil;
- reinforcing safeguards when transporting fuel or waste (suitable containers);
- ensuring the availability of emergency kits in the event of spillages and carrying out the corresponding drills;
- developing operational procedures and high levels of awareness among operators and service providers through suitable training.

The Sustainable Development Policy adopted at Group level stipulates that for each activity presenting a risk of pollution, a soil and groundwater management approach including pollution prevention must be launched before 2019.

#### 3.4.3.2 Optimising soil use

The Group's industrial activities may entail some localised soil pollution. Action plans are in place to control these situations across all of the Group's sites. They consist of four stages: site surveys; identification of those that are potentially polluted; soil analysis on potentially polluted sites (sensitive areas first); introducing a monitoring system for sources of pollution and drawing up a management plan, and considering possible remediation depending on future use and regulatory requirements. In 2017, several studies were produced related to the preparation of baseline reports in response to the European IED Directive: they are in Phase II for Cordemais, Brennilis, Vaires and Phase I for Le Havre, Arrighi, Dirinon, Gennevilliers, Montereau, Blénod, Bouchain and Martigues, as well as for the IES and PEI sites, with no discovery of any significant contamination. The "soil background" surveys have also been completed at the Paluel, Saint Alban and Flamanville nuclear sites, on all the sites of SOFILO and at EDF Luminus (Monsin, Ringvaart and Ham). As part of the safety re-assessments, the Cattenom, Saint Alban and Paluel soil condition was assessed and did not show any significant marking. Soil cleaning actions are in progress and have already been completed at EDF Luminus (Monsin), in the Nuclear Generation Division (Chinon, Flamanville, Blayais) and the Real Estate Division (Cahors, Villers Semeuse, Marc en Bareuil, Saint Malo and Buzancay).

To reduce the probability of pollution, the Group uses its considerable synergies to replace hazardous products with products that are less harmful to the environment and public health, where this is technically feasible. With this in mind, EDF SA, Enedis and Électricité de Strasbourg are continuing with their programmes to decontaminate equipment containing PCBs<sup>(1)</sup> and PCTs<sup>(2)</sup> of more than 50 ppm. These action plans continued in 2017 are on target. Approximately 8,000 devices polluted with more than 50 ppm of PCB will have been decontaminated or eliminated by Enedis in 2017 in line with the 50% target at 31/12/2019 and total elimination at 31/12/2025. EDF R&D, EDF IES, EDF PEI, SOCODEI, DALKA and the thermal generation sites no longer have any equipment surpassing the threshold.

Furthermore, action plans are underway to limit exposure to phytosanitary products (e.g. zero phytosanitary product project at the Mediterranean generation unit of EDF's Hydropower Generation Division which is being developed in the other hydropower units). The DIG has set a target of "zero phytosanitary products" by 2020 across the 640 service sites with green spaces. At end September 2017, the 2017 target of 535 sites was achieved in line with the progress envisaged for this plan. These action plans are based on alternatives to the use of chemical (mechanical, thermal or other) herbicides, vegetation management protocols for EDF EN (non-use of pesticides, differentiated management of vegetation, sheep, etc.) as well as on rules relating to companies in charge of maintaining their green spaces, with the long term goal of abandoning the use of phytosanitary products altogether. They are accompanied by a training and awareness-raising programme. Some entities no longer use these products (EDISON, EDF Luminus, Norte Fluminense, DIPNN). ÉS has abandoned all glyphosate-based products.

#### 3.4.4 AIR<sup>(3)</sup>

The materiality matrix identifies air quality among its material issues (issue no. 23 Air quality). This refers to the management of air pollution from the Group's facilities (SO<sub>x</sub>, NO<sub>x</sub>, fine particles, toxins, etc.), and their effects on health.

The use of electricity has the advantage of not polluting the atmosphere; however, as part of its activities, the Group may have an impact on air quality. This is mainly the case where electricity generation is concerned, while its impact on air quality varies according to the generation facility in question. Significant investments have therefore been made to the EDF group's thermal power plants, coal-fired in particular, to limit their emissions of atmospheric pollutants. EDF SA is engaged in a process of gradual closure of its thermal power plants. 3,800MW capacity from fuel-fired power plants were closed in 2017.

(1) PCBs: polychlorinated biphenyls.

(2) PCTs: polychlorinated terphenyls.

(3) Air emissions, excluding CO<sub>2</sub> emissions.

<i>SO<sub>2</sub> and NO<sub>x</sub> emissions due to heat and electricity generation (kt)</i>	2017		2016			2015	
	SO <sub>2</sub>	NO <sub>x</sub>	SO <sub>2</sub>	NO <sub>x</sub>	SO <sub>2</sub>	NO <sub>x</sub>	
EDF group	31	63	37	60	70	92	
EDF	6	18	5	15	13	20	

Thermal fuel-fired power plants emit pollutants such as Sodium Oxides (SO<sub>2</sub>), Nitrogen Oxides (NO<sub>x</sub>), or dusts. Faced with an increase in environmental concerns and regulatory constraints, particularly in Europe with the IED (Industrial Emissions Directive) entering into force on 1 January 2016, all Group companies must improve the performance of their power plants. These improvements relate to dust extraction, desulfurisation and flue gas de-nitrification systems, by promoting the use of more efficient technologies and selecting less polluting fuels, even changing from coal to fuel oil and/or gas, which is cleaner.

In the island systems, recent facilities or those under construction are equipped with de-nitrification systems. The plan for modernising the thermal IES plants reduces CO<sub>2</sub> emissions: new generation diesel engines that reduce fuel consumption are systematically installed during the total or partial replacement of power plants, as well as for fuel turbines.

In Italy, Edison's thermal installed base constitutes CCGT power plants offering technology with the lowest emissions. In the United Kingdom, the Group has been operating 1,290MW of CCGT since 2013. The start of work at the Hinkley Point power plant is part of the strategy to reduce air pollution. As far as the facilities in Poland are concerned, the thermal power plants are particularly affected by pollutant emissions in the air. Most of EDF Polska's boilers are now equipped with low NO<sub>x</sub> emissions burners. In anticipation of the European Directive on industrial emissions, EDF Polska is fitting its co-generation units in Krakow, Kogeneracja, Gdansk and Gdynia with desulfurisation systems, and has launched a de-nitrification programme for its facilities. In Poland, EC Zielona Góra completed the modernisation of its power plant in 2013 and substituted coal with gas. All the facilities in Poland were sold in 2017.

The Group is also active in this field of research. In France, the Demeter project provides support for the renovation of coal units at Cordemais and Le Havre (the last remaining coal-fired power plants of the Group in France), so as to optimise the performance of its facilities in terms of pollution abatement (SO<sub>2</sub>, NO<sub>x</sub> and dusts). In Poland, the "Flexibility of coal-fired units" project will shortly be implemented. The aim of this project is to improve the energy and environmental performance of power plants in a market that has become more flexible thanks to advances in renewable and intermittent energies. The questions relate to the ability of pollution abatement systems to withstand a drop in the minimum technical threshold, wide variation in loads and more frequent outages and start-ups.

Enedis<sup>(1)</sup> aims to reduce its direct greenhouse gas emissions by controlling SF<sub>6</sub> emissions and reducing fuel consumption (optimisation of kilometres traveled, significant reduction of customer interventions after the deployment of Linky, deployment of electric vehicles as part of the ecoflot project)

For SF<sub>6</sub>, which accounts for less than 20% of its direct emissions, Enedis is seeking alternatives with builders to develop greenhouse gases with identical properties.

Numerous drone experiments will lead to a lower use of helicopters for line monitoring with a reduction in CO<sub>2</sub> emissions.

(1) Enedis is a fully independent subsidiary.

### 3.4.5 MANAGEMENT OF BIODIVERSITY AND PROTECTION OF ENVIRONMENTAL CAPITAL



The materiality matrix identifies the management of biodiversity among its material issues (issue no. 21 Biodiversity management and protection of environmental capital). This refers to the practices implemented to protect and enhance the biodiversity present at the location of the activity.

Biodiversity, aquatic or terrestrial, represents a common universal heritage. Industrial companies depend on biodiversity to undertake their business but this has an impact on this same biodiversity, for example, during the phases of building structures but also during operations, maintenance, and dismantling said structures. The EDF group has been addressing these issues for over 50 years. It began by looking at hydro-ecology before moving on to biodiversity. In France, EDF owns 41,000 hectares of land on the mainland and 20,000 hectares in the overseas departments, as well as close to 50,000 hectares of water reservoirs. It is an opportunity to make a positive contribution to biodiversity. Biodiversity constitutes an economic priority for the Group; if local biodiversity is not adequately or sufficiently taken into account this can lead to construction sites coming to a halt and output being interrupted or result in delaying or preventing the launch of new industrial programmes, while the identification and internalisation by the Company of services rendered by nature, contributed towards ensuring the sustainability of its economic model.

#### 3.4.5.1 EDF group's biodiversity commitment (G4 DMA indicator – GRI 103)

Corporate Social Responsibility Goals no. 6 (CSRG 6): to launch a positive approach to biodiversity, not limited to understanding and reducing the impacts of our activities in the long run but having a positive effect on biodiversity.

Biodiversity is one of the areas in which EDF has chosen to become involved through Corporate Social Responsibility Goals (CSRG). Goal no. 6, committed to for the whole Group, concerns the entire life cycle of the installations, from the project study stage, construction and operation through to the end of the life of installations; it spans the whole length of the value chain, including procurement policies and relationships with suppliers and sub-contractors.

To meet this objective, EDF asked the World Conservation Monitoring Center to assess the ecological sensitivity of the natural spaces located in or near its production sites. Ongoing study.

Moreover, this commitment is part of the ISO 14001 certified Environmental Management System (EMS). It is structured on the basis of three goals:

- developing knowledge of natural environments and the potential impact of Group activities on these ecosystems;
- preserving biodiversity, while protecting or restoring natural spaces;
- informing employees and local residents, raising awareness, and dialogue with scientific communities and associations.

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It is implemented in the Group's entities and subsidiaries in a manner tailored to their activities, and in compliance with local regulations. Biodiversity contacts have been named in each of the Group's lines of business. Cross-functional management ensures the sharing and consistency of the entire approach. EDF SA is committed to the French National Strategy for Biodiversity over the 2014-2017 period. EDF's proactive commitment towards protecting biodiversity, developed with its partners, has resulted in a major focus and concrete actions implemented in favour of biodiversity for the 2014-2017 period. Its goal is to contribute to slowing down biodiversity erosion and support local movements. This commitment has been recognised by the National Strategy for Biodiversity (SNB) Committee of the Ministry in charge of Ecology; a first report was sent to it in October 2016 while awaiting the final report in 2018.

EDF Energy meets the Wildlife Trusts' Biodiversity Benchmark.

EDF considers partnerships, training and R&D as major levers of the success of its commitment in terms of biodiversity.

##### Partnerships

- In France, the Company's historic partners are given priority with the major players in the sector: National Natural History Museum (MNHN), League for the Protection of Birds (LPO), Nature Reserves of France (RNF), French Committee of the International Union for Nature Conservation (IUCN), Federation of National Botanical Conservation Bodies (FCBN), Federation of Natural Site Conservation Bodies (FCEN), Coastal Conservation Agency. In total, EDF has forged over 100 partnerships with not-for-profit organisations or research organisations such as the National Institute for Scientific and Technological Research for the Environment and Agriculture (Istrea) and Ifremer (French Research Institute for Exploitation of the Sea). Locally, numerous partnerships aim to help the sites in their approach conducted in favour of biodiversity;
- The partnership with the National Federation of Fishing in France (FNPF) continues through the financing and management of actions in favour of aquatic environments (1 framework agreement and nearly 50 local agreements with departmental federations);
- These partners meet regularly in seminars in order to maintain a collective momentum in support of EDF's biodiversity approach. In 2017, a seminar on the topic "Biodiversity and Climate Change" was organised with Natural Reserves of France and the French Federation of Natural Areas Conservatories from the perspective of sharing scientific knowledge and feedback from managers;
- In the UK, for more than 20 years, EDF Energy has worked in partnership with the Suffolk Wildlife Trust at Sizewell and the Natural England Wildlife Trust;
- EDF has regular discussions and enjoys close relationships with think tanks like OREE, EPE, CILB or the Business & Biodiversity Offsets Programme (BBOP).

##### Training:

Training and raising awareness of the Company's employees are important levers for progress with regard to taking into account biodiversity issues challenges across the whole value chain. In France, eight business guides have been published, written in a manner which very closely reflects the biodiversity issues and challenges specific to each operational activity. Training and raising awareness of the Company's employees are important levers for progress with regard to taking into account biodiversity issues challenges across the whole value chain. Several training or internal awareness courses on biodiversity in conjunction with partners are proposed to employees (e.g. 2017: awareness on invasive species, biodiversity in general, actions in favour of protected species on-site). In 2017, 86 employees took these training courses.

##### R&D:

The Group is conducting a research programme concerning the interaction of its activities with the environment. Among the research projects conducted, the programmes concerning terrestrial technology and ecosystem services as well as hydro-ecology involve 25 researchers and technicians. EDF has undertaken to:

- assess the ecological value of the Company's land and take it into account in industrial decision-making;
- understand and reduce the impacts of generation on aquatic and terrestrial biodiversity;
- improve the practices of environmental mitigation and the consideration of interactions between ecosystem services and the Company's activities;
- identify solutions for restoring and re-establishing the ecological continuity (sediment and fish) of watercourses.

#### 3.4.5.2 Issues related to site location (indicators G4 EN 11 and EN 14 – Disclosure 304-1 and 304-4)

Special attention is given to ensure that the activities carried out on the sites do not harm these spaces with high biodiversity value. In deed, the vast majority of EDF production sites are located close to or within protected sites (in France, 80% of hydropower sites are situated in or near a Natura 2000 site). These sites are preserved from agriculture and urbanisation and are located close to watercourses. These factors foster biodiversity. Consequently, these sites also represent opportunities for implementing ecological management to foster biodiversity.

In France, a Geographical Information System (GIS) is presently being deployed on the mainland and in the overseas departments. To date, EDF has assessed the ecological quality of more than 60% of its land. The company has developed an Ecological Potentiality Indicator (EPI) in conjunction with the National Natural History Museum intended to be deployed on a large scale to monitor the ecological state of the Company's land. For example, this method has already been implemented on 22,000 hectares of land for hydropower (i.e. 64% of the land to be analysed).

In the UK, EDF Energy has carried out surveys concerning all of its land (1,450 ha). In 2017, update of the integrated management plans for the Heysham and Hinkley sites and the plan produced for the Dungeness Estate site.

During the beginning and design phases of the projects, the environmental issues, including diversity, are integrated throughout the engineering process. In Brazil, on the Sinop project, an environmental and social (E&S) management plan has been set up, comprised of several plans and management programmes (33), including fauna and flora protection measures, in addition to a management plan for a protected area around the whole reservoir. Concerning Nachtigal (Cameroon), the project was the subject of a first E&S study in 2006, updated in 2011. Additional biodiversity studies were conducted in 2014 and 2015 to complete these impact studies and enable the drafting of an in-depth operational E&S Management Plan and a Biodiversity Action Plan carried in 2016. Then, specific plans detailing the strategy of offsetting (fish) and support (endemic species of aquatic flora) measures were also implemented in 2017. According to these plans, further studies (including a thesis) are in progress in order to enhance knowledge of the species of fish and aquatic flora and to put forward effective reduction and mitigation measures in respect of the project. For all the sensitive aspects, measures to avoid, reduce and offset impacts have been developed and are included in the E&S Management Plan and Biodiversity Action Plan.

Certain sites of the Group present bigger challenges in terms of biodiversity, including <sup>(1)</sup>:

- its sites situated in or near (less than 5km) a protected area or an area rich in biodiversity (indicator G4 EN 11);

**G4-EN 11: NUMBER OF SITES SITUATED IN OR NEAR A PROTECTED AREA OR AN AREA RICH IN BIODIVERSITY (2016 TABLE).**

Protected area category according to the IUCN	France		UK
	Mainland (incl. Corsica)	Overseas dept.	
I	34	8	0
II	18	16	0
III	190	3	1
IV	79	16	10
V	142	4	2
VI	0	0	0
Natura 2000	310	0	5
Areas rich in biodiversity	532	24	5

- its sites hosting species threatened by extinction (indicator G4 EN 14) <sup>(2)</sup>

**G4-EN14: NUMBER OF THREATENED SPECIES SITUATED IN MUNICIPALITIES WHERE EDF IS LOCATED**

	IUCN categories of threatened species					
	Global red list			Regional red list		
	CR	EN	VU	CR	EN	VU
Mainland France	5	24	53	32	93	253
Overseas Departments & French Islands	18	23	47	45	102	179

**3.4.5.3 Impact management and impact management (indicator G4 EN 12 – Disclosure 304-2)**

In general, the potential impacts of the EDF group’s generation activities mainly concern:

- water and aquatic biodiversity, largely as a result of:
  - hydraulic generation structures (close to 450 power plants and 900 dams and water intakes), which bring about modifications of the biodiversity upstream of the structures in the event of flood defence, and downstream, due to the fragmentation of areas and flow limitations or variations;
  - thermal structures, to a lesser extent.
- to address the degradation and fragmentation of natural terrestrial habitats, due to the land occupied by the existing sites or projects, as well as part of new projects, EDF seeks to reduce the footprint to the minimum and in the case of decommissioning to restore the natural environment. For DPIT, the systematically mapped natural spaces are an input for new projects. Avoidance and compactness are systematically sought when installing facilities. When the facilities are decommissioned, the spaces released are subject to a management plan adapted according to their end use;
- the fauna, flora and natural habitats which are particularly impacted by building sites or maintenance work;
- overhead transmission systems and wind turbines, which pose a threat to birds and bats.

Impact studies enabling the effects on biodiversity to be measured are conducted and documented for projects fulfilling the criteria set out in Article R. 122-2 of the French Environment Code. This involves the fragmentation of ecosystems due to infrastructures, impacts on population dynamics, soil erosion, etc. In order to better assess the threats and opportunities related to the impacts and dependency of the

Company’s activity on ecosystems, EDF is trialling, in each line of business, the Ecosystem Services Review (ESR) method <sup>(3)</sup>.

Similar processes are also performed at facilities in operation. Their impacts on the environment and biodiversity are the subject of monitoring conducted by public bodies (Ifremer, IRSN, Irstea, AFB/Onema). The results are published and are accessible.

By way of example:

- in hydroelectric activities in France: between 2013 and end 2017, almost 120 fish and/or sediment diagnostic projects were conducted to identify the continuity challenges site by site. With regard to fish, 36 fish passes or levelings have been implemented on the sites at risk (classification List 2 <sup>(4)</sup>, Rhine, etc.). In 2017, 5 sites were adapted, and other sites are in the process of being commissioned in 2018, including the Gerstheim-sur-le-Rhin fish pass. On the sediment side, we can mention a national approach to find ways of recovering sediments stored in the reservoirs, with, among other things, the implementation of a full scale agronomic experiment in connection with the emptying of Mont-Cenis. As far as the terrestrial environment is concerned, since 2016-2017, forests are being monitored through the setting-up of a sentinel network of plots across various sites and monitored and integrated into their networks of sites by the partners of RNF and CEN;
- EDF Luminus has started an ambitious programme aiming to reduce mortality of migratory fish due to hydropower turbines. Supported by the European Life Programme and with an overall budget of €4.2 million, the objective of the programme is to model migratory routes, putting in place repelling systems such as electrical barriers or bubble curtains and specially adapted systems to make fish passage easier. At the same time, the programme aims to design turbines which have very low impact on migratory fish, with a test on the Monsin site;

(1) EN 14 was the scope of activity of EDF SA.

(2) EN 11 was the scope of activity of EDF SA and EDF Energy.

(3) Method developed by the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

(4) Classification of List 2: Article L. 214-17 of the French Environment Code introduces two lists of watercourses ranked in terms of ecological continuity. List 2 includes all the watercourses in respect of which it is necessary, in terms of all structures impeding continuity, to ensure or re-establish the free movement of migratory fish and the transit of sediment in accordance with an imposed regulatory period of time.

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Optimising the use of natural resources and preserving the environment

- EDF Energy continues to implement off-site eel conservation measures in response to the 2009 Eel regulation. In 2017, the connection of a 150 acre nursery area for eels to the sea (Fruitton Lake in Norfolk);
- Edison is undertaking two projects in this field: the “Mosselmonitor” Project on the Rospo offshore oil platform in the Adriatic Sea, where mussels are being used as bio-indicators of water quality and pollution prevention; and the “Biovega” programme, consisting of analysing biodiversity around the Vega oil platform;
- in distribution activities: on the mainland, 45% of the HVA and LV grids have been buried underground by Enedis in areas operated by it. However, 98% of the new HVA lines are underground and 100% of the LV lines use underground or discrete technology.

EDF Énergies Nouvelles stopped the construction of its Arada/Montemurro wind farm site in Portugal between March and September so as not to disturb the breeding period of wolves. In the UK, restoration and improvement of habitats in peatland areas on the Corriemoullie wind farm site.

#### 3.4.5.4 Offsetting measures (indicator G4 EU 13)

The Group applies the principles of mitigation hierarchy<sup>(1)</sup>, for which the French variation is the “prevent, reduce and offset” approach, further reinforced in France by the Biodiversity Law of 2016<sup>(2)</sup>. This law notably requires the transfer of raw biodiversity data from impact studies to the Natural Heritage Inventory (IPN) from 1 January 2018. Within the scope of its relations with the French Natural History Museum, EDF has already anticipated this obligation.

The impacts on biodiversity are taken into account across the whole life of the projects and, in particular, during their design phase. Avoiding these impacts during construction is a priority, and those that cannot be avoided or reduced are mitigated. EDF attaches particular importance to the quality of the analyses conducted to characterise the initial state of a site and monitor compensation actions.

Furthermore, in the Belledonne en Isère mountain range, the Company is conducting a long term experiment with the Initiative Biodiversité Combe-Madame not-for-profit organisation and the key community players. It is aimed at restoring sub-alpine environments and enabling the return of remarkable species of fauna and flora. This experiment is part of the action initiated by the Ministry of Ecology, Sustainable Development and Energy (MEDDE) to test the relevance and feasibility of the offsetting proposals. The project took off in 2015; in 2016, the assessment of the initial condition of the site was completed and preliminary work for reopening the environments started; in 2017, actions were also carried out with the Fédération des Alpes de l’Isère, LPO Isère, ONCFS and IRSTEA to reconcile economic and tourism uses with the biodiversity of the site.

Moreover, EDF has launched a thesis with Irstea and the Natural History Museum concerning the preparation of a method to verify the achievement of ecological equivalence; this involves measuring the gains resulting from the offsetting measures. The thesis was sustained in 2017.

EDF Energy set itself the goal of having a positive net impact before 2030.

In Italy, on the Serra Carpaneto wind farm, EDF Énergies Nouvelles is carrying out a reforestation programme (2,700 native plants) to compensate for the 174 trees damaged during construction.

#### 3.4.5.5 Protection and restoration (indicator G4 EN 13 – Disclosure 304-3)

Today, the Company manages natural sites in partnership with local associations. It does so either pro-actively or through applying offsetting measures. EDF, on numerous sites, puts in place a series of protection measures, with a part of the land owned being allocated to areas dedicated to the protection or reconstitution of biodiversity, through management plans, i.e., multi-year monitoring and action plans in favour of biodiversity and linked to the objectives adapted to the site’s challenges.

The Group also helps with the deployment of public policies, both national and local, in favour of biodiversity; a number of examples can be mentioned:

#### Restoration and renovation:

- Aquatic life:
  - In France, on the emblematic site of Poutès, work began in June 2017 according to a new timetable agreed to with all stakeholders. Staggered until 2018, they will allow a reconfiguration of the reservoir: concretely, the most mobile sediments will be mechanically replaced on the banks in order to prevent them from going downstream during the emptying that is necessary for the construction site. At the same time, temporary operating measures were implemented as of March 2017 (lowering the reservoir to reduce its length) in order to improve the downstream migration of smolts (young salmon), with very encouraging initial results (significant decrease in the passage time in the reservoir).
- Terrestrial life:
  - In France, creating the “Small Rhine”, a re-natured area as part of the Kembs environmental project; it is an old agricultural corn monoculture plot (100 ha), which has been renatured into a mosaic of open and wet environments, with some afforestation, and the passage of the “Small Rhine”, the course of which has been redesigned to a more natural one that plays a key role in the continuity of fish movements in line with the fish crossing structures installed at the plant. In 2017, the monitoring of nature and management actions, in particular for the limitation of invasive alien species, continue to form part of a management plan that will be managed by the Nature Reserve of Petite Camargue. This operation is already showing success through the return of nesting species such as red-backed shrike, tufted duck, and others;
  - In France, as part of the Romanche Gavet project, the temporary rights-of-way for the construction of the dam over 10 hectares have been renovated by ecological engineering techniques using local plants, with support from partners such as CBNA and IRSTEA. This ecological restoration experiment is set to be rolled out to similar operations;
  - In France, within the framework of the partnership with FCBN, a differentiated space management approach is undertaken on the thermal sites aiming to plant native plant species in order to suppress the use of phytosanitary products and reduce practices while respecting the safety and operating constraints of the sites. Depending on their purpose, the spaces are thus developed by supporting the emergence of a certified native seeds activity. The Bouchain and Dirinon sites are already partners in the approach (see Local vegetation and harvest plants programme – FCBN);
  - In the UK, EDF Energy continues creating habitats on its Sizewell B site on a large scale (including the conversion of agricultural land into semi-natural habitats) as a mitigation strategy for the potential impact of Sizewell C.

#### With regard to invasive alien species:

- Invasive alien species are systematically detected in the ecological diagnostics and pre-diagnostics of the land. This makes it possible for EDF to have a global vision of the issue and also to integrate this issue into the projects, and carry out management actions with partners at the local level (local authorities, river contracts, etc.);
- On all of the nuclear and thermal sites, an inventory of invasive exotic species has been conducted, with a set of related management recommendations being issued;
- EDF Energy has undertaken to identify the invasive exotic species on all its nuclear sites, to inspect and implement eradication measures whenever possible;
- EDF works with other national and regional players. Thus, EDF is involved in the FUI PARIS project, which aims to develop a new process for treating soils containing invasive alien species (the consortium contract was signed in January 2016). In 2017, the first tests started with a prototype on a construction site to fight Japanese Knotweed. The innovative treatment process is compared to a more usual method by sheeting.

(1) Principles of PS6 of the IFC: Performance standard 6 of the reference framework of the International Corporation (international financial company, a World Bank structure) dedicated to the conservation of biodiversity and the sustainable management of living natural resources.

(2) Act no. 2016-1087 of 8 August 2016 for the restoration of biodiversity, nature and landscapes.

- In addition, EDF participates in the working group Biological Invasions in Aquatic Environments coordinated and led by the AFB and UICN France. This group aims to make knowledge about methods for the management of these species accessible.

**Some examples concerning actions in favour of threatened species <sup>(1)</sup>**

- the Group contributes to a number of national action plans for the Bearded Vulture, the Zingel Asper and Bonelli’s Eagle, and takes part in the regional variations of these plans, such as the European otter project in the Centre region or Angelica Heterocarpa, or one for Odonata, which is also part of a thesis, and will end in 2018;
- the Group participates in Life+ programmes, in particular EDF for the Pyrenean Desman (2014-2019), Luminus for migratory fish, or Enedis with Life Gypconnect.

In partnership with the League for the Protection of Birds (LPO), the Cordemais site has had a building constructed, which is tailored for bats to mitigate the destruction of existing buildings. Creating this ex nihilo bat’s lair as part of the offsetting measures is the first of its kind in France. The LPO is monitoring the use of the roost by bats.

As far as protected areas are concerned, several EDF sites contribute to achieving the preservation objectives in the Natura 2000 areas and implementing the Natura 2000 contracts.

**3.4.5.6 Other voluntary actions**

The Group is implementing other voluntary action levers, as part of patronage initiatives or through scientific contribution. This is a very concrete way of reinforcing the fight to preserve biodiversity.

By doing this, EDF supports the "red list" of endangered species in France prepared by UICN France and the French Natural History Museum.

In France, EDF focuses on the Fête de la nature. The company is the main sponsor of this national festival which attracts considerable media attention. In 2017, 31 EDF units participated, organising a total of 83 events which attracted 4,500 visitors. On the occasion of this festival, EDF published 10,000 copies of a newspaper dedicated to questions about biodiversity.

EDF is also a partner of the "Local vegetation" programme organised by the Federation of French Botanical Conservation Bodies. The aim of this programme is to promote the systematic use of local wild plants in development works, the re-naturation of areas, the upkeep of green spaces etc. The use of local species enables a natural barrier to be created which protects these spaces from invasive exotic species and increases the ecological functionalities of the local environment. Thanks to this programme, EDF will be able to include in its management recommendations the systematic use of local plants on its land.

EDF is also a partner in the autumn construction programme organised by the Natural Areas Conservatories each year, which offers the public the possibility of taking part in building sites, lighter work on nature, and heavier and sometimes unusual work.

In Reunion, to avoid young Barau’s Petrels, an endemic species, being blinded by street lighting when they first fly, EDF has supported the search for solutions with the Société d’Études Ornithologiques de la Réunion (SEOR), by funding the purchase of an astronomical clock programmed to turn off the lights in public areas for twenty days per year. This initiative is extended during the "Nights without light".

Edison conducts a biodiversity education and awareness programme in schools in areas where their wind farms are located. In 2017, an educational project was also carried out around the Campo hydropower plant on land given by Edison to the local community: training of 50 students in the concepts of biodiversity and preservation of the environment.

EDF Energy implements its biodiversity commitment programme on its land, particularly through events in Heysham (more than 1,300 people in 2017).

In Brazil, EDF Norte Fluminense is continuing with its action with the Mico Leao Dourado not-for-profit organisation to preserve an Atlantic rainforest (reforestation project on the watershed).

**3.4.6 RAW MATERIALS**

The Group uses raw materials for electricity generation and to provide energy services to its customers. A significant portion of these raw materials is comprised of fuels: uranium, coal, gas, fuel-oil and biomass. To optimise its consumption of raw materials while guaranteeing energy supply to its customers, the Group has opted to implement certain measures:

- changing its generation mix with the development of renewables such as solar power, wind power and marine energy; the decommissioning of low-efficiency coal-fired plants, the commissioning of high-efficiency CCGTs (world record 61% efficiency for the Bouchain CCGT), the use of biomass in the boilers and biogas plants of Dalkia in place of coal (Cordemais), the modernisation of its IES thermal stations (new PEI power stations) and the replacement of old engines at power plants in the French overseas departments and in Corsica;
- optimisation of existing facilities: improving energy efficiency (IES, Dalkia, EDF Energy) through maintenance measures, modifications, rules relating to fuel quality (coal) and more rigorous monitoring of efficiency levels (loss limitation) or cogeneration;
- the real-time selection of the best performing means of generation depending on the load curve and energy performance. Specifically concerning IES: the thermal power plants are listed in order of generation costs, which are evolving in a virtually linear fashion in relation to the consumption of fuel-oil per kWh output. These power plants are started in "merit order", an economic mechanism that minimises hydrocarbon consumption. These optimisation measures have been further reinforced with the ISO 50001 certification of these thermal sites since 2016. Likewise, Dalkia uses an energy management tool, ENERGY, which optimises the fuel used by the energy facilities that it operates;
- the implementation of a natural uranium savings strategy: EDF’s control of each stage of the fuel cycle, the design of high-efficiency fuel and suitable management of that fuel within nuclear units all contribute to optimising the need for natural uranium (see section 1.4.1.1.4 "The nuclear fuel cycle and related issues"). Recycling spent fuel enables savings of 10% of natural uranium;
- the Group’s business model, based on controlling the full life cycle of its facilities, allows for efficient feedback as well as the implementation of eco-design initiatives developed in the engineering centres and the design of projects such as the EPR New Model project. With the improvement in the production process, PHOTOWATT has increased the proportion of silicon recycled in its photovoltaic panel production and the power of the cells and modules to lengthen the life cycle of these products. As part of its supplier qualification system, EDF EN, whose raw material use is related to equipment manufacture, requests turbine and panel manufacturers to provide life cycle analyses of their products;
- the Group is also developing industrial ecology initiatives among its various entities and initiatives supporting local authorities through a service based on the RECYTER tool, developed by EDF R&D, for the regional diagnosis of material and energy flows. The heating of liquefied gas at the LNG terminal in Dunkirk is carried out with cooling water energy from the nearby Gravelines plant, using a canal several kilometres in length, commissioned in 2015, which sets a strong example in terms of the circular economy.

From a global point of view, the consumption of the various fossil fuels changed in 2017 as follows: coal up 6%, fuel-oil up 4%, gas down 4%.

(1) These actions are carried out on species identified according to their status and dependence on or proximity to our facilities.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Optimising the use of natural resources and preserving the environment

Downstream, all energy saving management initiatives also serve to conserve resources. EDF and its subsidiaries develop and market packages for its customers that combine energy-efficient equipment, the use of renewable energy in buildings, autoconsumption ("Mon soleil et moi"), incentives for energy saving behaviour and innovative energy recovery solutions, such as the recovery of heat from waste water (Roquebrune-Cap-Martin), the use of biomass (the Nestlé boiler house project with Dalkia), or the use of solid recovered fuel (Tiru).

Where large sites connected with investments are concerned, materials are recycled (see section 3.4.8 "Conventional waste").

The R&D Department develops programmes aimed at reducing the use of raw materials as with the creation of ZnR Batteries, the Group's spin-off dedicated to the development of zinc-air batteries. This technology uses easily accessible and non-polluting materials for manufacturing batteries.

### Paper

Since 2012, EDF has implemented a policy to reduce paper consumption.

First and foremost, it is applied through the development of electronic invoicing for residential customers. The target for 2015 of 4.2 million customers invoiced electronically (15% of residential customers) was surpassed by a substantial amount and the target for 2016 was raised to 5.5 million. The result surpassed the target: 5.65 million customers signed up for electronic invoicing, representing 21% of residential customers. The target for 2017 was set at 6.5 million customers and the result was achieved and increased to 7.2 million customers for 2018.

The paper consumption policy has also been applied by setting a target for reducing purchases of paper for office use by 3% per year. This target is renewed annually. The annual results have significantly outstripped the target. In 2012, paper consumption per employee was 24kg of CO<sub>2</sub> equivalent for the year, in 2013 it was 20kg of CO<sub>2</sub> equivalent per employee, in 2014 it was 17.6kg of CO<sub>2</sub> equivalent per employee and in 2015 as in 2016, it reached 11kg of CO<sub>2</sub> equivalent per employee, representing a reduction in paper consumption of more than 50% over 3 years. The new profit-sharing agreement for 2017-2019 includes a sustainable development and digital criterion based on the reduction in paper consumption. This criterion represents a total of 10%. It involves the reduction in the annual percentage of print jobs on the printers connected to the EDF network (annual target: -15%). A number of measures were implemented to achieve this target and encourage the personnel to reduce paper printing: fewer printers, removal of individual printers, basic double-sided printing on printers in black and white, generalisation of secure print with password and, finally, on some sites, targeted and encrypted campaigns (annual paper consumption displayed) are carried out and displayed at the printing locations.

In addition, 100% of the paper used is FSC paper (recyclable and carbon neutral) and carries the EU Ecolabel. Every EDF site has implemented paper sorting for the recovery of office paper<sup>(1)</sup>.

### 3.4.7 RADIOACTIVE WASTE

The materiality matrix identifies the production and management of radioactive waste and spent fuel as one of its material priorities (issue no. 16 Production and management of radioactive waste and spent fuel). This refers to the technical, environmental and financial issues associated with spent fuel treatment processes, long term waste management and support to the processing and recycling segments.

The generation of nuclear electricity produces waste, some of which is radioactive. The largest volumes of radioactive waste are produced during the decommissioning of nuclear power plants<sup>(2)</sup> that have been permanently shut down: rubble (concrete, soil, etc.), scrap and piping. But the most radioactive of all is essentially the waste produced by the processing of spent nuclear fuel.

All waste is recorded in the national inventory published by ANDRA every three years and is made public. This ensures the transparent management and total visibility of all radioactive waste.

Since 1985, the volume of EDF's operating waste has been reduced by a third thanks to advances made in power plant operation. Waste that cannot be avoided is sorted according to type. It is then hermetically sealed by EDF in special containers so as to prevent the spread of radioactivity and to increase protection. This allows it to be securely transported to ANDRA facilities where it will be permanently stored.

Some radioactive waste can be destroyed. Solid and liquid incineratable waste (gloves, overalls, oils, solvents, etc.) is burned in the Centraco plant oven which is operated by SOCODEI (an EDF subsidiary). Other waste can be considerably reduced in volume to facilitate its storage: this is the case with metallic waste (valves, pumps, tools, etc.) which is melted into ingots in the melting furnace at the same plant.

Waste that can be neither recycled nor destroyed must be placed in a storage facility until such a time that its radioactivity returns to its natural radioactivity level. It is stored in ANDRA storage facilities. 90% of the volume of radioactive waste generated by EDF's nuclear installed base can be stored in the facilities in Morvilliers and Soulaines (Aube region). Two new storage facilities are planned for the 10% that cannot be stored. This is essentially waste produced by the processing of spent fuel and is the most radioactive of all waste. For this waste, which is very long-lived, the Act of 2006 approved the solution of a geological storage facility (Cigéo project). Research is underway for another storage facility which would be for graphite waste from first-generation nuclear plants (currently being decommissioned).

In accordance with the 2006 Act on the Management of Radioactive Waste, EDF is also contributing to research into the separation and transmutation of the most radioactive waste (transformation of very long-lived radionuclides into stable or short-lived elements).

The entire French radioactive waste management system is controlled by independent authorities: the French National Assessment Board (Commission Nationale d'Évaluation) controls the work of ANDRA and the ASN monitors all existing sectors and upcoming projects to ensure their safety and lack of risk to public health and the environment.

For a description of radioactive waste processing downstream of the fuel cycle, see section 1.4.1.1.4 "The nuclear fuel cycle and related issues".

### 3.4.8 CONVENTIONAL WASTE

According to its conception to end-of-life activity model, the EDF group generates conventional waste at different stages in the life cycle of its assets: site development (construction, decommissioning and heavy maintenance) operations (operations waste, such as process sludge), in addition to office waste generated by service activities. EDF's conventional waste is managed under the framework of prevailing regulations, which sets out a hierarchy of treatment methods according to each type of waste.

So-called conventional waste includes waste passed on to a subsidiary during the year, and products used during site development, operations and service activities. It does not include radioactive waste, which is dealt with separately as it falls under specific regulations and is handled by specific subsidiaries. Process-generated coal and gypsum ash are covered in a specific report, taking into consideration the quantities produced and the corresponding recycling opportunities (mainly the cement subsidiary). The report exclusively covers the waste that is removed from sites and excludes waste that is stored on-site, waste awaiting removal, materials reused on-site (e.g. earth and rubble) and equipment that could be reused (sold or gifted). Construction and decommissioning waste is included in this report, if its management falls under the responsibility of the EDF group. On the other hand, waste managed by service providers is not accounted for.

As part of its sustainable development policy, the EDF group is committed to limiting the environmental impacts of its facilities and activities. Based on the ISO 14001 certified Environmental Management System (EMS), conventional waste management complies with the waste management hierarchy and prioritises reduction at source, particularly by repairing, reusing and use of eco-designed and eco-friendly products, sorting and recycling (particularly for site waste which is the most significant in terms of volume).

(1) See PAP50 assessment, refer to section 3.8 "Non-financial rating".

(2) For further information on this significant challenge, see 1.4.1.1.6 "Decommissioning of nuclear power plants".



**3.4.8.1 Waste management and recovery**

The Group’s entities and companies are committed to a process of continuous improvement according to the principle that the “best waste” is waste that is not produced. They have action plans that aim to limit waste production and are incorporated within the management system action plans in place (EDF SA, Dalkia, ÉS, EDF LUMINUS) with associated indicators. A number of levers for action are used: internal procedures (anticipation of construction sites: SOGED, management plans, sales agreements or donations for reuse), specific rules in the Company specifications (EDF SA, EDF EN), innovative technical solutions (separation of water/oil from hydrocarbon effluent, asbestos stripping, etc.), numerous awareness-raising initiatives for staff and service providers (communication, training, 2016 waste prevention guide incorporating 34 best practices, e-learning), and initiatives to reduce waste hazardousness (and exposure of staff to dangerous substances), particularly by limiting the use of hazardous products (see section 3.1.8 “Organisation and deployment of action”). Given the importance of this type of waste, specific actions are implemented in relation to site waste or decommissioning waste, involving dedicated EDF working groups. To assemble a compendium of best practices in this field, a “Waste Prevention Competition” has been in place since 2011 and was extended to the entire Group in 2016. In-house or external reuse activities are developing strongly in connection with the cessation of activity of (thermal) production units and the support of linking tools such as the intranet VEOL with its site dedicated to “Between sites” exchanges. EDF SA has set itself a target of €100 million over 3 years (2018-2020) by recording the savings related to waste prevention and sale of equipment and material. EDF is heavily involved in the inter-company Tango Blockchain project to facilitate the reuse of discarded furniture. In broader terms, the design of facilities is increasingly based on eco-design initiatives which take into account the environmental footprint by implementing a life cycle approach. A study has been conducted by EDF EN on the impacts of wind and solar

power technologies throughout the life cycle, and the extraction of raw materials upon decommissioning the facilities with a special focus on the end of life of equipment and its recyclability.

**3.4.8.2 Waste management and recovery**

In addition to the prevention measures, the Group’s environmental policy aims to improve the recovery of waste that is produced. The main actions implemented consist of:

- developing the recycling of parts and materials, particularly in the decommissioning phase (decommissioning of DPIT and IES thermal power plants, parts removed and recycled at Aramon and Porcheville, earth removed at Dunkirk LNG terminal or La Coche, etc.);
- the efficient sorting of waste so that it may be sent to energy or material recovery companies in line with specific objectives defined in the environmental policies of the entities and relayed in the management contracts of the dedicated recovery companies and units (EDF EN’s PV Cycle and First Solar agreements which take panels back at the end of their useful life, rental of IT equipment to DSP);
- developing partnerships with recycling players (RECYLUM for Citelum, Ateliers du Bocage for printer cartridges);
- implementing on-site pre-treatment of various waste items, in order to limit the volume of hazardous waste and promote the recovery of the remaining portion (e.g.: concentration of hydrocarbons for energy recovery).

The EDF sustainable development policy has set an objective to recover all 90% waste for the entire Group by 2021. The recovery rates for all conventional waste (excluding coal and gypsum fly ash, which are fully recycled) remain at high levels.



Results within the Group	2017	2016	2015
Volume of conventional industrial waste recovered or transported for recovery (in tonnes)	518,591	607,171	365,744
Waste recovery rate (%) – EDF group	85.0	89.9	80.6
Waste recovery rate (%) – EDF	93.0	95.3	92.0
Waste recovery rate (%) – EDF Energy	96.8	99.1	94.5

The volume of conventional waste for 2017 has declined sharply particularly for non-hazardous waste from major ongoing projects in France: carrying out of the “Grand Carénage” of nuclear power plants; work to set up a new production unit at La Coche hydropower generation station; work to extend a storage building in Velaines and continuation of the decommissioning of the thermal plants (with less activity in 2017).

Year-to-year changes in tonnage are strongly influenced by ongoing investments and decommissioning programmes. The Group’s objective is to effectively manage the end of the life cycle of its facilities and ensure good waste recovery without any target fixed for the volume of waste production.

**Impact of decommissioning and maintenance activities**

Construction, decommissioning and maintenance activities remained at high levels throughout 2017, particularly in France (including the island systems) and in the UK with the Hinkley Point site, which had an impact on the overall volume of waste generated and recovered. Among the sites, it should be noted: the first steps of the French nuclear installed base “Grand Carénage” and decommissioning operations (Richemont, Champagne, Vitry and Martigues) and in the islands (Martinique, Corsica), large-scale maintenance operations (La Coche).

In France, waste management schemes (SOGED) are now systematically implemented prior to any major construction, decommissioning or maintenance project. Feedback is provided annually from the EDF business units in the spirit of continuous improvement.

**The recovery of combustion products and materials: a circular economy initiative**

The Group has been committed to developing the circular economy for some years, with ethical systems in place for the recycling and reuse of thermal plant products and materials used during construction works.

Combustion fly ash and gypsum produced by desulphurisation are recovered in full by all thermal generation plants both in Europe (France, United Kingdom) and in China. Overall, several hundred thousand tonnes of ash are used in building roads and in the cement industry (with savings of approximately one tonne of CO<sub>2</sub> avoided per tonne of ash used<sup>(1)</sup>). In France, EDF’s fossil-fuel thermal plants produced 188,560 tonnes in 2017 and 230,000 tonnes were recycled in the cement and concrete sector (depletion of old inventory<sup>(2)</sup>).

The materials involved in construction works are, to a great extent, reused, as in the following examples: Post-Fukushima projects of the nuclear sites, burial sites (Enedis, ÉS).

(1) EDF calculation based on average greenhouse gas content by country, including life cycle analysis (LCA), determined according to the generation mix per country provided by the International Energy Agency (IEA) 2012 and according to the LCA of generation methods provided by the International Panel on Climate Change 2012.  
 (2) Independently of this inventory depletion, everything which was produced in 2017 was recycled.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Act positively within communities and strengthen dialogue

In order to find other levers for recovery of these waste products in France, the Group has undertaken research into better recovery of ash, sediment and sludge and is an active participant in the work of the National Institute for Circular Economy and the RECORD association to develop methods and tools in collaboration with

industrial groups (EFFICHAGE for Tiru) or universities. Full scale tests are underway in hydropower generation to develop sediments as soils (Mont-Cenis and Romanche Gavet) and these results in scientific theses. Dalkia/Tiru are actively participating in the research project TERRACOTA for the recovery of SRF supported by ADEME.

## 3.5 ACT POSITIVELY WITHIN COMMUNITIES AND STRENGTHEN DIALOGUE

This is a major trend observed everywhere: civil society is calling for more dialogue and is becoming increasingly vigilant with regard to projects likely to alter the environment. This is why the EDF group has undertaken to systematically organise and engage in transparent and inclusive dialogue and consultation, for each new project, worldwide, observing the best international standards. The Group has turned this undertaking into a lever for the transformation of our business, by encouraging the development of renewed practices of listening to our stakeholders, and by learning to develop projects in partnership with them.

### **Corporate Social Responsibility Goal no.5 (CSRG no.5): to organise, on a systematic basis throughout the world, transparent and genuine discussions and consultations around each project**

Ensuring the local integration of its industrial facilities is a constant challenge for EDF. At present, the Group's ambition is to renew and systematise its practice of engaging in dialogue around each new project, so as to better take into consideration the aspirations of different regions and their inhabitants. The EDF group undertakes to implement the rules governing dialogue, as prescribed by international standards with regard to stakeholder participation, and to ensure that such consultations are publicly reported.

From 2017 onward, this undertaking concerns new projects involving investments of more than €50 million, entailing a significant impact on regions and the environment. It is the Group's ambition to lower this investment threshold to €30 million <sup>(1)</sup> by 2030.

These projects will be the subject of systematic engagement in dialogue and consultation, in proportion to the implications of the project and observing the following procedures: identify the stakeholders; initiate consultation as far upstream as possible; provide stakeholders with transparent access to clear information on the project; gather stakeholders opinions on the project and address them; set up a system for dealing with suggestions and complaints; ensure that local populations are able to participate in the consultation <sup>(2)</sup> process.

A pilot group was established at Group level to define these specific principles of implementation and to prepare guidelines for project leaders. This Committee, comprising business lines and subsidiaries, will continue with its work over time and will ensure that this undertaking is pursued.

The materiality matrix identifies dialogue with stakeholders, transparency and consultation on nuclear energy among its priority issues (issue no. 14 Dialogue with stakeholders and transparency on nuclear energy). This refers to information and consultation actions geared to answering questions raised by public opinion and some stakeholders about nuclear energy and the quality of dialogue on this issue.

### **3.5.1 DIALOGUE WITH STAKEHOLDERS AND TRANSPARENCY**

To meet the expectations of all its stakeholders, EDF has set up tools for dialogue, listening, analysing and monitoring stakeholders: surveys, mapping, partnerships, forums for dialogue with stakeholders, monitoring Committees. Identifying stakeholders is a powerful way of analysing the Company's environment and developing an appropriate and relevant dialogue with them.

#### **3.5.1.1 Identification of stakeholders**

The mapping of EDF stakeholders enables business units to gain information through:

- local consultation on generation sites and new industrial projects;
- relations with customers, suppliers, sector partners, socio-professional organisations, public authorities and national and international institutions;
- operational partnerships with NGOs and the academic world;
- the participation of experts and specialists in independent boards or panels to provide Group managers with external opinions;
- public information and education, for young people in particular, on energy and sustainable development issues.

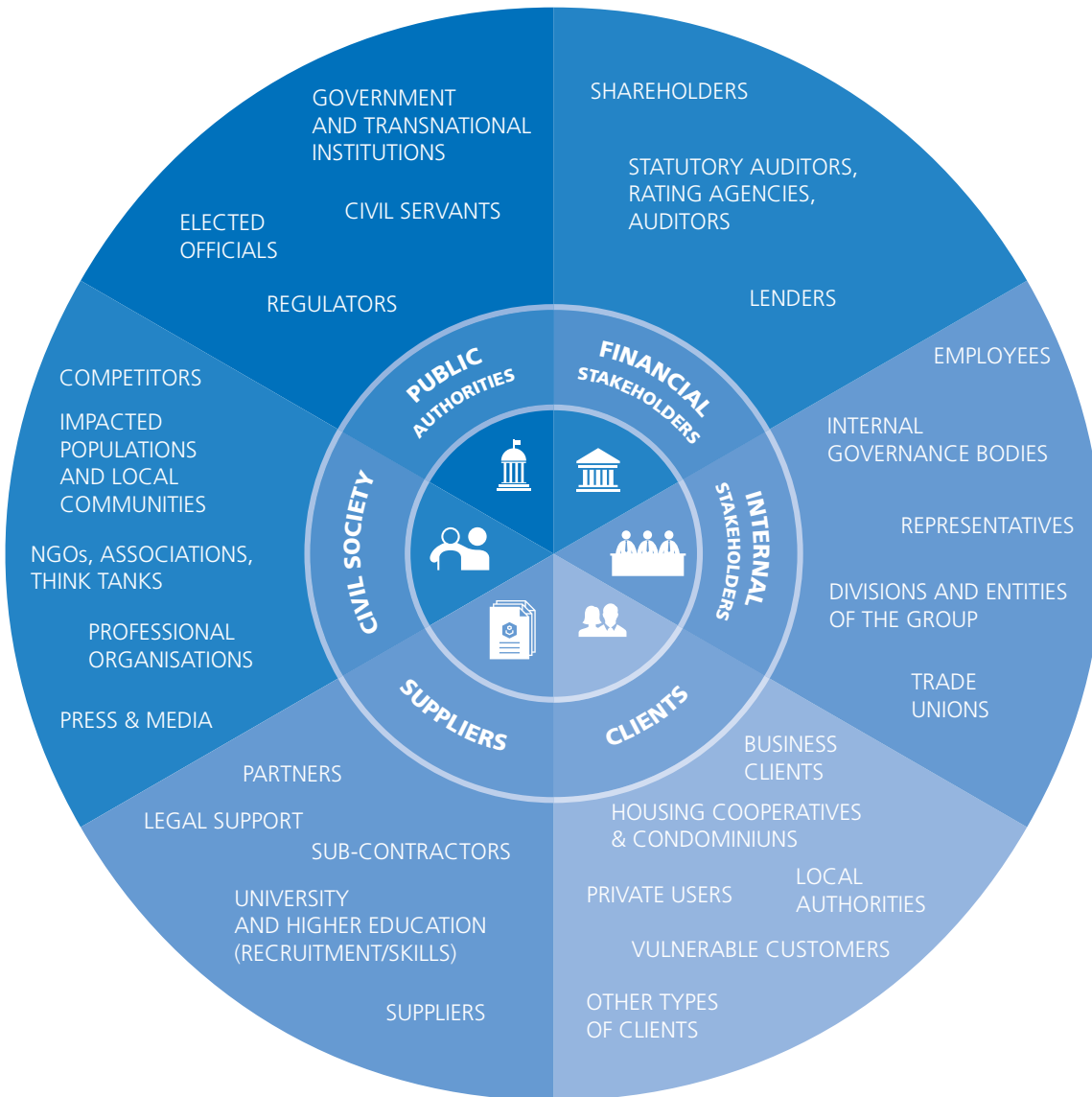
Listening to stakeholders contributes to improving strategies and policies; EDF is committed to guidelines for constructive dialogue between the Company and stakeholders.

The EDF group's main stakeholders are presented opposite.

(1) As a reminder, the financial threshold for the regulatory public debate procedure is €300 million.

(2) As required by local law.

Mapping of EDF stakeholders



Listening to the expectations of our stakeholders enables us to develop and refine our strategies and policies.

The main stakeholders at EDF central level associated with the Sustainable Development Department are presented opposite.

The mapping of EDF stakeholders enables business units to gain information through:

- local consultation on generation sites and new industrial projects;
- relations with customers, suppliers, sector partners, socio-professional organisations, public authorities and national and international institutions;
- operational partnerships with NGOs and the academic world;
- participation of experts and specialists in independent boards or panels to provide Group managers with external opinions;

- public information and education, for young people in particular, on energy and sustainable development issues.

With the aim of preventing, reducing and offsetting the impacts of its activity on the environment, the quality of this dialogue with all stakeholders relies on the success of the Group’s sustainable development policy and its performance.

3.5.1.2 Dialogue mechanisms

Listening to stakeholder expectations has become an essential part of the operational activity of Group entities and companies; it’s historically strongly developed in generation businesses (nuclear, hydropower or thermal), in EDF Energy, as well as in entities where marketing is an inherent part of business (the Sales and Marketing Department and Dalkia in particular) within the Group.

**Surveys monitored over time with a real continuity of questionnaires and scope makes it possible to monitor changes in the expectations of the populations concerned. For example:**

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- **Local resident survey on nuclear generation**, thermal generation and hydropower generation: carried out since 2009 by official survey companies such as IPSOS, these research measure local residents' opinions on nearby plants and energy. 19 nuclear generation sites, 7 fossil thermal sites, 15 hydropower sites and 2 nuclear sites under decommissioning (Creys-Malville and Brennilis) were the subject of this survey in 2017. Local residents' surveys around generation sites highlight that nuclear power plants have a positive impact in terms of employment (82%), economic activity (78%), commerce (68%) and community equipment (64%). For thermal generation sites, 74% of local residents consider that they have a positive impact on economic activity, 69% that they have a positive impact on employment, 51% on commerce and 50% on community equipment;
- **Sustainable Development Survey (SDS)**: this monitors French and European opinion on topics relating to the environment, energy and sustainable development, and is carried out by EDF's R&D department alternately in three European countries. It contributes to providing opinion data for different projects and issues. The latest wave confirms that in Europe, especially in Germany, Belgium and France, the deterioration of the environment is the main issue of growing concern, especially with the higher socio-economic categories, unlike economic concerns, which are on the decline. With respect to energy sources, although European public opinion is currently against coal and for renewables, opinions differ when it comes to nuclear power. Support continues to dwindle in France, and a clear majority considers that at the European level, we will be able to phase out nuclear energy in 30 years and replace them with renewable energy;
- **Internal Environmental Survey (BIPE)**: a survey carried out on a sample of EDF and Enedis operators. The questionnaire covers the following themes: environment, energy, CSR, innovative concepts. The main findings for 2017 are reaffirmed support for renewable energies, opposition to fossil fuels and stability for nuclear generation.

The operators' perception of the state of the environment is more severe if the region under consideration is vast or far away: in 2017, a quarter of the operators questioned considered that the state of the environment is poor or very poor in their region and in France, compared with 38% for the environment in Europe, and 79% for the world. These perceptions have been stable since 2014. The operators perceive nature as being very vulnerable to human interference and are pessimistic about its future. Over 80% of them think that were heading towards a major ecological disaster, over three quarters of them think that human interference has disastrous consequences for nature, and half consider that we are reaching the limits of the number of persons that the Earth can cope with. Two thirds do not consider that scientific progress will resolve Europe's environmental problems in the next 20 years. This pessimism is reflected in their deep mistrust of sources of information concerning the environment, except when it comes from scientists and doctors. In terms of knowledge and awareness of environmental concepts, more than three quarters of the operators questioned say that they have already heard of sustainable development, green energy or the Ethics Charter. Lastly, one out of six operators declared that they had taken a course on the environment or sustainable development in the last three years (see section 3.5.8.1 "For employees").

**Listening practices are widespread**: this is traditionally the case for the Sales and Marketing Department and Dalkia who conduct rolling customer satisfaction surveys. These surveys aim to estimate service progress and customer benefits, and to better understand customer reasons for dissatisfaction and expectations. EDF Polska also carries out local residents' perception surveys, for example on the Torun investment project, along with listening and consultation seminars for local residents in Gdansk and Gdynia. EDF Luminus has consulted identified stakeholders in its networks to draw up its materiality matrix. In the UK, EDF Energy holds regular meetings (three to four per year) with identified stakeholders on questions linked to its activities and impact with the aim of identifying and delivering the products and services best suited to customers for each of its segments. All survey methods, both quantitative and qualitative, are used, in the form of face-to-face interviews, telephone interviews or via social networks.

In 2017, Dalkia deployed the "Let's Talk Customers" approach based on the three pillars below: the aim of being close to its customers regardless of the weather; the promise of implementing the Dalkia touch to satisfy its customers every day and the right attitude to adopt: professionalism, listening ability, anticipation and support. In Martinique, SEI employees went to meet customers during various events (under the "listening to our customers" banner). The Producers Forum brought together more than one hundred persons who play a role in the energy sector such as photovoltaic panel producers. Edison listens to its customers' needs via discussion groups that deploy initiatives such as "regional roadmap" and the "Service Quality Charter". EDF group regularly holds meetings of its France and International panels, jointly setting the agenda, to collect their opinions and enable Group managers to respond.

#### 3.5.1.3 Stakeholder panels

Stakeholder dialogue within the Group takes varied forms depending on the type of activities (generation, sales etc.), the place it occurs (local, national, international), the time period (project or operational phase for a facility, for example), and the proposed dialogue objectives (solving a well identified operational problem, examining a major corporate issue, etc.). Over the last dozen years, EDF group has tested an original, effective type of dialogue by coordinating different external stakeholder councils, at corporate or country level.

To date, several panels of external experts provide Group managers and companies with their view on the major topics of interest to EDF. Agenda items are proposed by both parties and the recommendations made are reviewed two years after the work has been completed.

The **Sustainable Development Council** is made up of external specialists who represent the various issues associated with the impact of EDF's facilities and businesses. It challenges EDF managers and experts as early as possible over the Company's proposed actions regarding sustainable development. In 2017, the panel met to discuss the new materiality analysis conducted by the Group.

Within the Group, other stakeholder panels continue to work on areas associated with sustainable development, such as the EDF Scientific Council and the EDF Medical Council. For example, in 2017, the **Scientific Council** met to discuss the issue of the acceptability of industrial<sup>(1)</sup> structures. In response to the transformation of the technical, economic and political frameworks that govern its business, to changes in the definition of the general interest and the sometimes spectacular controversies such as the ZAD ("zone to be defended") movements in Sivens or Notre Dame des Landes, a working programme has been created to gain more insight into the local factors of acceptability, the increased professionalisation of the people involved, better understanding of the impact of digital tools in the public area and the specific manner in which the issue of acceptability arises for new infrastructure derived from emerging technologies.

The **EDF Medical Council** is made up of personalities from the medical community and university lecturers. It is a body for reflection and advice on a number of current health topics connected to EDF's activities. Its Chairman is Professor André Aurengo, member of the French Academy of Medicine. The Medical Council held three plenary meetings in 2017. The main subjects discussed by the Council covered the essential professional and environmental health issues of current relevance: the impact of the functioning of wind turbines on the health of residents, the risks associated with the presence of endocrine disruptors, and the setting up an epidemiological study on the post-employment follow-up of employees who are exposed to magnetic fields during their career.

In 2017, EDF created a **Council of Future Generations**. Launched by EDF and Usbek & Rica on 11 July, it brings together 60 people every quarter to discuss the major controversial issues of the future. It is made up of 40 representatives of EDF's businesses and the Group's subsidiaries in France<sup>(2)</sup> and 20 people from outside EDF: entrepreneurs, philosophers, specialists of the circular economy or energy transition issues, media professionals, CSR and digital experts. The first two sessions focused on the following issues: "100% renewable, in how many years?"; "Is electricity a market like any other?".

(1) "Acceptability of facilities and industrial projects: what are the challenges for EDF?".

(2) Excluding Enedis and RTE.

In the UK, EDF Energy coordinates a “Sustainability Advisory Panel” to advise the CEO and Executive Committee on corporate strategy and sustainable development. In 2017, it met three times to deal with topics such as the industrial strategy, carbon pricing, Brexit, the 2020 Vision, the “Better Plan”, the post-electoral landscape and R&D programmes. Since 2006, the panel has played a key role in drawing up the sustainable development strategy and cooperates in order to improve the transparency and sustainability of our generation and service activities. EDF Energy also has another panel made up of business leaders (Business in the Community; Forum for the Future group, Cambridge Institute of Sustainable Leadership). This panel meets twice a year, and is chaired by the EDF Energy director of strategy and public affairs. For example, in July 2017, it met to discuss the forward-looking vision of EDF Energy’s <sup>(1)</sup> energy market.

Created in 2015, the **Enedis Stakeholder Council** brings together leading personalities from the corporate world, academics or heads of associations, under the aegis of the Sustainable Development Department. The Council’s goal is to bring a constructive view to the issues linked to societal changes that are liable to have an impact on the future of the Company and its businesses. It enriches the Company’s reflections on its strategy, sheds light on certain current or future issues through its external and multi-disciplinary vision, and makes recommendations. The Council met three times in 2017 to discuss societal actions, the Customer policy and electric transport.

### 3.5.1.4 Partnerships, listening tools and dialogue tools

Sustainable development partnerships are a way in which EDF can engage in dialogue with stakeholders on high stakes questions for our businesses, and better understand the expectations of our environment. These partnerships also provide internal expertise for Group businesses and companies.

In 2017, sustainable development partnerships covered four main components: “Biodiversity; “Energy transition/Climate change”; “Energy insecurity” and lastly “Consultation/Regions” partnerships.

- Partnerships in the field of biodiversity facilitate technical exchanges and dialogue with associations on high stakes issues for businesses and projects (for example partnerships signed with the French Natural History Museum (MNHN), the French Committee of the International Union for Nature Conservation (IUCN), the Bird Protection League (LPO) and the Federation of National Botanical Conservatories);
- Partnerships with think tanks enable EDF to further nourish discussions on high stakes subjects such as the climate, energy transition and the circular economy, for example through partnerships signed with the Sustainable Development and International Relations Institute (IDDRI) and the Foundation for Nature and Mankind (FNH);
- With respect to energy insecurity, EDF group supports the “Business and Poverty” Action Tank which looks for innovative solutions for renovating derelict co-ownership buildings with other companies and local communities, as well as with the National Association of Master Builders (ANCB) which intervenes to improve housing through self-rehabilitation works for people excluded from “traditional” solutions. The EDF group is developing its collaboration with ASHOKA France, a network of social entrepreneurs, aimed at favouring the co-creation of innovative entrepreneurial solutions with a strong social impact (fight against exclusion, insertion, economic development, etc.);
- In terms of dialogue and consultation carried out in the regions, the local dimension is developing, with a partnership with the French coastal protection agency (Conservatoire du Littoral) which falls under the Group’s commitment to provide support to local communities. In 2017, the EDF group continued the partnership concluded with the National School of Landscape Architecture (ENSP), which promotes the taking into account of the landscape in industrial projects in the field.

## 3.5.2 CONSULTATION WITH STAKEHOLDERS

The materiality matrix identifies consultation with stakeholders as one of its material issues (issue no. 33 Consultation with stakeholders). This refers to the effective taking into account of the needs and expectations of the Group’s stakeholders, through a sustained dialogue that favours the definition of solutions corresponding to shared issues. In particular, it concerns systems for consulting and involving stakeholders put in place at each stage in the life of the projects, and the taking into account of the interests of local communities to ensure proper integration of activities and structures.

The key to success for projects and their integration into the region’s economic and social development programmes is working together with local authorities, local populations and associations. Regular information and open dialogue are carried out close to the sites, and consultations and innovative public meetings are held on the sites or for the projects.

### 3.5.2.1 Local consultation

For each new project, Citelum carries a phase of consultation of the various stakeholders upstream of the project in order to identify the exact needs of customers and familiarise itself with the project environment.

For example, in Martinique, there have been diverse consultations in connection with the digital meter project: presentation of the external deployment scenario (SMEM, Association of Mayors) and two public meetings: in the towns of Rivière Pilote and Prêcheur. As part of site reconversions such as in Aramon or Porcheville, a consultation was undertaken based on partner charters with the public authorities and local elected representatives, and with the occasional participation of some associations. EDF Energy has taken a decentralised approach and each site publishes a monthly newsletter as part of the “open door policy” to encourage local residents to come and share their concerns. The HPC project carried out consultations between 2009 and 2011, and 6,500 persons answered through 34 public exhibitions. Some 2,000 requests were processed, leading to a certain number of major changes in the structure of the project and its delivery. This process is fully documented in the HPC consultation report. All requests for information and complaints are checked and managed by a computer system that records calls and makes sure that answers are sent within 10 working days.

### 3.5.2.2 Innovating through consultation

As part of ISO 9001 and 14001 V2015 certification, we systematically map our stakeholders and modes of dialogue to enable us to get to know the people and organisations involved in the consultation.

EDF has signed a partnership with the National School of Landscape Architecture (ENSP), and the regional educational workshops that have been rolled out on the Vouglans hydraulic sites and the Autunois positive energy region have enabled a new relationship with stakeholders to be established by working on the relationship between these sites and the landscape based on concrete proposals drafted after consultations carried out by students at this school with regional players. Moreover, a “Site landscape and landscape site” guide is currently being finalised with this same school of landscape architecture. It will be used by project managers to better integrate the landscape into their projects.

These tools will be used to complement existing ones such as regional audits, Durabilis or stakeholder mapping, and will also be used for the training course “Consultations with the stakeholders in your region”.

Several regional audits have been implemented linked to production units, either directly by the units or as part of in-depth studies conducted by the Societal Division of the EDF hydro engineering centre (CIH). We have used the information from these audits, along with an analysis of national level players, to draw up stakeholder maps for our facilities. Depending on local issues, or as part of major projects, innovative meetings for public discussions are organised in some valleys. We also organise annual review presentations with local stakeholders concerning many facilities and communication experiments with stakeholders through digital platforms launched by several facilities.

(1) See also <https://www.edfenergy.com/sustainability-governance>.

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Since 2012, EDF has been a signatory of the charter of innovative SMEs aimed at strengthening cooperation among public undertakings and SMEs, in favour of innovation, and it has renewed the RFR Label (responsible supplier relations) since 2015.

We have set up a partnership with the fire service and resident companies of MECO (PM3, GENCO3) to address issues concerning the environment, safety and emergency services <sup>(1)</sup>.

### 3.5.2.3 Building on the best national and international standards to support projects

The IHA protocol was used in mainland France to assess the Romanche-Gavet project. It constitutes the assessment model for international projects at the different milestones. All the international projects implemented by the International Division and concerning hydropower draw on the IFC guidelines.

EDF is a founding member of the Global Compact (see section 3.1.7 "Human rights") and encourages its subsidiaries to comply with the 10 principles when developing their projects, both in terms of national and international development. The DPIH draws both on the IFC standards and the IHA protocol which are complementary tools. The adoption of the IFC standards by the International Division enables the various EDF players to have a common language. To develop its projects, SOCODEI carries out risk and impact analyses including on the environment and populations.

### 3.5.3 REGIONS AND LOCAL COMMUNITIES: PARTNERSHIP AND ECONOMIC DEVELOPMENT

The materiality matrix identifies the subject of the economic development of regions as one of its material issues (Issue no. 35 Regions and local communities: partnership and economic development). This refers to the Company's ability to participate in the economic life of regions, and create value for these regions by contributing to the creation of local jobs and wealth.

#### 3.5.3.1 A player in the regions

The Thermal Generation and Engineering Department (DPIT) is committed to a significant decommissioning programme for sites at the end of their operating life with work forecast up to around 2030. This programme is part of consultations with local authorities and is carried out in accordance with Decommissioning Log Books prepared by the DPIT. In parallel, and in liaison with other Group entities (mainly EDF EN, SOCODEI, Dalkia Biogaz and Tiru), the DPIT post-operations centre looks to develop projects on sites at the end of their operating life.

Dalkia contributes to the economic and social development of the regions in which it operates, not only through the public services that have been delegated to it, but also through the investments that it makes to service, maintain and develop infrastructures in particular for biomass and heating network activities. Dalkia is also, through its management methods, Human resources and purchasing policies, a key employment and employability player in the regions where it operates. The major part of the proceeds of Dalkia's activities, i.e. 92% in 2016, is "redistributed" to stakeholders such as company employees, suppliers and subcontractors, tax authorities, banks and bond investors. This diagram was published in Dalkia's 2017 CSR report.

Citelum's development strategy is based on a strong local presence through the recruitment of employees in the areas where EDF is established.

The Procurement Department continues its actions with suppliers – including SMEs, microbusinesses and start-ups – with the operational implementation of an adapted process for innovative purchasing and to make it easier for SMEs to access our markets.

To facilitate the access of SMEs to its markets, EDF has:

- simplified general terms of purchase and has specific terms for "small orders";

- a simplified capacity questionnaire for new suppliers, for tenders with amounts lower than the thresholds of European Directive 2014/25/EU;
- and for innovative start-ups and SMEs, a tailored purchasing process and standard agreements. Three key figures of innovation procurement: 40 test cases, €45,000 budget on average, 100 potential contracts each year;
- a dedicated space on the edf.fr institutional site (single point of access for SMEs).

In 2017, innovative SMEs represented nearly 4% of EDF's approved suppliers.

The Real Estate Division has made a commitment concerning contracts for PARTNER projects and moving contracts to dedicate at least 6% (of the total volume of hours) to the professional integration sector.

#### 3.5.3.2 Some 2017 projects

The major EPR project continues to play a major role in terms of training, integration and recruitment of employees in the Cotentin labour market. Today, local employees continue to represent more 50% of employees on the site. At the end of 2017 and since the site was opened, the local branch of the national employment agency located at the site entrance had recorded 4,500 job offers proposed to companies working on the site. 92% of these vacancies (4,164) job offers were filled and this very positive result is the reflection of the strong cooperation between companies and the Employment Training Team. Training actions were also organised for jobseekers. 80,000 training hours were thus given thanks to the financing of the Normandy Regional Council and the national employment agency. For example, in 2017, we reached the 1,000<sup>th</sup> person trained and recruited on the EPR site. This was celebrated with an event that brought together all the local employment and training players (Government, Region, MEF, PE, trade union organisations, training bodies, industries, etc.). A contractual clause, incentivising but without any financial sanctions rounds off the general terms of purchase with an integration commitment expressed as a minimum percentage of the total working time on the site during the performance of the contract. The 20 largest companies are concerned by the EPR with a minimum of between 3 and 5%. Since the introduction of this clause, the EPR has generated more than 1,150,000 hours of integration, representing an average rate of 3% of the total number of hours worked on the site.

The regional involvement programme carried out jointly by EDF's Nuclear Generation Division and Regional Action Division falls under the scope of a dual objective to increase and enhance the value of each generation unit's economic and societal contribution to the region. The ultimate target is to increase the generation units' contribution, with local and regional players, to the co-construction of the sustainable development of the regions where they are established. In 2017, each nuclear power plant (CNPE) appointed a regional involvement manager tasked with coordinating the internal contributions of EDF divisions to the programme and to locally reinforce dialogue with regional stakeholders in order to draw up a regional project that will embody the unit's contribution and integration into local and regional economic development in line with its industrial programme.

With the creation of E-Clide, collaborative innovation pilot at Saint-Aubin-de-Blaye (Gironde Department), near the Le Blayais power plant, for the first time, a cluster has brought together the main players of nuclear maintenance: large groups, regional laboratories (Bordeaux institute of technology) and SMEs. The cluster, which facilitates innovation through hands-on experience, is a boon to employment in the region since it will be taking advantage of the "Grand Carénage" ("big refit") programme, which will make it possible to operate nuclear plants beyond 40 years.

In China, Citelum carried out an action to fight against poverty in agreement with the city of Kunming at the village of Jiewu located in the Yunnan region (200km from Kunming). In 2017, it donated 100,000 yuan for the purchase of lighting equipment.

In Italy, during the conclusion of new contracts, Citelum gives priority to local subcontractors to carry out works.

Lastly, in Spain, an agreement was concluded to employ people under professional integration contracts as is the case for the contract with the city of Toulouse in France where a target of 5% of the workforce is planned.

(1) "Regulation on coordination in firefighting and emergency interventions in the Phu My power plant".

### 3.5.3.3 Contribution to economic development

The industrial and commercial activities of the EDF group generate local jobs, directly or indirectly, local procurement, and payment of taxes, which support local development.

The “Grand Chantier” programme continues. Of the 58 operations carried out with local communities, 54 have been completed and the last four have been launched. In all, this currently represents nearly €110 million injected into the economy, one third of which has been paid for by EDF. In 2017, several operations were delivered including the Health Centre at Les Pieux, the Day Centre at Les Pieux and the refurbishing of the school canteen in Sotteville.

The Inter-company association, created under the Grand Chantier programme is a single point of contact for employees on transfer. It proposes accommodation, catering and transport services to employees. It provides approximately 700 rooms, 1,000 meals/day and manages 5 food trucks on the site.

In 2017, the reinforcement of the contribution of power plants to local economic development was structured around two areas:

- the increase in the local footprint of each unit through the development of local procurement;
- the development of the use of local service providers to support the economic activity of neighbouring communities.

In 2017, EDF thus strove, as part of its general industrial policy, to increase its efforts in favour of local economic support by adding a new clause to its tender regulations (DAPI) called “Local involvement and Bure”. With this clause, EDF encourages tenders to ask for proposals from one or more companies located close to EDF generation sites each time they plan to contract out a service and whenever the local economic fabric allow this. In this regard, all EDF suppliers can contribute to the success of the local involvement programme of the various energy generation industrial sites.

Through its “One river, one region” programme, the DPIH is contributing to the economic and social development of hydropower generating regions. On the one hand, it finances SMEs in the water, energy and environment sectors, and on the other it targets potential SME suppliers for development or maintenance bids for the hydropower plants. The DPIH also contributes to the financing of local communities, with its presence in the regions, and to the creation of direct, indirect or induced jobs and through the payment of fees and taxes.

The “site of the future” approach, which aims at maximising the value created both for the operator and the region, has been launched on major sites such as La Coche. It contributes to reinforcing the use of local companies and professional integration schemes, if necessary, with the support of the “One river, one region” agencies, by including specific clauses and through continuous work with regional employment players.

EDF Energy at Hinkley Point C will create 25,000 job offers on the site during the construction phase. It generates £200 million per year for the local economy for each year of construction for a total investment of £4 billion in the regional economy during the lifespan of the project.

To date, £465 million of contracts have been awarded to local companies, which is the equivalent of 650 jobs created. The project hopes to propose 1,000 apprenticeship contracts during its lifespan. To date it has signed 76 contracts. Over £120 million has been invested in the region as a whole. This includes new roads, £15 million in education upskilling with a regional educational programme, and a £20 million community fund. In 2017, the project launched the HPC youth programme that will provide career support to young people after they have completed their courses.

For minor works, EDF Luminus gives preference to local suppliers.

### 3.5.4 CONTRIBUTION TO THE FIGHT AGAINST ENERGY POVERTY

The materiality matrix identifies energy poverty among the main material issues (issue no. 32 Energy poverty of residential customers). This refers to all the different solidarity programmes that reduce energy poverty in the various countries where the Group operates.

Energy poverty is a complex phenomenon that has intensified in most developed countries, especially in Europe, both in terms of number of households concerned and the severity of the impacts encountered. This issue comes up in societal and public policy debates. In France, over five million households are concerned. In July 2017, the French Minister for Ecological and Inclusive Transition presented the Climate Plan, one of the focuses of which concerns thermal renovation with a view to “eradicating energy poverty in the next 10 years”. In this context, EDF has made its contribution to the fight against energy poverty a major subject. Above all, the Group acts to ensure that the electricity bill is not an additional aggravating factor for the most vulnerable customers.

**Corporate Social Responsibility Goal no. 3 (CRSG no. 3):** to propose information and solutions in terms of energy consumption and access to rights to assist all vulnerable sections of the population.

EDF has made the contribution to the fight against energy poverty one of the main focuses of involvement with respect to corporate social responsibility, and undertakes to propose information and solutions in terms of energy consumption and access to rights to assist all vulnerable sections of the population by 2030. The EDF group contributes to the fight against energy poverty by seeking to identify and reach as many vulnerable residential customers as possible. The Group implements public schemes, supports vulnerable customers to access these systems, and also develops voluntary actions and programmes. This proactive approach, focused primarily on information and support, is adjusted to fit the extremely diversified situations in the countries in which the Group operates.

In mainland France, EDF’s solidarity policy is based on three pillars: prevention, support for fragile customers and payment assistance. In 2017, EDF defined its policy for the French Overseas Departments, based on the improved identification of the customers concerned, a better understanding of their needs and assistance with better consumption, support and the will to mobilise the players who can help in supporting these customers.

EDF implements the various texts from the energy transition law for green growth. For example, EDF actively contributes to the experiments on the implementation of Energy Cheque, in 2016 and 2017, before being rolled out in 2018 in four French Departments (Ardèche, Aveyron, Côtes d’Armor, Pas-de-Calais), as well as the “Poverty Energy Savings certificate” obligation, in addition to the classic energy savings certificate mechanism since 1 January 2016, for a volume of 150TWhc over two years.

Still in the area of payment assistance: during the “winter truce” of 2016-2017 when electricity companies cannot cut off supply for unpaid bills, a series of personalised calls were made to customers who benefit from social energy tariffs and have outstanding bills to prevent these bills from piling up during the winter. EDF has also reinforced the means of alert and monitoring of vulnerable customers at the beginning of the winter (mailing campaigns, text messages, etc.).

In terms of prevention, in 2017, EDF continued its involvement in the implementation of social energy tariffs (TPN and TSS<sup>(1)</sup>), as well as its commitment alongside local authorities and social services to rolling out local payment assistance for energy bills; for example, with the housing solidarity fund (FSL), to which EDF is the leading private contributor with €23 million.

Economically disadvantaged customers can ask for assistance from the housing solidarity fund (FSL) and can benefit from continued energy (gas and electricity) supply in their homes once their case is examined by the FSL Commission. They can also request an energy cheque and thus benefit from a more staggered reminder procedure if they have difficulties in paying their bills and so maintain the subscribed power level during the winter period (from 1 November to 31 March)<sup>(2)</sup>.

3.

(1) Basic Necessity Tariff and Special Solidarity Tariff.

(2) For more information, see <https://particulier.edf.fr/fr/laccueil/contrat-et-consolfactures-et-documents/aides-sociales/aides-ponctuelles.html>.

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### Act positively within communities and strengthen dialogue

Through its participation in public mechanisms, EDF has renewed its commitment to the Habiter Mieux (Better Living) programme, implemented by the State and piloted by the French Agency for Home Improvement, until end 2018. At the end of September 2016, the programme had enabled the renovation of 190,000 homes occupied by owners in energy poverty. EDF also renewed its partnership with the Abbé Pierre Foundation in 2017.

Support for vulnerable customers is a priority focus of the actions carried out at the Group's own initiative to fight against energy poverty. EDF calls on 5,000 employees (customer advisors and solidarity advisors) to provide customers experiencing difficulties with suitable, flexible solutions, whether or not they are taken care of by social services. Solidarity advisors work directly with social workers to best support the most fragile customers.

The services implemented include the Energy Support service, which offers payment assistance solutions and customised support (proposal of suitable payment methods, energy savings advice); the digital solution, "e.équilibre" enables customers to better understand their electricity consumption as translated into euros, and offers advice on energy savings.

EDF pursues its partnership approach to act proactively with vulnerable customers; this is the case with the UNCCAS (National Union of Municipal Centres for Social Action) which also exists at departmental and communal level, and aims to strengthen the relationship with social workers; and again with the National Union of PIMMS (public service mediation centres)<sup>(1)</sup> and the National Agency for Housing Information (ANIL). EDF also continues its collaboration with charities such as the Secours Populaire, Secours Catholique and the French Red Cross.

In terms of research and development, for the last ten years, EDF has carried out a research project dedicated to the fight against energy poverty ("Energy Poverty: Understand in order to Act") costing over €1 million per year. Some social innovations have come from the community workshop in the Empalot district in Toulouse, a space where energy management workshops are organised in the heart of a "City Policy" district. As part of its research, EDF is also working on the digital divide, at a time when an increasing number of prevention and support solutions are using digital means.

EDF is implementing many other initiatives in France such as MDE and LED kits, or the implementation of the SLIME programmes (local intervention services for energy management) in Reunion by EDF Island Energy Systems, aimed at detecting and assisting customers in situations of energy poverty, and coordinated by the French energy transition network (CLER).

In the UK, the public authorities have installed a new Energy Poverty Committee. EDF Energy continues to improve its digital support solutions by making them accessible and easy to use. For example, "Energy Priority services" proposes a wide range of solutions for assisting vulnerable customers. This digital platform, designed and set up with the opinion of customer panels, also makes it possible to better identify customers; it reinforces the options offered to customers to declare their difficulties, and facilitates the development and implementation of appropriate offers (payment assistance, price adjustments, energy efficiency advice, etc.). EDF Energy continues its different partnerships and in 2017 it launched a partnership with the "MacMillan Cancer Charity", an organisation of which 80% of its beneficiaries require advice in budget management and the payment of bills.

EDF Energy has completed the training in the understanding of the energy poverty issue for all its customer points of contact.

In Belgium, the public authorities have, for a long time now, set up systems to protect and help vulnerable customers. For example, in Flanders, the government has launched a new plan to fight against energy poverty primarily focused on energy efficiency. EDF Luminus is involved in the implementation of these public systems. Moreover, EDF Luminus actively participates in the "Energy poverty" platform launched by the King Baudoin Foundation.

EDF Luminus makes it a point to warn its customers when their consumption is much higher than their usual consumption, and grants personalised payment plans.

In Italy, Edison offers a "social bonus"<sup>(2)</sup> social electricity tariff. Edison has also implemented an energy bill monitoring mechanism to anticipate significant increases (based on a change over 20%) and offer payment arrangements to support customers with difficulties.

### 3.5.5 CONTRIBUTION TO ACCESS TO ENERGY IN DEVELOPING COUNTRIES

The materiality matrix identifies access to energy as one of its material issues (issue no. 31 Access to energy in developing countries). This refers to the offer of technical and economical solutions (innovative partnerships and business models) that improve access to electricity in developing countries.

Over a billion people worldwide do not have access to electricity. Access to electricity is a vector for progress and development, for example in terms of health, education and security. This key subject has been clearly reaffirmed in the United Nations sustainable development objectives. At the same time, technological advances, the cost of equipment and local economic models open up new possibilities for action and mass implementation. For this reason and to pursue its action in this area, EDF has decided to develop new business models combining its traditional know-how with technological and financial innovations.

At the end of 2016, EDF and Off Grid Electric, a leading company in the distribution of solar energy in Africa, signed the first large scale operational partnership between a global energy provider and a leading off-grid solar electricity company. The joint venture in Côte d'Ivoire, ZECL, aims at gaining at a 20% market share by 2020, with plans to rapidly extend the partnership to other countries in the region. As part of this ZECL joint venture, EDF and Off Grid Electric will install and maintain solar power kits for rural and peri-urban households. At the end of 2017, ZECL had already installed 10,000 solar power kits in Côte d'Ivoire, providing some 50,000 people with electricity. EDF thus consolidates its commitment to access to electricity in Africa, in the continuation of actions already carried out by its decentralised service subsidiaries.

### 3.5.6 CUSTOMER HEALTH AND SAFETY

EDF group's low-carbon generation mode acts positively on air quality, and the electricity generated offers consumers a comfort that contributes to the major public health challenges (cold chain, lighting, interior air, interior circulation, etc.). Electricity generation sites and electricity use by customers, however, require the implementation of certain precautionary measures. For this reason, EDF has long employed information and awareness raising mechanisms in matters of health and safety, in the areas of generation, the electrical grids and uses. Recently, EDF has intensified its research and action on consumer health and safety. The EDF group is for example, likely to generate noise pollution that could affect people living close to its facilities. This is a type of impact which EDF has shown an interest in tackling for several years now, in both its generation and construction activities, for activities on-site or in transit.

EDF has a medical studies service that intervenes as experts in all the Group's activities. EDF has drafted a health strategy within the Sustainable Development Department to better take the health issues of its business into account. The research department has the most leading edge tools and has taken part, for example, in the creation of a laboratory (4EV Lab) whose research focuses on quality of life in urban areas. The subject is steered by the operational Generation and Sales and Marketing departments. In 2017, the Health topic was explicitly included in the EDF group's Sustainable Development Policy published on 6 March 2017.

(1) 64 of the 191 reception centres and social mediation structures that EDF partners in mainland France.

(2) Created by the Public Authorities in January 2009, the "Social Bonus" is a mechanism to support families experiencing difficulties by guaranteeing annual electricity expenditure savings. Open according to social eligibility criteria, the bonus is valid for 12 months, and renewable.



Some examples of actions carried out in 2017:

- at the Sales Department in France, a safety instructions booklet is systematically sent to all customers who take out a natural gas subscription with EDF, regardless of the channel of subscription of this offering. These instructions can also be accessed on the edf.fr web site. The edf.fr web site also has informative content concerning electricity. Moreover, EDF is an active member of the PROMOTELEC association which offers advice to consumers. The new Sowe subsidiary offers its residential customers access to information on their interior air quality via a connected terminal;
- as part of Dalkia's reinforced health and safety action plan, the subcontractor health and safety charter has been deployed and the subcontractor safety assessment scheme has been set up. In 2017, a certain number of actions (subcontractor breakfast meetings, for example) were set up by entities to ensure greater involvement of subcontractors in these issues as well as safety audits of subcontractors on large sites. Dalkia deploys SERENIS, an offering dedicated to health institutions that ensures the quality and availability of useful energy (heating, air-conditioning, etc.), and includes the regulatory conformity of facilities and the implementation of health risk control procedures;
- EDF conducts research to assess the impact of energy efficiency work on the quality of life of occupants. EDF develops major research on the assessment of the impacts of our generation facilities on people and ecosystems, for example, through our chemical or radiological discharges. Replacement processes or products are also tested and assessed to reduce health risks to residents as well as employees;
- Électricité de Strasbourg provides its customers with various sorts of information relating to their electrical installations and acts on risk prevention. On its web site, its blog and also with specific messages such as customer letters concerning electrical installations<sup>(1)</sup>, ÉS provides its gas customers with a document entitled "gas safety info." that sets out the principles for use, servicing and safety relating to natural gas<sup>(2)</sup> in the home;
- for several years now, Enedis has been disseminating safety advice to people working near electrical facilities. This prevention campaign was completely renewed in 2016 and completed in 2017. It is now based on the slogan: "Caution Electricity: keep your distance" and gives advice that reminds various groups of the different precautions to be taken close to the facilities. At the national level, Enedis develops partnership agreements with organisations that represent the main populations at risk, for example with the national fishing federation in France (FNPF) in order to raise the awareness of anglers to the risks close to electric lines and advise them; the General Directorate of civil security and crisis management (DGSCGC) in order to reinforce their cooperation in the prevention of risks related to fire-fighting close to electrical networks. There are other agreements with partners in the building and civil engineering sectors, farming and recreational aviation. In the regions, Enedis also works with associations and professional federations to relay information. There were over 300 agreements in force in 2017, in particular with organisations representing agricultural activities, recreational aviation, fishing and fire-fighting. Lastly, Enedis takes part in national and local events (trade shows, fairs, etc.) where it raises the awareness of visitors to the risks arising from certain activities conducted close to electrical facilities. In 2017, Enedis was at the International Agricultural Show and, as it does every year, took part in a programme broadcast by Campagne TV;
- for high risk customers (people who require respiratory assistance at least 20 hours a day and children with parenteral nutrition), there is a specific information procedure in case of a power cut. For cases of power cuts scheduled in advance for works, the distributor notifies the patients or their representatives one by one so they can organise themselves and avoid the consequences of an interruption to supply. For non-scheduled power cuts, the distributor provides the patients with a phone number that is especially reserved for them as well as the organisations representing them to enable them to call and find out the probable duration of the power cut. This information is essential since the emergency services on which these patients depend have a limited<sup>(3)</sup> period of autonomy;
- abroad, EDF Energy in the UK, and EDF Polska informed their customers of the potential dangers of electricity through newsletters or on the back of bills; EDF Energy also offers a toll free number to inform its customers about safety practices. It carries out a specific action for its more vulnerable customers to promote their health especially during the winter period;
- in Italy in 2017, our subsidiary Edison acquired a 51% stake in Assistenza Casa (Home Serve Group), a company involved in innovative services to consumers. This company that employs 50 people has a network of 400 artisans all over Italy to serve some 300,000 customers. Edison is thus able to offer new maintenance and repair services to improve home comfort. Edison has created a home assistance service to its customers to cover the malfunctioning of electrical appliances that run on gas. This service offers the possibility of unlimited calls and a guarantee of services;
- an information campaign was organised by the Medical Studies Service (SEM) on the question of magnetic fields;
- EDF Énergies Nouvelles ensures that its facilities are fully compliant by adhering to the applicable regulatory requirements with regard to acoustics. Furthermore, it has internal staff dedicated to this issue within the Group's Engineering Department. Acoustic studies are performed for each wind project studied to assess impacts and minimise them at the design stage of project development. The noise level of turbines form part of the selection criteria for the procurement of machinery. This parameter is taken into account as part of the technical criteria for the classification of turbine manufacturers. EDF Énergies Nouvelles listens to local residents where there is evidence of noise pollution in the operational phase. The acoustics are monitored at wind farms in operation to check the assumptions of impact studies and take any appropriate corrective measures. In 2017, EDF EN signed a partnership agreement with the Medical Studies Service of the EDF group in order to collaborate on environmental health issues related to wind farms. At the Nuclear Generation Division (DPN), acoustic measurements were taken periodically on the outskirts of power plants and the results were presented to the Local Information Commission. At the DIPDE, the TYMPAN software is an environmental acoustic engineering tool developed by the R&D Department and used for conducting acoustic impact studies of the facilities. In the case of Centraco, a measurement campaign was conducted for emerging tones at the Centraco site in 2017 and did not show any values that exceeded the regulatory thresholds. at the DPIH, we note a specific and innovative action on the La Coche (Department 73) site located in a peri-urban area. To limit the impact of the site for residents, the DPIH pays special attention to noise control and the acoustic and vibrations monitoring of the site. This monitoring is carried out continuously by an independent design office using sensors implanted on the closest homes. Alerts may be sent in real time if the pre-defined thresholds are exceeded, and noise reduction measures are taken immediately. At Dalkia, the issue of noise pollution is taken into account locally when the activities are deployed. This is managed by the SMI (Infrastructure maintenance site) and is also seen in the use of more silent new technologies such as special wall coverings, sound traps, and exhaust gas mufflers for co-generation facilities). At Citelum, as well as at Électricité de Strasbourg, the deployment of vehicles fitted with electric pods makes it possible to carry out operations with engines switched off during night operations. Sound measurements are taken systematically by Edison and Norte Flu who continuously monitor compliance with the regulatory thresholds. At the DIAG, the reporting guidelines for work spaces include an acoustic component aimed at improving the acoustic quality of work spaces;
- EDF also takes action at its hydroelectric facilities with, in particular, hydro-guides during the tourist season: people who are trained by EDF, and can carry out risk prevention on river banks in Corsica, posters and alerts in the media. Our actions extend to prevention with subcontractors who work at or close to our facilities, and to prevention with companies that are not subcontractors but work close to the facilities;

(1) For example : <http://particuliers.es-energies.fr/particuliers/demenagement/jour-j-une-installation-electrique-conforme>

(2) <http://particuliers.es-energies.fr/content/download/9670/60916/version/2/file/infos-securite-gaz.pdf>.

(3) For more information, see <https://www.service-public.fr/particuliers/vosdroits/R33396>

## 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

### Act positively within communities and strengthen dialogue

■ many actions are carried out in the French islands and the Overseas Departments. In Corsica, information campaigns about tree pruning have been organised in schools through associations. This campaign was reinforced with companies working with state services after an accident that occurred in 2017. In French Guyana, there were operations in the illegal neighbourhoods on “spontaneous” housing where non-conforming facilities represent a real danger. In Martinique, an information campaign was organised around risks related to power lines (brochure, web site, social networks, press) and on the fact of working close to power lines for construction and agricultural professionals. In Reunion, a specific brochure for pruning was printed, and there was information in the press following a tropical storm. During the cyclone season, EDF systematically reminds its customers of the safety instructions to be obeyed. We inform our customers after storms or cyclones to advise them not to touch cables or wires on the ground.

### 3.5.7 RESPONSIBLE PURCHASING

The materiality matrix identifies the theme of responsible purchasing as one of its material issues (issue no. 34 duty of care and responsible purchasing). This refers to responsible relationships with suppliers.

#### 3.5.7.1 Responsible purchasing

EDF’s responsible purchasing approach is at the heart of the Group’s social and environmental responsibility policy. The Group’s new purchasing policy, signed in 2017, defines that the Group’s values must be respected by suppliers and that obligations in terms of sustainable development and social responsibility must be systematically included in contracts, in particular through the signing of a sustainable development charter (established in 2014 and updated in 2016). Contracts include clauses that allow contractual relationships to be challenged in the event of non-compliance or serious deviations observed, for example during an audit conducted on the basis of legal obligations and sustainable development and social responsibility obligations. This is because the Group’s Purchasing Department implements an assessment programme for all contract holders that may involve risks identified during the risk mapping process for risks related to sustainable development, via a system of self-assessments or audits depending on the type of supplier.

Moreover, the purchasing policy promotes regional involvement, support for local development, in particular by giving preference to relationships with SMEs as well as the use of the protected worker sector and structures for integration through economic activity.

In implementing purchasing contracts, the Group Purchasing Department ensures that supply chain risks of suppliers are controlled, and also that there is financial fair treatment with respect to suppliers, in particular through pricing actions or the deployment of collaborative reverse factoring which gives them the possibility of pre-financing their invoices before the contractual due date, as soon as EDF <sup>(1)</sup> issues the payment voucher.

Under the Group Purchasing Policy signed in 2017, the EDF group Purchasing Department ensures that actions carried out in the Group’s Purchasing Departments (excluding RTE) are consistent, defines the general framework of the policy and manages the organisation of the purchasing function.

Most entities and subsidiaries, such as Dalkia or EDF Energy, have implemented sustainable development charters and sustainable development and social responsibility assessment systems.

#### 3.5.7.2 Supplier relations

EDF is one of the first signatories of the Responsible Supplier Relations Charter created in 2010 by the ombudsman and the national procurement council. In 2017, a follow-up audit confirmed the “Supplier Relations” Label conferred on EDF in 2015 by the Ministries of Economy and Finance, to reward companies that have sustainable and balanced relationships with their suppliers.

Backed by the Group’s ethical values, the Group’s Purchasing Department has implemented a Code of Good Conduct for players in the contract process, combining strict ethical rules, principles of good sense and recommendations of good practices for its employees. A Sustainable Development Charter between EDF and its suppliers reinforces and lays out the principles of the Group’s Ethics Charter as part of supplier relations. The ethical undertaking signed by each buyer lists the principles to be complied with in relationships with current and prospective suppliers.

In 2017, EDF reinforced its monitoring mechanisms for its suppliers, by setting up a conformity undertaking. All suppliers can bid for tenders only if they have signed this undertaking. The undertaking covers the following themes: corruption, money laundering, financing of terrorism, absence of conflicts of interest. The main subsidiaries include a specific clause in their general terms of purchase (Clause 18 or its equivalent) relating to sustainable development (environmental and social clauses).

In 2017, the Group Purchasing Department stepped up its proactive programme of “Productivity Partnerships” with suppliers in a win-win approach. Results are on the rise (gains of €56.8 million in 2017, gains of nearly €50 million in 2016 and gains of nearly €27 million in 2015)

It organises forums and meetings with suppliers and service providers to reinforce dialogue, promote local sourcing and the upskilling of local companies. Specific programmes have been set up for this purpose. They include “One river, one region” to provide support to regions and service providers in the environment of hydroelectric generation facilities. The Group Purchasing Department also organises supplier days around a specific theme (artificial intelligence in October, followed by manufacturing and related risks and intellectual services in November 2017. Lastly, in collaboration with the R&D Department, it organised the 4<sup>th</sup> “SME and Innovation” Forum.

Service provider surveys are conducted by various Group entities to assess the level of satisfaction of service providers with their relationship with EDF.

#### 3.5.7.3 Assessment of suppliers

Compliance by suppliers and their subcontractors with the environmental and societal commitments is mainly controlled by a system that prioritises assessments according to a sustainable development – Corporate Social Responsibility risk mapping covering EDF’s 253 purchasing segments <sup>(2)</sup>. This mapping was drawn up based on the following criteria: societal (impact of the quantity of labour, impact of the qualification of labour, impact of relocation of labour); environmental (risk in the development and use of the product or service, risk of non recycling); economic (risk of corruption). After they have been scored, these segments are classified into four risk categories (16 major risk segments, 33 strong risk segments, 149 average risk segments, 55 low risk segments). At the end of 2017, less than 500 suppliers belonged to the major (1/3) and strong (2/3) risk categories.

The Group’s Purchasing Department uses Afnor’s Acesa internet assessment and dialogue platform to send these questionnaires. This tool makes it possible for purchasers and suppliers to share an approach of continuous improvement in corporate social responsibility.

Moreover, during consultations, EDF can use these CSR assessments as aptitude or attribution criteria.

In 2017, the EDF group Purchasing Department carried out 224 new “Sustainable Development – Social Responsibility” assessments divided between 173 questionnaires and 51 audits, based on the CSR risk mapping of the purchasing segmentation.

At the end of 2017, nearly 1,500 suppliers had been questioned and 730 had been assessed and controlled. The objective is to send a questionnaire to all suppliers with contracts for an amount of over €400,000, with a major or strong risk level.

(1) EDF enables its suppliers to benefit from interest rates based on its own financial risk and credit standards.

(2) Enedis insourced its entire purchasing function in 2017, the mapping of the Group Purchasing Department therefore has 253 segments in 2017 compared with 265 in 2016.

The assessments made turned out to be “satisfactory” or “acceptable with comments” in more than 80% of cases for audits and in nearly 40% of assessments.

CSR audits enabled the detection of deviations on the following points: absence of waste sorting, including on supplier sites located in France; irregularities in the monitoring of workplace accidents, non-observance of working hours and absence of social security contributions (mainly suppliers located in China); absence of measures to reduce gender pay gaps; absence of upstream identification of CSR issues (social, societal, environmental, ethical, health and safety).

Furthermore, these audits also made it possible to detect good practices and trends: sending of EDF’s Sustainable Development Charter by the approved supplier to its own suppliers and subcontractors; undertaking and implementation of monitoring and assessment procedures for their suppliers, even if the CSR criteria are still too under-developed. In this respect, for example, HPE, a computer supplier, is a member of the Responsible Business Alliance (RBA), which is committed to supporting the rights of workers and communities that are affected by the global electronic supply chain worldwide.

Suppliers concerned by “unsatisfactory” or “insufficient” assessments have sent EDF an improvement action plan. They corrected major environmental or social gaps as soon as possible. For suppliers in major risk segments, the results of audits considered as “unsatisfactory” or “insufficient” may lead to the termination of the contract.

Supplier CSR scorings carried out show the need to implement wide ranging supplier awareness raising plans to improve skills within the CSR scope. The findings of the CSR audits revealed the main strengths to be in the following areas: setting up of a formal EMS (with certification) for HSE policies on the worker health and safety component, in particular accident prevention; regulatory monitoring; implementation of actions in favour of the disabled; training of employees (technical and CSR).

In Group companies that do not use the Acesa platform, various assessment modalities are used. Dalkia periodically assesses suppliers based on an assessment grid including sustainable development issues. The results are shared with suppliers and improvement actions or audits are implemented if required. Edison uses a self-assessment platform that focuses on the ten principles of the Global Compact and is shared with other companies.

### 3.5.7.4 Coal and uranium supply chain

With regard to coal, EDF is a founding member of Bettercoal, an initiative launched in 2011 that brings together energy providers, port institutions and coal-fired terminals. It is a mechanism that aims to promote the corporate responsibility of companies in the coal supply chain, particularly in mining sites, and to ensure that the fundamental rights (human rights, working conditions, worker and community life, protection of the environment) are respected. The operational approach focuses on a guideline that establishes ten corporate, environmental and ethical principles as a basis for supplier self-assessments and audits. Audit results are shared between members, in compliance with anti-trust principles.

The bettercoal.org site publishes, in addition to its annual reports, updated information on the approach, particularly the list of companies and mining sites that have carried out self-assessments or been audited, and the list of bettercoal approved audit organisations. In the same logic of disseminating information, the minutes of bettercoal’s Consultative and Technical Committee meetings are circulated, as well as the composition of the Committee, whose members come from NGOs, international trade union federations, mining companies and energy producing companies. This Consultative and Technical Committee met three times in 2017.

For uranium, see section 1.4.1.1.4 “The nuclear fuel cycle and related issues – upstream”.

## 3.5.8 SUSTAINABLE DEVELOPMENT TRAINING AND AWARENESS RAISING ACTIVITIES

### 3.5.8.1 For employees

At Group level, sustainable development training courses are primarily related to the environmental aspects of each business activity. They aim at developing the knowledge, skills and expertise of employees with respect to regulatory requirements and standards, to enable the environmental and health impacts of facilities and activities to be kept to a minimum. To this end, specific “environmental” training courses have been integrated into the “business” training syllabus and in the employee induction process. Specific actions to raise awareness about environmental protection are also deployed on sites for service providers and subcontractors.

At the Sales and Marketing Department in the subsidiaries (Dalkia, Citelum, etc.), federated into a Group level Academy of Energy Services since 2016, these courses mainly concern energy efficiency.

Within the EDF SA scope, 3,262 employees took “environmental” training courses, representing a total of 31,391 training hours.

To create a common platform of knowledge on sustainable development, training courses accessible to all have been included in the “Academy for all”, created in March 2017 to develop skills that are not directly related to the exercise of a specific function. These courses are either classroom based or e-learning based and concern the following themes: human rights, health and environment, protection of biodiversity, waste prevention and management, environmental management, renewable energies, etc.

In the chapter on “sustainable development”, the Company training guidelines developed over a three year period by EDF SA, focused primarily on two areas of knowledge and skills: consultation with stakeholders and the taking into account of biodiversity in activities and projects. In these areas, the collective and cross-functional upskilling was organised to meet corporate social responsibility objectives and comply with the latest regulatory trends. These courses are intended for managers, project managers, and all employees concerned in particular by consultation with stakeholders and the preservation of biodiversity.

In France, the “Sustainable development training and awareness raising” catalogue for managers and employees, accessible on the sustainable development communities and Functional Academies, groups together courses in themes that cut across all departments and subsidiaries. These include training in the new environmental regulations monitoring tool and the “ISO 14001 standard and its transformation” e-learning tool, designed in 2016, which were deployed in all departments in 2017. The “Responsible Purchasing” course has also been updated to include changes in regulations and standards. It is now intended for all those involved in the purchasing process from all departments and subsidiaries. A similar course has been developed at EDF ENERGY.

In the United Kingdom, a new e-learning tool enables the refreshing of the skills of new arrivals and current employees in the area of sustainable development. It explains the advantages that sustainable development can bring to EDF ENERGY by taking into account all the guidelines of the “Better Plan”.

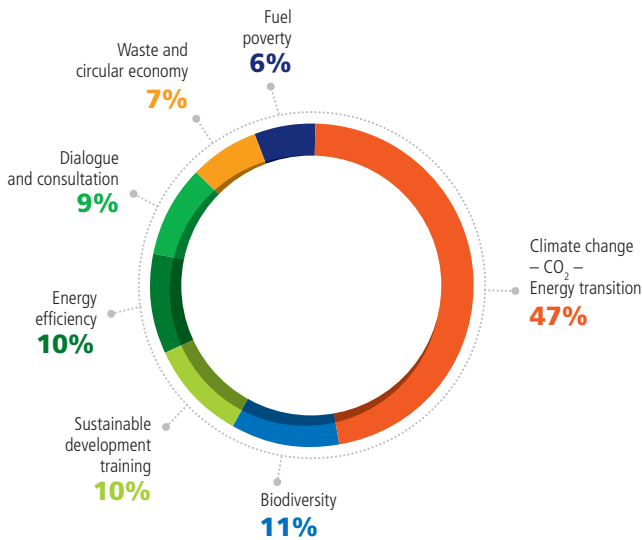
The awareness of employees was also raised through communication actions focused on the Group’s six Corporate Social Responsibility Goals (CSRG). They have been distributed to Group managers and employees through media such as the Vivre EDF le Mag, Vivre EDF Group News, the “Vivre EDF On-Line” intranet, and through the sustainable development community.

The objective of this community for the last five years has been to inform, raise awareness and discuss the key themes of the CAP 2030 strategy, the CSRGs, and all topics linked to sustainable development with employees. Accessible to all Group employees, since it was opened, the SD community has recorded nearly 1,000 articles/videos published, 235,000 visits, 524,000 pages viewed, for an average reading time per visitor of about 5 minutes. To convey news about sustainable development, the Group’s businesses and divisions, as well as outside news about the subject, a push mail is sent every week to over 2,500 Group employees who have asked to receive this weekly newsletter.

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#### → Themes addressed in the SD community in 2017



The topics discussed are either “external” ones (the government’s 2017 Energy Climate Plan, the energy transition law, or the COP 23 in Bonn) or “internal” (the new “solutions for the climate” developed by the EDF group to fight against climate change, and the showcasing of the Group media: “Performance” documents, focus on Group CO<sub>2</sub> emissions, etc.).

The community is also used to inform about events in which the Group’s companies and business lines take part each year.

For example:

- La Fête de la nature: EDF has been a partner of this event for over ten years now. It has enabled the Company to raise the awareness of its employees to the challenges of biodiversity. In 2017, a large number of EDF sites and business lines took part in this event. (see section 3.5.8.2 “For the general public”);
- the EWWR – The European Week for Waste Reduction organised in France by the French Environment and Energy Management Agency (ADEME). In 2017, the Group’s divisions and business lines organised about thirty events for employees and service providers to raise their awareness about eco-gestures to better manage waste, reduce waste production and reuse or recycle waste;
- they reinforced the awareness of employees on the “waste” issue. Tiru signed a partnership with the association Run Eco Team to raise the awareness of employees to producing less waste and reusing the waste produced. At Luminus, managers took advantage of team meetings to discuss topics related to social and environmental issues (for example, “the 12 good habits to adopt to avoid wastage”; “how to sort your waste for a better environment”); the EDF R&D Department organised workshops to teach employees to reduce and recover waste; the EDF Nuclear and Thermal Plant Division has developed and deployed learning tools about waste for its employees and service providers. It also organised workshops about the circular economy and raised the awareness of participants to environmental impacts and waste from sites.

#### Measuring the impact of training and awareness raising actions

The impacts of training and awareness raising on sustainable development are measured annually through an internal survey of over 3,000 employees of EDF and Enedis. Since 2014, nine out of ten employees declare that they are concerned by sustainable development; note the 4 percentage point increase in those who feel “very” concerned in 2017, bringing the percentage to 41%. The results of the survey follow on from the basic trends observed since 2010: increasing concerns of employees over climate change, even considered as “very worrying” by 65% of

them in 2017 (45% in 2010). It is increasingly identified as the consequence of human activity (77% compared with 73% the previous year). 85% of employees also believe that it is possible to fight against climate change (up 4 points). Nearly all employees declare that they are for the use of renewables (88% for wind power and 96% for hydropower), but also for nuclear power (79%). Lastly, a large majority of employees declare that they are hostile to fossil fuels: 79% are against the use of oil, 83% are against shale gas and 90% are against coal. For nearly all the employees questioned (96%), energy distribution companies have a role to play in environmental protection. Moreover, 85% expect them to promote energy savings. 65% of them declare that they have already heard of corporate social responsibility commitments in their work, while 66% of them have heard of energy efficiency. Room for improvement: the concept that employees encounter the least is that of the circular economy (20%).

EDF integrates three corporate responsibility criteria into variable compensation mechanisms when calculating employee profit-sharing, up to 40% of overall profit-sharing. For 2017-2019, it used the following criteria:

- a social criterion relating to participation in e-learning training in health and safety, accounting for 20% of total profit-sharing (target of 3,500 e-learning courses in 2017);
- two “Sustainable Development and Digital Development” criteria: one concerns the reduction of print jobs on the printers connected to the network (reduction target of 15% in 2017), and the other concerns the increased use of remote connection to replace physical connection (increase target of 20% in 2017), each accounting for 10% of total profit-sharing.

#### 3.5.8.2 For the general public

The issues of energy, the environment and sustainable development are often not well known by the Company’s various external stakeholders. This sometimes leads to less fluid dialogue, the formation of pre-conceived ideas or even, for EDF, unsuitable practices in terms of electricity consumption. That is why the Group contributes to informing and raising awareness in these areas, in particular with a special focus attention to young people.

The Group, in connection with the CAP 2030 strategy, has focused for the past two years on raising the awareness of external audiences to its corporate social responsibility and the six areas covered by its Corporate Social Responsibility Goals: fight against climate change, human development, energy efficiency, energy poverty, dialogue and consultation, and biodiversity. These six themes have been included in the strategic communication plan for 2018-2020.

#### Climate change and local actions

An information campaign to prove the issue of climate change and the solutions that EDF and its subsidiaries need to implement to reduce carbon in the economy was continued in 2017 on the internet and relayed on the social networks (EDF Facebook and Twitter accounts, opinion leader networks specialising in sustainable development, etc.). Over and above the raising of awareness on the issues of climate change themselves, over 60 “EDF group solutions for the climate” which explain concretely and instructively how the Group reduces its own CO<sub>2</sub> emissions, steps up the development of renewable energies, helps its customers to consume better and less, and supports the energy transition of cities and regions, were published on-line.

In France, this operation was supported by the continued cycle of “Energy Climate Encounters” started during the COP 21, where national and international experts share their approach towards climate issues and energy transition with targeted audiences (major companies, local authorities, government representatives, etc.). Three conferences were organised on the themes “Energy transition: from the why to the how?”, “Circular economy and climate change: performance obligations”, “The new Paris Climate Plan: how to build a fair, resilient and carbon neutral city?”. Each conference is preceded by an encounter with e-opinion leaders specialising in these fields, to increase the impact of this action.

Lastly, the heart of EDF’s advertising communication to the general public in France was based on climate issues and the relationship between the choice of a mix primarily based on nuclear and renewable energies and generation that comprises 97% of zero carbon emissions.

In direct contact with corporate stakeholders, generation sites continued their local activities. There was record attendance (20,000 visitors) for the 2017 edition of the "Electricity Industry Days", created in 2011. It contributed to raising the awareness of the general public to the challenges of the decarbonisation of the energy mix. Similar operations were conducted by Dalkia and its subsidiaries during the French sustainable development week.

The measurement of the overall effectiveness of these actions led to the following results: at the end of 2017 <sup>(1)</sup>, 44% of people in France considered that EDF is developing new energy sources (wind power, solar power, biomass, etc.); 24% of them think that EDF generates energy with relatively low CO<sub>2</sub> emissions. For 32% of survey participants, in France, the Company acts in favour of the energy transition and proposes new energy solutions.

EDF has maintained its partnership with the Fête de la nature (nature festival) and partnered the 11th edition of this national operation supported by the Ministry of the Environment, Energy and the Sea <sup>(2)</sup>, which raises the awareness of over 570,000 people to biodiversity issues over a five day period. This year, 35 EDF sites took part in this festival, with the notable inclusion of Corsica, Reunion, Guadeloupe and Martinique, which are important sites of French biodiversity. All the sites presented a total of 91 events (exhibitions, conferences, nature trails, etc.) on the theme "the super powers of nature", and welcomed some 4,700 visitors.

Around one hundred French nuclear, thermal and hydropower sites also maintained the opening of industrial installations to local residents and school children: 400,000 visits in 2017, systematically integrating an educational conference on their operations and their economic and environmental impacts.

In the French Overseas Departments and territories, the regional units prioritised their actions on energy poverty and organised symposiums on this theme with regional solidarity players. In the United Kingdom, in April, EDF Energy launched its Better Plan for a sustainable and responsible energy business. This programme is an integral part of CAP 2030 and has been developed with the Company's stakeholders. It is based on three pillars: the decarbonisation of electricity (Better Energy); energy efficiency and the taking into account of energy poverty (Better Experience); human development (Better Lives). In Italy, Edison has focused its awareness raising actions on public debates devoted to sustainable development and corporate social responsibility issues such as the CSR and Social Innovation Annual Event (5,000 people in two days), the Women G7 (theme of inclusion), or workshops organised throughout the year by the Global Compact network, which is very active in the country.

Awareness raising of young populations on the issues of electricity and sustainable development has been a long term strategic focus. Within the scope of a partnership signed in 2002 with the Ministry of Education, EDF organises free conferences on energy, electricity and sustainable development, for classes from primary school to the final year of secondary school. Linking to school programmes, these are led by suppliers specialising in education. In 2017, more than 102,000 school children took part in these conferences. The company also provides education resources for young people and teachers on its website [edf.fr/energie-a-z](http://edf.fr/energie-a-z) (over 800,000 single visitors). In the French Overseas Departments and local communities, EDF reinforced the partnership created in 2016 with the regional education authorities and teaching associations for the "Watty at school" programme. company employees go to the middle schools to raise the awareness of children of the need for water and energy savings.

### Raising customer awareness on energy savings

With more than 27 million customers in France, EDF is a key player in raising awareness of the management of energy demand. The company has developed "e.quilibre", a digital tool accessible on the website [edf.fr](http://edf.fr) to help customers easily analyse their electricity and gas consumption and better manage it. Using their computers or tablets, they can visualise in euros and kilowatt-hours the consumption of their appliances by type of use (heating, hot water, household appliances, etc.) and benefit from personalised advice and eco-friendly tips for adopting energy saving behaviours. This solution is now available for nearly 12 million customers. During 2016, a new functionality will enable customers equipped with Linky meters to set an annual consumption target. In parallel, 28 million e-mails to help customers better understand their consumption were sent during the year.

(1) L. Millward Brown Study – October 2017.

(2) Currently Minister of Ecological and Solidarity Transition.

(3) <http://fondation.edf.com>.

In Alsace, the Électricité de Strasbourg Group has also provided an online electricity consumption analysis and monitoring tool ([l-agis-sur-ma-facture.fr](http://l-agis-sur-ma-facture.fr)), where the Company provides energy saving advice.

### 3.5.9 SPONSORSHIP

For almost 30 years, EDF group, through its sponsorship, has shown its commitment to promoting actions driven by civil society <sup>(3)</sup>. With 43% of employees personally involved alongside associations throughout the country (according to an internal survey), the Corporate Foundation expresses strong attachment to the Group's values of solidarity, respect and responsibility. Thus, each year, the Foundation supports almost 150 social innovation drivers.

Since 1 January 2016, the EDF group Foundation has taken a common approach with several Group entities such as EDF SA, EDF Énergies Nouvelles and Dalkia represented on its Board of Directors with a Group approach to corporate sponsorship.

Endowed with a budget of €40 million over four years, the EDF group Foundation has focused its actions on solidarity and progress. It draws on the commitment and excellence of its employees' expertise to support the projects to which it gives its backing. It runs a cultural space that proposes a free cycle of exhibitions and meetings. For example, in 2017, the exhibition "Game, the video game over time" drew 117,492 visitors.

The EDF group Foundation is a historical partner of the Téléthon charity event that finances research projects on rare neuromuscular genetic diseases. Hundreds of employees participate through the time donation system or through the organisation of local activities (events, cycling tours, etc.). The Foundation supports the deployment of the 2<sup>nd</sup> Chance School Network to promote the integration of young people and organises a Hackathon with the aim of helping this partner benefit from innovative digital solutions.

The Foundation also contributes to the third sector economy through the Agir pour l'emploi ("Act for Employment") Fund as part of an original donation mechanism with donations made by 13,000 Group employees. It also supports a number of medical research institutes: the endowment fund of the Paoli-Calmettes Institute, for example, for the development of nanotechnologies for the study and management of serious forms of breast cancer, or the Institut du Cerveau et de la Moelle Épineuse (brain and spine institute) for the production of algorithmic models to slow down the development of Parkinson's disease. It also carries out activities to raise the awareness of young people to science subjects, through programmes such as Sciences Ouvertes and Fermat Sciences.

The Foundation also has a special focus on making progress with digital technology to fight against the digital divide in a spirit of e-inclusion. It consists in setting up an integrated management software to reinforce the chain of donation of unsold products thanks to the partnership with ADN Connect, or to build digital devices that enable young people to develop an informed and civic view of current image and media practices with the association Le Bal.

Since 2010, through the Association Trophies, each year the Foundation rewards 50 exemplary actions in favour of youth by small associations. For three years now, it has set up a call for proposals for employees involved in associations. This initiative, which is becoming increasingly popular has made it possible to set up a network of more than 500 employees identified in associations of public interest. For employees who wish to try out working with an association, the Foundation facilitates the organisation of "pro bono" activities designed to help associations develop their projects thanks to the input of professional skills (30 participants in 2017). Gradually, the Foundation is striving to combine support for public interest causes and the commitment of its employees through the various partnerships that it sets up. This is the case in the field of education and integration with Energie Jeunes or Télémaque, and in the field of disability with Jaccède or the AFM Téléthon.

Internationally, the Foundation supports projects run by associations for which electricity is a vector of access to water, health, education or development, by providing them with a combination of funding and technical expertise. For example, in 2017, it supported about forty projects that resulted in 61 technical assignments by 38 employees in 16 different countries. It also supports the voluntary commitment of employees who are engaged in international solidarity associations

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by allowing solidarity leave: in 2017, 30 employees benefited from this support in 2017.

In the UK, EDF Energy focuses its corporate sponsorship policy on sustainable development and support for local communities. EDF Energy grants employees two days per year to carry out volunteer activities within their local communities, to support schools and charitable or not-for-profit organisations. Employees are also encouraged to raise funds for the Company's major partner charity, Breast Cancer Now, which contributes to breast cancer research, raising the awareness of

employees and their families, prevention of the disease and support for employees who suffer from it.

In Italy, Edison's sponsorship activities are part of a corporate responsibility strategy to involve employees in volunteering actions. Edison has chosen to focus particularly on the younger generation to promote a sustainable development culture through schools, thanks to projects with major environmental, musical and cinema associations.

### 3.6 PAY CLOSE ATTENTION TO OUR CO-WORKERS AND MAKE OUR INTERNAL TRANSFORMATIONS A SUCCESS

In a changing environment, the human dimension is more than ever at the heart of EDF's strategic project, a key factor in the Group's performance.

To meet its industrial challenges, EDF must remain a socially-responsible and engaged employer, a leader in terms of the professionalism and involvement of its employees, by developing their skills and the diversity of their profiles. The Group also seeks to set an example in terms of social innovation by promoting a participative approach and making it easier to share good practice, in order to ensure long-term performance.

The Human Resources Division has chosen to focus on three areas that specifically reflect its responsible commitment: health & safety, gender equality, and the "social elevator". Details of these three themes, which form the "Human Development" Corporate Social Responsibility Goals, are in the relevant sections of the Reference Document.

Everywhere that the Group operates, the health and safety of its own employees and its sub-contractors' employees is an absolute priority. Both in France and internationally, EDF, as an integrated Group, acts in accordance with its values, by requiring all its staff to show integrity and respect for fundamental rights.

The "Human Ambition", which is supported by the Group's CAP 2030 strategy, is based on five fundamental values and implemented through practical measures:

- developing a digital culture and new ways of working;
- making people accountable and simplifying working procedures;
- developing and adapting skills;
- transforming the recognition model;
- setting high health and safety standards.

#### 3.6.1 PROFESSIONAL EXCELLENCE: EMPLOYMENT AND SKILL DEVELOPMENT

##### 3.6.1.1 Group workforces in 2017

The EDF group's consolidated workforces totalled approximately 152,033 <sup>(1)</sup> people on 31 December 2017, of which 66,789 worked at EDF SA, 38,888 at Enedis and 46,356 at the Group's other subsidiaries and shareholdings, which are included in the consolidation scope.

These staff numbers are up 0.7% compared with the end of 2016, against a backdrop of energy transition, technological developments and, in France, increased competitive pressure due to the liberalisation of markets.

##### Group workforces in France

The Group has almost 130,000 employees in France. Whilst globally this workforce is stable compared with 2016 (+176 employees), the Group has both entities which have grown (notably +12% for EDF Énergies Nouvelles, +20% for Dalkia and +10% for SOCODEI) and others which have had to adjust their workforce to a lower workload, which was notably the case for EDF SA.

EDF SA thus continues with the transformation undertaken as part of its strategic projects (Grand Carénage, EPR Flamanville etc.). The company agreement signed at the end of 2016 for the adaptation, transmission and development of skills contributes to this. After the 2008-2014 period marked by an ongoing increase in staff numbers (over 6,700 positions created and 23,000 new people hired), in order to anticipate the large numbers of people retiring and the strengthening of skills, there was a reversal of the trend during the 2015-2017 period, with a 3% contraction of staff on open-ended contracts in 2017. This change is the result of the closure of thermal generation sites, the adaptation of the commercial activity model and productivity efforts as regards simplification and digitisation of processes.

(1) This figure does not include the staff (2,265) of Eastern European subsidiaries sold in 2017, or those of AREVA NP (about 14,000), which became Framatome after its acquisition on 13 December 2017.

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The table below shows the breakdown of the Group workforce in France over the last three fiscal years:

	2017	2016	2015
<b>EDF SA</b>	<b>66,789</b>	<b>68,464</b>	<b>71,580</b>
<i>Of which Generation and Engineering</i>	40,302	40,843	41,789
<i>Of which Sales</i>	8,880	9,667	10,860
<i>Of which Corporate</i>	10,306	10,801	11,450
<i>Of which Island Energy Systems</i>	3,013	2,986	2,985
<i>Of which CDI (open-ended contracts) and CDD (temporary contracts) not employed under EGI status</i>	4,288	4,167	4,496
<b>Subsidiaries France:</b>	<b>63,092</b>	<b>61,239</b>	<b>61,826</b>
<i>Of which Enedis (previously ERDF)</i>	38,888	38,742	39,030
<i>Of which Dalkia and Tiru</i>	15,456	14,061	14,050
<i>Of which EDF Énergies Nouvelles</i>	3,482	3,108	3,029
<i>Of which Électricité de Strasbourg, SOCODEI, CHAM, EDF PEI, G2S (from 2016), Citelum</i>	5,266	5,328	5,717
<b>TOTAL FRANCE</b>	<b>129,881</b>	<b>129,703</b>	<b>133,406</b>

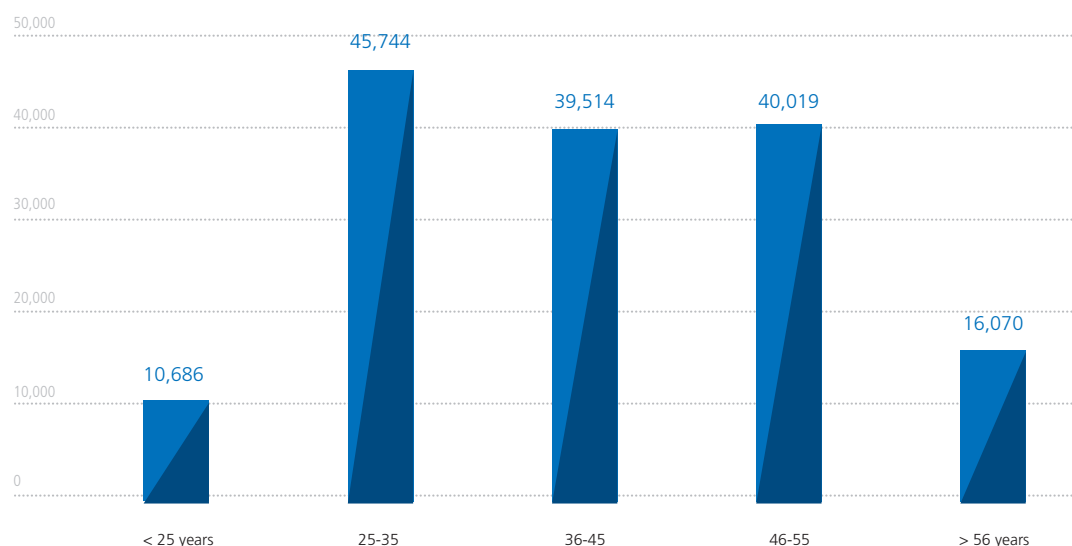
### International group workforces (consolidated subsidiaries)

Internationally, the Group workforce is rising (3.8%), excluding the scope effect linked to sales of subsidiaries in Eastern Europe in 2017.

The table, below, shows the breakdown of the workforces (Group share) of the international subsidiaries and shareholdings included in the consolidation scope over the last three fiscal years:

	2017	2016	2015
<b>EDF Energy (United Kingdom)</b>	<b>13,957</b>	<b>13,404</b>	<b>13,920</b>
<b>EDF Trading (United Kingdom)</b>	<b>796</b>	<b>966</b>	<b>988</b>
<b>Edison and Fenice (Italy)</b>	<b>5,144</b>	<b>4,949</b>	<b>4,950</b>
<b>EDF Luminus (Belgium)</b>	<b>1,940</b>	<b>1,708</b>	<b>1,583</b>
<b>Other foreign subsidiaries:</b>	<b>315</b>	<b>4,145</b>	<b>4,265</b>
<i>Of which EDF Norte Fluminense (Brazil)</i>	105	105	103
<i>Of which MECO (Vietnam) and China Holding Co (China)</i>	210	213	224
<i>Of which subsidiaries in Eastern Europe sold in 2017.</i>	0	3,797	3,938
<b>INTERNATIONAL TOTAL</b>	<b>22,152</b>	<b>25,142</b>	<b>25,706</b>

The graph below shows the age pyramid in the Group at 31 December 2017 (in France and outside France):



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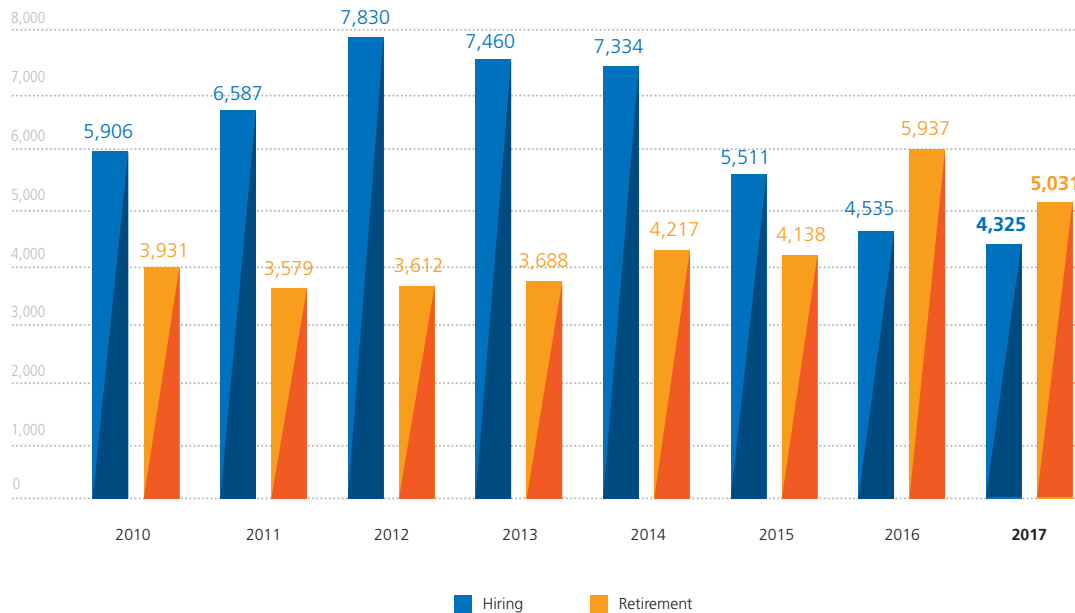
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#### 3.6.1.2 Levels of recruitment in 2017

The EDF group has a dynamic recruitment policy, with over 9,200 hires in 2017.

EDF SA has re-focused its employment policy since 2016 and intends to prioritise internal mobility in order to optimise existing resources and develop the career paths of its employees. Recruitment is now focused first and foremost on unusual, hard-to-fill or developing professions. The majority of recruitments are in the technical and information systems fields.

The graph, below, shows external recruitments as well as retirements observed since 2010 in Group companies whose head-office is located in France (excluding Dalkia and Citelum).



#### The EDF group's attractiveness maintained at a high level in 2017

Since 2016, the focus for recruitment has been on internal<sup>(1)</sup> mobility with better-classified internal short lists to manage declines in certain business lines. The changes in the structure of our recruitments (fewer engineers whilst maintaining a high number of technicians) as well as control of our costs led us to take another look at the entire process.

In 2017, EDF SA recruited over 1,700 staff on open-ended contracts and 2,242 people on work-study contracts.

The share of managers in external recruitments fell below 40% due to the continued significant presence of work-study trainees and the re-focusing of recruitment on the core business, with almost 35% of hires involving former apprentices.

The "EDF recruits" website continues to attract approximately 3 million visitors every year; in 2017, 260,000 applications were submitted online. The digital ecosystem around the site has also been strengthened. At the end of 2017, the EDF recruitment LinkedIn account had nearly 150,000 subscribers and the Twitter account nearly 5,000 followers. The internet user engagement rate continues to increase. The careers site has updated its homepage to showcase HR news and share it more effectively on "Elevate", the Group ambassadors' promotion tool jointly managed by the Communications and HR departments. In this way, several articles are shared, including powerful messages on the recruitment dynamic in partnership with the "Lempirecontreuntaff.com" blog.

In a difficult external employment market where companies' transparency and local activity make the difference, we use job-boards in a targeted manner in order to encourage applications for sensitive jobs: "Welcometothejungle" for IT, "EmploiMaintenanceIndustrielle" for technicians, and social networks to reach our various targets with original content (videos, photos).

EDF's attractiveness as an employer remains a key issue, particularly as recruitment becomes a preferred means for teams to acquire more cutting-edge and specific skills that are not available on the internal employment market.

The volume of recruitment in 2017 puts the EDF France Group amongst the benchmark recruiters and has been showcased to internal players (managers, HR, ambassadors) to remind them of the importance of external recruitment in the overall employment equation. Results from engineering school student surveys show that EDF is struggling to withstand the disaffection felt towards the energy sector, and it is in eighth place in the Universum "Engineers" ranking (behind Airbus, Google, Thales, and Dassault Aviation amongst others), and fifth in the "France's favourite employer" survey carried out by Randstad.

Whilst the vast majority of students express their interest in new energies, engineering schools have begun to issue warnings on the lack of attractiveness of the nuclear industry, even though this industry allows France to be the country that relies least on carbon-based sources for its energy needs. This alert is also true for work-study contracts. The attractiveness of the nuclear sector, which is constantly adapting to new technologies, will be highlighted during an event sponsored by industry professions for schools and students on 8 March 2018 at EDF's research and training facilities in Saclay: Low Carbon Day.

The robustness of our employer brand strategy nonetheless enabled all our business lines to recruit at a better level in 2017.

This strategy will involve other projects, such as an overhaul of the careers site in order to bring it into line with best market practices by offering an optimal "candidate experience", simplifying the application process and allowing dialogue with Group ambassadors. A student challenge could be organised as part of the Electric Days event, the EDF group's showcase for innovation and know-how. A new communications campaign will be deployed in 2018 to showcase EDF as an employer of the future.

At the same time, our close relationship with student and young graduate applicants continues to be strengthened: EDF is scheduled to participate in forty or so school forums during the 2017-2018 university year, and dialogue with students will also be enriched by regional events.

(1) Decision of 1 February 2016: EDF SA Favouring internal mobility over external recruitment.



Finally, efforts to optimise relations with higher education and research institutions have helped to prioritise actions aimed at major engineering schools and universities and organised with support from the network of approximately 1,400 “EDF Graduates Network” ambassadors.

The HE&R (Higher Education & Research) Committee has approved the renewal or creation of 17 partnerships with schools and universities since the start of 2017.

In more general terms, the Company continues to reform its recruitment process in order to adapt to current and future priorities:

- continuation of the internal sourcing offering, which has been a great success for the various entities and makes it possible to source skills internally for all of the Group’s departments in France (EDF SA and subsidiaries). The establishment of internal sourcing has had the effect of rebuilding expertise in the area of candidate search and recruitment, which had been totally outsourced since 2001;
- overhaul of the external recruitment process, bringing sourcing back in-house, diversification of candidate search channels and setting up of flexible and rapid mechanisms against a backdrop of applications volatility. In this way the recruitment process is firmly back within the remit of HR processes, in connection with Occupational and Skill Forecasting;
- preparation of sector-wide negotiations on compensation for new recruits to be more attractive, especially to high-level technicians (particularly those with three years of higher education who are almost excluded from our recruitment in the wake of the Bologna agreement which aims to do away with the level equivalent to two years of higher education) and candidates with significant professional experience, and to better integrate young engineers.

**Organised and enhanced welcome and integration, appreciated by new employees**

In a context of skills renewal, EDF group massively recruited over the last few years. Nearly 9,398 new co-workers joined the Group in 2017.

The Group’s progressive welcome programme lasts three years.

It firstly focuses, over the first year, on local integration into the unit. Integration then continues, in the second year, at national level, then at business line level or within the Company, with access to specific training where applicable. For management staff, integration at the international level completes the programme with the “2days2gether” event. All newly-hired employees, regardless of their category and business line, were also given a digital application to help them acquire an overall understanding of the energy sector in a fun way, better understand the Group’s workings, learn key figures and concepts and develop a network of contacts beyond just their own geographical site.

**3.6.1.3 Skill development: preparing for the future**

EDF relies on the development of its employees’ skills to support its industrial project. The professionalism of the Group’s men and women is a decisive factor in providing its public service missions, guaranteeing the safety and performance of its facilities, developing customer satisfaction and making EDF a global leader in energy and low-carbon growth.

The Group faces many challenges and EDF must adapt to a complex, fast-moving industrial and technological environment. The CAP 2030 strategy continues to provide guidelines for the Group to transform and take up these challenges, through such means as the extension of nuclear power plant lifespans, successful next-generation nuclear power plants, the growth of renewable energies and the rapid expansion of energy services and digital offers.

The success of these transformations depends, amongst other things, on the Human Ambition that they underlie. This means not only having the rights skills in the right place at the right time, but also improving the effectiveness of investment in training, via increasingly diversified teaching methods and by paying greater attention to the impact of the training provided.

In 2017, the Group allocated a budget of €617 million to training its employees.

In this context, 2017 was marked by the implementation of several key transformations in the field of training:

- the 28 October 2016 EDF SA collective agreement for Skills for the period 2017-2019 has been deployed. For the first time at EDF, this agreement covers a wide remit that includes occupational and skill forecasting, mobility, career paths, training, work-study programmes, and the generational contract. It promotes different skill development methods at the initiative of the employer and of the individual, with an innovative boost to Personal Training Account (CPF) contributions, if the training is for certification in a priority area for the Company or employees whose their CPF belong to a priority training category (low-qualification employees, disabled employees, employees involved in promotional training, employees with little training etc.). The agreement also strengthens the quality of training, better assessing its impact and encouraging diversification of learning methods, in particular through the digitisation of training;
- more than ever, the year has been marked by the way training has been used to serve mobility priorities at the Group level. Against the backdrop of intensifying competition and a situation in which the energy transition and process digitisation will have consequences for jobs, EDF is increasing its support for redeployment of sites and jobs and re-training programmes. The skills academies play an essential role in this since they are responsible for the content of redeployment and retraining courses, which are financed by funds from the professional branch whenever this is possible;
- 2017 was also marked by the continued deployment of the November 2015 Group “skills development and training” Policy, particularly the training quality section. The internal training bodies of the various Group entities continue to systematically apply the level 1 assessment (measurement of trainee satisfaction) and have adopted level 3 or 4 assessment methodologies (impact of training on work situation or measurement of its contribution to the improvement of operational performance) in order to meet the target of having 30% of training programmes assessed at level 3 or 4. In addition, at both Enedis and EDF SA, the training bodies are completing their accreditation in Data Dock, a training quality accreditation system;
- the Saclay Group campus, opened in August 2016, continued to increase its importance in 2017. This campus, which seeks to learn from its environment (EDF research teams, prestigious schools and universities, businesses at the cutting edge in energy, environmental issues and new technologies), has shown what a rich place it is for learning and innovation, thanks to the new spaces designed to disrupt habits and encourage reflection (dynamic co-working creativity space, educational innovation area open to all trainers, etc.). This campus joins Cannington Court, inaugurated in 2015 by EDF Energy near the future Hinkley Point C EPR, and the Lomme campus, managed by Dalkia and focused on energy services;
- digital training continues to be enhanced, with the constant goal of reaching more learners more easily and safely via increasingly modern and shared distance learning courses (virtual and augmented reality, simulators, MOOC, serious games, e-learning modules, etc.). These schemes are aimed at not only Group employees but also a growing share of its sub-contractors;
- skills Academies, which are still responsible for adapting and optimising the training provided by the Group, continue to develop. 2017 was marked by the creation of the “academy for all”, the newest addition to the other 16 academies. Its objective is to help EDF group employees improve professional skills in areas outside the core business. It provides a solution to employees’ training demands and objectives throughout their careers, with the development or acquisition of transferable skills (communication, quality of life in the workplace, risk prevention, safety and quality, digital, personal development etc.). This academy structure was extended to the United Kingdom starting in 2016 and continues its development with EDF Energy now managing 8 academies. EDF has undertaken a sizable project to overhaul its Human Resources Information system (HRIS), which will continue in 2018. Its objectives include stronger training management, more flexibility in the management of the training process, and better report quality.

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The GMU (Université Groupe Management – UGM), created in 2010, is intended to train 29,000 Group managers, executives and talents. It is one of the 19 major global group corporate universities with international CLIP (Corporate Learning Improvement Process) accreditation, which places it among the best corporate universities.

The GMU contributes to the EDF group's integration and internationalisation. It helps to develop the Group's managers' skills in terms of leadership, management, strategy and energy market fundamentals using proven training courses, and modern teaching tools (e-learning, multi-modal coaching, joint development). Today, the GMU provides professional training for managers in practically all the geographical areas where the Group operates: Asia-Pacific, United Kingdom, Italy, France, Central Europe and America.

In 2017, the GMU started to expand its scope of intervention. An inter-company benchmark with Thales and Renault was produced on the topic of "Supporting the improvement of project management skills"

Certification by the Project Management Institute (PMI) will be an essential component in the career of future EDF project managers.

"La Chocolaterie", an internal incubator, has welcomed over 6,000 people and contributed to the deployment of projects thanks to innovative methods such as Design Thinking or the development of business projects.

One of the priorities for the years to come will be support for EDF's managerial transformation. To do this, the GMU has launched several pilot projects with entities to design a quantitative assessment tool to support and encourage dialogue amongst Management Committee members and management teams. The GMU's know-how will thus be able to support the transformation of the entire management line.

The GMU also continued its e-training, through training offers for "Sense and Strategy", which is targeted at the 20,000 Group managers and aims to deploy the CAP 2030 Group strategy.

Furthermore, two "Culture and Cash" e-learning courses, for all directors and managers, have been launched. They aim to raise awareness about the Company's finances and are targeted at directors and managers so that they can better identify concepts of economic and financial performance, incorporate them into their operational activities and understand their impact on the Group's financial priorities.

The GMU offers fifty or so courses and trains more than 1,000 managers on site annually. The GMU also offers programmes aimed at Group talent and executives.

In 2017, approximately 1,000 executive and talents took GMU courses.

#### Promotional training courses promote the "social elevator" at all levels

Among the new Corporate Responsibility Objectives set by the Group, EDF undertakes to integrate the best practices of industrial groups in terms of human development, particularly including the aim to develop the "social elevator" of tomorrow.

To contribute to this process, EDF focuses on the potential of its employees, whatever their level, by investing in promotional diploma courses. EDF SA has thus built and negotiated with social partners for innovative mechanisms based on the Personal Training Account. The initiative rests with the employee and it is jointly financed by the Company. These mechanisms allow employees to fast-track their career and change category by obtaining a diploma.

This form of "social elevator" genuinely sets the Group apart and has proven its effectiveness:

- more than 37% of the EDF group's current managers in France became managers over the course of their careers;
- nearly 1,100 group employees began a promotional diploma course over the last 7 years, 100 of whom began attending them in 2017;
- 200 graduated the same year;
- 2017 also saw the launch of the updated "Cap Exécution Cadre" mechanism, which allows employees to move from Operations to Management in four years. In 2018, these efforts will lead to new methods of reinforcing individual career support.

#### Work-study programmes: a solid history and a commitment for the future

The EDF group has been historically committed in favour of work-study programmes, which are considered as a way to ensure excellent training, professional training and occupational integration of young people. Accordingly, since the signing of the first agreement on work-study programmes in 2010, the EDF group, and more particularly EDF SA and Enedis, have more than fulfilled the statutory obligations to welcome and support work-study trainees and help them find employment.

The 2017 results continue this trend, with 6,404 work-study trainees within the EDF group at the end of 2017, including 3,495 trainees at EDF SA and 1,728 at Enedis. Among the work-study trainees who finished their contracts, 96% obtained their diploma and 87% found a job or started training at the end of their contract.

In 2017, Group initiatives already underway continued to operate:

- a proactive policy to hire work-study trainees in Group companies; within the scope of EDF SA, 33% of 2017 hires were of work-study trainees, a figure well above the commitment of 25% made in the EDF SA Skills agreement signed at the end of 2016;
- there were actions to help the work-study trainees not hired to find work, such as the organisation of speed-dating events with the Group's service providers, the offering of services by specialist recruitment firms, business start-up assistance for work-study trainees who have formulated proposals, the organisation of workshops in conjunction with Pôle Emploi or enrolment on the "Engagement Jeune" inter-company platform, which allows EDF's work-study trainees to submit their curriculum vitae along with a short recommendation from their tutor;

As proof of this commitment by the Group to work-study programmes, in autumn 2016, Jean-Bernard Lévy became Chairman of Fondation Innovations Pour les Apprentissages (FIPA), which is financially supported by major groups operating in France <sup>(1)</sup>.

#### 3.6.1.4 Appropriate career management

##### Management of talent and executives

The EDF group has developed a flagship talent-spotting system. The 2011 Group "Talents" policy is being reviewed by the Group's different subsidiaries and the management of manager career paths is getting special attention. "People reviews" by line of business and by geographical area are organised in order to ensure the development of executives' careers and their appointment to appropriate positions.

##### Employee career path management

The Group "Training & Skill Development" policy, approved at the end of 2015, includes several objectives for assisting employees with their careers, mobility and employability.

This policy particularly systematises, at every Group company, an annual review of each employee's career plan. It also aims to ensure that every employee, wherever they work, can be assisted, if they so wish, with developing their career plan.

These Group training policy commitments relating to career support are strengthened in the EDF SA skills agreement (2016-2019) and include an employee appraisal every year, compared with the statutory requirement of every two years per the training law of 5 March 2014. In addition, since September 2017, employees have had access to the "multi-modal" career support offering described in the agreement (digital platform, internal employment fair, easier access to Career Advisors), and:

- a single online space for career development, mobility and training was launched to give users tools to aid them at every stage of their careers and facilitate their carrier path. This space contains every link, tool, mechanism, information sheet, etc. employees need for every stage of their career. It is structured around 4 main stages: "I'm sharing my skills" "I'm imagining my career path", "I've decided to change jobs", "I'm looking for training courses to take". Managers and employees are encouraged to use this community to prepare for professional interviews every year;

(1) Under the aegis of the Ministry of Labour, Employment, Professional Training and Social Dialogue, and the Act Against Exclusion Foundation (FACE), FIPA's objective is to promote innovation in all kinds of work-study schemes through the financing of concrete projects proposed by companies that meet those companies' real needs.

- employee are able to see the name of their career advisor on the Vivre EDF Online intranet site in their personal area ("My HR situation") and can contact them without prior management approval.

In addition, the use of the Vivre EDF Online profiles created in 2016 (EDF internal LinkedIn) was strengthened by a decision of the Group HR Department on 1 June 2017<sup>(1)</sup> which authorises employees to declare their intent to change jobs six months before their contract expires, thus allowing recruiters to contact them directly. This same decision relating to EDF group's commitments to mobility in France specifically mentions duration of employment, which must now be systematically stated in the job offers published.

All these actions help to make the internal jobs market more fluid and give employees all the resources they need to truly improve their employability over the long term.

In addition to the actions implemented to make career development within the Group easier, EDF also assists its employees who have external career plans.

Indeed, among the new Corporate Responsibility Objectives set by the Group, EDF undertakes to integrate the best practices of industrial groups in terms of human development, with the particular aim of developing the "social elevator" of tomorrow. For EDF, the "social elevator" also means helping employees to set up or take over a business.

For EDF, this "spin-off" programme is a tool that helps it to diversify career paths, and develop certain specific skills (daring, ability to innovate, etc.) as well as entrepreneurial culture. It's also a way for the company to strengthen its commitment to economic development and job creation in the regions, each "spin-off company" creating on average 2.6 jobs. Finally, it is a way of detecting new business which may create value for the Group.

Nearly a hundred employees are assisted each year with their business set-up project. Since 1998, more than 1 businesses have been set up by Group employees.

EDF also launched "Altern'Up", a programme unique in France, intended to assist work-study trainees who are considering setting up or taking over a business. Out of the twenty or so projects supported since 2014, around 10 start-ups have already been set up by former EDF work-study trainees.

On 18 October 2017 Jean-Bernard Levy presented the "Grand prix des alternants créateurs d'entreprises" (prize for work-study trainee business creators) in the presence of executives from the other 7 large companies which joined this initiative in 2017 (Thales, Sanofi, Carrefour, Siemens, Total, La Poste and Air France).

### Age management

In addition to the implementation of the measures in the Generation Contract signed in 2016 as part of a three-year "Skills" agreement, which also included Occupation and Skills Forecasting, various Diversity initiatives have been implemented to prevent discrimination and the stereotyping associated with it: concepts of generations and ageing and the promotion of inter-generational cooperation

- deployment of an "Ages and work: inter-generational cooperation in a professional setting" course;
- distribution of a dashboard aimed at identifying any differences in indicators from age group to age group in different HR and management fields (health, training, recognition, mobility);
- a working group for various Group divisions to develop inter-divisional skills transfers and the collective skills of teams with new arrivals, notably on subjects in connection with CAP 2030 strategy Human Ambition project (accountability, innovation, simplification);
- Participation in the mission of the Via l'Emploi project (Ministry of Employment, European Social Fund and FACE foundation).

## 3.6.2 THE HEALTH AND SAFETY OF OUR EMPLOYEES AND OUR SERVICE PROVIDERS' EMPLOYEES, AN ABSOLUTE PRIORITY

### 3.6.2.1 Guaranteeing the best health & safety conditions at work for all

Since January 2014, the Group's health and safety policy has defined a common, consistent framework with which the policies and action plans of the Group's different subsidiaries must comply. This Group policy applies to all the companies controlled by the EDF group, in all the countries in which EDF operates, and concerns both its employees and its sub-contractors' employees working on its facilities and premises. There is an annual Group health & safety review.

In 2015, during the Group's first annual review, the CAP 2030 programme's strategic health and safety objectives were defined. The Group strives to set an example in the area of Health and Safety. The main priority is to eradicate fatal accidents, then reduce the number of accidents and combat absenteeism. This ambition and these priorities for the coming years are implemented in all the companies of the Group in order to:

- make health and safety one of the Group's major commitments and an essential component of its culture;
- place managers at the heart of the deployment of health & safety policy;
- make all employees accountable on a daily basis: for example, in 2017 at EDF SA, over 9,790 online courses were taken on the subjects of safety culture and preventing musculoskeletal disorders (MSD). Employees were also mobilised during the annual Health and Safety Week in October, which was dedicated to preventing traffic risks this year with each working team making commitments regarding risk factors;
- protect and promote health of everyone: employees, service providers, clients and local people. In this regard, initiatives to raise awareness about preventing addictions were developed, and followed by the introduction of checks for alcohol and drug consumption.

In addition, in 2016, the health and safety theme was highlighted as a significant part of the Corporate Social Responsibility Goal no.2, in which the Group commits to integrating the best practices of industrial groups in terms of human development.

In terms of actions undertaken, 2017 was in line with the previous year, particularly as it relates to the building of the Group "BEST" (Building Excellence in Safety Together) frame of reference, a list of 8 Health and Safety management requirements (the group Safety benchmark) and the pilot introduction of a new indicator whose purpose is to spot accidents directly related to professional activities. This year was a turning point in which we worked on the development of the policy formally drawn up in 2014 and the creation of the 2018-2020 action plan.

### Eradicating deadly accidents, cutting the number of accidents, and reducing absenteeism at work

#### Eradicating work-related deadly accidents

This was the first aim firmly set in 2015 for Group employees and service providers.

In 2017, 15 deaths in total occurred in the Group: 7 were directly linked to work. This figure is close to the total for 2016 (6 deaths in 2016, 12 in 2015, 11 in 2014).

Amongst the victims of these 7 "work" accidents: 2 were EDF group employees, 5 employees of service providers.

(1) Decision of 1 June 2017: "EDF group's commitments to mobility in France".

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(Group Data)	2017	2016	2015	2014
Total number of employee and service provider deaths	15 <sup>(1)</sup>	10	16	15
including number of employee deaths:	6	1	3	4
including number of service provider deaths:	9	9	13	11

(1) With 7 deaths linked directly to work and 8 deaths linked to other causes (7 dizzy turns and 1 transit accident).

The 7 deaths linked to work were: 4 electrocutions, 1 employee who was hit by a vehicle on a site by the side of a road, 1 employee hit when he was returning a hire car and 1 employee who was hit by the bucket of an excavator in a trench.

In 2017, continuing the initiatives started in 2015, the Group focused on 10 key rules, which were adopted following an analysis of deadly accidents in the EDF group over the last 30 years, which everyone must follow as they go about their work in order to avoid serious accidents and protect both themselves and those around them.

In order to continue to develop a culture of safety, other initiatives were taken or continued in 2017 (signing of the Charter for safer journeys proposed by the Road Safety Department, in accordance with the Group's Essential Rules regarding speed, wearing seatbelts, not using a mobile phone whilst driving and prevention of accidents. The signing of this Charter was the culmination of the Group Safety Week organised in October 2017, which dedicated to the aforementioned theme this year). The drafting of 8 Group Requirements for health and safety management

launched in 2016 has been finalised, and their deployment will constitute the basis of the 2018-2020 Group road map.

#### Occupational accidents

Since 2015, each Group entity has monitored its service providers' accident rates, as had already been the case for several years at certain Group entities.

In 2017, the Group confirmed the positive results obtained in 2016 (number of accidents at work that resulted in more than one day of absence from work, recorded over the current year and per million hours worked. Days of absence from work are linked to the year when they are taken even if the accident occurred the previous year), confirming its capacity to sustain this level, never before achieved at the Group scale.

(Group Data)	2017	2016	2015 <sup>(1)</sup>	2014
Group employee frequency rate	2,7	2,7	3,2	3,1

(1) The 2015 frequency rate takes account of the integration of 7 new companies at EDF Luminus and Dalkia. With equivalent scope to 2014, the 2015 frequency rate was 2.9, in line with the objectives set.

#### Absenteeism at work

Among the areas for improvement pinpointed, prevention of anxiety- and depression-related disorders, stress and musculoskeletal disorders (MSD), the three main causes of absenteeism, are regularly targeted by prevention initiatives.

In 2017, the participation of EDF employees in an online course on the prevention of MSDs was chosen as a safety criterion under of the profit-sharing agreement. In 2017, 8,675 employees completed this course, well above the 3,500 target set in the profit-sharing agreement.

Deployment in 2017 of the EDF SA labour agreement: "Improving the functioning and working conditions of teams on a daily basis for better quality of life in the workplace and better performance by organisations", signed on 8 July 2016, allows efforts within teams to improve quality of working life and the prevention of psychosocial risks.

In addition, in 2017, within the framework of the EDF National Workplace Health Group consisting of representatives of union organisations, occupational health physicians delegated by their peers and management representatives, a recommendation for the Prevention of Psychosocial Risks (PSRs) and Quality of Working Life (QWL) was drafted. It stresses the importance of raising awareness, multi-disciplinary work, and impact studies in the case of a change of organisation.

#### Health at work, a major theme

The EDF group employs staff specialised in health at work. Accordingly, in 2017, EDF employed 87 occupational physicians (practising) and 156 nursing staff in France. Enedis, for its part, employed 55 occupational physicians and 83 nursing staff. The Group also employs physicians who are experts in toxicology, ergonomics, epidemiology, first aid, and radiation protection. In addition to medical monitoring of employees, these healthcare workers are involved in setting up primary prevention programmes and are stakeholders on all the social dialogue bodies in the field of health at work.

Health in the workplace is the subject of important social dialogue with the EDF SA central works council, with a session dedicated to the topic every year to examine the results of inter-establishment Work Health Services. A special commission was created in the body to monitor cases.

In addition, under the terms of a 2010 agreement, a National Health at Work Group was established. It includes representatives from three unions that signed the agreement, employers and occupational health physicians. This NHWG meets four times a year.

#### Occupational diseases

The annual data published by the Group's French companies (particularly EDF and Enedis) gives as the main causes of occupational diseases: asbestos (pleurisy, pleural plaques, primary cancer of the lung), movements and positions (shoulder condition, tendinitis, carpal canal), conditions caused by ionising radiation, silica (pneumoconiosis) and noise hazards (deafness).

#### Asbestos

In the past, the EDF group has used products, materials and facilities containing asbestos. In accordance with current regulations in France, the replacement of materials containing asbestos in EDF establishments and facilities began in the late 1980s, with all materials containing asbestos being treated, and EDF set up reporting measures and procedures to protect employees and third parties working at the Company.

In July 1998, EDF signed an agreement, revised in June 2002, with all trade union federations, for the prevention of and compensation for exposure to asbestos. Following this agreement, EDF introduced an early retirement plan for workers who are duly recognised as suffering from an occupational disease associated with asbestos. Voluntary financial assistance and a pension supplement both financed by EDF were established. EDF also provided social assistance to sick workers and their families with information and support during the compensation process. See section 2.4 "Legal proceedings and arbitration" for a description of current procedures.

### **Ionising radiation**

Work by field operatives has enabled continuous improvement of performance in terms of protection of employees against the effects of ionising radiation. In France, the average annual individual dose of all the workers, employees of EDF and external companies, working on reactors was halved in less than ten years; in the United Kingdom, there was the same reduction, mainly thanks to optimised governance of maintenance and repair work. In France as in the United Kingdom, in 2017 and since 2003, no workers, employees or service providers exceeded the regulatory threshold (individual dose over 12 sliding months).

In France, in 2017, the average collective dose is 0.61mSv (man-Sievert) by reactor (0.76 and 0.71mSv by reactor in 2016 and 2015). This result is the fruit of the optimisation of sites and activities, especially of the radiological cleanliness of premises and circuits.

In the United Kingdom, in 2017, the average collective dose was 0.3mSv for the EPR reactor and 0.02mSv per reactor for advanced gas reactors.

EDF is proactively implementing an ALARA (As Low as Reasonably Achievable) policy to limit the collective dose to take account of the workload involved in the industrial project on the fleet in operation over the coming years.

Efforts must be continued to implement the ALARA procedure on the ground in the years to come, and also in terms of the radiological cleanliness of circuits and premises to bring us up to the levels of the best operators. We must also continue efforts to control and reduce doses in the most exposed professions.

### **3.6.2.2 Making health at work a subject of social dialogue**

Within the Group, there is social dialogue on health at work at three levels:

- European level (presentation of the actions taken during the year to the European Works Council's Health & Safety workgroup);
- at Group France level (with the presentation of the year's key issues and figures to the France Group Committee); and
- at EDF level, with a national health at work group issuing recommendations on four themes: prevention of asbestos risk, impact of business line developments on medical teams, development of a health at work action plan and communication on health at work.

In 2015, the Group's new strategic objectives, set via the CAP 2030 programme, were presented to the EDF group's different bodies (EDF CWC, European Works Council and France Group Committee).

In 2016, joint work on health and safety was carried out with the European Works Council and a progress report on the strategic health and safety objectives was presented to all the bodies.

### **3.6.2.3 Providing the conditions for well-being: organisation and quality of working life**

#### **Quality of working life**

Quality of working life covers the organisation of work, relations at work, professional development, working environments and work-life balance. It is a factor in the joint improvement of the health of employees and the performance of organisations.

Programmes have been implemented in the main companies of the Group, for example, "wellness@work" at Edison, "well-being" at EDF Energy, a partnership with ANACT (national agency for the improvement of working conditions) and the manager of the Enedis network, and teleworking experiments at EDF EN and EDISON, while EDF SA continues to deploy three agreements signed in 2016 on the working time of managers, teleworking and the organisation of work. Each of them provides innovations in terms of quality of working life in line the "simplicity, accountability, innovation" part of the Group's Human Ambition project: more than 25,000 managers are covered by the agreement on working time and benefit from provisions that give them more autonomy in the organisation of their activities

(including occasional teleworking); furthermore, teleworking is now open to more than 25,000 employees, over 4,870 of whom had signed an agreement to that effect at the end of 2017 (i.e. over 19% of employees whose activities are eligible for teleworking and over 7% of the workforce). Finally, the terms and conditions for the right to disconnect are defined under the agreement on organisation of work.

In 2017, the development of more collaborative working methods accelerated with the start of a France Group community of facilitators and the multiplication of areas and mechanisms to fast-track projects and implement new ways of working within the various Group entities and companies.

The body to monitor the quality of working life met for the first time in 2017. This makes it possible to identify best practices in terms of organisation of work but also prevention of psycho-social risks (PSR).

Specifically regarding the prevention of PSR at EDF SA and in addition to the body to monitor the quality of working life, primary preventive actions are being implemented (study of the socio-organisational and human impact of reorganisation, team projects to reduce travel, right to disconnect, etc.) and the multi-disciplinary groups (MDGs) created in 2010 by a collective agreement on the quality of working life are a local resource. In addition, resources to help support these initiatives and training and digital resources are made available to all management. Enedis has also put in place an MDG programme and is developing specific change management tools.

As regards secondary and tertiary prevention, 2017 saw the renewal of internal and external skills to support management or employees, such as anonymous a freephone "life at work" hotline, support for teams under stress and assistance with change management.

#### **Organisation and working hours**

In order to meet the needs relating to each company's business and particularly to ensure continuous operation, personnel may be required to provide a continuous service 365 days-a-year or be on call outside of regular working hours.

These arrangements are adapted over time according to the changing circumstances at each company, legislation and new authorised work organisation practices, particularly communications technology developments.

For companies based in France, the duration of the working week in France is 35 hours, with services available for a minimum of five days.

In 2016, a category-wide agreement regarding the organisation of managers' working time at EDF SA was signed. This agreement introduces fixed numbers of working days, with a standard number of 209 days. It accordingly aims to develop the autonomy of managers in the organisation of their working time, to increase the overall time worked by managers, to support simplification and accountability measures, and to meet their expectations in terms of changes to working methods, flexible organisation and quality of life.

At the end of 2017, over 80% of managers had opted for a fixed number of working days and the number of days worked has increased markedly.

In more general terms, in 2017, through the overwhelming selection of the fixed number of working days option, and the constantly increasing number of employees who opt for teleworking and the introduction of team projects, EDF SA's desire for more effective and innovative team-working and management methods has been demonstrated, with benefits for both company performance and employee autonomy and work-life balance.

With regard to the negotiation of agreements on working time, following on the PEI in 2016, 2017 has seen several subsidiaries in France negotiate an agreement to introduce the fixed number of working days option, including G2S, DKLNG and SOWEE.

At EDF SA, 2 Business Departments have re-negotiated their local working time agreements (the Shared Services Department and the Customer Department), to adapt the organisation of work to their new priorities.

At Enedis, there were also renegotiations of local agreements to make the necessary adaptations to the organisation project of the Company.

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## 3.6.3 COMPENSATION AND SOCIAL WELFARE: AN ATTRACTIVE EMPLOYER

Total compensation is a key component in recognising the contribution of every staff member to the Group's performance. It contributes to employee engagement, increases the loyalty of talent and adds to the Group's attractiveness.

Accordingly, the Group is committed to offering its employees fair and competitive compensation, while paying great attention to the quality and level of social welfare it proposes, particularly in terms of cover against the major risks of life. The Group accordingly formally introduced a total compensation and fringe benefits policy in 2013. It covers all employees of the main companies controlled by the Group.

Since 2014, the Group's main foreign companies' compensation and social welfare systems have been reviewed based on this policy. Following each review carried out by the Group Human Resources Division, an action plan is jointly drawn up with the subsidiary and its implementation is monitored during subsequent reviews.

At the same time, a network of Compensation and Fringe Benefits managers was set up to back up the scheme, particularly in order to present the policy and share good practices.

### 3.6.3.1 A fair and competitive total compensation policy

Total compensation policy is guided by four principles that are reviewed by the Group Human Resources Division:

- competitiveness with the external market;
- consistency and internal equity;
- financial sustainability;
- communication.

It is based on fixed compensation and individual and/or collective variable compensation which serves to recognise the achievement of objectives, connected to the companies' economic results. There is a direct and visible link between the employee's contribution and the related compensation.

The Group's companies guarantee the meeting of the minimum legal or professional requirements in each country and the absence of discrimination.

In the "communication" section, each employee receives information on the compensation rules and arrangements with the utmost transparency in accordance with the principles detailed above. Each EDF group employee must have visibility on their total compensation. Accordingly, in France, EDF, Dalkia and Enedis have offered each of their employees a full individual review of their annual compensation and its components.

#### Variable compensation plans to boost performance

Within the Group, most employees have individual or collective performance-related variable compensation. The terms and conditions of this variable compensation differ from one Group company to another, based on historical agreements and the applicable regulations.

At EDF Energy (United Kingdom), a similar system applies to the majority of staff.

At Dalkia (France) performance-based variable compensation was reviewed and recognises individual and collective performance for managers.

At Edison (Italy), all employees, excluding executives, benefit from collective performance-based compensation schemes, based on profitability and productivity criteria (Premio di Risultato & Premio di Produttività).

At EDF Luminus (Belgium), managers and most non-managers are eligible for individual and collective performance-based compensation schemes.

The China Division also introduced performance-based individual variable compensation for employees based in Beijing, designed to stimulate and recognise collective performance.

At EDF, all employees may receive performance-related variable compensation.

For projects and their management, compensation is based on collective performance alone. In 2017, the variable share represented 2% of average basic pay.

For managers the average figure is 8% of the annual salary, so the Company is on a par with other major French companies. Furthermore, EDF decided to introduce an individual variable compensation scheme for all its non-management employees, which in 2017 represented 2% of their annual salary.

For managers, the variable share is based on both individual and collective targets whose weighting increases with the position within the Company.

EDF and Enedis pay special attention to the professional training of their managers on issues of compensation.

In France, EDF and Enedis's employees benefit from a profit-sharing scheme, introduced more than 20 years ago in the case of EDF and for Enedis when it became a subsidiary. Most of the Group's European subsidiaries have similar schemes. EDF and Enedis employees can choose either to receive payment and/or to invest it into either the Group Corporate Savings Plan or the Group Collective Retirement Saving Plan (see below). In a restrictive economic environment, the policy of an employer contribution for sums invested has been maintained

The EDF and Enedis profit-sharing agreements are three-yearly and require the profit-sharing amount payable to be set based on the meeting of national objectives reflecting the different components of the companies' performances (economic, business lines, social and environmental).

The most recent EDF SA three-year agreement (signed in 2016 for the period 2017-2019) aims to better link profit sharing to EDF SA performance. It includes the following five national performance criteria: development of Group cash flow, which is more directly linked to the employee activity than EBITDA, electricity generation, customer satisfaction, online health and safety training of employees and a sustainable development/digital criterion (reduction of printed paper and increase in teleconferencing).

In 2017, the EDF SA agreement saw the payment of €99 million to EDF employees, i.e. €1,419 per beneficiary (down 29% due to worse performance, generation in particular). Jean-Bernard Levy decided that this did not fairly reflect employee efforts and decided to pay an exceptional bonus of €600 gross to all EDF SA employees, to recognise their commitment to the transformation of the Company in 2016.

In 2017, Enedis paid €82 million for 2016 profit-sharing, i.e. €2,116 on average per beneficiary.

EDF and Enedis are not eligible for the shareholding scheme.

In 2017, the Dalkia group paid €4.4 million for 2016 profit-sharing, i.e. a median amount of €452.

The median amount of the shareholding in 2017 for 2016 amounted to €1,088 per employee.

In 2017, EDF EN paid €3.2 million for 2016 profit-sharing, i.e. an average amount of €3,504.

No sum was paid under the shareholding.

#### A comprehensive employee savings policy

##### The Group corporate savings plan

It is open to employees of EDF and of the Group's French companies in which EDF owns directly or indirectly at least 40% of the share capital and which have signed up for the Group Corporate Savings Plan.

Five varied mutual funds, including a socially-responsible investment fund, a solidarity mutual fund and the "EDF Share" fund, are open to subscriptions.

The EDF group Corporate Savings Plan totalled €4,583 billion at the end of 2017.

Profit-sharing, as well as individual payments and transfers from the Time Savings Accounts that employees make to the Group Corporate Savings Plan, are matched by the Company under conditions negotiated within each company.

### Collective Retirement Savings Plan

The EDF group Collective Retirement Savings Plan is open to employees of EDF and of the Group's French companies in which EDF owns directly or indirectly at least 40% of the share capital which have signed up for the Collective Retirement Savings Plan.

Two mutual investment funds are offered to employees: a solidarity mutual fund and the "Cap Horizons" umbrella fund, offering targeted management of the savings invested depending on retirement age.

The EDF group's Collective Retirement Savings Plan totalled approximately €816 million at the end of 2017. Profit-sharing, as well as individual payments and transfers from the Time Savings Account that employees make to the Collective Retirement Savings Plan, are matched by the Company under conditions negotiated within each company.

### Time Savings Account

Time Savings Account agreements have been signed within the Group's principal French subsidiaries, specifically EDF and Enedis.

As at 31 December 2017, the total number of hours saved in the time savings account by EDF employees was valued at €724 million, and at €197 million for Enedis employees. This negotiated scheme enables employees who want to take leave to receive compensation corresponding to the saved time. It is also possible to monetise the time saved based on the current Time Savings Account agreement or make transfers to the Group Corporate Savings Account and the Collective Retirement Savings Plan.

### Employee shareholding

On 31 December 2017, current and former employees of the EDF group held a total of 35,252,261 EDF shares, i.e., 1.20% of the share capital. This number includes, firstly, 30,856,184 shares (i.e. 1.20% of capital) based on the definition of employee shareholding in accordance with Article L. 225-102 of the French Commercial Code (shares held by employees and former employees of EDF via "EDF Share" mutual plans of the EDF group corporate savings plan and the EDF International group corporate savings plan). This number includes, secondly, nearly 4,396,077 shares, i.e. 0.15% of capital, held directly or indirectly, without a non-transferability period or after the non-transferability periods, by current or former employee shareholders. Most of the shares held by employees are held via the Group Corporate Savings Plan.

In accordance with the law, the dilution of the State's stake in the EDF capital triggers the obligation to carry out an offer of EDF shares reserved for employees (ORS), and, under certain conditions, for retired and former employees.

### 3.6.3.2 Social welfare policy

The Group fringe benefits policy is guided by three principles:

- a principle of responsibility, which covers three requirements:
  - guaranteed social cover, in terms of health, welfare and pensions,
  - non-discrimination (access to health coverage must not be dependent on the employee's state of health),
  - regulatory compliance;
- a principle of balance between competitiveness and sustainability:
  - the combined level of compensation and fringe benefits meets the need for the Group's companies to be attractive on their local markets,
  - fringe benefits must be able to be maintained over time and accordingly be financially sustainable in the long-term both for employees and the employer;
- a principle of appropriation by beneficiaries:
  - employees are informed of the content of the fringe benefits in order to make it easier for them to understand and actually receive them.

### Status of employees in the Electricity & Gas Industries (EGI): a specific social welfare plan

In France, the vast majority of the Group's workforce are employed by companies descended from "historic operators" (EDF, Enedis, PEI) which have electricity and gas industry or "EGI" status. This is the case, in particular, of the main components of Électricité de Strasbourg.

Fringe benefits at these "historic operators" were mainly introduced via the Law of 8 April 1946 organising the monopoly on electrical generation and distribution electricity and via the maintaining of a special social security plan linked to the professional status of employees in the EGI branch (Decree of 22 June 1946). Today still, the main fringe benefits that set EDF apart from other major groups are based on these legislative or regulatory texts: special pension plan, special health plan for, firstly, incapacity for work and, secondly, healthcare costs, including an additional mandatory part also covering retired employees, centralised social activities in the professional branch, financed by companies in the Sector and managed independently by the unions.

In addition to these schemes, which have remained very stable over the last few decades, is a benefit in kind historically based on a company decision which covers gas and electricity supplied by historic operators to employees and is maintained for retired employees.

Significant changes have been made over the last decade:

- EDF's IPO and the application of international accounting standards required the valuation and provisioning of commitments to retired employees. The maintaining of the industry's special pension and healthcare cost plans faced with this requirement was made possible by the overhaul of their financing: affiliation with standard mandatory plans for pensions and strengthening of affiliation between current and retired employee plans for complementary health insurance cover;
- the special pension plan has also, like other public sector special pension plans, been increasingly affected by efforts to reform mandatory pension plans launched by successive governments. Except for the pension calculation method (specific rate, applied to a salary at the end of career, with a reduced base), the main parameters (retirement age, required contribution period, etc.) are currently being brought into line with the standard compulsory plan; a number of other less wide-ranging rules remain specific. The definition of active service, enabling earlier retirements, has also been revised and how it is taken into account significantly overhauled for newly-hired employees, via the creation of a Retirement Days Savings Account.

Finally, unlike other historic benefits, the level of employee health, disability and life cover appeared significantly less generous than that offered by other major groups, which led from 2008 to the introduction, in agreement with the professional branch, of complementary cover in these three areas.

### Other Group employees' social welfare

The Group's other employees in France are covered by several collective bargaining agreements and can have fringe benefits provided by their own employer. Each employer must therefore ensure the consistency of the benefits offered with the Group policy presented above. This issue is regularly discussed with Group Human Resources.

The same applies to Group companies based outside France, for which the regulatory context specific to each country should also be taken into account.

### Social activities

Unlike the common practice in French law, the management of social and cultural activities is delegated to specific organisations in the EGI sector.

The central social activity fund (CCAS), mutual and social welfare funds (CAS) and the CAS Coordination Committee are legal entities and are fully independent from EDF. The CCAS is administered exclusively by employee representatives and is supervised by the public authorities.

The environment for companies in the electric and gas industries (IEG) has changed greatly since 1946. Negotiations conducted in 2016 under the aegis of the Ministry of Energy involving the union federations and employers' groups highlighted the need for in-depth reform of the framework.

Commitments made within the framework of these negotiations were formally drafted in a document called "14 February 2017 platform for the reform of IEG social activities including the modifications proposed by the mediator". Decree no. 2017-952 of 10 May 2017 amended Article 25 of the national status of IEG personnel, incorporating certain commitments made under the platform, in particular the modification of the financing method for social activities to stabilise the level of resources for social activities and equitable roles between employers, and to optimise the management of human and financial resources, particularly in the area of catering, in order to manage operating costs for the benefit of members.

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### 3.6.4 AN EMPLOYER ENGAGED ALONGSIDE ITS STAKEHOLDERS

The EDF group acts responsibly to promote diversity and respect for human rights alongside its stakeholders: employees, sub-contractors and employee representatives. Its work also affects the general population as a contributor to the development of the regions in which it operates.

#### 3.6.4.1 Responsible sub-contracting: a reality

EDF SA's sub-contracting policy focuses on three major themes:

- providing service providers with visibility and having long-term supply partners;
- helping the Group improve its sub-contracting practices by defining criteria to support decision-making in terms of strategy, economics, skills and social impact;
- developing socially-responsible sub-contracting practices, particularly via the EDF group CSR agreement signed in 2005 and extended in 2009 as well as the agreement signed on 19 October 2006 on "Socially-Responsible Sub-Contracting" at EDF SA.

#### Group CSR agreement commitments

The EDF group's CSR agreement (see section 6.3.4.5 "High-quality social dialogue") shows our commitment to ensuring that the sub-contractors that the companies employ do high-quality work in accordance with the law and current international standards (e.g. ban on child labour). They strive to enable sub-contractors and their employees to work on their account under the highest working and health & safety conditions in the industry and country in question.

The Group CSR agreement's commitments impacting sub-contractors particularly focus on:

- abiding by the law;
- employee health and safety;
- ethical behaviour with clients, particularly respect for people and integrity;
- respect for the environment.

Appropriate sub-contractor selection and assessment procedures meeting these requirements have been put in place. In case of any serious breach, unresolved when the issue is raised, of legislation, employee health and safety rules, principles governing relations with clients, or current environmental regulations, relations with the sub-contractor can be suspended in accordance with the contractual obligations.

Furthermore, the sub-contractor must ensure the meeting by any sub-contractors with which it has signed an agreement, for the work in question, of the requirements that the EDF group has set it.

#### Areas of sub-contracting at EDF

At EDF, sub-contracting is used for industrial and commercial activities, and in Information Systems. In 2017, there was no major change in the type of activities sub-contracted.

#### In the industrial field

2017 saw a continuation of the progress started in 2015 reflected in the Progress Charter signed in June 2016 between EDF SA and the Professional Organisations representing the Group's sub-contractor service providers.

In this spirit, in 2017, EDF began initiatives to support sub-contractors on the Flamanville three sites to reduce the workload scheduled from 2018 onwards. A link-up was initiated with the two large Cotentin customers (AREVA and Naval Group), which should facilitate the re-deployment of skills in the nuclear sector.

#### In the field of Information Systems

In 2017, the Company continued to implement its industrial strategy in the IT field which determines the sub-contracted share. This is particularly demonstrated by the proactive decision in favour of "Open Source" – unrestricted and free – software as well as the implementation of a fast-track contractualisation procedure with start-ups, which are vectors for innovation. Vigilance regarding training conditions and service provider turnover has been maintained, particularly as the total number of suppliers in the IT field continued to increase.

#### In the commercial field

In an increasingly competitive context, the sales division continued to use outsourcing to deal with variations in workload and cover extended hours, with value-creating tasks being directed towards internal consultants. All EDF's customer relations centres, both internal and external, are located in mainland France.

### 3.6.4.2 A significant contribution to local development via occupational integration

#### The Group's commitment to occupational integration

The Group maintains an ambitious work-study scheme, whose contribution to social mobility is continuously underlined (see section 3.6.1.3 "Skill development: preparing for the future").

Work-study programmes are considered as a key tool to develop the occupational integration of young or long-term unemployed people, and to enable them to acquire or finish a qualification.

Certain work-study offers are specifically proposed to young people in major social difficulty, in conjunction with occupational integration organisations. These offers prepare them to obtain a qualification corresponding to at least the first level of occupational qualification.

Partnerships are formed with local and regional employment and training organisations (Mission Locale, École de la deuxième chance, AFPA, Compagnons du Devoir, etc.) in order to encourage young people, particularly from deprived areas, to train for promising professions. An agreement was signed between EDF SA, Enedis and Energie Jeunes in 2017 to encourage young people in low-income areas to stay in education.

Via its apprenticeship tax award policy or via contributions, the EDF group provides financial support for organisations that work for occupational integration (Écoles de la deuxième chance, Compagnons du Devoir, Association Jeunesse et Entreprise, C Génial, etc.).

#### Contribution to occupational integration

##### Introduction of social clauses in contracts

EDF includes, in some of its contracts for which it launches calls for bids, the application of integration clauses, which provide in concrete terms for reserving a certain number of working hours to hiring people who are having difficulty in finding work.

The Group works in partnership with local employment organisations (Pôle Emploi, Maisons de l'Emploi et de la Formation, Chambers of Commerce and Industry, etc.), particularly for major projects. The principal beneficiaries are young people under 26 with a low level of training, long-term jobseekers, young people who have never worked, beneficiaries of minimum social benefits or persons to whom the 2005 law on disability applies.



**Purchasing from companies that employ only disabled people and provide them with special facilities and support and integration enterprises**

**Purchasing from companies that employ only disabled people and provide them with special facilities and support**

In 2017, the Group Purchasing Division continued its efforts to make purchases from companies that employ only disabled people and provide them with special facilities and support in accordance with the provisions of the EDF SA 2016-2018 agreement for "equal opportunities and occupational integration of disabled persons". The national policy to encourage purchases from companies that employ only disabled people was reaffirmed in 2017, and an experiment is being carried out with such a company and a department in order to quantify what units will benefit.

**Purchasing from integration organisations**

EDF continues purchasing from organisations supporting integration via economic activity, particularly integration enterprises. In 2017, the volume of purchases was €905k.

**3.6.4.3 Promotion of and respect for all forms of diversity**

The EDF group is committed to promoting diversity as a vector for performance in order to:

- better understand the diversity of its clients and meet their expectations as best as possible;
- better reflect the society in which it operates;
- allow women and men to express their talents to the best of their ability.

In 2005, the Company devoted several articles of its global agreement on Corporate Social Responsibility to combating all forms of discrimination, respecting diversity, and promoting equal opportunities. With the Group code of ethics, this agreement constitutes the main frame of reference for the Group's companies. The challenges of all the strategic objectives in terms of diversity are managed by Group HR.

All diversity themes are coordinated in three areas: at Group level, a "Diversity & Inclusion" network has been in place since 2011 and features the diversity officers of the main international subsidiaries, a France Diversity network, consisting of the EDF SA business line divisions and entities of the Group in France.

**3.6.4.3.1 Support for employee network initiatives**

Promoting diversity also involves supporting schemes organised by employee networks. These networks (ethnic minorities, women, working parents, disability, LGBT) are now active in certain Group companies and concern several thousand employees.

Each Group company has a specific level of commitment which can vary according to the model of activities and the current legislative framework and context. For example, Dalkia was awarded the "Diversity" standard whereas EDF has the GEEIS (Gender Equality European & International Standard) and EDF Energy, the NES (National Equality Standard).

In 2017, EDF signed the "Disability and Businesses" Charter of the International Labour Organization (ILO) (see section 3.6.4.3.3)

Finally, a new indicator was created to meet one of the six Corporate Responsibility Objectives launched in 2016 by the Group. It involves "incorporating best practices of industry groups in terms of human development" including "setting an example in terms of gender equality". EDF now measures diversity in Management Committees in all its entities and is strongly committed to a policy to promote women to key positions. For example in EDF SA, the percentage of women in Management Committees is [27.7% at the end of 2016 and is gradually converging towards the percentage of women in management (28.5% at end of 2016 <sup>(1)</sup>].

EDF's "Diversity" commitments led to the creation of several awareness and professional training programmes for managers, HR staff, employee representatives and employees. Approximately 9,300 employees have attended courses, since 2007, as part of these programmes.

Tools such as serious games have been developed and released on themes of diversity management, equal access to employment and inter-generational issues. One such tool, "Experiencing Diversity Together" offers certification for skills acquired. In 2017, an online communication campaign for Diversity Week was launched.

In terms of diversity, the measures taken by French companies are most often based on collective agreements or action plans on equal access to employment for women and men, disability and age management.

In 2017, EDF SA, EDF EN, Enedis and Électricité de Strasbourg signed a gender equality agreement; EDF EN and Enedis signed a Disability agreement to prevent discrimination, and EDF regularly conducts surveys and tests of its HR processes (for example at EDF SA, since 2008 there have been five tests of its main HR processes such as recruitment, work-study schemes or access to internships).

In 2017, EDF released a qualitative study on stereotypes in business, a quantitative study on sexism in business and a survey on parenting. The qualitative study shows that the stereotypes found throughout French society are also present at EDF but that employees are aware of and positively appreciate the actions taken by the Company, particularly in terms of equal access to employment between women and men and integration of disabled persons.

Internal networks	Company	Launch date	Number of members on 31/12/2017
Women	EDF SA	2004 Interp'Elles, which became Énergies de Femmes in 2015	2900
	EDF Energy	2009	791
	EDF Polska	2014	88
LGBT	EDF SA	2011 Energyay	91+806 "allies"
	EDF Energy	2010 LGBT Supporters	368
Disabled	EDF Energy	2010 Disability and Carers	
Ethnic minorities	EDF Energy	2010 (Black Asian Multicultural-Ethnics)	392
Parents	EDF Energy	2014	430
Forces Support ex-military personnel	EDF Energy	2015	180
Young professionals (length of service < 10 years)	EDF Energy	2016	500

(1) The 2017 final data was not available on the date of this Reference Document.

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These networks develop schemes to allow discussion, increase awareness and sometimes provide mentoring. For example, in 2017, the Group has, in France, over 340 "Elles Bougent" godmothers who work, within their regions, to increase awareness among young women of the attractiveness of the Group's technical business lines.

In France, the women's network "Énergies de Femmes" and "Energy" (the LGBT association for EDF and the Electricity & Gas Industries) have received financial and logistical support from EDF since 2012. Furthermore, EDF and its partner the "L'Autre Cercle" association, which fights against discrimination based on sexual orientation and homophobia at work signed on 21 December 2015, an LGBT (Lesbian, Gay, Bisexual or Transgender) commitment charter. Finally, in 2016 and 2017, EDF endorsed UN projects and created and distributed a code of conduct related to them to prevent discrimination against LGBTI people.

The work carried out jointly with these associations led to the publication by the Company in June 2015 of a "guidelines" document on respect for sexual orientations at work, targeted at managers and HR.

The "guidelines" document on religion targeted at managers and HR, the first of its kind in 2010, was updated in July 2016 and distributed amongst Group Business Departments and companies in France. In addition, a survey was carried out in 2017 of the main entities worldwide in order to draw up the first international "Religion & Beliefs" overview study in the Group.

#### 3.6.4.3.2 Gender equality

Equal access to employment for men and women is a key tool for organisations to change and modernise. It is a key component of the Group's diversity policy.

Several Group companies began the process to gain European recognition regarding equal access to employment (EDF, EDF Energy and EDF Polska in 2014, confirmed in 2016, Fenice in 2015) and were accordingly awarded the Gender Equality European & International Standard (GEEIS). EDF and WIN France created a "Fem'Énergia" prize which since 2006 has recognised and supported women involved in the nuclear industry.

By way of example, as part of its new 2017-2020 gender equality agreement, EDF SA promises:

#### Main ambitions

To increase awareness among its staff of the bias created by stereotypes and to fight against any form of discrimination, sexism at work and more generally against violence done to women

To put in place schemes that guarantee equal pay, that neutralise the impact of maternity or adoption on career development, and that also attempt to better understand, analyse and deal with persistent wage differentials

To guarantee equal access to occupational and promotional training

To mobilise all the career path tools and stakeholders to advance gender-related representation of business lines in order to favour the recruitment of women in technical business lines and, more globally, to enable greater variety and diversity at work

To promote, finally, employee engagement via better work-life balance, by adapted working conditions and an organisation of work encouraging women to hold key positions and responsibilities at the Company.

#### Related objectives

Distribution of an annual communication kit on "everyday sexism at work" to help managers to increase awareness among all work teams. Guidelines on harassment and discrimination distributed online in 2017.

Deployment of a serious game, "Experiencing Diversity Together" to enable employees to test and train themselves on issues of stereotypes and discrimination (with separate modules for the general public and managers). The company has made the commitment to train 100% of its managers and HR staff involved in recruitment over the next five years.

To preserve equal pay for "equal work, equal skills and equal value", achieved since 2009. Systematic examination of the pay situation of women returning from maternity leave. External auditing & analysis of wage differentials at the Company (INED/INSEE researchers) in order to better identify, and correct, the sources of gender wage gaps at all pay levels.

Annual training reviews by gender. Monitoring by gender of employees who have not attended a training course for 3 years. Covering of childcare costs incurred due to absence for promotional training and for any course and from the first day of training for single parents, or within the framework of particular family situations.

Support for the "Énergies de Femmes" and "Elles Bougent" networks. Increased proportion of women recruited and mobilisation of company's work/training networks to improve recruitment of women in technical departments. Promotion of fast-tracking between business lines enabling reconversion from tertiary to technical.

Parenthood charter signed, adapted and implemented. Parenthood guide distributed to all employees. Aim to achieve diverse teams amongst Management and Directors. At the start of 2017, at EDF SA, women represented 30.5% of staff, 28.5% of managers and 27.7% of Management Committee members.

Deployment of teleworking and the right to disconnect for all. (over 4,870 teleworkers at the end of 2017).

Mechanism to allow employees to opt to extend paternity leave by an additional 10 working days (15 days for multiple births).

Experiment with a mechanism to provide help with homework and academic support entirely covered by the employer in organisations that may have difficult working hours.

### 3.6.4.3 Measures taken to promote the occupational integration of disabled people

#### Group Vision

The Group Corporate Social Responsibility agreement has the issue of disability in two of its articles. Within the framework of the legislative contexts specific to them, the Group's companies put in place disability awareness campaigns for employees (including awareness campaigns aimed at employees coming into contact with customers). They enter into local partnerships with associations working in the field of disability and strive to make premises and workstations accessible.

To strengthen the Group's commitment, in 2017 Jean Bernard Lévy signed the "Business & Disability" Charter of the International Labour Organisation and joined the ILO's global network to implement and share the actions of the 10 Charter principles with all of the Group's entities and demonstrate the Group's commitment to the issue since 1989.

In France several Group companies (EDF SA, Enedis, Électricité de Strasbourg and EDF Énergies Nouvelles) chose to sign a disability agreement.

2017 was marked by the signing of two disability agreements:

on 29 May Enedis signed a 3<sup>rd</sup> agreement with the social partners for occupational integration, continued employment and career development for disabled people, covering the period 2017-2018.

- The two previous agreements made possible significant increases in the number of disabled people at Enedis and its overall employment rate (2.47% in 2009, 5.51% in 2016). This new agreement aims for 6%. This target requires less progress compared with targets in previous agreements, which will allow Enedis to concentrate more on improving monitoring (making it more systematic and regular) and on support for the professional development of disabled employees;

- on 5 September 2017, EDF Énergies Nouvelles signed its second Disability agreement (2017-2019).

The 2016-2018 EDF SA agreement relates to equal opportunities and the occupational integration of disabled people. With an overall employment rate of 4.55% at the end of its previous agreement, the current agreement is aiming for 5% in 2018. The rate achieved at the end of 2016 was 4.81%<sup>(1)</sup>. Whilst continuing an active policy of recruiting disabled people and accepting them into work-study schemes (129 recruitments and 60 people accepted into work-study schemes in total over the first two years), this EDF SA agreement stresses the conditions that may encourage equal opportunities during all stages of a professional life.

In accordance with its 2017-2018 disability agreement signed on 18 December 2015, the Electricité de Strasbourg group has recruited 7 disabled workers in 2016.

### 3.6.4.4 Organised forecasting and management of reorganisation and transformation

The Group is aware of the need for organisations to adapt to changes in the economic and social environment, both in France and abroad, and it has dedicated an article to "anticipating and providing social support for industrial transformation" in its Group agreement on Corporate Social Responsibility signed in 2005 (renewed in 2009). The involvement of management and the special focus placed on dialogue with employees and their representatives are key.

### 3.6.4.5 High-quality social dialogue

EDF relies on high-quality social dialogue to manage the Company's industrial changes and contribute to the development of its employees.

#### France

Throughout EDF, there are currently 56 works councils, one Central Works Council (CWC), a France Group Committee and 104 employee representative councils and 207 Health, Safety & Working Conditions Committees. The chairs of these bodies meet regularly for discussions and sharing of good practices.

#### Central Works Council

2017 was marked by the renewal of the EDF SA central works council (40 members) during the election of 9 March 2017, with 18 ordinary sessions and 6 extraordinary sessions being held over the year. The body was consulted on the three so-called "Rebsamen" recurring issues: corporate social policy, economic and financial position and end-of-year strategic refocusing and its consequences for employment.

The central works council was also consulted on several projects to transform professions and businesses, including a project to create the Transformation and Operational Efficiency Department, creation of Edvance, re-organisation of New Nuclear Projects and Engineering (DIPNN), the Group Real Estate Department's PRIMMO project, early closure of the Fessenheim plant, phase 1, Coordination and pooling of supplies

#### 2017 social agenda

In 2017, collective negotiations were intense, with 7 agreements and amendments signed covering all EDF SA HR areas:

- quality of working life, with the agreement on professional gender equality and family rights;
- compensation, with the agreement on itinerant employees, the PERCO and PEG amendments, 2018 wage measures and the amendment to the CET time savings account;
- social dialogue & relations, with the agreement on the career paths of staff or union representatives, social activities, social dialogue in the professional branch of IEGs, and union law at EDF SA.

#### France Group Committee

The France Group Committee, a forum for discussion at France-level featuring 28 elected representatives of the Group's main subsidiaries (EDF, Dalkia, EDF EN, etc.) met three times in 2017, including one off-site meeting for a visit to the SOCODEI industrial site near Avignon.

Other than the statutory themes on which it is regularly informed (results, employment, strategy), the France Group Committee discusses issues involving the Group's activities, professional training and health at work.

#### International

##### European Works Council

At the end of 2001, the Group created a European Works Council (EWC), which is consulted on the Group's major policies and informed on changes to the Group's scope. Through its work groups, the EWC initiated numerous discussions on human resources policies at the European level, notably concerning health and safety and equal access to employment within the Group's different companies in Europe, collective guarantees and consolidated financial statements. At the request of members, a new working group for Energy Transition and the "Winter Package" was established this year.

In 2017, the EWC came together on two occasions for the traditional meetings in June and November. These meetings led to discussions with members of the Executive Committee on the European strategy of Group companies, health and safety, employment, Group results and work done by working groups. Social support for employees impacted by the sale of EDF Polska was the main theme of the EWC this year.

##### CSR agreement and governance

The CSR framework agreement signed in 2005 and renewed in 2009 by all employee representatives and union organisations of the main Group companies, and by the international federations for the industry are annual monitored at the meeting of the Dialogue Committee on the Group's Social Responsibility (DCSR).

This agreement governs social dialogue on the issue of CSR. It has enabled the Group to put in place a set of basic shared commitments and common objectives that contribute to the renewal and extension of social dialogue issues. On 29 June 2017, the Head of Human Resources met the trade union representatives of the companies that have signed the CSR agreement to discuss the Group's strategy, corporate news and the CSR reporting undertaken by the Group for the previous year. Action to implement the Law on the duty of care was also proposed this year during the plenary meeting.

(1) The rate at end-2017 was unknown as of the writing of this document.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Reporting system and methodology

### 3.6.4.6 Employees' view: My EDF engagement survey

At the end of the first "My EDF" internal engagement survey conducted in November 2012 involving all Group employees, a plan to issue results to employees was implemented. The companies drew up action plans to increase or introduce improvement measures based on the results observed within their scope. This process has been repeated every year since.

The sixth survey was taken in September and October 2017. A major internal communication campaign was organised to encourage employees to express their opinion (videos, posters and communication kit).

Employee participation (77% and nearly 103,500 respondents), a marked increase from the first year (63%), demonstrates the interest of Group employees in this

survey. Confidence in the future of the Group remains stable (52%) after the decline registered in 2016. Employee engagement remains at a level of 66% at the Group level, down two points compared with 2016. 75% of employees would recommend EDF as an employer to a friend or relative. The survey demonstrates that confidence in local management remains a real strong point (72%) as well as employee implication (72%). At the same time, the QWL index has fallen (-2 points, 68%) with a more marked fall regarding working atmosphere. However, working conditions, work content and even the work-life balance remain at very high levels despite the decline (67% for work content, 71% for conditions and 71% for work-life balance). However, the perception of the effectiveness of collective functions is down 4 points (53%), as is satisfaction with compensation (43%). Finally, for 87% of employees (stable) safety is a concern shared by everyone.

## 3.7 REPORTING SYSTEM AND METHODOLOGY

### 3.7.1 REPORTING SYSTEM

Reporting falls within the framework of the obligations of the French NRE law, Article 225 of the Grenelle 2 law (application decree of 24 April 2012) and Article 173 of the Energy Transition law (application decree of 19 August 2016).

The Group is engaged in a progressive process to have the reliability of its social, environmental and societal indicators and information verified by the Statutory Auditors, initially on a volunteer basis since 2007 and since 2013 in compliance with Article L. 225-102-1 of the French Commercial Code.

The sustainable development information published by the Group forms the basis for evaluations by ratings agencies or non-financial analysis departments acting on behalf of investors.

### 3.7.2 METHODOLOGY FOR SOCIAL AND ENVIRONMENTAL DATA

#### 3.7.2.1 Reporting scope

##### Principles

The scope covered by the reporting process (economic, environmental and social indicators) includes the entire EDF group as defined by the financial consolidation. More precisely, this scope includes EDF and the comprehensively integrated subsidiaries (integration of 100% of the value of the social and environmental indicators). Subsidiaries accounted for using the equity method are excluded from the reporting scope.

The social and environmental data is consolidated according to financial standards (IAS-IFRS)<sup>(1)</sup>. The entities acquired during the fiscal year are included in the scope of

consolidation on the year following the date of acquisition for environmental data, and the year of acquisition for social data if the acquisition was made more than six months from the reporting date. Workforce data for staff registered at 31 December and the data relating to the capacities of entities sold during the fiscal year is not included in the scope of consolidation.

The reporting indicators are used on the following basis:

- the scope of consolidation established by the Financial Department;
- the aforementioned rules in terms of variation of scope;
- the criteria linked to relevance of the subsidiaries' activities in terms of environmental and social impact:
  - for the environmental data, data from industrial activities that are significant in terms of environmental impact is reported, therefore, some subsidiaries included in the financial scope may not appear in the report due to their activity or their small size with respect to the environmental challenges,
  - concerning social data, the selection criterion is the entity's workforce (greater than 50).

For 2017, given the criteria presented above, the differences between the reporting scopes for the social and environmental indicators are as follows:

- subsidiaries taken into account in the reporting of environmental indicators and not in the reporting of social indicators: EDF Belgium (Belgium), EES (USA);
- subsidiaries taken into account in the reporting of social indicators and not in the reporting of environmental indicators: CHAM, Citelum and China Holding.

Given the collection difficulties, the reporting scope may vary depending on the indicators. This is specified for each indicator provided in the summary table.

List of main entities included in the consolidation scope of the social or environmental data as of 31/12/2017		Scope of environmental indicators	Scope of social indicators
France	Électricité de France	X	X
	Enedis	X	X
	EDF PEI	X	X
Other activities	G2S		X
	Électricité de Strasbourg	X	X
	Socodei	X	X
	EDF Énergies Nouvelles	X	X
	Dalkia including Tiru	X	X

(1) Group reporting guidelines, chapter 6.

List of main entities included in the consolidation scope of the social or environmental data as of 31/12/2017	Scope of environmental indicators	Scope of social indicators
		X
	X	
		X
UK		X
	X	X
Italy	X	X
Other international	X	X
	X	
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X

List of main entities included in the consolidation scope of the social or environmental data as of 31/12/2017	Scope of environmental indicators	Scope of social indicators
		X
	X	
		X
UK		X
	X	X
Italy	X	X
Other international	X	X
	X	
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X
	X	X

\* These companies were sold on 13 November 2017.

### Changes in scopes

The Polish companies were sold on 13 November 2017. The capacities of their generating plants were set to zero at 31 December 2017. By contrast, other environmental indicators are reported pro rata to the number of days held by EDF<sup>(1)</sup>. EDF Démász was sold in 2016. Dalkia has consolidated Tiru in its figures since 1 January 2017.

#### 3.7.2.2 Further details on the environmental data

The environmental data in this report are based on descriptive and methodological sheets. This is the Group's standard for reporting in force in 2017. All of the indicators relating to consumption and emissions are linked to the electricity and heat generation data and to other processes related to these activities.

Dalkia's environmental indicators are reported over a sliding year, from 1 December N-1 to 30 November N.

#### Further details on the indicators relating to water withdrawn and water returned

Indicators on cooling water include water withdrawn and water returned to rivers, the sea and water tables. For nuclear power electricity plants located on coastlines and for thermal power plants, the amounts of cooling water withdrawn and water returned are calculated on the basis of the operating time and nominal debit of pumps.

This indicator is not collected by EDF RE, a subsidiary of EDF Énergies Nouvelles in the United States, and some Edison sites (within the scope of Fenice).

### Further details on air emissions

#### Direct emissions

CO<sub>2</sub>, SO<sub>2</sub>, N<sub>2</sub>O, NO<sub>x</sub> and CH<sub>4</sub> emissions from thermal power plants of the EDF group are measured or calculated on the basis of analyses of the fuels or based on standard emissions factors. As they are not significant, fleeting emissions of CO<sub>2</sub> and CH<sub>4</sub> from dams within the entity of the scope of consolidation are not included in the calculation the indicator.

The Group's SF<sub>6</sub> emission are calculated, in priority on the basis of a mass balance or, otherwise, to a lesser extent, using an estimation method approved by Executive Management.

GCC power plants outside EDF do not report dust emissions, which do not have a significant impact at the Group scale. MECO does not collect emissions of N<sub>2</sub>O and SF<sub>6</sub>, also without material impact at the scale of the Group.

The Global Warming Potential (GWP) coefficients were updated for 2017 according to the recommendations of ADEME and GIEC<sup>(2)</sup>. They are 30 for CH<sub>4</sub>, 23,500 for SF<sub>6</sub> and 265 for N<sub>2</sub>O.

#### Indirect emissions

Every year, EDF establishes a greenhouse gas emission report for the scope of the Group. The scope of the 2016 fiscal year covers all companies with direct emissions and consolidated financially by full consolidation. Within this scope, the direct and indirect emissions (scopes 1, 2 and 3) are calculated according to the principles of the GHG Protocol Corporate Standard. Any indirect emissions relating to Group investments in non-consolidated assets were not included.

The 2016 GHG report enabled us to identify the significant information items adopted for the 2017 fiscal year. In 2016, the two items representing the highest contributions to GHG emissions are: direct emissions of CO<sub>2</sub> of 47.7 million tonnes (38% of total emissions) and indirect emissions associated with the combustion of gas sold to our end-customers (38% of total emissions).

(1) The last environmental report by Polish companies was dated 31/10/2017. Given the representativeness of certain indicators for the Group consolidated figures, an estimate for values at 13/11/2017 was made. This estimate is based on a linear extrapolation, weighted by the growth of generation observed between the two dates. The latest figures reported were used for the indicators not correlated with generation.

(2) 5<sup>th</sup> report from the IPCC (2013): <http://www.ecoinvent.org/database/>.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Reporting system and methodology

### Further details on conventional waste

The conventional waste data were obtained on the basis of data available on the closing date for the quantities removed and the disposal channels. It should be noted that the reported data is not comprehensive concerning conventional industrial waste from Tiru, Dalkia and EDF Énergies Nouvelles and from certain operational sites belonging to Edison (scope: Fenice), as this data cannot, at this stage, be reported within the Group's reporting deadlines.

Construction and decommissioning waste is included in this report, if its management falls under the responsibility of the EDF group. On the other hand, waste managed by service providers is not accounted for. Regarding Enedis, waste reporting is done on a rolling-year basis, from 1 November N-1 to 31 October N.

### Details on radioactive waste

#### Concerning EDF

Indicators pertaining to "Very Low Level radioactive Waste (VLLW) from operations and from decommissioning" take into account:

- the actual volume of the VLLW directly evacuated from the Industrial Gathering, Storing, and Stockpiling Centre (Centre industriel de regroupement, d'entreposage et de stockage – CIRES) from the production sites, which corresponds:
  - to the volume of waste produced in the year for operating sites;
  - to the volume of waste shipped in the year for sites being decommissioned;
- the actual volume of VLLW waste packages sent to CIRES from Centraco (after upgrading) connected to processing by incineration and by merging EDF metallic waste. The volume to be attributed to sites in operation and sites being decommissioned is determined in proportion to the tonnages delivered by the sites in operation and by the sites being decommissioned.

Indicators pertaining to "Short Lived Low and Intermediate Level radioactive Waste (short lived LLW and ILW) from activity and from decommissioning" take the following into account:

- the actual volume of the short lived LLW and ILW waste directly evacuated into the Aube Storage Centre (CSA) from the production sites, which corresponds:
  - to the volume of waste produced in the year for operating sites;
  - to the volume of waste shipped in the year for sites being decommissioned;
- the actual volume of LLW and ILW waste packages sent to the CSA from Centraco (after upgrading) connected to treatment by incineration and by merging with EDF waste. The volume to be attributed to sites in operation and sites being decommissioned is determined in proportion to the tonnages delivered by the sites in operation and by the sites being decommissioned.

Since 2016, the reduction in the volume contributed by treatment before storage (by ANDRA) has also applied to VLLW and also to packages sent by Centraco, where applicable. It includes the reduction in volume contributed by treatment before storage (the case of super-compacted waste).

For the indicator "Long-Lived High- and Intermediate-Level solid radioactive Waste", the packaging of the waste is taken into account in the calculation.

Given the technical constraints linked to processing operations, the packages are produced approximately ten years after the fuel has effectively generated waste. The indicator is thus an estimate that relies on the long existence of current practices of packaging of Long-Lived waste that projects the current packaging ratio into the near future (number of packages effectively created following the processing of one tonne of fuel). This ratio essentially depends on the mixtures used to optimise the operations and is a combination:

- for waste coming directly from spent fuel: factors from the national inventory of radioactive materials and waste created by the national Agency for the management of radioactive waste (ANDRA);

- for waste not coming directly from fuel (control clusters, etc.) for which an average life time of ten years is assumed: on the basis of feedback.

#### Concerning EDF Energy

The data relating to the indicator "Intermediate-Level radioactive Waste" of nuclear activities of EDF Energy, are founded on the inventory of radioactive waste produced during the year, established by the Nuclear Decommissioning Authority. This is an estimate of the annual volume of waste that will be considered and classified as Intermediate-Level radioactive Waste at the end-of-life of the nuclear generation sites. These estimates include packaging necessary to allow the transport of wastes off site. All of the Intermediate-Level radioactive Waste is temporarily stored at the nuclear generation sites while waiting for a national decision on their final processing. An update of the national inventory was performed in 2016 and the inventory was published on the official site of the "UK Radioactive Waste Inventory" <sup>(1)</sup>.

"Low Level radioactive Waste" includes dessicants that are sent for processing in the form of Intermediate-Level Waste in compliance with applicable regulations.

#### Further details on operational releases

EDF operational releases into air and water in France are subject to ongoing measures. The data for EDF is calculated on the basis of:

- measured data for tritium, over the period from December N-1 to November N;
- data measured in 2017 and calculated on the basis of generation of previous years, for carbon 14, of January N to December N.

The consolidation methodology takes account of the number of EDF reactors and SOCODEI operational units.

#### Further details on the quantity of electricity and heat generated from renewable energies

For Dalkia, the quantity of electricity and heat generated from renewable energies has been calculated on a pro rata basis to the quantities of renewable energies entering into their systems.

### 3.7.2.3 Further details on the labour data

Since 2011, the population considered in data collection is all employees who have a non-suspended employment contract with one of the Group's companies.

#### Further details on calculating the workforce and movements

For entities taken out of the scope of consolidation during the year under consideration:

- the indicators calculated in aggregate since the start of the year take into account those entities for the period during which they belonged to the scope of consolidation;
- indicators measured at 31 December represent the situation at the end of the year and do not take into account the entities which have left the scope of consolidation.

The workforce includes employees shared between EDF and Engie. An employee working 50% for EDF is counted for 0.5 in the published workforce.

The indicators "Other arrivals" and "Other departures" include:

- movements between companies of the Group;
- movements of workers in the electricity and gas industry, in compliance with industry-based agreement (IEG status);
- movements of certain categories of employees, in particular those with rotating shifts, doctors and personnel made available by outside entities.

These movements are thus not recognised in hires, resignations or redundancies.

#### Further details on calculating absenteeism

In its calculation of absenteeism, EDF includes absences for the following reasons: absences due to sickness, work and travel related injuries as well as absences due to other reasons such as unpaid leave and unjustified absences. Absences related to company and union activities, pre-retirement leave and maternity leave are not included. Absences related to company and union activities, pre-retirement leave

(1) <https://ukinventory.nda.gov.uk>.

and maternity absences are not included. The number of hours worked used in the calculation of the absenteeism rate is the number of hours theoretically worked.

At the Group level, the “average number of absences” is the sum of absences due to sickness, counted in days worked in proportion to time worked by employees and absences due to work-related accidents, counted in calendar days.

### Further details on the accident indicators

For EDF and ENEDIS, data on the number of accidents occurring during the course of the year is extracted from the PREVENISS safety information system and the data relating to the number of employee days lost to work related accidents is extracted from the HR information system (Sprint).

The frequency rate for employees does not include the accidents occurring in transit between home and work. Road accidents may be taken into account when local laws consider them as work-related accidents. The number of fatal accidents takes into account work-related accidents and employee transit accidents. It does not include fatal accidents of subcontractors. The hours worked used for calculating the frequency rate are actual hours corresponding to the hours of “exposure to risks” according to CNAM (French national insurance body).

### Further details on integration of health and safety data

In 2017, health and safety data of the IMTECH subsidiary (incorporated into the Group in 2017), 50% held by EDF Energy and 50% by Dalkia, was 100% incorporated into the Dalkia data.

### Details on counting occupational diseases

During 2015, the process for listing occupational diseases of agents working for EDF SA was changed. To ensure that all declarations of occupational diseases are processed in a harmonised manner and that the number of occupational diseases published does correspond to their number declared during the year and not rejected by the CPAM, EDF SA has set up a centralised declaration management system.

The figure published for 2017 corresponds to occupational illnesses declared and not rejected by CPAM as at 31 December 31 of 2017 and will only be consolidated in the 2018 balance sheet. The 2016 figure for its part was definitively consolidated. This situation is due to the fact that medical certificates originally dated 2017 will still be coming into the units, and therefore the PCST, in the months to come.

This offset in time enables taking into account those cases which occurred after 31 December of the year in question and withdrawing from the account those cases which were rejected for said year.

### Further details on the training indicators

The trainings for which supporting documentation are not received on the date of closure of the report are not taken into account.

The number of training hours includes the hours spent in class for staff on vocational training contracts.

### Further details on the indicators on tracking employees with disabilities

In countries in which regulations do not impose any mandatory declaration of the number of employees with disabilities, the reported data is provided on the basis of voluntary statements of employees. Certain subsidiaries do not communicate this type of data.

## 3.7.3 INDICATORS

### 3.7.3.1 Economic indicators

	Unit	2017	2016	2015	Ref. GRI <sup>(1)</sup>
Economic indicator – EDF					
Amount of indemnities paid or to be paid following a legal decision in environmental matters <sup>(2)</sup>	€k	0.0	21.0	10.5	EN 29
Environmental management – Group					
% of the Group's consolidated sales covered by an ISO 14001 certification <sup>(3)</sup>	%	98.4	98.0	98.1	

(1) GRI - Global Reporting Initiative, version G4.

(2) Excluding court fees and for definitive legal decisions.

(3) Excluding companies with independent management.

### 3.7.3.2 Environmental indicators

The following tables summarise the main environmental indicators within the scope of the EDF group. Any other scope is indicated on a case by case basis.

	Unit	2017	2016	2015	Ref. GRI <sup>(1)</sup>
<b>Fuel and raw materials – fuel consumption</b>					
Nuclear fuel loaded in reactor – EDF	t	1,104	1,042	1,120	EN 1
Coal	kt	9,902	9,306	15,065	EN 1
Heavy fuel oil	kt	931	885	867	EN 1
Domestic fuel oil	kt	375	371	368	EN 1
Natural gas	GWh PCI	106,125	110,720	100,013	EN 1
Industrial gas	GWh PCI	371	335	4	EN 1
Biomass	kt	2,254	2,676	3,172	EN 1
<b>Water – raw materials consumed originating from sources outside the Company</b>					
Cooling water withdrawn	10 <sup>9</sup> m <sup>3</sup>	47.6	47.3	49.3	EN 8
of which fresh water	10 <sup>9</sup> m <sup>3</sup>	16.0	16.2	18.3	EN 8
of which brackish (or estuary) water	10 <sup>9</sup> m <sup>3</sup>	6.4	6.1	5.2	EN 8
Cooling water returned	10 <sup>9</sup> m <sup>3</sup>	47.0	46.8	48.7	EN 22

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Reporting system and methodology

	Unit	2017	2016	2015	Ref. GRI <sup>(1)</sup>
of which fresh water	10 <sup>9</sup> m <sup>3</sup>	15.5	15.7	17.8	EN 22
of which brackish (or estuary) water	10 <sup>9</sup> m <sup>3</sup>	6.4	6.1	5.2	EN 22
<b>Air – gas emissions</b>					
Direct CO <sub>2</sub> emissions, from electricity and heat production (including installations not subject to quotas) √	Mt	50.5	47.7	59.1	EN 15
Indirect CO <sub>2</sub> emissions, from combustion of natural gas sold to end users	Mt eq. CO <sub>2</sub>	48.8	47.5	n.c.	EN 17
SO <sub>2</sub> emissions	kt	31.2	37.3	70.0	EN 21
Emissions of NO <sub>x</sub>	kt	63.0	59.5	92.2	EN 21
Dusts	t	4,170	2,783	4,385	EN 21
CH <sub>4</sub> emissions	kt eq. CO <sub>2</sub>	45.8	44.4	37.3	EN 15
N <sub>2</sub> O emissions	kt eq. CO <sub>2</sub>	186.9	267.1	238.9	EN 15
SF <sub>6</sub> emissions – EDF	kt eq. CO <sub>2</sub>	38.5	52.1	58.6	EN 15
SF <sub>6</sub> emissions	kt eq. CO <sub>2</sub>	53.0	67.5	80.3	EN 15
<b>Conventional waste</b>					
Hazardous waste	t	52,659	51,643	64,411	EN 23
Non-hazardous waste	t	557,454	623,957	389,471	EN 23
Conventional industrial waste recycled or transported for recycling	t	518,591	607,171	365,744	EN 23
Ash produced	kt	1,105	1,205	2,657	EN 23
<b>Energy</b>					
Renewable energies: electricity generation of hydropower origin (excluding marine)	GWh	40,229	46,045	43,439	
Renewable energies: quantity of electricity and heat generated using renewable energies (other than hydropower)	GWh	22,557	20,900	19,163	
<b>Direct energy consumption, by primary source</b>					
Internal consumption, pumping electricity	TWh	7,1	7,0	7,0	EN 3

(1) GRI: Global Reporting Initiative, version G4.

√: 2017 indicator subject to reasonable assurance check by KPMG S.A.

#### NUCLEAR INDICATORS – GROUP IN FRANCE

	Unit	2017	2016	2015	Ref. GRI
<b>Radioactive emissions to water <sup>(1)</sup></b>					
Carbon-14	GBq/oper. un.	9.539	12.853 (11.712)*	12.9 (12.7)*	EN 24
Tritium	TBq/oper. un.	15.592	17.423 (17.105)*	18.1 (17.77)*	EN 24
<b>Radioactive emissions to air <sup>(1)</sup></b>					
Carbon-14	TBq/oper. un.	0.148	0.161 (0.156)*	0.17 (0.17)*	EN 21
Tritium	TBq/oper. un.	0.447	0.640 (0.455)*	0.50 (0.50)*	EN 21
<b>Fuel</b>					
Transported spent nuclear fuel	t	1,161	1,170	1,216	EN 25
<b>Decommissioning nuclear waste</b>					
Very Low Level radioactive Waste (VLLW)	m <sup>3</sup>	1,186	2,171	1,847	EN 25
Low and Intermediate-Level radioactive Waste (LLW and ILW)	m <sup>3</sup>	410	443	914	EN 25
<b>Nuclear waste from operations</b>					
Very Low-Level solid radioactive Waste	m <sup>3</sup>	3,535.9	3,472.1	(2,488.8)*	EN 25
	m <sup>3</sup> /TWh	-	8,849	6.0 (5.98)*	EN 25
Short Lived Low and Intermediate Level solid radioactive Waste	m <sup>3</sup>	5,603.4	5,687.0	(6,842.3)*	EN 25
	m <sup>3</sup> /TWh	-	14,764	16.4 (16.3)*	EN 25
Long-Lived High and Intermediate Level solid radioactive Waste	m <sup>3</sup>	300.2	299.7	375.0	EN 25
	m <sup>3</sup> /TWh	-	0.873	0.88	EN 25

N.B. With a view to homogenising units of measurement, radioactive waste will be expressed in m<sup>3</sup>. Former values in m<sup>3</sup>/TWh are presented for information only.

Radioactive waste is presented by reactor and operational unit.

(1) The methodology relating to nuclear waste was updated in 2017 (see § 3.7.2 "Methodology for social and environmental data").

\* The values determined according to the new methodologies are presented in brackets.



## NUCLEAR INDICATORS – GROUP IN THE UNITED KINGDOM

	Unit	2017	2016	2015	Ref. GRI
<b>Radioactive emissions to water</b>					
Tritium – AGR reactor (Advanced Gas-cooled Reactor)	TBq/react.	154.770	156.154	120	EN 24
Tritium – PWR reactor (Pressurised Water Reactor)	TBq/react.	31.928	23.374	19	EN 24
<b>Radioactive emissions to air</b>					
Carbon-14 – AGR reactor	TBq/react.	0.889	0.762	0.69	EN 21
Carbon-14 – PWR reactor	TBq/react.	0.221	0.231	0.24	EN 21
Tritium – AGR reactor	TBq/react.	0.614	0.674	0.71	EN 21
Tritium – PWR reactor	TBq/react.	0.697	0.557	0.68	EN 21
<b>Fuel</b>					
Uranium sent to off site	t	197	180	172	EN 25
<b>Nuclear waste</b>					
Transported Low Level radioactive Waste	m <sup>3</sup>	453	774	485	EN 25
Generated Intermediate Level radioactive Waste	m <sup>3</sup>	161	161	178	EN 25

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

## Reporting system and methodology

### 3.7.3.3 Social indicators

EDF group	Unit	2017	2016	2015	Ref. GRI
<b>Workforce on 31/12/2017 and breakdown</b>					
EDF	Number	66,789	68,464	71,580	
Enedis		38,888	38,742	30,930	
TOTAL EDF group ✓	Number	152,033	154,845	159,112	G4-10
<b>Employee breakdown by age</b>					
Under 25 years old ✓	%	7%	7%	8%	
From 25 to 35 years old ✓	%	30%	29%	28%	
From 36 to 45 years old ✓	%	26%	26%	25%	
From 46 to 55 years old ✓	%	26%	27%	28%	
56 years old and older ✓	%	11%	11%	11%	
<b>Distribution of employees by geographic region</b>					
France	Number	129,881	129,703	133,406	
Great Britain	Number	14,753	14,370	14,908	
Italy	Number	5,144	4,949	4,950	
Belgium	Number	1,940	1,708	1,583	
Rest of the world	Number	315	4,115	4,265	
Managers	Number	45,517	45,474	45,935	G4-10
Women at managerial level <sup>(1)</sup>	%	32.5%	31.06%	30.0%	G4 LA 12
Non-management employees	Number	106,515	109,372	113,177	G4 LA 12
<b>Gender equality</b>					
Male workforce ✓	Number	112,504	114,503	117,295	G4 LA 12
Female workforce ✓	Number	39,529	40,342	41,817	G4 LA 12
Male managers	Number	32,654	32,941	33,383	G4 LA 12
Female managers	Number	12,863	12,533	12,552	G4 LA 12
<b>Hires/departures</b>					
Hires	Number	9,398	7,724	8,866	G4-LA1
Other arrivals <sup>(2)</sup>	Number	9,999	8,270	8,466	G4-LA1
Retirement departures/inactive employees	Number	5,031	6,591	4,722	G4-LA1
Resignations <sup>(3)</sup>	Number	2,397	2,062	2,104	G4-LA1
Redundancies, dismissals, people made inactive	Number	2,140	1,882	1,097	G4-LA1
Other departures <sup>(2)</sup>	Number	7,825	8,152	8,289	G4-LA1
Staff turnover <sup>(4)</sup>	%	6.13	5.89	5.30	G4-LA1
<b>Compensation</b>					
Total gross compensation	Millions of euros	See note 10.1 "Personnel expenses"	See note 10.1 "Personnel expenses"	See p. 66	
Part-time employees	Number	9,264	10,061	11,491	G4-10
<b>Absenteeism</b>					
Absenteeism: Average number of days lost through illness and accidents	Number	9.19	9.55	9.20	
<b>Health and safety conditions</b>					
Fatal accidents	Number	6	1	3	G4 LA 6
Accident frequency rate <sup>(5)</sup>		2.7	2.7	3.2	G4 LA 6
Workplace accidents involving at least one lost day	Number	613	645	757	G4 LA 6
Accident severity rate <sup>(6)</sup>		0.15	0.16	0.20	G4 LA 6
<b>Employee relations</b>					
Employees covered by collective bargaining agreements	%	89%	91%	90%	G4-11

(1) This percentage represents the number of women in managerial positions/the number of female employees.

(2) Entries and exits from scope are accounted for under: "Other arrivals" and "Other departures" respectively. Entries of work-study employees are accounted for under "Other entries".

(3) The end of special contracts (including work-study employees) are counted under "Other departures", regardless of the action that may be taken. Departures during probationary periods are counted under "Other departures".

(4) Turnover is calculated as follows: entries (number of hires) + exits from the workforces (number of retirements + number of resignations + number of redundancies, dismissals, individuals placed on inactive status) divided by two and compared with the total physical headcount at the end of the period multiplied by 100.

(5) The frequency rate represents the number of workplace accidents involving at least one lost day for every million hours worked.

(6) The accident severity rate represents the number of days lost for every thousand hours worked.

✓ : 2017 indicator subject to reasonable assurance check by KPMG S.A.

EDF group	Unit	2017	2016	2015	Ref. GRI
<b>Training</b>					
Hours of training provided	Number	7,830,735	8,306,479	9,085,028	G4 LA 9
Number of employees benefiting from training	Number	129,479	133,130	138,839	GA LA 9
<b>Employment and integration of employees with disabilities</b>					
Number of employees with disabilities <sup>(7)</sup>	Number	5,279	5,211	5,232	G4 LA 12

(7) In certain subsidiaries, this data is declarative.

EDF SA	Unit	2017	2016	2015	Ref. GRI
<b>Workforce on 31/12 &amp; breakdown</b>					
Statutory employees (as of 31/12)	Number	62,501	64,300	67,088	G4 10
Employees under unlimited-term contracts (CDI) not covered by collective bargaining agreement	Number	505	487	479	G4 10
Employees under fixed-term contracts (CDD) not covered by collective bargaining agreement	Number	3,783	3,677	4,013	G4 10
Total not covered by collective bargaining agreements	Number	4,288	4,164	4,492	G4 10
Total workforce	Number	66,789	68,464	71,580	G4 9
<i>Managers</i>	Number	29,728	30,404	31,192	G4 LA 12
Women at managerial level	%	29.4	28.6%	28.4%	G4 LA 12
<i>Non-management employees</i>	Number	37,061	38,060	40,388	G4 LA 12
Technicians and supervisory staff	Number	30,551	31,354	33,016	G4 LA 12
Operatives	Number	6,510	6,705	7,372	G4 LA 12
<b>Gender equality</b>					
Male workforce	Number	47,260	47,490	49,099	G4 LA 12
Female workforce	Number	20,604	20,974	22,481	G4 LA 12
Male managers	Number	20,996	21,718	22,315	G4 LA 12
Female managers	Number	8,732	8,686	8,877	G4 LA 12
<b>Hires/departures</b>					
Hires	Number	1,890	1,889	2,760	G4 LA 1
Integration & rehiring	Number	284	278	256	G4 LA 1/LA 3
Other arrivals <sup>(1)</sup>	Number	2,689	2,589	2,809	G4 LA 1
Retirement departures/inactive employees	Number	2,775	3,696	2,433	G4 LA 1
Resignations	Number	158	146	110	G4 LA 1
Redundancies – dismissals – people made inactive	Number	18	27	23	G4 LA 1
Deaths	Number	53	69	77	G4 LA 1/LA 6
Other departures <sup>(1)</sup>	Number	3,536	3,935	3,786	G4 LA 1
<b>Overtime</b>					
Overtime worked hours	In thousands	3,161	2,887	2,835	
Outside contractors					
Monthly average of temporary employees <sup>(2)</sup>	Number	1,120	1,315	1,510	G4 10
<b>Organisation of working hours</b>					
Full-time employees	Number	61,821	62,641	64,318	G4 10
Part-time employees	Number	4,967	5,822	7,261	G4 10
Employees working shifts	Number	6,530	6,597	6,860	G4 10
<b>Absenteeism</b>					
Absenteeism	%	3,8	3,8%	3,7%	G4 LA 6
Hours of maternity or paternity leave/hours worked	%	0,9	0,90%	0,8%	G4 LA 6
<b>Health and safety conditions</b>					
Number of occupational illnesses <sup>(3)</sup>		27	29	64	G4 LA 6
Fatal accidents	Number	2	0	0	G4 LA 6
Accident frequency rate		1.9	2.28	2.6	G4 LA 6
Accident severity rate		0.14	0,127	0.16	G4 LA 6
Workplace accidents involving at least one lost day	Number	181	228	261	G4 LA 6

(1) The arrivals and departures of seasonal fixed-term contract employees have been excluded from the counting.

(2) The 2017 figure is not available at the date of reporting.

### 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

#### Non-financial rating

EDF SA	Unit	2017	2016	2015	Ref. GRI
<b>Compensation/Personnel expenses/Profit-sharing</b>					
Main monthly compensation					
Managers	Euros	4,546	4,518	4,361	G4 EC 1
Technicians and supervisory staff	Euros	2,605	2,618	2,606	G4 EC 1
Operatives	Euros	1,888	1,889	1,871	G4 EC 1
Personnel expenses	In millions of euros	6,428	6,597	6,525	G4 EC 1
Average amount of profit-sharing per employee	Euros	1,419	2,000	2,107	G4 EC 1
<b>Employee relations</b>					
Collective bargaining agreements signed in France	Number	7	19	2	G4 11/G4 LA 8
Employees covered by collective bargaining agreements <sup>(4)</sup>	%	91	93.5	93%	G4 11
Training					
Number of employees benefiting from training	Number	59,000	61,056	63,748	G4 LA 9
<b>Employment and integration of employees with disabilities</b>					
Number of employees with disabilities	Number	2,215	2,150	2,157	G4 LA 12
Number of employees hired with disabilities	Number	93	76	91	G4 LA 12
<b>Social work</b>					
Charitable works Committee budgets (fulfilling 1% requirement)	In millions of euros	187	182.7	201	

(3) See section "3.7.2.3. Further details on the social data".

(4) EDF SA employees are not covered by a legally defined collective agreement but benefit from the status of the electricity and gas industry.

## 3.8 NON-FINANCIAL RATING

Evaluations by the primary specialised rating agencies and managers of ethical funds indicate the Group's CSR performance, in its benchmark sector. The evaluations and assessments underscore the outside recognition of the Group's sustainable development performance. EDF's good results were reconfirmed in 2017: it maintained its presence in the Dow Jones Sustainability Index (DJSI) and progressed in all ratings.

### ETHICAL MARKET INDICES AND EVALUATIONS BY NON-FINANCIAL RATING AGENCIES

#### Dow Jones Sustainability Indexes (DJSI)

In 2017, EDF achieved the excellent score of 84 out of 100, and more importantly, was included in the prestigious DJSI for the second consecutive year, having been included in it for the first time in 2016. In its 2018 annual report (Sustainability Yearbook), RobecoSAM once again puts the EDF group into the "Bronze Class", which means it is in the top 10% of the best performing companies in its sector of activity (among the 98 companies of the Electric Utilities sector).

#### CDP Climate change

In 2017, EDF was awarded the A- rating and the Leadership Level. In 2016, EDF scored the highest rating of A and in 2015 the rating of A- (B in 2014 and in 2013, with possible ratings ranging from A to F). EDF's response is published on CDP's site.

EDF belongs to the Climate Disclosure Leadership Index (CDLI) for France and Benelux region.

#### CDP Water

LEDF obtained a B rating in 2017 with Management level, the same as in 2016 and 2015 (ratings from D- to A). EDF's response is published on CDP's site.

#### CDP Supply Chain

Every year, EDF makes CDP Supply Chain disclosures, in its capacity as a supplier to its French and foreign corporate accounts who request this information. It also makes disclosures in the Climate change and Water parts of the Supply Chain questionnaire.

#### FTSE4Good

In March 2012, the EDF group was admitted to the FTSE4Good Index. This admission is reviewed every six months, and EDF's acceptability has been confirmed at every review since it first joined the index. In July 2017 the EDF group was once again included in the index.

In 2016 its overall score was 4.6 out of 5, moving up regularly and continuously in relation to previous years (4.5 in 2015 and 4.3 in 2014) and coming second in its sector of activity, among all the businesses assessed, obtaining the relative performance of 99/100. The next assessment of EDF group will take place in February 2018.

#### VigeoEiris

In November 2012, Euronext and Vigeo jointly launched a range of indices distinguishing listed companies demonstrating the best performance in Social Responsibility. The indices are updated twice annually, in May and November.

At the end of November 2017, EDF was in all the indices it can apply for: Euronext VigeoEiris 120, Europe 120, Eurozone 120 and France 20. In 2016, EDF obtained a score of 60 out of 100, an increase of 2 points compared to the previous score (58 at the end of 2014), and achieved for the first time the Advanced Level. It is ranked amongst the best 48 companies in the Electric & Gas Utilities sector.

### Sustainalytics

In 2017, EDF obtained a score of 82 out of 100, up 4 points compared to 2015 (78 out of 100) and up 6 points compared to 2014 (and 11 points compared to 2013), and was ranked 9<sup>th</sup> out of the 225 companies in the Utilities sector. It is among the best 4% in the sector. For the first time, the EDF Group is the leader among its peers, i.e. companies of a comparable size in its sector of activity. EDF is a member of the STOXX ESG Leaders Index.

### OEKOM

In 2017, EDF obtained the rating of C+, the same as in 2016, 2015 and 2014 (and C in 2013, on a scale from D- to A+). Of the 154 companies in the Utilities sector assessed by Oekom in 2017, EDF is in the best 20% and is the only company of the sector to be awarded B- for "Social and Governance" (compared with C+ in 2016, 2015 and 2014), which puts it in first position in this area.

### Morgan Stanley Capital International (MSCI)

In 2017, EDF obtained the Advanced Level, with an A rating (on a scale from CCC to AAA), the same as in 2016, 2015 and 2014.

### EcoVadis

In November 2017, EDF achieved the excellent score of 75 out of 100 and Advanced Level, up 3 points compared with 2016 (72 out of 100) and up 8 points on 2015. EDF Group is ranked among the best 3% in its sector of activity and the best 1% in

all sectors. It was awarded the "Gold Recognition Level" reserved for companies with a score of more than 60 out of 100.

### AFNOR Acesa Solutions Achats (Purchasing Solutions)

In 2017, EDF obtained a score of 98 out of 100, an improvement of 7 points compared with 2016 (91 out of 100) and 13 points compared with 2015 (85 out of 100).

### PAP 50 Entreprises

In this study conducted every three years by WWF France, on the evaluation of the paper policy of the 50 largest French companies, EDF obtained a score of 74 out of 100 in 2016 and rose to 7<sup>th</sup> place in the overall ranking (up 22 points compared to the previous survey conducted in 2013 at 20<sup>th</sup> overall).

### French Centre of Corporate Information (CFIE)

For the past 15 years, the CFIE has published a study on the quality of labour and environmental information in the annual reports of large French companies (mainly Reference Documents). In 2017, for the first time, the EDF Group was ranked first among the 22 large companies assessed, with the rating of 77.3/100 (75/100 and 2<sup>nd</sup> out of 36 in 2016, 74/100 and 2<sup>nd</sup> out of 36 in 2015, 65/100 and 7<sup>th</sup> out of 44 in 2014).

## 3.9 ASSURANCE REPORT OF THE STATUTORY AUDITORS

Report by one of the Statutory Auditors, appointed as independent third party, on the consolidated human resources, environmental and social information included in the management report.

*This is a free English translation of the Statutory Auditors' report issued in French and is provided solely for the convenience of English-speaking readers. This report should be read in conjunction with, and construed in accordance with, French law and professional standards applicable in France.*

For the year ended 31 December 2017

To the Shareholders,

In our capacity as Statutory Auditor of EDF S.A., (hereinafter named the "Company"), appointed as independent third party and certified by COFRAC under number 3-1049<sup>(1)</sup>, we hereby report to you on the consolidated human resources, environmental and social information for the year ended 31 December 2017, included in the management report (hereinafter named "CSR Information"), pursuant to article L.225-102-1 of the French Commercial Code (Code de commerce).

### Company's responsibility

The Management Board is responsible for preparing a company's management report including the CSR Information required by article R.225-105-1 of the French Commercial Code in accordance with the guidelines used by the Company (hereinafter the "Guidelines"), summarised in the management report and available on request from the Company's head office.

### Independence and quality control

Our independence is defined by regulatory texts, the French Code of ethics (Code de déontologie) of our profession and the requirements of article L.822-11-3 of the French Commercial Code. In addition, we have implemented a system of quality control including documented policies and procedures regarding compliance with the ethical requirements and applicable legal and regulatory requirements.

### Responsibility of the independent third party

On the basis of our work, our responsibility is to:

- attest that the required CSR Information is included in the management report or, in the event of non-disclosure of a part or all of the CSR Information, that an explanation is provided in accordance with the third paragraph of article R.225-105 of the French Commercial Code (Attestation regarding the completeness of CSR Information);
- express a limited assurance conclusion that the CSR Information taken as a whole is, in all material respects, fairly presented in accordance with the Guidelines (Conclusion on the fairness of CSR Information);
- at the request of the Company and out of the scope of certification, express reasonable assurance, that information selected<sup>(2)</sup> by the Group and identified by the symbol √ in the third chapter of the management report is fairly presented, in all material respects, in accordance with the Guidelines (Reasonable assurance on a selection of CSR information).

However, it is not our responsibility to pronounce on the compliance with the relevant legal provisions applicable if necessary, in particular those envisaged by article L. 225-102-4 of the French Commercial Code (Duty of care) and by the law n° 2016-1691 of December 9, 2016 known as Sapin II (fight against corruption).

Our work involved twelve persons and was conducted between October 2017 and February 2018 during a twenty weeks period. We were assisted in our work by our CSR experts.

We performed our work in accordance with the order dated 13 May 2013 defining the conditions under which the independent third party performs its engagement and with the professional guidance issued by the French Institute of Statutory Auditors (Compagnie nationale des commissaires aux comptes) relating to this engagement and with ISAE 3000<sup>(3)</sup> concerning our conclusion on the fairness of CSR Information and the reasonable assurance for the selected information.

(1) "whose scope is available at [www.cofrac.fr](http://www.cofrac.fr)"

(2) Indicators with reasonable assurance: Total EDF group workforce as of 31 December, breakdown by age and gender; Direct CO<sub>2</sub> emissions from electricity and heat production (including installations not subject to quotas).

(3) ISAE 3000 – Assurance engagements other than audits or reviews of historical financial information.

## 1. Attestation regarding the completeness of CSR Information

### Nature and scope of our work

On the basis of interviews with the individuals in charge of the relevant departments, we obtained an understanding of the Company's sustainability strategy regarding human resources and environmental impacts of its activities and its social commitments and, where applicable, any actions or programmes arising from them.

We compared the CSR Information presented in the management report with the list provided in article R.225-105-1 of the French Commercial Code.

For any consolidated information that is not disclosed, we verified that explanations were provided in accordance with article R.225-105, paragraph 3 of the French Commercial Code.

We verified that the CSR Information covers the scope of consolidation, i.e., the Company, its subsidiaries as defined by article L.233-1 and the controlled entities as defined by article L.233-3 of the French Commercial Code within the limitations set out in the methodological note, presented in 3.7 section of the management report.

### Conclusion

Based on the work performed and given the limitations mentioned above, we attest that the required CSR Information has been disclosed in the management report.

## 2. Conclusion on the fairness of CSR Information

### Nature and scope of our work

We conducted about forty interviews with the persons responsible for preparing the CSR Information and, where appropriate, responsible for internal control and risk management procedures, in order to:

-assess the suitability of the Guidelines in terms of their relevance, completeness, reliability, neutrality and understandability, and taking into account industry best practices where appropriate;

-verify the implementation of data-collection, compilation, processing and control process to reach completeness and consistency of the CSR Information and obtain an understanding of the internal control and risk management procedures used to prepare the CSR Information.

We determined the nature and scope of our tests and procedures based on the nature and importance of the CSR Information with respect to the characteristics of the Company, the human resources and environmental challenges of its activities, its sustainability strategy and industry best practices.

Regarding the CSR Information that we considered to be the most important listed in the hereafter tables:

- at parent entity and divisions level, we referred to documentary sources and conducted interviews to corroborate the qualitative information (organisation, policies, actions), performed analytical procedures on the quantitative information and verified, using sampling techniques, the calculations and the consolidation of the data. We also verified that the information was consistent and in agreement with the other information in the management report;

■ at the level of a representative sample of entities selected by us<sup>(1)</sup> on the basis of their activity, their contribution to the consolidated indicators, their location and a risk analysis, we conducted interviews to verify that procedures are properly applied and to identify potential undisclosed data, and we performed tests of details, using sampling techniques, in order to verify the calculations and

reconcile the data with the supporting documents. The selected sample represents 91% of headcount considered as material data of social issues and between 21% and 100% of environmental data considered as material data of environmental issues (listed in the hereafter tables).

Social indicators	Assurance
Total EDF group workforce as of 31 December, breakdown by age and gender	Reasonable
Managers, breakdown by gender	Limited
Hires	
Other arrivals	
Retirement departures/inactive employees	
Resignations	
Redundancies, dismissals, people made inactive	
Other departures	
Hours of training provided	
Number of employees benefiting from training	
Average number of days lost through illness and accidents	
Work related illnesses reported in the year to Social Security (EDF)	
Fatal accidents (employees) – Fatal accidents (third party provider)	
Workplace accidents involving at least one lost day (employees)	
Accident frequency rate (employees)	
Accident severity rate (employees)	
Percentage of women at managerial level	
Number of employees with disabilities	
Environmental indicators	Assurance
Direct CO <sub>2</sub> emissions from electricity and heat production (including installations not subject to quotas)	Reasonable
Coal-fired consumption	Limited
SO <sub>2</sub> emissions	
Emissions of NO <sub>x</sub>	
Dusts	
Indirect CO <sub>2</sub> emissions from combustion of natural gas sold to end users	
Renewable energies: quantity of electricity and heat generated using renewable energies (other than hydropower)	
Nuclear fuel loaded in reactors	
Radioactive emissions to air: Carbon-14, Tritium (EDF)	
Radioactive emissions to water: Carbon-14, Tritium (EDF)	
Decommissioning nuclear waste: Very Low-Level radioactive Waste (VLLW) (EDF)	
Decommissioning nuclear waste: Low and Intermediate-Level radioactive Waste (LLW and ILW) (EDF)	
Very Low-Level solid radioactive Waste (EDF)	
Short-Lived Low and Intermediate-Level solid radioactive Waste (EDF)	
Long-Lived High and Intermediate-Level solid radioactive Waste (EDF)	
Radioactive emissions to water: Tritium (EDF Energy)	
Radioactive emissions to air: Carbon-14, Tritium (EDF Energy)	
Uranium sent to off site (EDF Energy)	
Transported low-level radioactive waste (EDF Energy)	
Generated Intermediate-Level radioactive waste (EDF Energy)	

(1) See the list of entities in appendix of this report.

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

Assurance report of the Statutory Auditors

For the remaining consolidated CSR Information, we assessed its consistency based on our understanding of the Company.

<b>Qualitative information</b>	
Social information	<p>Summary of collective agreements</p> <p>Occupational health and safety conditions</p> <p>Policies implemented regarding training</p> <p>Measures implemented to promote equal opportunity</p>
Environmental information	<p>The organization of the Company to integrate environmental issues and, if appropriate, the assessments and certification process regarding environmental issues</p> <p>Measures of prevention, recycling, reuse, other forms of recovery and disposal of waste</p> <p>Consumption of raw materials and measures implemented to improve efficiency in their use</p> <p>Energy consumption and measures implemented to improve energy efficiency and renewable energy use</p> <p>Significant greenhouse gas emissions items generated as a result of the Group's activity, particularly by the use of goods and services they provide</p> <p>Adaptation to consequences of climate change</p> <p>Measures implemented to protect and conserve the biodiversity</p>
Societal information	<p>Territorial, economic and social impact of the Company activity</p> <p>Conditions of the dialogue with stakeholders</p> <p>Actions of partnership and sponsorship</p> <p>Integration of social and environmental issues into the company procurement policy</p> <p>Actions implemented against corruption</p> <p>Actions implemented regarding the tackling of energy precariousness</p>

We also assessed the relevance of explanations provided for any information that was not disclosed, either in whole or in part.

We believe that the sampling methods and sample sizes we have used, based on our professional judgement, are sufficient to provide a basis for our limited assurance conclusion; a higher level of assurance would have required us to carry out more extensive procedures. Due to the use of sampling techniques and other limitations inherent to information and internal control systems, the risk of not detecting a material misstatement in the CSR information cannot be totally eliminated.

### Conclusion

Based on the work performed, no material misstatement has come to our attention that causes us to believe that the CSR Information, taken as a whole, is not presented fairly in accordance with the Guidelines.

## 3. Reasonable assurance on a selection of CSR Information

Nature and scope of our work

For the information selected by the Group and identified by the symbol √, our audit consisted of work of the same nature as described in paragraph 2 above for CSR information considered the most important, but in more depth, particularly regarding the number of tests. The selected sample represents 91% of headcount considered as material data of social issues and 62% of CO<sub>2</sub> emissions (scope 1) from electricity and heat production (including installations not subject to quotas).

We consider that this work enables us to express a conclusion of reasonable assurance for the information selected by the Group and identified by the symbol √.

### Conclusion

In our opinion, the information selected by the Group and identified by the symbol √ is fairly presented, in all material respects, in compliance with the Guidelines.

Paris La Défense, on 15 February 2018

Anne Garans Associée  
Partner, Sustainability Services

Jean-Louis Caulier  
Partner

Michel Piette  
Partner



## Appendix

## Sample of entities selected

Within EDF	Agence RH de Talence Agence RH de Rouen Pôle Compétences Santé au Travail de Mulhouse Centre Nucléaire de Production d'Electricité de Nogent Centre Nucléaire de Production d'Electricité de Blayais Centre Nucléaire de Production d'Electricité de Civaux Centrale de Production Thermique de Martigues Centrale de Production Thermique de Cordemais Division Production Nucléaire – Unité d'Ingénierie d'Exploitation Division Production Nucléaire – Unité Technique Opérationnelle Division Ingénierie Nucléaire – Direction de Projets Déconstruction Déchets Division Combustible Nucléaire Division Production Ingénierie Thermique
Within Enedis	Siège Enedis Direction Régionale de Lorraine (RH)
Within SOCODEI	Centre nucléaire de traitement et de conditionnement des déchets faiblement radioactifs - Centraco
Within Insular Electrical Generation	Centrale électrique de Bellefontaine, Martinique
Within EDF Energy	Nuclear power plant of Hinkley Point B Nuclear power plant of Hartlepool Combined Cycle Gas Turbine power plant of West Burton B EDF Energie Crawley Headquarter (HR)
Within EDF Energies Nouvelles	Siège EDF EN Services France, Colombiers (RH) Siège EDF EN Services, UK (RH) Siège EDF EN Corporate, Paris La Défense
Within Edison	Centrale di Candela Centrale di Torviscosa Centrale di Marghera Levante Edison Group Headquarter, Milan (RH)
Within Dalkia	Direction Régionale Centre-Est Direction Régionale Nord TIRU Site de Saint-Ouen Siège Dalkia, Lille (RH)
Within EDF Luminus	EDF Luminus Siège EDF Luminus SA, Bruxelles (RH)
Within EDF Polska	Coal power plant Rybnik Coal power plant Krakow Coal power plant Wyrbrzeze EC Gdanska
Within MECO	Combined Cycle Gas Turbine power plant of MECO
Within Norte Fluminense	Combined Cycle Gas Turbine power plant of Norte Fluminense

# 3. ENVIRONMENTAL AND SOCIETAL INFORMATION – HUMAN RESOURCES

Assurance report of the Statutory Auditors

# 4. CORPORATE GOVERNANCE

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## 4.1 CORPORATE GOVERNANCE CODE

EDF has signed up to the AFEP-MEDEF Code<sup>(1)</sup>, which is the Corporate Governance Code to which the Company refers, in accordance with Article L. 225-37-4 of the French Commercial Code<sup>(2)</sup>, subject to the specific laws and regulations applicable to EDF.

These specific laws and regulations, in accordance with EDF's status as a state-owned company and in particular the application to the Company of Order no. 2014-948 of 20 August 2014 and its implementing texts, and decree no. 53-707 of 9 August 1953, are detailed in this Reference Document and relate specifically to:

- the members of the Board of Directors (see section 4.2.1 "Members of the Board of Directors");

- the terms and conditions for the appointment of the Chairman and Chief Executive Officer of EDF and the method of Executive Management (see section 4.2.2.2 "Method of Executive Management – Appointment and powers of the Chairman and Chief Executive Officer");
- the terms and conditions for the setting of the compensation of the Chairman and Chief Executive Officer (see section 4.6.1.1.1 "Terms and conditions for the setting of compensation").

In addition to the aforementioned specific laws and regulations, the table below sets out the AFEP-MEDEF Code recommendations that are not applied by the Company and the related explanations:

<b>AFEP-MEDEF Code recommendation</b>	<b>Company's position</b>	<b>Explanation</b>	<b>Relevant section of the Reference Document</b>
Staggered re-election of the Board of Directors Recommendation 13.2: <i>"Terms should be staggered so as to avoid replacement of the entire body and to favour a smooth replacement of directors".</i>	The replacement of the entire Board of Directors every five years is no longer mandatory in accordance with the order of 20 August 2014 but the Company has not implemented the staggered re-election of the Board of Directors.	A proposal will be made to the Shareholders' Meeting called for 15 May 2018 to amend Article 13 of EDF's articles of association, starting from the Shareholders' Meeting held in 2019 to approve the financial statements for fiscal year 2018, to renew half of the Board of Directors every other year, excluding the directors elected by the employees and the representative of the French State appointed by decree.	See section 4.2.2.1 ("Term of office of directors").
Holding of company shares by directors Recommendation 19: <i>"The director should personally be a shareholder and, by virtue of the provisions in the by-laws or the internal regulations, hold a minimum number of shares that is significant in relation to the directors' fees awarded. If he or she does not hold these shares when assuming office, he or she should use his or her directors' fees to acquire them".</i>	The company's articles of association and the Board's internal rules of procedure do not require directors to hold a minimum number of shares that is significant in relation to the directors' fees awarded.	In accordance with the law of 26 July 1983, the directors representing the employees receive no directors' fees. Furthermore, the directors' fees payable to members recommended by the French State who are civil servants are paid to the French State budget. Representatives of the French state who are not civil servants can only receive 30% of the directors' fees due to them, the remainder being paid to the French State budget. Finally, the Chairman of the Board of Directors does not receive any directors' fees. Taking account of the wide range of situations, the Board has not established a unique rule on the holding of the Company' shares. Furthermore, each director must act in the Company's best interests, irrespective of the number of company shares they hold personally.	See sections 4.6.1.2 ("Total compensation of directors") and 4.5 ("Shareholding by directors and trading in EDF securities by corporate officers and executives").

(1) Code updated in November 2016.

(2) After having considered the AFEP-MEDEF recommendations of October 2008 on the compensation of corporate officers and executives of companies, the Company's Board of Directors of 17 December 2008 approved these recommendations, deeming that they are in line with EDF's corporate governance approach, and that they had already been implemented by the Company.

AFEP-MEDEF Code recommendation	Company's position	Explanation	Relevant section of the Reference Document
<p>Requirement for corporate officers to hold shares</p> <p>Recommendation 22:</p> <p><i>"The Board of Directors defines a minimum number of registered shares that the corporate officers must retain through to the end of their term of office. This decision is reviewed at least on each extension of their term of office. (...)</i></p> <p><i>Until this objective regarding the holding of shares has been achieved, the corporate Officers will devote a proportion of exercised options or awarded performance shares to this end as determined by the Board".</i></p>	<p>The Board of Directors has not set rules for the holding by the Chairman and Chief Executive Officer of a minimum number of the Company's shares.</p>	<p>The Chairman &amp; Chief Executive Officer does not receive directors' fees. His compensation is limited in accordance with decree 2012-915 of 26 July 2012 modifying decree 53-707 of 9 August 1953. Finally, the Company has not put in place a stock and/or performance stock option plan in favour of the Chairman and Chief Executive Officer. Accordingly, it was decided to not implement this recommendation. Furthermore, the executive corporate officer must also act in the Company's best interests, irrespective of the number of company shares they hold personally.</p>	<p>See sections 4.6.1.1 ("Total compensation of the Chairman &amp; Chief Executive Officer"), 4.6.2 ("Stock options – Bonus shares") and 4.5 ("Shareholding by directors and trading in EDF securities by corporate officers and executives").</p>
<p>Rules for the distribution of directors' fees</p> <p>Recommendation 20.1:</p> <p>The method of distribution of directors' compensation <i>"should take account, in such ways as it shall determine, of the directors' actual attendance at meetings of the Board and Committees, and the amount shall therefore consist primarily of a variable portion".</i></p>	<p>A significant but not "preponderant" share of the directors' fees is dependent upon actual attendance by the directors of the Board and Committee meetings.</p>	<p>Special distribution rules were adopted, which in particular take account of the level of responsibilities and the time spent by the directors on their duties. Though the variable share of compensation paid in directors' fees that compensates the actual presence of directors is not preponderant, the Company considers that it is nonetheless significant, insofar as it accounts for 50% of the total budget of directors' fees and, as recommended by the AFEP-MEDEF Code, as it is appropriate to the level of responsibilities assumed by the directors and to the time that they must spend on their duties.</p>	<p>See section 4.6.1.3 ("Total compensation of directors").</p>

### 4.2 MEMBERS AND FUNCTIONING OF THE BOARD OF DIRECTORS

#### 4.2.1 MEMBERS OF THE BOARD OF DIRECTORS

In accordance with order 2014-948 of 20 August 2014 regarding governance and trading in state-owned companies, EDF is now administered by a Board of Directors consisting of three to eighteen members, including members appointed by the Shareholders' Meeting, if applicable on recommendation from the French state in accordance with Article 6 of the order, a French State Representative chosen by the Minister for the Economy from the civil service in accordance with Article 4 of the order, and one third employee representatives elected in accordance with the provisions of the law of 26 July 1983 <sup>(1)</sup>.

In accordance with the AFEP-MEDEF Code recommendations, the Board of Directors periodically reviews the desirable balance in its membership and that of the Committees it creates, particularly in terms of diversity (representation of women and men, nationalities, international experience, expertise) and the percentage of independent directors.

On the date of filing of this Reference Document, the Board of Directors has eighteen members:

- eleven directors appointed by the Shareholders' Meeting, including five on recommendation from the French State;
- six directors elected by the employees;
- one Representative of the French State.

The Government Commissioner <sup>(2)</sup> and Head of the French State General Economic and Financial Supervisory Mission to the Company <sup>(3)</sup> and the Secretary of the Central Works Council attend the meetings of the Board of Directors, but are not entitled to vote. However, in accordance with Article L. 311-5-7 of the French Energy Code, based on Law 2015-992 of 17 August 2015 relating to the Energy Transition for Green Growth, the Government Commissioner is informed of investment decisions and can oppose decisions whose implementation would be incompatible with the objectives of the strategic plan developed by the Company or with those of the multi-year energy programme.

Between 1 January 2017 and the date of filing of this Reference Document, the following modifications were made to the membership of the Board of Directors:

First name, surname	Director	Date of beginning or expiration of term of office	Replacing
Christian Masset	Director appointed by the Shareholders' Meeting on recommendation from the French State	Resignation on 1 August 2017	n/a
Maurice Gourdault Montagne	Director appointed by the Shareholders' Meeting on recommendation from the French State	Co-option by the Board of Directors on 20 September 2017 <sup>(1)</sup>	Christian Masset
Maxime Villota	Director elected by the employees, sponsored by the CGT	Term of office expired on 6 November 2017	n/a
Christophe Cuvilliez	Director elected by the employees, sponsored by the CGT	Term of office began on 7 November 2017 <sup>(2)</sup>	Maxime Villota

(1) In accordance with Articles L. 225-24 of the French Commercial Code and 13 of order no. 2014-948 of 20 August 2014, the Board of Directors appointed, on a provisional basis, Maurice Gourdault-Montagne as director to replace Christian Masset for the remainder of Mr. Masset's term of office, i.e. until the close of the Ordinary Shareholders' Meeting convened to approve the financial statement for the fiscal year ended 31 December 2018. This co-option will be submitted to the approval of the Shareholders' Meeting of 15 May 2018.

(2) Article 16 of Law no. 83-675 of 26 July 1983 on the Democratisation of the Public Sector stipulates that the candidates immediately below the last elected candidate on a list are called upon to replace the elected representatives from this list whose seat may become vacant for any cause whatsoever.  
n/a not applicable.

#### Balanced representation of men and women on Boards of Directors

In accordance with Article L. 225-18-1 of the French Commercial Code and the order of 20 August 2014, EDF, as a listed company and a state-owned company, is subject to the rules relating to the balanced representation of women and men on Boards of Directors and Supervisory Boards and the Company must comply with a proportion of no less than 40% of directors of each gender on the Board.

At the date of publication of this Reference Document, EDF's Board of Directors thus includes seven women, including two of the directors elected by employees. Women thus make up 41.7% of the Board members taken into consideration to calculate this percentage under the AFEP-MEDEF Corporate Governance Code (i.e. excluding directors representing employees).

#### Information regarding the directors

The list of directors, their personal details as well as information on their terms of office on 15 January 2018 <sup>(4)</sup> are provided below.

(1) The employee representatives mentioned in I of Article 7 of the order of 20 August 2014 are subject, for their election and their status, to the same provisions as those applicable to employee representatives of companies subject to the Law of 26 July 1983, in sections II and III of Title II of this law.

(2) Article 15 of the order of 20 August 2014.

(3) This mission exercises the French State's economic and financial supervision of EDF, in accordance with Article 8 of decree 55-733 of 26 May 1955. It can exercise extensive supervisory procedures.

(4) Unless otherwise stated in the table.

## DIRECTORS APPOINTED BY THE SHAREHOLDERS' MEETING:

**JEAN-BERNARD LÉVY, 61 YEARS OLD***Position held within the Company*

Chairman and Chief Executive Officer since 27 November 2014<sup>(1)</sup>

*Date of appointment to the Board*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Chairman of the Strategy Committee

*Shares held*

0

*Nationality*

French

A former student of École Polytechnique (graduating in 1973) and Telecom Paris Tech, Jean-Bernard Lévy began his career at France Télécom in 1979 as a works engineer at the Angers Division. In 1982, he became responsible for managing executive managers and HR budgets at head-office, then assistant to the head of HR. In 1986, he was appointed Technical Advisor to the office of Gérard Longuet, Minister for Postal Services and Telecommunications. From 1988 to 1993, Jean-Bernard Lévy managed the telecommunications satellite activity of Matra Espace, now Matra Marconi Space. From 1993 to 1994, he ran the office of Gérard Longuet, Minister for Industry, Postal Services and Communications and foreign trade. In 1995, he was appointed Chairman & Chief Executive Officer of Matra Communication. In 1998, he joined Oddo & Cie as Chief Executive Officer then Managing Partner. In summer 2002, Jean-Bernard Lévy joined Vivendi. He served as its Chief Executive Officer until April 2005 and became Chairman of its Executive Board in April 2005, until June 2012. From December 2012 to November 2014, he was Chairman & Chief Executive Officer of the Thales defence and aerospace group. EDF director since 23 November 2014, Jean-Bernard Lévy has been the Company's Chairman & Chief Executive Officer since 27 November 2014.

**Offices and positions held during 2017***Position held within the Company*

- Chairman and Chief Executive Officer of EDF

Office/Position	Name	Country	
Chairman and Chief Executive Officer	EDF	France	C
Chairman of the Board of Directors	Edison	Italy	G/L
Director	EDF Energy Holdings	UK	G
Chairman of the Board of Directors	EDF Foundation	France	G
Director	Dalkia	France	G
Director	EDF Énergies Nouvelles	France	G
Chairman of the Supervisory Board of	Framatome	France	G
Director	Société Générale	France	C
Representative of EDF	French High Committee for Transparency and Information on Nuclear Safety	France	
Chairman and Director as the representative of Électricité de France	French Energy Council	France	
Director	Global Sustainable Electricity Partnership	Canada	

G: EDF group company - C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Chairman and Chief Executive Officer of Thales
- Chairman of the Board of Directors of Institut Mines Télécom (formerly Institut Télécom)
- Chairman of JBL Consulting & Investments
- Chairman of the Supervisory Board of Viroxis
- Deputy Chairman of GIFAS (French Aerospace Industries Association)
- Director of DCNS
- Director of the Institut Pasteur
- Director of Vinci

*Abroad*

- Deputy Chairman of the Board of Directors of Eurelectric
- Chairman of the Board of Directors of EDF Energy

(1) Jean-Bernard Lévy was appointed temporary Chairman and Chief Executive Officer effective 23 November 2014, by ministerial decisions of 21 November 2014.

**OLIVIER APPERT, 68 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting on recommendation from the French State

*Date of appointment to the Board*

17 June 2013

*Last re-elected*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Member of the Nuclear Commitments Monitoring Committee and the Strategy Committee

*Shares held*

0

*Nationality*

French

A former student of the École Polytechnique and a Corps des Mines engineer, Olivier Appert began his career at the Mines de Lyon. After having held various positions at the Ministry for Industry and the Prime Minister's office, he was appointed Deputy Director of the office of the Minister for Industry from 1984 to 1986. In 1987, he was put in charge of strategy at Télécommunications Radioélectriques et Téléphoniques (TRT). In 1989, he was appointed Director of Hydrocarbons at the Ministry for Industry, and in 1994, Olivier Appert joined the Executive Management of IFP where he took the reins of research and development. In 1998, he was appointed Chief Executive Officer of Isis, a technology holding company whose majority shareholder was IFP. In 1999, he became Director of Long-term Cooperation and Energy Policy Analysis at the International Energy Agency (IEA). From 2003 to 2015, he was Chairman and Chief Executive Officer of IFP, renamed IFP Énergies Nouvelles (IFPEN) in July 2010. From 2010 to 2017, he was Chairman of the French Energy Council. He is the General representative of the National Academy of Technologies of France since March 2015. He is also Chairman of the French Energy Council since 2010 and of France Brevets since December 2016. Olivier Appert has been a director of EDF since June 2013.

**Offices and positions held during 2017***Principal positions held outside the Company*

- General representative of the National Academy of Technologies of France

Office/Position	Name	Country
General representative	National Academy of Technologies of France	France
Chairman of the Board of Directors	France Brevets	France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Chairman of the French Energy Council
- Chairman & Chief Executive Officer of IFP Énergies Nouvelles
- Director of CGG
- Director of the Institut de Physique du Globe de Paris (Paris Institute of Earth Physics)
- Director of Storengy
- Director of Technip



**PHILIPPE CROUZET, 61 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting

*Date of appointment to the Board*

23 November 2009

*Last re-elected*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Chairman of the Nuclear Commitments Monitoring Committee and member of the Audit Committee

*Shares held*

294 shares

*Nationality*

French

A graduate of the Institut d'Études Politiques de Paris (Paris Institute of Political Studies) and a former student of the École Nationale d'Administration, Philippe Crouzet is a former Counsel (Maître des Requêtes) at the French Council of State. He spent most of his career at Saint-Gobain, which he joined in 1986. He served successively as Head of Corporate Planning, Chief Executive Officer of Papeteries de Condat, General Manager for Spain and Portugal and Head of the Industrial Ceramics branch. From 2000 to 2004, he held the position of Vice-President for Finance, Purchasing and Information Systems. He was then appointed Group Vice-President in charge of the Building Distribution Division, before joining Vallourec, the world leader in steel tubes for the energy markets. Appointed to the Supervisory Board of Vallourec in April 2008, he became Chairman of the Group Executive Board in April 2009, and his term of office was renewed in 2016. He is also Deputy Chairman of the Institut de l'Entreprise and director of the Théâtre de la Ville (Paris). Philippe Crouzet has been a Director of EDF since November 2009.

**Offices and positions held during 2017***Principal position held outside the Company*

- Chairman of the Executive Board of Vallourec

Office/Position	Name	Country	
Chairman of the Executive Board	Vallourec	France	C
Chairman and Director	Vallourec Tubes	France	
Chairman	Vallourec Tubes France	France	
Chairman	Vallourec Oil & Gas France	France	
Director	Vallourec Services	France	
Chairman of the Supervisory Board of	Vallourec Deutschland	Germany	
Director	Vallourec Soluções Tubulares do Brasil	Brazil	
Director	Théâtre de la Ville (Paris)	France	
Deputy Chairman	Institut de l'Entreprise	France	

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Director of Vallourec Tubos do Brasil
- Director of the Théâtre National de l'Opéra-Comique

**MAURICE GOURDAULT-MONTAGNE 63 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting on recommendation from the French State

*Date of appointment to the Board*

20 September 2017<sup>(1)</sup>

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Member of the Strategy Committee

*Shares held*

0

*Nationality*

French

A graduate of the Institut d'études politiques de Paris (Paris Institute of Political Studies) and of the INALCO (National Institute for Oriental Languages and Civilisations), Maurice Gourdault-Montagne holds a master's degree in law and a two-year undergraduate degree (DEUG) in German. He joined the French Foreign Affairs Ministry in 1978. He served in various diplomatic posts in India and in Germany, as well as in the headquarters of the French Foreign Affairs Ministry as a deputy spokesperson for the Foreign Affairs Ministry and as a Deputy Principal Private Secretary to Foreign Affairs Minister Alain Juppé. He later became Prime Minister Juppé's Principal Private Secretary. He was appointed France's Ambassador to Japan in 1998 and became Senior Diplomatic Counsellor to French President Jacques Chirac in 2008 as well as a French sherpa to the G8. From 2002 to 2007, he was responsible for the Franco-Indian and Franco-Chinese strategic dialogue as the personal representative of the French President. He was subsequently appointed France's Ambassador to the United Kingdom in December 2007, France's Ambassador to Berlin in February 2011, and France's Ambassador to China in August 2014. On 22 June 2017, the French Council of Ministers appointed Maurice Gourdault-Montagne as Secretary General of the Ministry for Europe and Foreign Affairs effective 1 August 2017.

**Offices and positions held during 2017***Principal position held outside the Company*

- Secretary General of the Ministry for Europe and Foreign Affairs

Office/Position	Name	Country
Director	Orano	France
Director	Agence Nationale des Titres Sécurisés (French national agency of secure shares)	France
Director	Commissariat à l'Énergie atomique (Atomic Energy Commission)	France
Director	Commission de Récolement des Dépôts d'Œuvres d'Art (Commission for the Verification of the Registration of Works of Art)	France
Director	École Nationale d'Administration (ENA)	France
Director	France Médias Monde	France
Director	Renault Foundation	France
Director	Institut Français	France
Director	French office for the protection of refugees and stateless persons	France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- None

(1) Mr. Gourdault-Montagne's appointment will be submitted to the shareholders for ratification at the Shareholders' Meeting scheduled for 15 May 2018.

**BRUNO LAFONT, 61 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting

*Date of appointment to the Board*

20 May 2008

*Last re-elected*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Chairman of the Appointments & Remuneration Committee

*Shares held*

238 shares

*Nationality*

French

A graduate of the *École des Hautes Études Commerciales (HEC)* and a former student of the *École Nationale d'Administration (ENA)*, Bruno Lafont began his career with the Lafarge group in 1983. Having served in several financial and operational positions in France and abroad, he became Group Vice-President, Finance at the end of 1994 and joined the Executive Committee in early 1995 prior to being appointed Chairman of the plaster business at the end of 1998. He became Group Deputy Chief Executive Officer in 2003, a director in 2005 and Chief Executive Officer in January 2006. He was Chief Executive Officer of Lafarge between May 2007 and July 2015, Honorary Chairman of Lafarge since 2015, and co-Chairman of the Board of Directors of LafargeHolcim between July 2015 and May 2017. He is a director of ArcelorMittal since 2011, and lead independent director since 2017. He is a member of the Executive Committee of the World Business Council for Sustainable Development (WBCSD) since November 2013 and chaired the Sustainable Development Division of the MEDEF (Mouvement des Entreprises de France) between February 2014 and January 2018. Bruno Lafont has been a Director of EDF since May 2008.

**Offices and positions held during 2017***Principal position held outside the Company*

- Director, lead independent director of ArcelorMittal

Office/Position	Name	Country
Director, lead independent director	ArcelorMittal	Luxembourg C
Member of the Executive Committee	World Business Council for Sustainable Development (WBCSD)	Switzerland

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Chairman and Chief Executive Officer of Lafarge
- Chairman and director of Lafarge Ciments
- Chairman of Sustainable Development Division at the MEDEF (Mouvement des Entreprises de France)
- Director of the Association Française des Entreprises Privées (AFEP)

*Abroad*

- Co-Chairman of LafargeHolcim (Switzerland)
- Director of Lafarge Cement Shui On (China)

**BRUNO LÉCHEVIN, 66 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting on recommendation from the French State

*Date of appointment to the Board*

6 May 2013

*Last re-elected*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Member of the Governance and Corporate Social Responsibility Committee<sup>(1)</sup>

*Shares held*

0

*Nationality*

French

Holder of a postgraduate degree from the Institut d'Etudes Politiques in Paris, Bruno Léchevin began his career at EDF and subsequently held various union roles. Federal Secretary of the CFDT Gaz-Electricité federation from 1983 to 1988, he was then its General Secretary in 1988 and member of the national Board of the CFDT union association from 1988 to 1997 then Secretary of the Chimie-Energie union from 1997 to 1999. At the same time, he was member of the Haut Conseil du Secteur Public (High Council of the Public Sector) from 1992 to 1999. Appointed in 2000, for two years, commissioner of the French Energy Regulation Committee, his term of office was extended for six years. General Representative of the French National Energy Mediator from March 2008 to March 2013, he was at the same time Special Advisor to the Chairman of the French Energy Regulatory Commission. Appointed as a member of the Board of Directors of the French Environment and Energy Management Agency (ADEME) in February 2013, he was its Chairman from March 2013 to March 2018. Bruno Léchevin is Deputy Chairman, founder member of Electriciens Sans Frontières (Electricians without borders), an organisation that works to provide access to energy and water in developing countries, and Chairman of the National Fuel Poverty Monitoring Centre (Observatoire national de la précarité énergétique) since June 2016. He has been a Director of EDF since May 2013.

**Offices and positions held during 2017***Principal position held outside the Company*

- Deputy Chairman of Electriciens sans frontières

Office/Position	Name	Country
Deputy Chairman	Electriciens Sans Frontières	France
Chairman	National Fuel Poverty Monitoring Centre (Observatoire national de la précarité énergétique)	France
French Energy Council	Director as representative of ADEME	France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Chairman of the French Environment and Energy Management Agency (ADEME)
- General Representative to the French national energy mediator
- Special advisor to the Chairman of the CRE (French Energy Regulatory Commission)

(1) The Governance and Corporate Social Responsibility Committee was known as the Ethics Committee until 24 January 2018 (see section 4.2.3.4 "Governance and Corporate Social Responsibility Committee").

**MARIE-CHRISTINE LEPETIT, 56 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting on recommendation from the French State

*Date of appointment to the Board*

7 May 2012

*Last re-elected*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Chair of the Audit Committee and member of the Nuclear Commitments Monitoring Committee

*Shares held*

0

*Nationality*

French

A former student of the *École Polytechnique* and the *École Nationale d'Administration (ENA)*, Marie-Christine Lepetit joined the *Inspectorate General of Finance* in 1987, where she held auditing and advisory positions. In 1991, she was recruited by Jean Lemierre to the *Directorate General for Tax* in order to introduce management control. In 1995, she was placed in charge of synthesis work at the tax law department before joining the office of the *Prime Minister, Alain Juppé*, as technical advisor in tax matters and macroeconomic studies then taxation and SMEs from 1995 to 1997. She continued her career at the *General Directorate for Tax*, working to improve service quality (pre-filled tax returns, remote procedures, and certification). She was appointed *Director of Tax Law* at the *Ministry for the Economy and Finance* in 2004 and used this role to push through tax reforms from 2004 to 2012. At the same time, she co-chaired the working group on reform of the financing of social welfare in 2006 and co-signed the report by the conference of experts on the "energy-climate contribution" chaired by Michel Rocard. She also sat on the *Local Authorities Reform Committee* chaired by Edouard Balladur as *Executive Director* and was a member of the *Public Life Renewal and Ethics Committee* chaired by Lionel Jospin. She has been *Head of the Inspectorate General of Finance* since March 2012, and now reports to the *Ministry for the Economy and Finance* and the *Ministry of Public Action and Accounts*. She has been *director of the Etablissement Public de la Réunion des Musées Nationaux et du Grand Palais des Champs-Élysées* since 2015. Marie-Christine Lepetit has been a *Director of EDF* since May 2012.

**Offices and positions held during 2017***Principal position held outside the Company*

- Head of the *Inspectorate General of Finance* at the *Ministry for the Economy and Finance* and the *Ministry for Public Action and Accounts*

Office/Position	Name	Country
Director	Établissement Public de la Réunion des Musées Nationaux et du Grand Palais des Champs-Élysées	France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Director of the *Fondation nationale des Sciences Politiques*

**COLETTE LEWINER, 72 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting

*Date of appointment to the Board*

11 April 2014

*Last re-elected*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing

31 December 2018

*Other position(s)*

Chair of the Governance and Corporate Social Responsibility Committee, member of the Audit Committee and the Appointments & Remuneration Committee

*Shares held*

1,825 shares<sup>(1)</sup>

*Nationality*

French

A former student of the *École Normale Supérieure* and holder of an *Agrégation* degree in physics and *Doctorate in science*, Colette Lewiner joined *Électricité de France* in 1979. In 1989 she created the *Development and Commercial Strategy Division*, accordingly becoming the first woman appointed *Executive Officer* at EDF. From 1992 to 1998, she was *Chair and Chief Executive Officer* of SGN, a subsidiary of AREVA-Orano. In 1998, she joined Capgemini to create then manage until in June 2012 the *Global Energy and Utilities* sector. Since July 2012, she has been, as *Manager* of Cowin, a *Consultant* in the energy field. *Non-executive Chair* of TDF (SAS) from 2010 to 2015, she is a member of the *National Academy of Technologies of France* since 2002 and has been a member of the *Strategic Research Committee* reporting directly to the *French Prime Minister* since February 2014. She is a *director* of the Bouygues group as well as *Getlink*, *Nexans*, *Ingenico* and *CGG*. Colette Lewiner has been a *Director* of EDF since April 2014.

**Offices and positions held during 2017***Principal position held outside the Company*

- Professional director

Office/Position	Name	Country	
Director	Bouygues	France	C
Director	Nexans	France	C
Director	Getlink (ex Eurotunnel)	France	C
Director	Ingenico <sup>(2)</sup>	France	C
Director	CGG <sup>(3)</sup>	France	C

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Chair of the Board of Directors of TDF
- Director of Lafarge

*Abroad*

- Director of Crompton Greaves (India)
- Director of TGS Nopec (Norway)

(1) Shares held directly and through a mutual fund.

(2) Mandate expiring at the Shareholders' Meeting held in 2018, settling the accounts for the 2017 financial year.

(3) Ms. Lewiner was co-opted as a director by the Board of Directors of CGG on 8 March 2018.

**LAURENCE PARISOT, 58 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting

*Date of appointment to the Board*

23 November 2014

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Member of the Audit Committee and Strategy Committee

*Shares held*

137 shares

*Nationality*

French

Holder of a Masters in public law from Université Nancy II, graduate from the Institut d'Etudes Politiques (IEP) and holder of a M.A.S. in Political Studies from the IEP, Laurence Parisot began her career in 1983 working with Alain Lancelot, Chairman of CEVIPOF (Centre for the Study of French Political Life). In 1985, she became survey manager at the Louis Harris Survey Institute, of which she became Chief Executive Officer in 1986. In 1990, she joined the IFOP Survey and Market Study Institute and was appointed as its Chair & Chief Executive Officer, and then Deputy Chair of its Executive Board from 2006 to 2016. She was Chair of MEDEF from 2005 to 2013. She is currently the Chief Development officer of the Gradiva consulting firm. She is also a director of BNP Paribas, Fives et Foxintelligence, member of the Board of Directors of the FNSP, and she chairs the Scientific Board of Fondapol. Laurence Parisot has been a Director of EDF since November 2014.

**Offices and positions held during 2017***Principal position held outside the Company*

- Chief Development Officer of Gradiva

Office/Position	Name	Country	
Director	BNP Paribas	France	C
Director	Fives	France	
Director	Foxintelligence	France	
Chair of the Science Committee	Fondapol	France	
Director	Fondation Nationale des Sciences Politiques (FNSP)	France	

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Manager of Gradiva
- Deputy Chair of the Executive Board of the IFOP group
- Director of Coface
- Member of the Supervisory Board of Fives
- Member of the Supervisory Board of Michelin

**CLAIRE PEDINI, 52 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting

*Date of appointment to the Board*

12 May 2016

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2019

*Other position(s)*

Member of the Governance and Corporate Social Responsibility Committee

*Shares held*

0

*Nationality*

French

Claire Pedini is a graduate of the *École des Hautes Études Commerciales* and holds a Master's degree in media management from the *École Supérieure de Commerce de Paris*. In 1988, she joined Total as Corporate Controller. She assumed responsibility for Total's admission to trading on the New York Stock Exchange in 1991, and became President of Investor Relations in 1992, Vice-President of Media Relations in 1994 and President of New Information Technologies in 1999. In 1998, she joined Alcatel as Chief of Financial Information and Shareholder Relations, becoming successively Vice-President, Investor Relations and Public Affairs in 2001, Deputy Chief Financial Officer in 2004, Senior Vice-President, Human Resources and Corporate Communications and member of the Executive Committee in 2006, Senior Vice-President, Human Resources, Corporate Communications and Real Estate in 2007, and Executive Vice-President, Human Resources and Transformation, of Alcatel-Lucent in 2009. Since June 2010, Claire Pedini has served as Senior Vice-President in charge of Human Resources for the Saint Gobain Group. She was a director of Arkema from 2010 to 2016 and has been a director of EDF since May 2016.

**Offices and positions held during 2017***Principal position held outside the Company*

- Senior Vice-President in charge of Human Resources for the Saint Gobain Group – Member of the Executive Committee of Saint-Gobain

Office/Position	Name	Country
None		

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Director of Arkema

**MICHÈLE ROUSSEAU, 60 YEARS OLD***Position held within the Company*

Director appointed by the Shareholders' Meeting on recommendation from the French State

*Date of appointment to the Board*

30 September 2016

*Expiry of current term*

Shareholders' Meeting called to approve the financial statements for the fiscal year closing 31 December 2018

*Other position(s)*

Member of the Nuclear Commitments Monitoring Committee

*Shares held*

0

*Nationality*

French

Michèle Rousseau is a graduate of the *École Nationale Supérieure des Mines de Paris*, and is an *Ingénieur Général des Mines*. She started her career at the Nord-Pas de Calais DRIRE (Regional Directory for Industry, Research and the Environment) as Head of the Environment Division. She went on to join the Ministry of the Environment where she was responsible for waste, and later the Ministry of Industry where she held the post of Deputy Director of the Nuclear Installation Safety Directorate with responsibility for oversight of EDF's nuclear fleet. She then moved to the French research and innovation agency, ANVAR, as Deputy Director General where she conducted policies supporting innovative projects driven by SMEs, and later to the Ministry of Economy, Finance and Industry as Director with responsibility for energy demand and markets. Here, she was tasked in particular with developing a new legislative and regulatory framework in the wake of the opening up of European electricity and gas markets and expanding energy conservation and renewable energies. Michèle Rousseau subsequently returned to the Ministry of Ecology and Sustainable Development, where she held the positions of Secretary General and, in 2008, Director, Deputy Commissioner General for Sustainable Development, with particular responsibility for implementing the Grenelle Environment initiative. In 2011, she was appointed Director General of the Seine-Normandie Water Agency before returning in 2016 to the General Council for Environment and Sustainable Development where she is Chair of the Haut-de-France Regional Environmental Authority (MRAe). She is the Chair of the Bureau de Recherches Géologiques et Minières (French Geological Survey) since March 2017, and she is a director of EDF since September 2016.

**Offices and positions held during 2017***Principal positions held outside the Company*

- Chair of the Board of Directors of the Bureau de Recherches Géologiques et Minières - BRGM

Office/Position	Name	Country
Chairman of the Board of Directors	Bureau de Recherches Géologiques et Minières - BRGM (French Geological Survey)	France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years:**

- Chair of the General Council for Environment and Sustainable Development's Hauts-de-France Regional Environmental Authority (MRAe)



**DIRECTOR REPRESENTING THE FRENCH STATE:****MARTIN VIAL, 64 YEARS OLD***Position held within the Company*

Director – Representative of the French State

*Date of appointment to the Board*

9 September 2015

*Expiry of current term*

20 November 2018

*Other position(s)*

Member of the Appointments & Remuneration Committee and Strategy Committee

*Shares held*

0

*Nationality*

French

Graduate from the *École Supérieure des Sciences Économiques et Commerciales (ESSEC)* and the *École Nationale Supérieure des Postes et Télécommunications*, Martin Vial began his career as postal services and telecommunications director at the financial division of the General Postal Directorate. In 1986, he joined the Treasury Division at the Ministry for the Economy and Finance. From 1988 to 1993, he was successively Technical Advisor, Deputy Director then Director of the offices of the Minister for Postal Services and Telecommunications and Space, the Minister for Equipment, Housing, Transport and Space, and finally the Postal Services and Telecommunications Minister. In 1993, Martin Vial was appointed Chairman and Chief Executive Officer of *Aéropostale*, airline and joint subsidiary of Air France, La Poste and TAT, and he was elected Chairman of the *Chambre Syndicale du Transport Aérien* (French air transport union) and *Fédération Nationale de l'Aviation Marchande* (French national commercial aviation union). At the end of 1997, he became Chief Executive Officer of La Poste group. In September 2000, he was appointed Chairman of La Poste group and at the same time Deputy Chairman of the *Caisse Nationale de Prévoyance (CNP)*. Martin Vial joined the French National Audit Office in September 2002 as Chief Advisor. From 2003 to 2014, he was Chief Executive Officer and Director of the *Europ Assistance* group, world leader on the assistance market and director and Chief Executive Officer of *Europ Assistance Holding*. He also chairs several boards of directors of this group's companies. In January 2015, he founded the *Company Premium Care*, which provides assistance to the elderly. Commissioner of the French State Shareholdings since August 2015, Martin Vial is a director of *Renault* and *Bpifrance*. He has been a Director of *EDF* since September 2015.

**Offices and positions held during 2017***Principal position held outside the Company*

- Commissioner of the French State Shareholdings Agency

Office/Position	Name	Country	
Director	Renault	France	C
Director	Bpifrance	France	

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Chief Executive Officer and director of *Europ Assistance Holding*
- Chairman of *International Health Solutions*
- Chairman of *Sicav Libertés et Solidarités*
- Director of *Hormair Vacances*
- Director of *Business Solutions Capital*
- Director of *Thales*

*Abroad*

- Chairman of *Club Santé Afrique* (United States)
- Chairman of *Europ Assistance Brazil*, Belgium, France, UK, USA
- Director of *Europ Assistance South Africa*, Germany, China, Spain, Italy, Portugal

## DIRECTORS ELECTED BY THE EMPLOYEES:

**CHRISTINE CHABAUTY, 46 YEARS OLD***Position held within the Company*

Director elected by the employees

*Date of appointment to the Board*

23 November 2009

*Last re-elected*

23 November 2014

*Expiry of current term*

22 November 2019

*Other position(s)*

Member of the Governance and Corporate Social Responsibility Committee and the Appointments & Remuneration Committee

*Shares held*

0

*Nationality*

French

Graduate in Law, Christine Chabauty gained professional experience in a legal environment and in 2000 joined EDF's Trading Department as commercial attaché to the Key Accounts Department. She now works in the Key Accounts Sales Support Department of the Key Accounts Division. Since December 2008, she has also served as a member of an elected industrial tribunal (conseiller prud'homme). Sponsored by the CGT union, Christine Chabauty has been a Director of EDF since November 2009.

**Offices and positions held during 2017***Principal position held outside the Company*

- Commercial attaché to the EDF Trading Division Key Accounts Department

Office/Position	Name	Country
Member of an elected industrial tribunal (conseiller prud'homme)	Conseil de Prud'hommes (Industrial France Tribunal)	France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years**

None.

**JACKY CHORIN, 58 YEARS OLD***Position held within the Company*

Director elected by the employees

*Date of appointment to the Board*

23 November 2014<sup>(1)</sup>

*Expiry of current term*

22 November 2019

*Other position(s)*

Member of the Audit Committee, the Strategy Committee and the Governance and Corporate Social Responsibility Committee

*Shares held*

269 shares<sup>(2)</sup>

*Nationality*

French

A graduate from the Institut d'Études Politiques (IEP) in Paris and a Doctor of Law, Jacky Chorin began his career at EDF as a legal specialist at the Corporate Office of the Equipment Division in 1983. He is currently representative of the Human Resources Manager at the EDF Nuclear and Division. He was a member of the French National Ecological Transition Council from 2014 to 2016 and has been a member of the French Higher Energy Council since 2012. Sponsored by the Force Ouvrière (FO) trade union, Jacky Chorin was a director of EDF from September 2004 to November 2009. He has again been a director at EDF since November 2014.

**Offices and positions held during 2017***Principal position held outside the Company*

- Representative of the Director of Human Resources at the EDF Nuclear and Thermal Division.

Office/Position	Name	Country
Member	French Higher Energy Council	France

G: EDF group company –C: listed company.

**Expired offices held outside the Company over the past five years***France*

- Member of the French National Ecological Transition Council
- Member of the Economic, Social and Environmental Council
- Representative of the Force Ouvrière trade union to the Board of IRES (French institute for economic and social research), a multi-union research body reporting to the French Prime Minister
- Federal Secretary of the FO Energies & Mines trade union, in charge of the Skills Centre

(1) Jacky Chorin was previously director of EDF (EPIC then SA) from September 2004 to November 2009.

(2) Shares held through a mutual fund.

**CHRISTOPHE CUVILLIEZ, 54 YEARS OLD***Position held within the Company*

Director elected by the employees

*Date of appointment to the Board*

7 November 2017

*Expiry of current term*

22 November 2019

*Other position(s)*

Member of the Nuclear Commitments Monitoring Committee

*Shares held*

24 shares

*Nationality*

French

Christophe Cuvilliez was hired by Lyonnaise des eaux in January 1988, where he held various positions in the "central laboratory IT", "wastewater" and finally "potable water" departments. He joined EDF in October 1989 as a security guard on the Penly site. He participated in the industrial commissioning of unit 1 in April 1990, prior to working in startup operations for unit 2, commissioned in 1992. Having undergone POT (Technical Advancement for Workers) training from 1994 to 1998, Christophe Cuvilliez was assigned to the department for unit outages in Flamanville as a chief of site. In 2003, he joined the Safety Security Quality Department in Flamanville and began training as a safety engineer. Certified in 2004, he held this position for around two years. In 2005, Christophe Cuvilliez opted for a 50% secondment to the *fédération CGT mines-énergie* trade union, eventually increasing to 100%, sitting on several EDF employment dialogue bodies such as the Joint Production Committees (CMP), the Works Committee, in which he held the role of Secretary, the Secondary Personnel Commission (CSP) and the Health and Safety at Work Committee (CHSCT). He was the trade union representative for Flamanville from September 2009 to September 2017. Sponsored by the CGT, Christophe Cuvilliez is a director of EDF since 7 November 2017.

**Offices and positions held during 2017***Principal position held outside the Company*

- Member of the Executive Management of the *fédération CGT Mines-Énergie*

Office/Position	Name	Country
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None.

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years**

None.

**MARIE-HÉLÈNE MEYLING, 57 YEARS OLD***Position held within the Company*

Director elected by the employees

*Date of appointment to the Board*

1 September 2011

*Last re-elected*

23 November 2014

*Expiry of current term*

22 November 2019

*Other position(s)*

Member of the Audit Committee, the Nuclear Commitments Monitoring Committee, the Strategy Committee, and the Governance and Corporate Social Responsibility Committee

*Shares held*

28 shares

*Nationality*

French

Graduate in communication (Université Paris V), Marie-Hélène Meyling joined EDF in 1982 where she has held a range of communication positions. She then focused on activities relating to the opening of the electricity market as well as support for renewable energy. From 2008 to 2011, she was a member of the EDF Central Works Council. She is currently Senior Engineer at the EDF Innovation, Strategy and Planning Division. In November 2012, Marie-Hélène Meyling also obtained the Company Director Certificate jointly issued by the IEP and the Institut Français des Administrateurs (French Institute of Directors). Sponsored by the CFDT trade union, Marie Héléne Meyling has been a Director of EDF since September 2011.

**Offices and positions held during 2017***Principal position held outside the Company*

- Senior Engineer at the EDF Innovation, Strategy and Planning Division.

Name	Country
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French Higher Energy Council (CSE)

France

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years:**

None.

**JEAN-PAUL RIGNAC, 55 YEARS OLD***Position held within the Company*

Director elected by the employees

*Date of appointment to the Board*

1 November 2007

*Last re-elected*

23 November 2014

*Expiry of current term*

22 November 2019

*Other position(s)*

Member of the Audit Committee and Strategy Committee

*Shares held*

0

*Nationality*

French

Holder of a doctorate in energy from the Institut National Polytechnique in Toulouse, Jean-Paul Rignac joined EDF in 1991. He served as Secretary of EDF Research & Development's joint generation Committee for five years. He is a research engineer at EDF's Research & Development Division (Renardières Centre), and currently works on energy efficiency in the heating/air-conditioning of industrial buildings and clean rooms. Sponsored by the CGT union, Jean-Paul Rignac has been a Director of EDF since November 2007.

**Offices and positions held during 2017***Principal position held outside the Company*

- Research Engineer at the EDF Research and Development Division

Office/Position	Country
None.	

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years**

None.

**CHRISTIAN TAXIL, 42 YEARS OLD***Position held within the Company*

Director elected by the employees

*Date of appointment to the Board*

23 November 2014

*Expiry of current term*

22 November 2019

*Other position(s)*

Member of the Audit Committee and Strategy Committee

*Shares held*

1,131 shares<sup>(1)</sup>

*Nationality*

French

Graduate from the ESCP Europe School, holding an Executive MBA diploma, and from the École des Mines in Douai, Christian Taxil began his career in 1997 at EDF Gaz de France Distribution in customer, local authority and concession management positions. From 2004 to 2008, he was in charge of electricity and gas industry social dialogue on the Fédération CFE-CGC Énergies union's management team. In 2008, he began work at the EDF group Auditing Division before being elected, from June 2009 to September 2014, General Secretary of the Fédération CFE-CGC Énergies union. Sponsored by the CFE-CGC trade union, Christian Taxil has been a Director of EDF since 23 November 2014.

**Offices and positions held during 2017***Principal position held outside the Company*

- Representative of the Human Resources Division

Office/Position	Name	Country
Elected representative	Board of the Syndicat Mixte d'Électricité, France de Gaz et de Télécommunications du Val-d'Oise (SMDEGTVO)	

G: EDF group company – C: listed company.

**Expired offices held outside the Company over the past five years***France*

- General Secretary of the Fédération CFE-CGC Énergies union
- Local councillor in Courdimanche (95)

(1) Shares held through a mutual fund.

## 4.2.2 FUNCTIONING OF THE BOARD OF DIRECTORS

The internal rules of procedure of the Board of Directors set the principles of its functioning and the terms and conditions according to which the Board and its specialised Committees fulfil their duties. It also defines the role and powers of the Chairman and Chief Executive Officer.

The Board's internal rules of procedure are regularly updated, particularly to take account of legislative and regulatory changes and changes to the AFEP-MEDEF Code (see section 4.1 "Corporate Governance Code"). The most recent update to these rules was adopted by the Board of Directors at its meeting on 24 January 2018, after a joint review by the Governance and Corporate Social Responsibility Committee and the Appointments & Remuneration Committee held on 15 January 2018.

### 4.2.2.1 Term of office of directors – Staggered re-election of the Board

In accordance with the option provided by the aforementioned order of 20 August 2014, the EDF Shareholders' Meeting held on 21 November 2014 modified the Company's articles of association and reduced the term of office of the directors to four years. As an exception, the articles of association state that the first term of office of the directors representing the employees that came into effect after the Shareholders' Meeting held on 21 November 2014 shall be five years and that the term of office of the directors appointed by the Shareholders' Meeting held on 21 November 2014 shall expire at the end of the Shareholders' Meeting called to approve the financial statements for the fiscal year ending 31 December 2018.

In accordance with the provisions of Article 2 of Decree no. 2014-949 of 20 August 2014 regarding the implementation of the order of 20 August 2014, the Representative of the French State is appointed for a term equal to the term of office of the members of the Board of Directors.

At the Shareholders' Meeting of 15 May 2018, a resolution will be put forward to modify Article 13 of EDF's articles of association in order to provide that, starting from the 2019 Shareholders' Meeting called to approve the financial statements for the 2018 fiscal year, the Board of Directors, excluding directors elected by the employees and the Representative of the French state appointed by decree, be renewed by rotation periodically in such a way that half (rounded to the nearest whole number) of the directors elected by the Shareholders' Meeting be renewed every two years and that the Board be completely renewed, with respect to the members concerned, at the end of each four-year period.

The directors appointed by the Shareholders' Meeting can be dismissed at any time by the Shareholders' Meeting. In accordance with Article 12 of the Law on the Democratization of the Public Sector, the directors elected by the employees can be individually dismissed for gross negligence in the exercise of their duties by order of the Presiding Judge at the District Court delivered at summary proceedings upon request from the majority of the members of the Board. However, in the event that serious dissent disrupts the Company's administration, dismissal pronounced by the Shareholders' Meeting can be extended to representatives of the employees. The Representative of the French State ceases their duties by resigning or if they lose the capacity by virtue of which they were appointed; they can be replaced at any time for the remainder of the term of office.

### 4.2.2.2 Method of Executive Management – Appointment and powers of the Chairman and Chief Executive Officer

In accordance with the option provided for in Article 18 of the Order of 20 August 2014, EDF's articles of association state that the Chairman of the Board of Directors is the Executive Manager of the Company and holds the title of Chairman and Chief Executive Officer. The "non-separated" Executive Management structure is therefore set out in the Company's articles of association. The Board's internal rules of procedure, and in particular the limitations it applies to the powers of the Chief Executive Officer, ensure a satisfactory balance, in the Company's interest, between the Chairman and Chief Executive Officer and the Board of Directors, whilst preserving the flexibility, effectiveness and responsiveness necessary in the administration and management of the Company.

EDF's Chairman and Chief Executive Officer is appointed by decree of the President of the Republic of France, on recommendation from the Board of Directors. They can be dismissed by decree in accordance with Article 20 of the Order of 20 August 2014. In accordance with the provisions of Article 13 of the French Constitution, the Chair is appointed based on the opinion of the permanent Committees of the French National Assembly and Senate. Jean-Bernard Lévy was appointed following this process as Chairman and Chief Executive Officer of EDF by Decree of 27 November 2014.

In case of vacation of the office of Chairman and Chief Executive Officer, Article 21 of the Order of 20 August 2014 states that the French State can appoint someone to the role temporarily until the appointment of the new Chairman and CEO <sup>(1)</sup>.

Subject to the specific legal provisions governing public sector companies and the powers specifically reserved by law or by the articles of association to the Board of Directors or to Shareholders' Meetings, and the limits to the powers of the Chairman and Chief Executive Officer provided for by the internal rules of procedure of the Board of Directors as internal rules (see section 4.2.2.3 "Powers and duties of the Board of Directors" below), the Chairman and Chief Executive Officer is vested with the most extensive powers to act on behalf of the Company under all circumstances, within the limits of the corporate purpose. The Chairman and Chief Executive Officer organises and supervises the work of the Board of Directors and reports to the Shareholders' Meeting. They oversee the proper running of the Company's bodies and, in particular, ensure that the directors are in a position to fulfil their duties.

### 4.2.2.3 Powers and duties of the Board of Directors

The Board of Directors meets as often as the interest of the Company requires, in accordance with applicable legislative and regulatory provisions. In accordance with the Board's internal rules of procedure, the directors meet once a year to discuss the strategy of the Company and of the Group as part of an *ad hoc* seminar. Moreover, under the internal rules of the Board of Directors, updated in January 2018, a meeting is to be held each year without the attendance of the Chairman and Chief Executive Officer, and shall be chaired by the Chair of the Governance and Corporate Social Responsibility Committee.

In accordance with the law, the Board of Directors sets the strategies for the Company's activities and oversees their implementation. It defines the major strategic, economic, financial and technological objectives for the Company and the Group. Subject to powers expressly attributed to the Shareholders' Meetings and as limited by the Company's corporate purpose, the Board may consider any question relating to the proper running of the Company and acts, through its deliberations, on any such issue.

In particular, the Board deliberates, after study by the competent Committee or Committees, as the case may be, on the annual budget, the medium-term plan, any significant operation falling outside the Company's announced strategy, the corporate strategic plan presenting the actions to be implemented by the Company or the Group in order to comply with the objectives of the multi-year energy plan (see section 1.5.2 "Public service in France"), the Group's strategies relating to upstream and downstream operations of the nuclear fuel cycle, gas and renewable energies and the Public service contract.

In accordance with its internal rules, the Board of Directors is also competent to authorise the following transactions prior to their implementation:

- external growth transactions (investments, mergers and acquisitions), divestments, organic growth transactions, as well as stock exchange transactions, carried out by the Company or by one of its subsidiaries, which represent overall financial exposure for the Company or the Group exceeding €350 millions; this threshold falls to €150 million for transactions not in line with the Company's or the Group's strategic objectives;
- coherent and inseparable industrial programmes of investments or works on existing assets, by the Company or one of its subsidiaries, exceeding €350 million per programme;
- real estate transactions, carried out by the Company or one of its subsidiaries, exceeding €200 million;
- certain financial transactions (long-term borrowings, debt management, securitisation or hedging transactions) whenever they exceed €5 billion (or the equivalent in any other currency);

(1) In accordance with this text, Jean-Bernard Lévy had been appointed, by ministerial decisions of 21 November 2014, temporary Chairman and Chief Executive Officer of the Company from 23 November 2014.

# 4.

## CORPORATE GOVERNANCE

### Members and functioning of the Board of Directors

- contracts and agreements (supplies, work or services) entered into by the Company involving amounts, including any necessary subsequent amendments, equal to or exceeding €350 million, or between €200 million and €350 million if these contracts relate to a new strategic direction or a new business line for the Group;
- long-term contracts for the purchase or sale of energy, CO<sub>2</sub> emission credits and quotas, by the Company or by one of its subsidiaries, for annual volumes or amounts in excess of 10TWh for electricity, 20TWh for gas (detailed information must also be provided on long-term gas purchase or sale agreements greater than 5TWh and less than 20TWh at the meeting of the Board of Directors following their signing) and €250 million for coal, fuel oil, and CO<sub>2</sub> emission credits and quotas;
- strategic agreements to be entered into by the Company constituting firm and irrevocable commitments relating to cooperation or partnerships with one or more foreign partners, in the nuclear industry involving significant transfers of intellectual property or technologies on the Group's part and constituting major challenges for the Group.

The Board of Directors sets the framework of the policy for the constitution, management and risk management of assets for hedging EDF's nuclear commitments, specifically ruling on asset/liability management and asset allocation strategy. If the Nuclear Commitments Monitoring Committee issues a negative opinion on a plan for investment in unlisted assets for dedicated assets, the Board of Directors has sole authority to authorise the aforementioned plan (see section 4.2.3.2 "Nuclear Commitments Monitoring Committee").

Furthermore, in accordance with the provisions of Article L. 225-37-1 of the French Commercial Code, the Board of Directors reviews annually on the Company's policy in terms of equal access to employment and equal pay and defines the Company's strategic aims, which are submitted every year to the EDF Central Works Council in accordance with Article L. 2323-10 of the French Labour Code.

#### 4.2.2.4 Evaluation of director independence

Total number of directors	18
Number of independent directors	5
Percentage of independent directors*	41.7%

\* Excluding directors representing employees.

The AFEP-MEDEF Corporate Governance Code recommends that, in companies with a controlling shareholder, the proportion of independent directors should be at least one third of the Board of Directors and specifies that directors representing employees are not taken into account to calculate the proportion of independent directors.

Given the specific legal framework applicable to the Company, the Board of Directors has, out of a total of eighteen members, one representative of the French State who cannot meet the independence criteria defined by the AFEP-MEDEF Code, as well as six directors representing the employees who are not taken into account to calculate the proportion of independent directors. Likewise, the Chairman and Chief Executive Officer in his capacity as Executive Officer cannot be considered as independent as regards the criteria defined by the AFEP-MEDEF Code.

At a joint meeting on 15 January 2018, the Governance and Corporate Social Responsibility Committee and the Appointments & Remuneration Committee examined the individual situations of directors appointed by the Shareholders' Meeting. Upon recommendation from these Committees, at its meeting on 24 January 2018, the Board of Directors conducted the annual evaluation of the independence of the directors based on the criteria defined by the AFEP-MEDEF Corporate Governance Code, and classified Colette Lewiner, Laurence Parisot and Claire Pedini, as well as Philippe Crouzet and Bruno Lafont as independent directors, as the Board deemed that these directors had no relations with the Company, its Group or its Management that might compromise the exercise of their freedom of judgement.

In particular, the Governance and Corporate Social Responsibility Committee and the Appointments & Remuneration Committee examined any business ties that might exist between the Company and companies at which the directors hold offices, as well as groups to which they belong, on a quantitative level, *via* the importance of any business relations existing between the Company and these companies (and their groups) and sales between them recorded in the course of the 2017 fiscal year, and on a qualitative level (director's position in the companies in question, any economic dependence, exclusivity, etc.). Based on their findings, none of the companies at which the directors hold offices, nor any of the groups to which they belong, could be classified as a significant Group client or supplier nor could EDF be considered a significant client or supplier of these companies or of their groups. Following this analysis, the Board concluded that there were no significant business ties involving the directors that it classified as independent.

On the date of this Reference Document, the Company's Board of Directors therefore features five independent directors out of the twelve taken into account to make the calculation in accordance with the AFEP-MEDEF Code, *i.e.* a proportion of independent directors of 41.7%, higher than the recommendations of the code (see section 4.2.1 "Members of the Board of Directors").

#### 4.2.2.5 Evaluation of the functioning of the Board of Directors and its Committees

In accordance with the provisions of the AFEP-MEDEF Code, the Board's internal rules of procedure state that the Governance and Corporate Social Responsibility Committee supervises annually an evaluation of the functioning of the Board of Directors and propose areas for improvement. Once a year, therefore, the Board dedicates one item on its agenda to this evaluation and holds a discussion on its functioning and that of its Committees in order to improve its efficiency and ensure that important issues are appropriately prepared and discussed.

Every three years, this evaluation is conducted by an external consultant under the supervision of the Governance and Corporate Social Responsibility Committee.

##### Three-yearly evaluation

The 2016 evaluation was conducted by a specialised external firm, selected following a call for tenders, under the supervision of the Governance and Corporate Social Responsibility Committee. The evaluation was conducted, at the end of 2016

and the start of 2017. It involved in-depth interviews with each of the directors based on a questionnaire and an interview guide prepared by the specialist firm with the Chair of the Governance and Corporate Social Responsibility Committee.

Accordingly, an analysis of the individual contribution of each director to the Board's work was also conducted. This involved individual and confidential meetings arranged by the external firm with each director.

The results of this evaluation showed that the directors considered that the quality of the work carried out by the Board of Directors and its Committees had improved over recent years and that the Board was capable of dealing with key strategic company issues in 2016. The directors were satisfied with the composition of the Board and felt that its members possessed a varied range of skills adapted to their needs.

Among the areas of improvement identified, the Board expressed its desire for more dialogue and collegiality, to strengthen the collective identity and improve

discussions within the Board, and to devote more time to prospective issues and talent management.

The findings of this evaluation were reviewed at a meeting of the Governance and Corporate Social Responsibility Committee and presented to the Board. The Board of Directors then met during the second half of 2017 for a special working session to explore the areas of improvement identified and to discuss in more detail the expectations expressed by the directors in the triennial evaluation.

### Annual evaluation

The 2017 annual evaluation was carried out internally *via* a detailed questionnaire, reviewed by the Governance and Corporate Social Responsibility Committee before being sent to the directors. Including both closed-ended questions, enabling statistical monitoring of the answers provided by directors, and open-ended questions, enabling directors to give detailed answers, provide qualitative observations and propose changes, this questionnaire is filled in anonymously by directors then analysed by the Board's Secretariat.

This evaluation particularly covered the following fields: organisation of meetings of the Board of Directors and meetings of the Committees (number, duration, document sending deadlines, etc.); information made available to the directors; areas of expertise and working methods of the Board and of the Committees; relations between the Board and the Chairman and Executive Management; personal opinion on the governance of the Company, expectations and suggestions.

The results of this evaluation, which were examined by the Governance and Corporate Social Responsibility Committee on 28 November 2017 and presented to the Board on 24 January 2018, showed that the directors were generally satisfied with the functioning of the Board and of the Committees. The information provided to the Board were deemed to be satisfactory. The directors were satisfied with the functioning of the Committees and considered that their work helped the Board with regard to decision-making. The balance of powers between the Chairman and Chief Executive Officer and the Board were deemed satisfactory and the directors considered that they had sufficient access to the Chairman and Chief Executive Officer and to the other members of EDF's Management.

Among the areas for improvement identified, the Board expressed its desire for its work programme to be stepped up in certain areas, including forward-looking issues and the competitive environment. The directors also suggested reducing the duration of the meetings and enhancing dialogue and discussion within the Board, including between directors. Lastly, they also expressed their desire for meetings without the attendance of Executive Management, as provided by the latest modification to the internal rules of the Board of Directors (see section 4.2.2.3 "Powers and duties of the Board of Directors" above).

#### 4.2.2.6 Information and training of directors – Digitisation

The Chairman and Chief Executive Officer ensures that the directors have access to the information necessary for them to carry out their functions. This information is provided to them as soon as possible to enable them to carry out their work under the best conditions.

Under the terms of the Board's internal rules of procedure, it periodically receives information on the financial, treasury and off-balance sheet commitments position of the Company and the Group, as well as information on the performance of the Company's principal subsidiaries on the occasion of the presentation of the annual and half year financial statements, in addition to the purchasing and human resources policy. The Board of Directors is regularly informed of changes to the Company's markets, competitive environment and main challenges, including in the field of social and environmental responsibility.

A document reviewing the Group's current major sectors of business and the market trends, as well as the economic, financial and institutional context is regularly submitted to the Board of Directors. The Company also provides them with any information that may be appropriate between the meetings of the Board, particularly where it is of an urgent or important nature.

The directors can add to this information by meeting with the principal executives of the Company or Group, without the Chairman's presence being necessary, to discuss issues on the Board's agenda.

In addition, information meetings are organised on complex matters or issues of major strategic importance, together with any training requested by members. Accordingly, each director can receive additional training in the specific characteristics of the Company and the Group, their business activities and their field of activity.

Since 2016, the Board of Directors has been using a digital management platform, which allows for the smooth and swift availability of Board and Committee files.

#### 4.2.2.7 Obligations and duties of the directors

The internal rules of procedure of the Board of Directors state that its members are subject to obligations such as: acting in the corporate interest of the Company, informing the Board of situations of conflict of interest (see also section 4.4.1 "Conflicts of interest"), and refraining from contributing to the discussions and voting on any decision in which there might be a conflict of interest, fulfilling the obligation of confidentiality, carrying out their mandate with diligence and commitment, and complying with the EDF Stock Exchange code of ethics. In addition to the right to obtain disclosure of the documents and information necessary to perform their work, the directors also have a duty to request the information they deem essential to carry out their duties.

The directors and the Chairman and Chief Executive Officer are required to immediately inform the Board of any agreement entered into by the Company in which they hold a direct or indirect interest, or which might be entered into through an intermediary.

Under the internal rules of procedure, the Chairman and Chief Executive Officer is also required to inform the Board of Directors before accepting an appointment in a listed company.

#### 4.2.2.8 Activity of the Board of Directors in 2017

The table below presents the statistical data relating to the 2016 and 2017 fiscal years:

	2016	2017
Number of meetings	15 <sup>(1)</sup>	11 <sup>(1)</sup>
Average attendance rate	92.8%	90.9%
Average duration of the meetings	3 hours	3 hours and 10 minutes

(1) In addition to this number of meetings, a one-day strategic seminar was also held.

The table below shows the individual attendance rate of directors over the 2017 fiscal year:

<b>Directors whose terms of office are ongoing at 31 December 2017</b>	<b>Average attendance rate in 2017</b>
Jean-Bernard Lévy	100%
Olivier Appert	100%
Christine Chabauty	81.8%
Jacky Chorin	100%
Philippe Crouzet	90.9%
Christophe Cuvilliez <sup>(1)</sup>	100%
Maurice Gourdault Montagne <sup>(2)</sup>	100%
Bruno Lafont	81.8%
Bruno Léchevin	72.7%
Marie-Christine Lepetit	100%
Colette Lewiner	90.9%
Marie-Hélène Meyling	81.8%
Laurence Parisot	100%
Claire Pedini	90.9%
Jean-Paul Rignac	100%
Michèle Rousseau	90.9%
Christian Taxil	90.9%
Martin Vial	100%

(1) Director since 7 November 2017.

(2) Director since 20 September 2017.

In 2017, the Board of Directors examined and/or authorised, in addition to items relating to the Company's regular business, issues such as the increase in EDF's share capital, the creation of the company Edvance (see section 1.4.1.2.3.4 "Creation of the company Edvance"), the finalisation of EDF's acquisition of the exclusive control of the activities of AREVA NP (see 1.4.1.3 "Framatome"), the draft settlement protocol relating to EDF's compensation by the French state for the early closure of the Fessenheim plant, the findings of the review of the Hinkley Point C project and the subsequent action plan, EDF's strategic plan presenting the actions to be implemented over the first phase (2016-2018) of the multi-year energy plan (see section 1.5.2 "Public service in France"), EDF's solar energy plan, the work programme prior to possible investment decisions relating to the renewal of the French nuclear fleet, the progress on the Flamanville EPR project and the "Grand Carénage" programme (see section 1.4.1.2.2 "Update on the Flamanville EPR project" and section 1.4.1.1.2 "Operation and technical performance of the nuclear fleet"), the key issues and outlook for Enedis and Dalkia, the disposal by EDF International of its shareholdings in the Polish companies EDF Polska and Kogeneracja, the planned acquisition of listed company Futuren by EDF Énergies Nouvelles, the implementation of smart meters in the United Kingdom, the sale of a real estate portfolio by Sofilo and EDF and of the headquarters of Edison, the Company's strategic objectives drawn up with a view to the consultation of the EDF Central Works Council, the reports of the Inspector General on nuclear safety and radiation protection and the Inspector for hydraulic safety, and the EDF equal access to employment and equal pay policy.

Finally, at the annual strategic seminar, the Board examined issues such as the impact on EDF's industrial and economic model of forward-looking scenarios up to 2050, the current status of the energy transition in Europe, the competitive environment, changes in the nuclear industry and renewable energy sector worldwide, and discussed the progress of the CAP 2030 strategy (see section 1.3.2.7 "CAP 2030 success factors").

### Independent directors' work groups – AREVA and Fessenheim projects

Following the discussions held in 2015 between EDF and AREVA SA on the project for the acquisition by EDF of exclusive control of the activities of AREVA NP, the Board of Directors decided on 8 April 2015 to create a workgroup featuring the independent members of the EDF Board of Directors in accordance with the criteria of the AFEP-MEDEF Code. Chaired by Colette Lewiner, it also featured Laurence Parisot, Philippe Crouzet and Bruno Lafont. The aim of this workgroup, in conjunction with EDF's Management, was to examine any project resulting from the discussions between EDF and AREVA SA, particularly regarding its strategic and industrial interests, its financial results and its social issues. Without replacing the work of the Board of Directors' Committees, or the decision-making processes in place at Board level, the workgroup could provide, based on its independent analysis, any useful opinions or recommendations to the Board of Directors on the project. Accordingly, it received from the Company the information for it to fulfil its duties and received assistance from an advisory bank, particularly to examine the valuation items, and technical advice from legal advisors. This workgroup, which met several times in 2015 and 2016, issued opinions to the Board of Directors and the Strategy Committee at different stages of the discussions with AREVA SA. The workgroup held a final meeting in 2017 before the completion of the transaction on 31 December 2017 (see section 1.4.1.3 "Framatome").

Furthermore, the Board of Directors also decided, on 3 June 2016, to entrust to a workgroup chaired by Colette Lewiner and comprised of the independent directors and Claire Pedini, the monitoring of the discussions held between EDF and the French State on the early closure of the Fessenheim power plant, in conjunction with EDF Management, and the examination of the terms and conditions of the compensation agreement to be entered into with the French state before submitting them for deliberation to the Board of Directors. Accordingly, the workgroup received from the Company the information needed to perform its duties and could contact the relevant stakeholders. It was assisted by an economic and financial advisor and a legal advisor. This workgroup, which met several times in 2016 and 2017, issued an opinion on the draft settlement agreement between the French state and EDF which was submitted for authorisation to the Board of Directors on 24 January 2017. A final meeting was held before the meeting of the Board of Directors of 6 April 2017 confirming EDF's authorisation to sign the settlement agreement with the French state.



### 4.2.3 BOARD OF DIRECTORS' COMMITTEES

To perform its duties, the Board of Directors has created five Committees to examine and prepare certain projects before they are presented to the whole Board. These specialised Committees are: the Audit Committee, the Nuclear Commitments Monitoring Committee, the Strategy Committee, the Governance and Corporate Social Responsibility Committee (formerly the Ethics Committee, see section 4.2.3.4 "Governance and Corporate Social Responsibility Committee" below) and the Appointments & Remuneration Committee.

The members, functioning and duties of the Committees are governed by the internal rules of procedure of the Board of Directors.

The Committees include at least three directors chosen by the Board, which appoints the Chair of each Committee. The Company's articles of association state that the Committees include at least one director representing the employees.

On the date of this document, the Chairs of the Board Committees were as follows:

- Mr. Jean-Bernard Lévy for the Strategy Committee;
- Mrs. Marie-Christine Lepetit for the Audit Committee;
- Mr. Philippe Crouzet for the Nuclear Commitments Monitoring Committee;
- Mrs. Colette Lewiner for the Governance and Corporate Social Responsibility Committee;
- Mr. Bruno Lafont for the Appointments & Remuneration Committee.

#### 4.2.3.1 Audit Committee

##### Members

In accordance with the provisions of Article L. 823-19 of the French Commercial Code and the recommendations of the AFEP-MEDEF Code, the Committee does not include any Corporate Executive Officer.

##### Composition of the Audit Committee

Marie-Christine Lepetit	Chairman	Director appointed by the Shareholders' Meeting on recommendation from the French state
Jacky Chorin	Member	Director elected by the employees
Philippe Crouzet	Member	Independent director appointed by the Shareholders' Meeting
Colette Lewiner	Member	Independent director appointed by the Shareholders' Meeting
Marie-Hélène Meyling	Member	Director elected by the employees
Laurence Parisot	Member	Independent director appointed by the Shareholders' Meeting
Jean-Paul Rignac	Member	Director elected by the employees
Christian Taxil	Member	Director elected by the employees

Number of members	8
Number of independent directors	3
Percentage of independent directors*	75%

\* Excluding directors representing the employees. The proportion of independent directors on the Committee is therefore three quarters for a minimum of two thirds as recommended by the AFEP-MEDEF Code.

In 2017, the Board of Directors appointed Mr. Jean-Paul Rignac as a member of the Audit Committee as the replacement of Mr. Maxime Villota.

Article L. 823-19 of the French Commercial Code states that at least one member of the Committee must have specific skills in financial or accounting matters and be independent based on the criteria defined and made public by the Board of Directors. The AFEP-MEDEF Code also recommends that the members of the Audit Committee have specific skills in financial or accounting matters.

At the joint meeting of 10 December 2014, the Ethics Committee and the Appointments & Remuneration Committee reviewed the situation of Colette Lewiner and Laurence Parisot and Philippe Crouzet and issued a notice to the Board of Directors. The Board of Directors, meeting on 10 December 2014, noted that these directors have specific skills in financial and accounting matters according to the criteria recommended by the French Financial Markets Authority (AMF) in its report on the Audit Committee dated 22 July 2010. On 24 January 2017, the Board of Directors also confirmed the classification as independent directors of Colette Lewiner, Laurence Parisot and Philippe Crouzet. These three Committee members

The membership of each Committee is described below.

The Government Commissioner and the Head of the French State General Economic and Financial Supervisory Mission to the Company can attend the meetings of these Committees.

The work of the Committees is organised within a program prepared for the year. Meetings are recorded in the form of written minutes and reports, which are submitted by the Committee Chair to the Board of Directors.

The Board's internal rules of procedure provide that the Committees shall meet in sufficient time before the Board's meeting, whose agenda includes consideration of matters falling within their remit.

The Committees may invite Company executives, including the Chairman and Chief Executive Office, to attend their meetings. They may also invite other parties to attend, whether employed by the Company or not, provided they inform the Chairman and Chief Executive Officer in advance and on the condition that they report such attendance to the Board. The Committees may also seek external technical advice and order studies on issues falling within their remit, at the Company's expense, after having informed the Chairman and Chief Executive Officer and provided that they report this matter to the Board.

In 2017, the average overall attendance rate of the Committees was 96%. The average attendance rate per Committee is indicated below.

The table below outlines the composition of the Audit Committee at the date of filing of the 2017 Reference Document:

meet the criteria of both expertise and independence mentioned in Article L. 823-19 of the French Commercial Code.

##### Duties

The Audit Committee carries out the duties entrusted to it in accordance with Article L. 823-19 of the French Commercial Code under the supervision of the Board of Directors. In accordance with this article, the Committee is tasked with the following duties in particular:

- monitoring the process to prepare financial information and making any recommendations to guarantee its integrity;
- monitoring the effectiveness of the internal control, risk management and internal audit systems, regarding procedures relating to the preparation and processing of accounting and financial information;
- monitoring the performance of the duties of the Statutory Auditors, ensuring their independence and approving the provision of the services mentioned in Article L. 822-11-2 of the French Commercial Code.

## 4. CORPORATE GOVERNANCE

### Members and functioning of the Board of Directors

In fulfilling its duties, it examines and gives its opinion to the Board of Directors, on:

- the Company's financial position, the medium-term plan and the budget;
- the preliminary company and consolidated annual and half-yearly financial statements and financial reports prepared by the Financial Division;
- the monitoring of risks and internal control (mapping of Group risks and methods of detection, anticipation and management of risks, organisation and evaluation of internal control processes);
- auditing (annual audit programme, main findings and corrective actions, monitoring of their implementation);
- the monitoring of the Statutory Auditors (coordination of the auditor selection procedure, monitoring of the Statutory Auditors' fulfilment of their duties taking account, where applicable, of the findings and conclusions of the High Council of Auditors, verification of the Statutory Auditors' compliance with the conditions of independence provided for in the applicable texts, opinion on the amount of fees, approval of the provision by the Statutory Auditors of non-auditing procedures

according to a procedure approved by the Board of Directors on 3 November 2016);

- the financial aspects of external growth or disposal activities that are particularly significant (see section 3.2.2.4 "Powers and duties of the Board of Directors");
- the policies in terms of insurance, energy market risks and risk of bankruptcy of the Group's counterparties.

The examination of the financial statements by the Committee is accompanied by a presentation by the Statutory Auditors underlining the bases for the preparation of the financial statements, the applicable accounting frame of reference, the audit approach implemented and the conclusions of their auditing work or limited review. In addition to the meetings of the Audit Committee devoted to examining the annual and half-yearly financial statements, the Statutory Auditors also attend the meetings devoted to risk monitoring, internal control and auditing.

For the purposes of its work, the Committee regularly meets with the Statutory Auditors, Executive Management, Corporate Finance, Group Risk Management and Internal Auditing.

#### Activity in 2017

The table below presents the statistical data relating to the 2016 and 2017 fiscal years:

	2016	2017
Number of meetings	8	5
Average attendance rate	87.5%	92.5%
Average duration of the meetings	3 hours	3 hours and 7 minutes

In 2017, the Audit Committee, amongst other tasks, examined the half-year and annual financial statements and the presentation by the Statutory Auditors of the key points of the results of their work on the financial statements, the 2018 budget and the 2018-2021 medium-term plan, the review of the value of assets with a view to the closing of the 2017 financial statements, risk mapping and risk control methods, energy market and counterparty risks, internal audit summaries and the audit program, employee benefit obligations and the variabilisation of the Group's debt, the 2017-2018 financial management and financial risk control agreement, the action plan subsequent to the review of the Hinkley Point C project, and cyber security risk.

In accordance with the procedure approved by EDF's Board of Directors on 3 November 2016, the Committee authorised the Statutory Auditors and the members of their network to provide services other than the certification of the financial statements and it was informed of the services provided as part of the pre-approval process under the terms of this procedure.

The Committee did not need to seek any external technical advice or order any studies on issues falling within its remit during the 2017 fiscal year.

#### 4.2.3.2 Nuclear Commitments Monitoring Committee

##### Members

The table below outlines the composition of the Nuclear Commitments Monitoring Committee at the date of filing of the 2017 Reference Document:

##### Members of the Nuclear Commitments Monitoring Committee

Philippe Crouzet	Chairman	Independent director appointed by the Shareholders' Meeting
Olivier Appert	Member	Director appointed by the Shareholders' Meeting on recommendation from the French state
Christophe Cuvilliez	Member	Director elected by the employees
Marie-Christine Lepetit	Member	Director appointed by the Shareholders' Meeting on recommendation from the French state
Marie-Hélène Meyling	Member	Director elected by the employees
Michèle Rousseau	Member	Director appointed by the Shareholders' Meeting on recommendation from the French state

Number of members	6
Number of independent directors	1
Percentage of independent directors*	25%

\* Excluding directors representing the employees.

During the 2017 fiscal year, the Board of Directors appointed Christophe Cuvilliez as a member of the Nuclear Commitments Monitoring Committee as the replacement of Maxime Villota.

##### Duties

The Nuclear Commitments Monitoring Committee (NMC) was created by Article 9 of Decree no. 2007-243 of 23 February 2007 on the securing of the financing of long-term nuclear expenses.

It is tasked with monitoring the value of nuclear liabilities and changes in the related provisions, issuing an opinion on issues relating to the governance of dedicated assets, the rules for asset-liability matching and on strategic allocation, as well as examining the results of the management of assets constituted by the Company and verifying the compliance of such management with the rules on constituting, managing, and controlling the financial risks of dedicated assets. It provides the Board with an opinion on the internal control procedure for the financing of the expenses set out in Article L. 594-1 of the French Environment Code.

The Committee relies on the works of the Nuclear Commitments Financial Expertise Committee (NCFEC) which is comprised of independent experts appointed by the Board<sup>(1)</sup>, whose duty is to assist the Company and its corporate bodies with matters relating to asset-liability matching and the management of dedicated assets.

Finally, the Committee issues an opinion prior to any investment in unlisted assets for any project exceeding a unit amount of €400 million as well as for any project (excl. real estate) exceeding a unit amount of €200 million resulting in full

consolidation of the target investment by the Company. In case the Committee issues a negative opinion on an investment plan, the Board of Directors has sole authority to authorise the aforementioned plan.

#### Activity in 2017

The table below presents the statistical data relating to the 2016 and 2017 fiscal years:

	2016	2017
Number of meetings	3	3
Average attendance rate	100%	94.4%
Average duration of the meetings	2 hours and 20 minutes	2 hours and 11 minutes

In 2017, the Committee examined in particular the coverage situation and the discount rate of nuclear provisions, the performance of the portfolio of listed and unlisted dedicated assets, investment decisions and prospects (see section 1.4.1.1.7 "Assets available to cover EDF's long-term nuclear obligations (outside the operating cycle)"), the 2017 annual update letter on the three-yearly report on the securing of financing for nuclear expenses and the report on internal control which it

includes, the state of progress of the first-generation nuclear power plant decommissioning programme and the industrial geological storage centre project ("Cigéo") for long-life high and medium-activity waste, as well as changes to the framework of the policy on the constitution and management of dedicated assets and the management of financial risks submitted to the Committee for its opinion.

4.

### 4.2.3.3 Strategy Committee

#### Members

The directors who are not members of the Strategy Committee may attend its meetings.

The table below outlines the composition of the Committee at the date of filing of the 2017 Reference Document.

#### Members of the Strategy Committee

Name	Role	Description
Jean-Bernard Lévy	Chairman of the Committee	Chairman and Chief Executive Officer, director appointed by the Shareholders' Meeting
Olivier Appert	Member	Director appointed by the Shareholders' Meeting on recommendation from the French state
Jacky Chorin	Member	Director elected by the employees
Maurice Gourdault-Montagne	Member	Director appointed by the Shareholders' Meeting on recommendation from the French state
Marie-Hélène Meyling	Member	Director elected by the employees
Laurence Parisot	Member	Independent director appointed by the Shareholders' Meeting
Jean-Paul Rignac	Member	Director elected by the employees
Christian Taxil	Member	Director elected by the employees
Martin Vial	Member	Representative of the French State

#### Duties

The Strategy Committee issues an opinion to the Board of Directors on the Company's major strategic objectives and, specifically, the corporate strategic plan presenting the actions to be implemented in order to comply with the objectives of the multi-year energy plan (see section 1.5.2 "Public service in France"), the

Company's strategic objectives drawn up with a view to the consultation of the EDF Central Works Council, the public service contract (see section 1.5.2 "Public service in France"), strategic agreements, alliances and partnerships, as well as research and development policy.

#### Activity in 2017

The table below presents the statistical data relating to the 2016 and 2017 fiscal years:

	2016	2017
Number of meetings	5	3
Average attendance rate*	97.8%	100%
Average duration of the meetings	2 hours and 20 minutes	3 hours and 10 minutes

\* Attendance rate calculated based on the members of the Committee alone (all of the members of the Board may attend these meetings).

In 2017, the Strategy Committee examined, in particular, the report on the maintenance of critical skills at Framatome's Creusot Forge plant drawn up by a group of specialists including Yves Bréchet, the High Commissioner for Atomic Energy, and the improvement plan for the Creusot site taking into account the recommendations outlined in this report, Framatome's situation and prospects, monitoring of investments made by the Group's Renewable Energies Division and its

strategy, discussions on the strategy for the renewal of the French nuclear fleet, challenges relating to the French nuclear sector and the choice of a new EPR model, the strategic context and underlying assumptions of the 2018-2021 medium-term plan and the strategic objectives with a view to consultation of the Central Works Council in accordance with Article L. 2323-10 of the French Labour Code.

(1) The current members of the NCFEC were re-elected or appointed on 3 November 2016 for three years by the Board of Directors on recommendation from the NCMC.

## 4. CORPORATE GOVERNANCE

### Members and functioning of the Board of Directors

#### 4.2.3.4 Governance and Corporate Social Responsibility Committee

During its meeting of 24 January 2018, the Board of Directors changed the name of the Ethics Committee to the Governance and Corporate Social Responsibility Committee and extended the scope of its responsibilities.

##### Members

The table below outlines the composition of the Governance and Corporate Social Responsibility Committee at the date of filing of the 2017 Reference Document:

Members of the Governance and Corporate Social Responsibility Committee		
Colette Lewiner	Chairwoman	Independent director appointed by the Shareholders' Meeting
Christine Chabauty	Member	Director elected by the employees
Jacky Chorin	Member	Director elected by the employees
Bruno L�chevin	Member	Director appointed by the Shareholders' Meeting on recommendation from the French state
Marie-H�l�ne Meyling	Member	Director elected by the employees
Claire Pedini	Member	Independent director appointed by the Shareholders' Meeting
Number of members		6
Number of independent directors		2
Percentage of independent directors*		67%

\* Excluding directors representing the employees.

##### Duties

The Governance and Corporate Social Responsibility Committee oversees issues relating to corporate governance and ensures the implementation, *via* the Company's corporate bodies, of the principles and rules of good governance outlined in particular in the AFEP-MEDEF Code. It may make proposals concerning changes in the functioning or powers of the Board or its internal rules of procedure and ensures that ethical considerations are taken into account in the work of the Board of Directors and in the management of the Company. The Committee advises the Board on the Group's corporate social responsibility policies and reviews the Company's approach to ethics and compliance. Each year, alongside the

Appointments & Remuneration Committee, it examines the individual situations of the directors according to the criteria defined by the AFEP-MEDEF Code and reports its findings to the Board. It conducts an annual evaluation of the functioning of the Board and its Committees, and every three years oversees a formal assessment entrusted to a specialist external consultant (see section 4.2.2.5 "Evaluation of the functioning of the Board of Directors and its Committees"). The Committee examines and gives its opinion on situations of conflicts of interest of which it has become aware or which are reported to it by the Chairman or the Board of Directors, and reports such situations to the Board.

##### Activity in 2017

The table below presents the statistical data relating to the 2016 and 2017 fiscal years:

	2016	2017
Number of meetings	6	7
Average attendance rate	88.9%	92.9%
Average duration of the meetings	1 hours and 10 minutes	1 hours and 35 minutes

In 2017, the Committee examined in particular the results of the 2016 "My EDF" internal survey, the 2016 ethics and compliance review and the priorities for 2017, the 2016 results of the external evaluation of the functioning of the Board and its Committees, the Group's health and safety policy, EDF's sustainable development policy and the Corporate Social Responsibility goals (see section 3.1.2 "Corporate social responsibility goals"), the Group's policy and results in terms of equal access to employment and equal pay, the 2016 report by the EDF Group mediator, the disability policy, the report on religious values, EDF's relations with its subcontractors and the Group's policy in terms of responsible purchasing, as well as the principles of the draft vigilance plan to be drawn up by EDF in accordance with

Act no. 2017-399 of 27 March 2017 on the duty of care of parent companies and ordering companies (see section 3.1.6 "The vigilance plan"). It examined the questionnaire used as a basis for the 2017 internal evaluation of the functioning of the Board and its Committees and the results of this evaluation before they are presented to the Board.

The Committee also held a joint meeting at the start of 2017 with the Appointments & Remuneration Committee in order to examine the independence of the directors according to the criteria defined by the AFEP-MEDEF Code, before the Board of Directors discussed the matter.

#### 4.2.3.5 Appointments & Remuneration Committee

##### Members

The table below outlines the composition of the Appointments & Remuneration Committee at the date of filing of the 2017 Reference Document.

Members of the Appointments & Remuneration Committee		
Bruno Lafont	Chairman	Independent director appointed by the Shareholders' Meeting
Christine Chabauty	Member	Director elected by the employees
Colette Lewiner	Member	Independent director appointed by the Shareholders' Meeting
Martin Vial	Member	Representative of the French State
Number of members		4
Number of independent directors		2
Percentage of independent directors*		67%

\* Excluding directors representing the employees.

During the 2017 fiscal year, the Board of Directors appointed Christine Chabauty as a member of the Appointments & Remuneration Committee as the replacement of Maxime Villota.

### Duties

The Committee submits its recommendations or proposals to the Board of Directors regarding the appointment of directors by the Shareholders' Meeting. It supervises, where appropriate, the selection process of potential candidates and may perform its own review of the candidates before they are approached in any way. Where appropriate, it gives its opinion to the Board of Directors on the candidates proposed by the Chairman and Chief Executive Officer for appointment as Deputy Chief Executive Officers. It ensures the existence of succession plans in order to anticipate the succession, whether unforeseen or at the end of their term, of Executive Directors and members of the Group's Executive Committee. The Chairman and Chief Executive Officer is involved, as necessary, in the Committee's work, particularly with regard to the appointment of directors.

With regard to remuneration, the Committee examines and gives an opinion on the principles and criteria used to determine and distribute the fixed, variable and exceptional items of the Chairman and Chief Executive Officer's remuneration and benefits of all kinds and, where applicable, of the Deputy Chief Executive Officers.

It provides its opinion to the Board of Directors for the discussion and determination of such remuneration and benefits. The Chairman of the Committee submits this opinion for approval to the Minister for the Economy. The Committee prepares its proposals within the limits specified by Decree no. 2012-915 of 26 July 2012, which amended the Decree of 9 August 1953, relating to French State control of the remuneration of the executives of public companies, in accordance with which the Chairman and Chief Executive's annual compensation must not exceed the gross sum of €450,000.

The Committee submits to the Board its opinion on the remuneration policy of the Group's Executive Committee and the main executives, as well as on the amount and terms and conditions for the distribution of directors' fees to the members of the Board of Directors.

Each year, alongside the Governance and Corporate Social Responsibility Committee, it examines the individual situations of the directors according to the criteria defined by the AFEP-MEDEF Code and reports its findings to the Board.

### Activity in 2017

The table below presents the statistical data relating to the 2016 and 2017 fiscal years:

	2016	2017
Number of meetings	5	4
Average attendance rate	95%	100%
Average duration of the meetings	30 minutes	16 minutes

In 2017, the Appointments & Remuneration Committee examined and gave opinions to the Board on, amongst other items, the compensation of the Chairman and Chief Executive Officer for the 2017 fiscal year, as well as the candidacies of Christophe Cuvilliez and Maurice Gourdault-Montagne to respectively replace Maxime Villota and Christian Masset.

The Committee also held a joint meeting at the start of 2017 with the Governance and Corporate Social Responsibility Committee in order to examine the independence of the directors according to the criteria defined by the AFEP-MEDEF Code, before the Board of Directors deliberates the matter.

### 4.3 BODIES CREATED BY EXECUTIVE MANAGEMENT

The Chairman and Chief Executive Officer are assisted by an Executive Committee which includes representatives of all the Group's lines of business.

This Committee is a body that makes decisions on, considers and discusses the Group's operational and strategic issues. It examines all the Group's significant underlying and current issues, tracks the operating objectives and results and contributes to the management and forecasting of the EDF group's major challenges. It reviews and authorises significant projects, specifically the Group's investment or divestment projects for amounts which exceed certain thresholds. The Executive Committee meets in principle each week.

In order to reinforce the examination and follow-up of projects, an Executive Committee Commitments Committee examines in-depth the most significant projects in terms of level of commitments or risks incurred before the Executive Committee makes its decision. No investment project by the Company may be submitted for review by the Board of Directors without having first been approved by this Committee.

On the date of filing of this Reference Document, the Executive Committee had thirteen members and a Secretary. The list of members and their personal information appear below.

#### 4.3.1 MEMBERS OF THE EXECUTIVE COMMITTEE

On the filing date of this Reference Document, the members of the Executive Committee were as follows:

Names	Position
Jean-Bernard Lévy	Chairman and Chief Executive Officer
Marc Benayoun	Group Senior Executive Vice-President, Gas and Italy, Chief Executive Officer of Edison
Antoine Cahuzac	Group Senior Executive Vice-President, Renewable Energies, Chairman and Chief Executive Officer of EDF Énergies Nouvelles
Christophe Carval	Group Senior Executive Vice-President, Human Resources
Xavier Girre	Group Senior Executive Vice-President, Group Finance
Véronique Lacour	Group Senior Executive Vice-President, Transformation and Operational Effectiveness
Henri Lafontaine	Group Senior Executive Vice-President, Customers, Services and Regional Action
Marianne Laigneau	Group Senior Executive Vice-President, International Division <sup>(1)</sup>
Cédric Lewandowski	Group Senior Executive Vice-President, Innovation, Strategy and Planning <sup>(2)</sup>
Dominique Minière	Group Senior Executive Vice-President, Nuclear and Thermal
Simone Rossi	Group Senior Executive Vice-President, Chief Executive Officer of EDF Energy <sup>(3)</sup>
Pierre Todorov	Group Senior Executive Vice-President, Group General Secretary
Xavier Ursat	Group Senior Executive Vice-President, New Nuclear Projects and Engineering

(1) Marianne Laigneau replaced Simone Rossi, effective 17 July 2017.

(2) Cédric Lewandowski replaced Philippe Torrion effective 17 July 2017.

(3) Simone Rossi replaced Vincent de Rivaz, effective 1 November 2017

Alexandre Perra, Executive coordinator to the Chairman and Chief Executive Officer, Government Relations, is Secretary of the Executive Committee.

#### 4.3.2 PERSONAL INFORMATION ON MEMBERS OF THE EXECUTIVE COMMITTEE

**Marc Benayoun**, 51 years old, a graduate of the École Supérieure des Sciences Économiques et Commerciales (ESSEC), began his career at Paribas Group in 1989, before joining the Boston Consulting Group in 1993. He became Partner and Managing Director at the Paris office in 2001 then at the Moscow office in 2008 and during this period held a range of responsibilities, including the development of skills in the natural gas sector. In 2009, he joined the EDF Group as Economics, Tariffs and Prices Director. In 2012, he became Director of the B2B Market within the Trading Division with responsibility for electricity, gas and service sales. In this role, he supervised the project linked to the end of regulated electricity tariffs for businesses and local authorities (more than 400,000 sites in all, 120TWh of electrical consumption), with the objective of regaining a leading position in a competitive environment. He is Director of EDF Trading, a member of the Supervisory Board of Trimet France, Chairman of Transalpina di Energia, Chief Executive Officer of Edison, 3<sup>rd</sup> largest energy company in Italy, which controls most of the Group assets in Italy, Chairman of Fondazione Edison and Director of Fenice. Since 2016, he is the Group Senior Executive Vice-President with responsibility for Gas and Italy.

**Antoine Cahuzac**, 63 years old, a graduate of the École Polytechnique and École de la Météorologie Nationale. After a first engineering position at the Ministry for Transport, Antoine Cahuzac joined EDF's Study and Research Department in 1982. In 1985, he joined the swaps department at Crédit Commercial de France (CCF), before becoming its manager in 1988. After spending three years at Vinci, where he was chief advisor to the Company's CEO, he returned to CCF in 1994 where he held a range of successive positions at CCF's Investment Bank then HSBC from 2000 at the same time as being, for many years, joint manager of the Energy and Utility sector for the HSBC group. Before returning to France in 2008 to monitor MSEs for

the Chief Executive Officer of HSBC France, he was based in Dubai, for nearly three years, to monitor the MENAT region for the Investment Bank. From May 2011, he managed HSBC's private banking activities in France. He was also a member of HSBC France's Management Board for a number of years. In 2012, Antoine Cahuzac became Chief Executive Officer of EDF Énergies Nouvelles, then Chairman and Chief Executive Officer in 2017. He has also held the position of Group Senior Executive Vice-President, Renewable Energies since March 2015. He is a Director of EDF Luminus and EDF Trading as well as the Renewable Energies Syndicate and the French Electricity Union.

**Christophe Carval**, 57 years old, holds a degree in electrical engineering from HEI Lille, and joined the EDF group in 1982. He has held several management positions in Departmental, Regional and Inter-regional Units in the electricity and gas distribution sector. In 2007, he was appointed to head up the project to create and manage the new Shared Services Division of the EDF Group. He was the Director of Human Resources, Health & Safety and the Enedis Transformation project from 2014. Since July 2017, he holds the position of Group Senior Executive Vice-President, Human Resources Division.

**Xavier Girre**, 49 years old, graduated HEC, is the holder of a Masters in business law, a graduate of Institut d'Etudes Politiques de Paris (IEP) and is ENA alumni. Xavier Girre began his career at the French National Audit Office in 1995, before joining the Veolia Environnement group in 1999 where he spent twelve years and notably held the positions of Group Risk and Auditing Director of Veolia Group, Deputy Chief Executive Officer in charge of Finance of Veolia Transportation then of Veolia Environmental Services. From 2011 to 2015, he was Deputy CEO, CFO of

La Poste Group and then XAnge Private Equity CEO. Xavier Girre joined EDF in 2015 as France CFO, before being appointed Group Senior Executive Vice-President, responsible for the Finance Division. Xavier Girre is also Director of EDF Energy, EDF Energies Nouvelles, Dalkia, Chairman of the Board of Directors of EDF Trading, a member of the Supervisory Board of Enedis and Chief Executive Officer of CTE. Xavier Girre is, in addition, a member of the MEDEF Ethics Committee, Director and Chairman of the Audit Committee of La Française des Jeux.

**Véronique Lacour**, 53 years old, holds a postgraduate diploma in Information Systems from the University of Paris I Panthéon Sorbonne. Véronique Lacour started her career at Thales in 1987, where she gained solid experience in Information Systems, before taking up the position of Chief Information Officer for a new division of Thales in 2004. Between 2007 and 2009, she managed the HR information systems shared services of such division. She moved to Safran in 2009 where she held the position, first, of Chief Information Officer for Safran Aircraft Engines (formerly Snecma), and later, in 2013, Vice-President Improvement Initiatives, where she managed continuous improvement and transformation initiatives. She went on to become Vice-President Programs for Safran Analytics, and was involved in the creation of this new Big Data-focused entity as part of the Group's digital transformation strategy. She joined EDF on 1 December 2016 as Group Senior Executive Vice-President, Transformation and Operational Effectiveness and is a member of the Executive Committee. She is tasked with directing the Group's activities in the areas of information systems, purchasing, property, consultancy and tertiary services and IT.

**Henri Lafontaine**, 61 years old, a graduate of the Supélec Engineering School with a Master's in Mathematics, joined EDF in 1983 where he had a wide range of responsibilities in the Distribution Division, finally becoming Director of the Distribution Division of EDF GDF Services Marseille in 2000. In 2002, he was appointed as Chief Executive Officer of Edenor, EDF's subsidiary in Argentina. He became Director of EDF Island Power Systems Division in 2007, before being made Director of EDF Entreprises in the Commerce Division in 2010. In July 2013, Henri Lafontaine was appointed Group Senior Executive Vice-President responsible for Commerce, Optimisation and Trading as well as Island Energy Systems. Since March 2015, he has been Group Senior Executive Vice-President, Customers, Services and Regional Action. He is also on the Board of the energy service subsidiaries (Dalkia, Tiru, Citelum, Netseenergy, Sodeltel, Sowe, Agregio, etc.). He is also Chairman of Citelum, and Director of Dalkia and EDF Energy. He also heads EDF's Commerce Division.

**Marianne Laigneau**, 53 years old, is a graduate of the École Normale Supérieure de Sèvres, the École Nationale d'Administration ("Condorcet" Class) and the Institut d'Études Politiques de Paris; she also holds an aggregation in Classics and a Masters Degree in French Literature. After graduating from the École Nationale d'Administration, Marianne Laigneau joined the Council of State and became Counsellor of State in 2007. In 1997, she was assigned to the Ministry for Foreign Affairs and served as First Councillor to the French Embassy in Tunis. From 2000 to 2002, as a member of the French Council of State, she was specifically responsible for being representative to the Director of ENA, legal advisor to the Ministry for Culture, and senior lecturer in public law at ENA. In 2003, Marianne Laigneau joined Gaz de France as Head of the Institutional Affairs Department at Headquarters, and then became Representative for Public Affairs (2004). She joined the EDF group in January 2005 as Group General Counsel, then held the position of Corporate Secretary, member of the Executive Committee, from June 2007. She held the position of Group Senior Executive Vice-President, Human Resources as a member of the Executive Committee from 2010 to 2017. She was appointed Group Senior Executive Vice-President, International Division in July 2017. On 11 January 2018, she was appointed Chairwoman of the Supervisory Board of Enedis. She is Director of Vinci Autoroutes.

**Cédric Lewandowski**, 48 years old, is a graduate of the Paris Institute of Political Studies (IEP) and holds a postgraduate degree (DEA) in Geopolitics (Paris-VIII). Cédric Lewandowski began his career at EDF in 1998 as the Chief of Staff for the Chairman of EDF from 1998 to 2004, he then served as Director of the Electric Transport and Vehicles Division of Électricité de France from 2005 to 2008. He subsequently became Director of EDF Regional Authorities within EDF's Commerce

Division from 2008 to 2012, Chairman of the Board of Directors of H4 from 2009 to 2012, Director of Safidi from 2009 to 2012 and Chairman of the Board of Directors of Tiru from 2009 to 2012. He was then appointed Chief of Staff of the Civil and Military Cabinet of the French Ministry of Defence from May 2012 until mid-2017. He has held the position of EDF Group Senior Executive Vice-President, Innovation, Strategy and Planning since July 2017. He is Chairman of the Executive Committee of EDF Nouveaux Business Holding, a member of the Board of Directors of Enedis, a director of the UFE and Chairman of the Board of Directors of Électricité de Strasbourg.

**Dominique Minière**, 59 years old, graduate of the École des Mines de Paris (1981). He joined EDF in 1982 as a young engineer and quickly took on responsibilities within the "Maintenance" Department of the division in charge of the operation of nuclear and thermal power plants; nearly a third of facilities currently in operation were commissioned during this period. From 1986 to 1989, he participated in the start-up of the Golfech nuclear power plant (Tarn-et-Garonne), then, from 1993 to 1997, in the start-up of the Daya Bay nuclear power plant in China. In 1997, he moved to the Cattenom power plant (Moselle) where he became manager in 1999. From 2002 to 2013, he successively occupied the positions of Deputy Director then Director of the Nuclear Generation Division, which supervises EDF's 58 nuclear generation units in France. In March 2013, he became Deputy Director of the Generation & Engineering Division, with responsibility for EDF's whole nuclear, thermal and hydraulic electrical generation fleet. Since March 2015, he has been Group Senior Executive Vice-President, Nuclear and Thermal.

**Simone Rossi**, 49 years old, graduates of the University of Bocconi (Milan) in business administration. Simone Rossi began his career as a consultant, firstly at KPMG Consulting in corporate finance, then from 1996 at McKinsey & Company, where he mainly specialised in the sectors of energy, financial institutions, and information and communication technologies. In 2004, he joined Edison SpA in Milan (Italy) as Head of Strategy, before being promoted to become Director of Planning, Control and IT in 2007. At the end of 2009, he was appointed Chief Financial Officer of Constellation Energy Nuclear Group (CENG), a company based in Baltimore in the United States. He then became Chief Financial Officer of EDF Energy in April 2011. In March 2015, Simone Rossi was appointed EDF Group Senior Executive Vice-President, International Division. Since 1 November 2017, he is the Chief Executive Officer of EDF Energy and Group Senior Executive Vice-President of EDF.

**Pierre Todorov**, 59 years old, a graduate of the École Normale Supérieure (Ulm) and the École Nationale d'Administration and holder of an advanced teaching degree in philosophy. Pierre Todorov was an auditor then Counsel at the French Council of State from 1986 to 1990. He then joined Lagardère Group, where he held a range of responsibilities in the media branch, particularly serving as International Deputy Chief Executive Officer of Hachette Filipacchi. In 1997, he was appointed General Secretary of Accor Group, a position he held until 2008. Between 2008 and 2011, he was partner at the law firm Hogan Lovells LLP, then joined PSA Peugeot Citroën in 2011, as General Secretary, member of the Executive Management Committee. Pierre Todorov has been EDF Group General Secretary and a member of the Executive Committee since 2 February 2015.

**Xavier Ursat**, 51 years old, a graduate of the École Polytechnique and Télécom Paris. He joined EDF in 1991, first holding various positions in the hydraulic engineering department until 2002. He oversaw the construction of EDF's hydraulic engineering centres and contributed to international projects, especially in South America. From 2002 to 2005, he was a special advisor to EDF's Deputy General Manager in charge of Generation and Engineering. From 2005 to 2007, he was Assistant Director of the Alps Generation Unit in Grenoble and from 2007 to 2010, Director of the Southwest Generation Unit in Toulouse. From 2010 to 2014, he was successively Deputy Manager and Manager of the Hydraulic Generation & Engineering Division. Since March 2015, Xavier Ursat has been Group Senior Executive Vice-President in charge of New Nuclear Projects and Engineering. He is also a director of EDF Énergies Nouvelles, a governor of the World Water Council, Chairman of the Supervisory and Steering Committee of Evdance and a member of the Supervisory and Steering Board of Framatome. He is also Vice-Chairman of the SFEN.

## 4.4 CONFLICT OF INTEREST, ABSENCE OF CONVICTIONS OF THE MEMBERS OF THE ADMINISTRATIVE BODIES AND EXECUTIVE MANAGEMENT, CONTRACTS FOR SERVICES

### 4.4.1 CONFLICTS OF INTEREST

To the Company's knowledge, on the date of filing of this Reference Document, there were no potential conflicts of interest involving EDF between the duties of the members of the Company's Board of Directors and Executive Management and their private interests or other duties (regarding the rules applicable to the members of the Board of Directors in terms of conflicts of interest, see section 4.2.2.7 "Obligations and duties of directors").

Subject to the specific legal and regulatory provisions applicable to the members of the Company's Board of Directors (see section 4.2.1 "Members of the Board of Directors"), to the Company's knowledge, no arrangements or agreements have been entered into with shareholders, clients, suppliers or others under which a member of the Board of Directors or Executive Management has been appointed in this capacity.

To the Company's knowledge, no member of the Board of Directors has agreed to restrict for a fixed period of time his/her ability to sell his/her holdings in the Company's capital, except for the restrictions resulting from the EDF Stock Exchange Ethics Code (see section 4.5.2 "Trading in Company securities"). In addition, corporate officers holding shares in mutual funds through an EDF Group Corporate Savings Plan invested in EDF shares, or who have acquired shares from the French state within the legal framework of the privatisation, can be subject to the lock-in and non-transferability rules resulting from the provisions applicable to these transactions.

To EDF's knowledge, there are, moreover, no family ties between members of the administrative bodies or Executive Management.

### 4.4.2 ABSENCE OF CONVICTIONS

To EDF's knowledge, within at least the past five years, no member of the Board of Directors or of the Executive Management of EDF has been subject to: (i) a conviction for fraud, (ii) bankruptcy, receivership or liquidation, or (iii) conviction and/or official public sanction issued by the statutory or regulatory authorities.

Moreover, to EDF's knowledge, no member of the EDF Board of Directors or Executive Management has been prevented by a court from serving as a member of an administrative, management or supervisory body of an issuer or from participating in the management or direction of an issuer's affairs during the past five years.

### 4.4.3 CONTRACT FOR SERVICES

EDF's company officers did not enter into any contract for services with the Company or any of its subsidiaries pursuant to which they would be entitled to any kind of benefits.



## 4.5 SHAREHOLDING BY DIRECTORS AND TRADING IN EDF SECURITIES BY CORPORATE OFFICERS AND EXECUTIVES

### 4.5.1 SHAREHOLDING BY DIRECTORS

As at 31 December 2017, the members of the Board of Directors of the Company, whose terms of office are ongoing as at 31 December 2017, held a total of 3,946 shares. The table, below, details the number of EDF shares held individually by these directors on 31 December 2016 and 31 December 2017:

	Number of EDF shares held on 31/12/2016	Number of EDF shares held on 31/12/2017
Jacky Chorin <sup>(1)</sup>	259	269
Philippe Crouzet	210	294
Christophe Cuvilliez <sup>(2)</sup>	n/a	24
Bruno Lafont	171	238
Colette Lewiner <sup>(3)</sup>	1,807	1,825
Marie-Hélène Meyling	28	28
Laurence Parisot	100	137
Christian Taxil <sup>(1)</sup>	1,090	1,131
<b>TOTAL</b>	<b>3,665</b>	<b>3,946</b>

*n/a: not applicable.*

*(1) Shares held through a mutual fund.*

*(2) Mr. Cuvilliez has been a director since 7 November 2017.*

*(3) Shares held directly and through a mutual fund.*

The other directors held no EDF shares at 31 December 2017.

### 4.5.2 TRADING IN COMPANY SECURITIES

In 2006, the EDF group adopted a set of principles and rules applicable to trading in shares in EDF or listed EDF group subsidiaries. These rules were compiled into an Ethics Code presented to the EDF Executive Committee on 4 April 2011. This code was updated in 2016 to take account of the entry into force of regulation (EU) no. 596/2014 on market abuse (so-called "MAR" – market abuse regulation), its implementing regulations <sup>(1)</sup>, law 2016/819 of 21 June 2016 reforming the system for the repression of market abuse and the new guide on ongoing information and the management of inside information published by the AMF on 26 October 2016.

At the same time as this Code was distributed, awareness campaigns on stock exchange rules were launched for Group employees, specifically regarding precautions and obligations relating to the holding of inside information and the black-out periods during which permanent or temporary insiders, including third parties acting in the name or on behalf of the Group, and, more specifically regarding black-out periods, all persons performing executive duties within the Group, are required to refrain from trading Company securities or other related financial instruments.

The Ethics Code also notes the obligations imposed on executives, high-level managers as well as persons closely linked to them to declare to the AMF and to the Company trades in EDF securities or other related financial instruments that they make on their own behalf. Indeed, under the terms of Article 19 of MAR, specified in Article 223-22 A of the AMF general regulations, the executives of companies with shares listed for trading on a regulated market must declare trades in Company securities to the AMF and to the Company within three trading days of their completion, when the combined amount of these trades exceeds the sum of €20,000 for the current calendar year.

The AMF <sup>(2)</sup> general regulations also state that the EDF Board of Directors must mention in its annual report to the Shareholders' Meeting trades that have been declared by executives and similar <sup>(3)</sup> persons over the past fiscal year.

No trades in EDF securities were declared to the AMF or to the Company during the 2017 fiscal year by the members of the Board of Directors and the Company's Executive Committee.

*(1) Delegated regulation (EU) 2016/522 of 17 December 2015 regarding the indicators of stock market manipulation, the disclosure thresholds, the permission for trading during closed periods and types of notifiable managers' transactions; delegated regulation (EU) 2016/908 of 26 February 2016 regarding accepted market practices; delegated regulation (EU) 2016/909 of 1 March 2016 regarding notifications and lists of financial instruments to be submitted to competent authorities in accordance with Article 4 of the MAR; delegated regulation (EU) 2016/1052 of 8 March 2016 regarding the conditions applicable to buy-back programmes and stabilisation measures; delegated regulation (EU) 2016-957 of 9 March 2016 regarding abusive practices or suspicious orders or transactions; delegated regulation (EU) 2016/958 of 9 March 2016 regarding technical arrangements for the objective presentation of investment recommendations or other information recommending or suggesting an investment strategy and the disclosure of particular interests or indications of conflicts of interest; delegated regulation (EU) 2016/960 of 17 May 2016 regarding market soundings; implementing regulation (EU) 2016/347 of 10 March 2016 regarding insider lists; implementing regulation (EU) 2016/523 of 10 March 2016 regarding transactions performed by persons exercising Executive Management functions; implementing regulation (EU) 2016/378 of 11 March 2016 defining the technical standards regarding the date, format and template for the submission of the notifications noted in Article 4 of the MAR; implementing regulation (EU) 2016/959 of 17 May 2016 regarding market soundings; implementing regulation (EU) 2016/1055 of 29 June 2016 regarding the technical methods for publishing and reporting insider information.*

*(2) Article 223-26 of the AMF general regulations.*

*(3) At EDF, staff "similar to executives" are the members of the Company's Executive Committee.*

## 4.6 COMPENSATION AND BENEFITS

### 4.6.1 REMUNERATION OF CORPORATE OFFICERS

The remuneration and benefits of all kinds paid in the 2017 fiscal year to corporate officers by the Company and the companies it controls are listed below.

The tables below were drawn up in accordance with the format recommended by the AFEP-MEDEF Consolidated Code of Corporate Governance and the AMF's position-recommendation 2009-16, modified on 13 April 2015.

#### 4.6.1.1 Total remuneration of the Chairman and Chief Executive Officer

##### SUMMARY TABLE OF REMUNERATION AND OPTIONS AND SHARES AWARDED TO THE CHAIRMAN AND CHIEF EXECUTIVE OFFICER <sup>(1)</sup>

<i>(in euros)</i>	2017 fiscal year	2016 fiscal year
Jean-Bernard Lévy, Chairman and Chief Executive Officer		
Remuneration due for the fiscal year	452,868	452,868
Valuation of multi-year variable remuneration awarded during the fiscal year	none	none
Valuation of options awarded during the fiscal year <sup>(2)</sup>	none	none
Valuation of bonus shares awarded during the fiscal year <sup>(2)</sup>	none	none
<b>TOTAL</b>	<b>452,868</b>	<b>452,868</b>

<sup>(1)</sup> Table 1 of AMF position-recommendation 2009-16.

<sup>(2)</sup> As indicated in section 4.6.2, the Company has not implemented any stock options plans and the corporate officers receive no allocation of bonus shares.

The table below details the remuneration of all kinds owed and paid to Jean-Bernard Lévy, Chairman and Chief Executive Officer, for the 2016 and 2017 fiscal years.

##### SUMMARY TABLE OF THE REMUNERATION OF THE CHAIRMAN AND CHIEF EXECUTIVE OFFICER <sup>(1)</sup>

<i>(in euros)</i>	2017 fiscal year		2016 fiscal year	
	Amounts due for the fiscal year	Amounts paid during the fiscal year	Amounts due for the fiscal year	Amounts paid during the fiscal year
Jean-Bernard Lévy, Chairman and Chief Executive Officer				
Fixed remuneration	450,000	450,000	450,000	450,000
Variable remuneration	none	none	0	0
Multi-year variable remuneration	none	none	none	none
Exceptional remuneration	none	none	none	none
Directors' fees	none	none	none	none
Benefits in kind <sup>(2)</sup>	2,868	2,868	2,868	2,868
<b>TOTAL</b>	<b>452,868</b>	<b>452,868</b>	<b>452,868</b>	<b>452,868</b>

<sup>(1)</sup> Table 2 of AMF position-recommendation 2009-16.

<sup>(2)</sup> These benefits in kind consist of a company car.

#### 4.6.1.1.1 Terms and conditions for the setting of remuneration

In accordance with Article 3 of decree no. 53-707 of 9 August 1953 and Article L. 225-47 of the French Commercial Code, the items comprising the remuneration of the Chairman and Chief Executive Officer are set by the Company's Board of Directors on the recommendation from the Appointments & Remuneration Committee and approved by the Minister for the Economy after consultation of the relevant Ministers (see section 4.2.3.5 "Appointments & Remuneration Committee").

Decree 2012-915 of 26 July 2012 modified the decree of 9 August 1953 by introducing a limit of €450 on remuneration payable to corporate officers of state-owned companies to which this decree is applicable.

Pursuant to the provisions of Article L. 225-37-2 of the French Commercial Code, the policy and the items comprising the remuneration of the Chairman and Chief Executive Officer as well as, where applicable, the payment of variable and exceptional items of remuneration, are subject to resolutions submitted to the approval of the Shareholders' Meeting (see section 4.6.1.2 "Remuneration policy to be presented to EDF's Shareholders' Meeting of 15 May 2018").

#### 4.6.1.1.2 Setting of the remuneration of the Chairman and Chief Executive Officer

##### Remuneration for the 2017 fiscal year

The Appointments & Remuneration Committee meeting of 13 January 2017 reviewed the remuneration policy of the Chairman and Chief Executive Officer and decided to recommend to the Board of Directors that the principles and criteria for the determination of items comprising his remuneration be maintained for the 2017 fiscal year.

On recommendation from the Committee, the Board of Directors meeting on 24 January 2017 decided to maintain the fixed annual remuneration of the Chairman and Chief Executive Officer for the 2017 fiscal year at €450,000 gross.

##### Remuneration for the 2018 fiscal year

The Appointments & Remuneration Committee meeting of 7 February 2018 reviewed the remuneration policy of the Chairman and Chief Executive Officer and decided to recommend to the Board of Directors that the principles and criteria for the determination of items comprising his remuneration be maintained for the 2018 fiscal year.

On recommendation from the Committee, the Board of Directors meeting on 15 February 2018 decided to maintain the fixed annual remuneration of the Chairman and Chief Executive Officer for the 2018 fiscal year at €450,000 gross.

#### 4.6.1.1.3 Other items of remuneration

In 2017, Mr. Jean-Bernard Lévy did not receive any directors' fees for his duties as Chairman of the Board of Directors and director of EDF. He also did not receive any directors' fees for the positions held at companies controlled by EDF, or any remuneration of any kind whatsoever from the companies it controls.

The Company allocated no stock options to the Chairman and Chief Executive Officer in 2017 and no options were exercised during the fiscal year. Similarly, no bonus shares were awarded to the Chairman and Chief Executive Officer during the past fiscal year, and none became available.

Mr. Jean-Bernard Lévy did not receive any hiring bonus from EDF.

### EMPLOYMENT CONTRACT, SUPPLEMENTAL PENSION, SEVERANCE PAYMENTS AND NON-COMPETITION CLAUSE

Chairman and Chief Executive Officer <sup>(1)</sup>	Employment contract	Supplemental pension plan	Remuneration or benefits due or liable to be due for termination or modification of duties	Non-competition clause remuneration
Jean-Bernard Lévy, Chairman and Chief Executive Officer	no	no	yes	no

(1) Table 11 of AMF position-recommendation 2009-16.

On recommendation from the Appointments & Remuneration Committee, the Board of Directors meeting on 8 April 2015 decided to award to Mr. Jean-Bernard Lévy severance payments in accordance with the provisions of the French Commercial Code and the recommendations of the AFEP-MEDEF Corporate Governance Code in case of termination of his term of office of Chairman and Chief Executive Officer of EDF. These payments are subject to the following terms and conditions:

- **payment due following:** definitive award of the payments by decision of the Board of Directors, only in the event of forced departure (dismissal except for gross negligence or wilful misconduct);
- **calculation method and limit:** initial amount of severance payment of €200,000 gross after one year of seniority from the date of initial appointment, *i.e.* 23 November 2014, then increased by €60,000 gross per additional quarter of seniority, without exceeding the limit of one year of remuneration;
- **performance criteria:** the severance payments shall only be due in the event that 80% of budgeted Group EBITDA is achieved in at least two of the three last full fiscal years at the time of termination of their duties; in the event that their duties are terminated during the second year of the term of office, the Board shall assess the meeting of this criterion based on the last full fiscal year; in the event that their duties are terminated during the third year of the term of office, the meeting of the criterion shall be measured based on the last two full fiscal years.

This regulated commitment mentioned in Article L. 225-42-1 of the French Commercial Code was the subject of a special report by the auditors dated 8 April 2015 included in appendix C of the 2014 Reference Document.

#### 4.6.1.2 Remuneration policy that will be presented to EDF's Shareholders' Meeting of 15 May 2018

In accordance with the provisions of the French Commercial Code, EDF's Shareholders' Meeting of 15 May 2018 will be asked to decide upon the items of remuneration due or allocated to Jean-Bernard Lévy, Chairman and Chief Executive Officer of the Company, for the 2017 fiscal year as well the 2018 remuneration policy pertaining to him.

These items are described in the following paragraphs. The draft resolutions will be submitted to the vote of the shareholders are:

#### Approval of the fixed, variable and exceptional components of overall remuneration and benefits of any kind paid or allocated to Jean-Bernard Lévy, Chairman and Chief Executive Officer of the Company, for the fiscal year ended 31 December 2017

The Shareholders' Meeting, ruling in accordance with the provision of Article L. 225-100 of the French Commercial Code, having reviewed the report of the Board of Directors as well as the information noted in the last paragraph of Article L. 225-37 of the French Commercial Code, approves the fixed, variable and exceptional items comprising the overall remuneration and benefits in kind paid or allocated to Jean-Bernard Lévy, Chairman and Chief Executive Officer of the Company, for the fiscal year ended 31 December 2017, which are described in the Company's Reference Document (see section 4.6) and reiterated in the report of the Board of Directors.

#### Approval of the principles and criteria for the determination, distribution and allocation of the fixed, variable and exceptional items comprising the overall remuneration and benefits in kind that may be allocated for the 2018 fiscal year to the Chairman and Chief Executive Officer of the Company

The Shareholders' Meeting, ruling in accordance with the provision of Article L. 225-100 of the French Commercial Code, having reviewed the report of the Board of Directors as well as the information noted in the last paragraph of Article L. 225-37 of the French Commercial Code, approves the principles and criteria for the determination, distribution and allocation of all of the items of overall remuneration and benefits in kind that may be allocated to the Chairman and Chief Executive Officer of the Company for the 2018 fiscal year, which were determined by the Board of Directors of the Company upon the recommendation of the Appointments & Remuneration Committee, are described in the Company's Reference Document (see section 4.6.1.1) and are reiterated in the report of the Board of Directors.

These principles and criteria are as follows:

- payment of gross fixed annual remuneration of €450,000;
- provision of a company car representing a benefit in kind;
- payment of severance pay in the event of a forced departure, subject to the achievement of performance criteria; and
- absence of any other items of remuneration or benefits of any type whatsoever, including directors's fees.

### 4.6.1.3 Total remuneration of directors

The table, below, shows the gross amounts of directors' fees paid during the 2016 and 2017 fiscal years to the members of the Board of Directors. No exceptional remuneration or any other type of remuneration was paid to directors during the 2017 fiscal year in return for their duties.

<b>Directors whose terms of office are ongoing on 31 December 2017</b>	<b>2016<sup>(1)</sup></b>	<b>2017<sup>(1)</sup></b>
Olivier Appert	39,556	40,046
<i>share paid to the French state budget</i>	30,889	28,032
Philippe Crouzet	50,167	48,548
<i>including amount paid for participation in a workgroup<sup>(2)</sup></i>	10,000	7,500 <sup>(3)</sup>
Maurice Gourdault-Montagne <sup>(3)</sup>	n/a	n/a
Bruno Lafont	45,889	42,033
<i>including amount paid for participation in a workgroup<sup>(2)</sup></i>	10,000	7,500
Bruno Léchevin	38,333	38,041
<i>share paid to the French state budget</i>	38,333	38,041
Marie-Christine Lepetit	49,944	48,064
<i>share paid to the French state budget</i>	49,944	48,064
Jean-Bernard Lévy	n/a	n/a
Colette Lewiner	87,500	79,066
<i>including amount paid for participation in a workgroup<sup>(2)</sup></i>	40,000	30,000
Laurence Parisot	53,222	48,548
<i>including amount paid for participation in a workgroup<sup>(2)</sup></i>	10,000	7,500
Claire Pedini <sup>(4)</sup>	2,722	40,530
<i>including amount paid for participation in a workgroup<sup>(2)</sup></i>	n/a	7,500
Michèle Rousseau <sup>(5)</sup>	n/a	19,566
<i>share paid to the French state budget</i>	n/a	19,566
Martin Vial	22,333	40,547
<i>share paid to the French state budget</i>	22,333	40,547
<b>TOTAL (IN EUROS)</b>	<b>389,666</b>	<b>444,989</b>

n/a: not applicable.

(1) The payments made during a fiscal year include 50% of the fixed portion and the entirety of the variable portion for the preceding fiscal year and 50% of the fixed portion for the current fiscal year.

(2) See sections 4.2.2.8 "Activity of the Board of Directors in 2017" and 4.6.1.3 "Total remuneration of directors" below.

(3) Director since 20 September 2017.

(4) Director since 12 May 2016.

(5) Director since 30 September 2016.

<b>Director whose terms of office expired during the 2017 fiscal year</b>	<b>2016<sup>(1)</sup></b>	<b>2017 (1)</b>
Christian Masset <sup>(2)</sup>	37,722	37,039
<i>share paid to the French state budget</i>	37,722	37,039
<b>TOTAL (IN EUROS)</b>	<b>37,722</b>	<b>37,039</b>

(1) The payments made during a fiscal year include 50% of the fixed portion and the entirety of the variable portion for the preceding fiscal year and 50% of the fixed portion for the current fiscal year.

(2) Director whose term of office expired on 1 August 2017.

<b>Directors whose terms of office expired during the 2016 fiscal year</b>	<b>2016<sup>(1)</sup></b>	<b>2017 (1)</b>
Gérard Magnin <sup>(2)</sup>	40,778	14,530
<i>share paid to the French state budget</i>	28,544	10,171
Philippe Varin <sup>(3)</sup>	7,333	n/a
<b>TOTAL (IN EUROS)</b>	<b>48,111</b>	<b>14,530</b>

(1) The payments made during a fiscal year include 50% of the fixed portion and the entirety of the variable portion for the preceding fiscal year and 50% of the fixed portion for the current fiscal year.

(2) Director whose term of office expired on 28 July 2016.

(3) Director whose term of office expired on 12 May 2016.

### **Budget and distribution of directors' fees**

The directors representing the employees hold office without fees in accordance with law 83-675 of 26 July 1983 concerning the democratisation of the public sector, and the Chairman of EDF's Board of Directors receives no directors' fees.

In accordance with order 2014-948 of 20 August 2014, the directors' fees allocated to directors appointed by the Shareholders' Meeting on recommendation from the French state in accordance with Article 6 of the order and who are French civil servants are paid to the French state budget. The same applies to directors' fees exceeding the limit set by the Minister for the Economy<sup>(1)</sup> payable to seven other directors appointed by the Shareholders' Meeting on recommendation from the French state and who are not French civil servants.

Regarding the Representative of the French State appointed in accordance with Article 4 of the order of 20 August 2014, any compensation that he/she is entitled to receive for the performance of his/her duties is paid to the French state budget.

After the issuing of an opinion by the Appointments & Remuneration Committee and approval by the Minister for the Economy in accordance with Article 3 of decree no. 53-707 of 9 August 1953, the Board of Directors submits for the approval of the Shareholders' Meeting the budget for the directors' fees to be allocated to directors based on the distribution approved by the Board of Directors.

The terms and conditions for the distribution of the annual budget for directors' fees applicable since the 2011 fiscal year were adopted by the Board of Directors on 22 June 2011, on recommendation from the Appointments & Remuneration Committee. They were re-examined and confirmed by the Board of Directors on 24 January 2018. The total budget is distributed between a fixed portion and a variable portion, each representing half of the budget, distributed as follows:

- the fixed portion is shared equally among the directors concerned; 50% of the fixed annual portion is paid during the fiscal year it is awarded and the remaining 50% at the beginning of the following fiscal year;

- the distribution of the variable portion among the directors is established through the application of a variable coefficient depending on the number of meetings (Board or Committee) and depending on the particular positions held by each director (member or Committee Chairman): a coefficient of 2 for the presence of a director at a meeting of the Board of Directors, a coefficient of 1 for the presence of a director as a member at a Committee meeting and a coefficient of 2 for the chairmanship of a Committee. The variable portion is divided by the total of the coefficients for the fiscal year in order to set the unit value of the coefficient; the variable portion for a fiscal year is fully paid at the start of the following fiscal year.

The Shareholders' Meeting of 21 November 2014, on recommendation from the Board of Directors following the issuing of an opinion by the Appointments & Remuneration Committee, had set the annual budget for directors' fees allocated to the Board for 2015 and subsequent years at €440,000. The Shareholders' Meeting of 18 May 2017, on the recommendation of the Board of Directors, approved the increase of the annual amount of directors' fees to €500,000 for the 2017 fiscal year, in order to remunerate the work done during the 2016 and 2017 fiscal years by the workgroup of independent directors on the project for the closure of the Fessenheim plant. The Board decided to allocate the sum of €30,000 to the Chair of the independent directors' workgroup and the sum of €7,500 to each member of the workgroup.

A recommendation will be made to the Shareholders' Meeting called for 15 May 2018 to maintain the annual budget for directors' fees at €500,000 for fiscal year 2018 and subsequent fiscal years until decided otherwise by the Shareholders' Meeting.

### **4.6.2 STOCK OPTIONS – BONUS SHARES**

The Company has not implemented any stock options plans and the corporate officers receive no allocation of bonus shares<sup>(2)</sup>.

4.

(1) A decision taken on 18 December 2014 in accordance with Article 6-V of the order dated 20 August 2014 states that the Company pays to the national budget the compensation exceeding a ceiling of 30% of the compensation received by these directors

(2) With the exception of any directors elected by the employees who may benefit from the systems implemented by the Company for the benefit of all its employees.

# 4.

## **CORPORATE GOVERNANCE**

Report by the Statutory Auditors, on the report of the Board of Directors on Corporate Governance

### **4.7 REPORT BY THE STATUTORY AUDITORS, PREPARED IN ACCORDANCE WITH ARTICLE L. 225-235 OF THE FRENCH COMMERCIAL CODE, ON THE REPORT OF THE BOARD OF DIRECTORS ON CORPORATE GOVERNANCE**

#### **For the year ended 2017**

In accordance with Article L. 225-37 of the French Commercial Code, the information that must be contained within the report on corporate governance is included in a section of the management report.

The report of the Statutory Auditors regarding this information is therefore included in their general report (see 6.4).

# 5 THE GROUP'S PERFORMANCE IN 2017 AND FINANCIAL OUTLOOK

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# 5. THE GROUP'S PERFORMANCE IN 2017 AND FINANCIAL OUTLOOK

## Operating and financial review

### 5.1 OPERATING AND FINANCIAL REVIEW

#### 5.1.1 KEY FIGURES

Pursuant to European regulation no. 1606/2002 of 19 July 2002 on the adoption of international accounting standards, the EDF group's consolidated financial statements for the year ended 31 December 2017 are prepared under the international accounting standards published by the IASB and approved by the European Union for application at 31 December 2017. These international standards are IAS (International Accounting Standards), IFRS (International Financial Reporting Standards), and SIC and IFRIC interpretations.

The Group's accounting policies are presented in note 1 to the consolidated financial statements for the year ended 31 December 2017.

The figures presented in this document are taken from the EDF group's consolidated financial statements at 31 December 2017.

The Group's key figures for 2017 are shown in the following tables.

#### EXTRACT FROM THE CONSOLIDATED INCOME STATEMENT

(in millions of euros)	2017	2016	Variation	Variation (%)	Organic growth (%)
Sales	69,632	71,203	(1,571)	-2.2	-1.0
Operating profit before depreciation and amortisation (EBITDA)	13,742	16,414	(2,672)	-16.3	-14.8
Operating profit (EBIT)	5,637	7,514	(1,877)	-25.0	-23.2
Income before taxes of consolidated companies	3,401	4,181	(780)	-18.7	-15.5
EDF net income	3,173	2,851	322	+11.3	+13.7
Net income excluding non-recurring items <sup>(1)</sup>	2,820	4,085	(1,265)	-31.0	-29.3

(1) Net income excluding non-recurring items is not defined by IFRS, and is not directly visible in the consolidated income statement. It corresponds to the net income excluding non-recurring items and the net change in fair value on energy and commodity derivatives, excluding trading activities, net of tax (see section 5.1.4.9 "Net income excluding non-recurring items").

#### FROM EDF NET INCOME TO NET INCOME EXCLUDING NON-RECURRING ITEMS

(in millions of euros)	2017	2016
EDF net income	3,173	2,851
Gain on sale of 49.9% of the Group's investment in CTE <sup>(1)</sup>	(1,289)	-
Other items, including net changes in fair value on energy and commodity derivatives, excluding trading activities	(94)	233
Impairment	1,030	1,001
<b>NET INCOME EXCLUDING NON-RECURRING ITEMS</b>	<b>2,820</b>	<b>4,085</b>
Payments to bearers of perpetual subordinated bonds	(565)	(582)
<b>NET INCOME EXCLUDING NON-RECURRING ITEMS, ADJUSTED FOR PAYMENTS ON HYBRID BONDS</b>	<b>2,255</b>	<b>3,503</b>

(1) The Company that holds 100% of RTE (an independent EDF subsidiary as defined in the French Energy Code).

#### EXTRACT FROM THE CONSOLIDATED BALANCE SHEET

(in millions of euros)	31/12/2017	31/12/2016
Non-current assets	156,899	147,626
Inventories and trade receivables	37,549	37,397
Other assets	63,649	66,238
Cash and cash equivalents, other liquid assets, and loans to joint ventures	22,655	25,159
Assets held for sale	-	5,220 <sup>(1)</sup>
<b>TOTAL ASSETS</b>	<b>280,752</b>	<b>281,640</b>
Equity (EDF's share)	41,357	34,438
Equity (non-controlling interests)	7,341	6,924
Special concession assets	46,323	45,692
Provisions	76,857	74,966
Loans and other financial liabilities	55,670	61,230
Other liabilities	53,204	56,281
Liabilities related to assets classified as held for sale	-	2,109 <sup>(2)</sup>
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>280,752</b>	<b>281,640</b>

(1) Including €104 million of financial assets impacting net indebtedness (see below).

(2) Including €1,458 million of financial liabilities impacting net indebtedness (see below).



**GROUP CASH FLOW**

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>	<b>Variation</b>	<b>Variation (%)</b>
Group cash flow <sup>(1)</sup>	(209)	(1,565)	1,356	+86.6

(1) Group cash flow is not an aggregate defined by IFRS as a measure of financial performance, and is not comparable with indicators of the same name reported by other companies. It is equivalent to the operating cash flow after net change in working capital, net investments, allocations and withdrawals from dedicated assets, and dividends.

**DETAILS OF NET INDEBTEDNESS**

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>	<b>Variation</b>	<b>Variation (%)</b>
Loans and other financial liabilities	56,846	65,195	(8,349)	-12.8
Derivatives used to hedge liabilities	(1,176)	(3,965)	2,789	-70.3
Financial liabilities reclassified as liabilities related to assets held for sale <sup>(1)</sup>	-	1,458	(1,458)	-100.0
Cash and cash equivalents	(3,692)	(2,893)	(799)	+27.6
Available-for-sale financial assets – Liquid assets	(18,963)	(22,266)	3,303	-14.8
Financial assets reclassified as assets held for sale <sup>(1)</sup>	-	(104)	104	-100.0
<b>NET INDEBTEDNESS <sup>(2)</sup></b>	<b>33,015</b>	<b>37,425</b>	<b>(4,410)</b>	<b>-11.8</b>

(1) Net indebtedness of assets held for sale in 2016 principally concerned CTE (the Company that holds 100% of RTE <sup>(1)</sup>) and Polish companies.

(2) Net indebtedness is not defined in the accounting standards and is not directly visible in the Group's consolidated balance sheet. It comprises total loans and financial liabilities, less cash and cash equivalents and liquid assets. Liquid assets are financial assets consisting of funds or securities with initial maturity of over three months that are readily convertible into cash and are managed according to a liquidity-oriented policy.

**5.1.2 ECONOMIC ENVIRENEMENT**
**5.1.2.1 Trends in market prices for electricity and the principal energy sources**

In an interconnected European market, analysis of market prices in France and the rest of Europe provides important context.

**5.1.2.1.1 Spot electricity prices in Europe <sup>(2)</sup>**

	<b>France</b>	<b>United Kingdom</b>	<b>Italy</b>	<b>Germany</b>	<b>Belgium</b>
Average baseload price for 2017 (€/MWh)	45.0	51.7	53.9	34.2	44.6
Variation in average baseload prices, 2017/2016	22.4%	5.3%	26.1%	18.0%	21.8%
Average peakload price for 2017 (€/MWh)	53.7	56.7	61.4	42.7	54.8
Variation in average peakload prices, 2017/2016	17.4%	-1.3%	27.9%	21.2%	17.2%

The comments below concern baseload prices.

In **France**, the increase in spot prices for electricity is explained by higher commodity prices compared to 2016. A very cold month of January, poor nuclear availability and drought affecting hydropower generation also helped to push spot prices upwards. Demand for electricity stood at an average 54.6GW (478.7TWh) for the year, relatively stable compared to 2016. Consumption for the first quarter showed marked contrasts depending on the month, as temperatures were very low in January while the month of March was one of the warmest since 1957, with temperatures on average 2°C above normal.

Nuclear power output amounted to an average 43.3GW (379.1TWh), down by 1% from 2016, which was a year of low production particularly in the final quarter. The first quarter of 2017 was marked by outages for additional tests concerning the carbon segregation issue, and in the final quarter the four Tricastin units were shut down at the request of the ASN.

Spot electricity prices in Europe were higher overall in 2017 than 2016. This increase in prices is notably explained by rising coal and CO<sub>2</sub> prices. 2017 also saw a substantial decline in water levels and a wave of severe cold weather in January, with temperatures 5-6°C below normal in most European countries.

Wind power and solar power output both increased (+0.4GW and +0.1GW respectively).

Power generation by fossil-fired thermal plants in France rose by 8TWh due to the cold weather of January, but also the low water levels. Annual production reached 53.4TWh, of which 16.1TWh were produced by EDF-owned plants. Gas-fired plants produced 41TWh, coal-fired plants close to 10TWh and oil-fired plants around 2TWh. Spot commodity prices for gas and coal registered year-on-year increases of 20% and 40% respectively, driving a significant rise in generation costs and therefore spot prices.

In the **United Kingdom**, average spot electricity prices rose by 5.3% from 2016 to €51.7/MWh. The increase was most marked in the first quarter due to the cold weather of January.

In **Italy**, average spot prices registered a year-on-year rise of 26.1% to reach €53.9/MWh for 2017.

In **Germany**, spot prices stood at an average €34.2/MWh (baseload) and €42.7/MWh (peakload), with respective increases of €5.2/MWh and €7.5/MWh from 2016. Prices in Germany were negative for 146 hours, compared to 97 hours in 2016. Negative prices generally occur when unavoidable renewable energy

(1) An independent EDF subsidiary as defined in the French Energy Code.

(2) **France and Germany:** average previous day EPEXSPOT price for same-day delivery;  
**Belgium:** average previous day Belpex price for same-day delivery;  
**United Kingdom:** average previous day EDF Trading OTC price for same-day delivery;  
**Italy:** average previous day GME price for same-day delivery.

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output is high, consumption relatively low and export channels saturated. Since some generation facilities have little room for manoeuvre to adjust output levels, some operators prefer to pay rather than shut their plants down. The average France-Germany spread was €10.8/MWh, up by €3.0/MWh from 2016. The greater spread is essentially due to high prices in January and the final quarter, notably due to the wave of cold weather in January, and lower nuclear output towards the end of the year.

In **Belgium**, spot prices were up by €8/MWh compared to 2016, with an average price of €44.6/MWh. This rise was boosted by first-quarter and second quarter prices which showed year-on-year increases of €23.3/MWh (+81.8%) and €8.6/MWh (+31.7%) respectively, while third-quarter and fourth-quarter prices were generally stable (+€1.6/MWh and -€1.3/MWh respectively).

#### 5.1.2.1.2 Forward electricity prices in Europe <sup>(1)</sup>

	France	United Kingdom	Italy	Germany	Belgium
Average forward baseload price under the 2018 annual contract for 2017 (€/MWh)	38.2	49.8	46.6	32.4	37.2
Variation in average forward baseload price under the annual contracts, 2017/2016	14.6%	3.9%	13.2%	21.7%	11.6%
Forward baseload price under the 2018 annual contract at 27 December 2017 (€/MWh)	43.9	52.9	54.2	37.7	44.3
Average forward peakload price under the 2018 annual contract for 2017 (€/MWh)	50.0	55.6	52.8	40.5	47.9
Variation in average forward peakload price under the annual contracts, 2017/2016	11.8%	1.1%	12.1%	20.7%	10.1%
Forward peakload price under the 2018 annual contract at 27 December 2017 (€/MWh)	55.3	57.8	61.4	46.9	55.3

Average annual contract prices for baseload and peakload electricity in Europe were higher in 2017 than 2016. The increase was mainly attributable to the rise in coal and CO<sub>2</sub> prices. After a dip in the first half-year, prices recovered in the second half-year, with particularly marked movements in the autumn.

In **France**, the average annual year-ahead contract baseload price was €38.2/MWh, up by 14.6% from 2016, principally due to the rise in commodity prices. Prices remained higher than in 2016 overall except in November, due to the sudden price leap of November 2016. 2018 annual contract prices were fairly steady until mid-August, then saw a steep rise due to the ASN's announcements about the French nuclear fleet and the increase in commodity prices, mainly concerning coal and CO<sub>2</sub>. As the November round of ARENH applications approached, prices settled at around €42/MWh. The annual contract price for delivery in 2018 ended the year 2017 at €43.9/MWh (baseload), €6.4/MWh higher than at the start of the year.

To guarantee secure electricity supply, a capacity mechanism was set up from 1 January 2017. This system remunerates producers and demand response managers for availability in periods of particular demand. Suppliers must acquire capacities to cover their customers' needs at such peak demand periods. After the 2016 auction for 2017 deliveries, which provided the market reference price of €10/kW, a second auction took place in April for 2017 deliveries, resulting in a price of €10.42/kW. The first EPEX auctions of capacities for 2018 took place on 9 November and 14 December 2017, leading to a market reference price of €9.34/kW for capacity for 2018. The first capacity certificates for 2019 were traded at the December auction at the price of €13/kW.

In the **United Kingdom**, the April Ahead contract baseload price in Euros for 1 April Y+1 to 31 March Y+2 was an average 3.9% higher than in 2016. Prices reflected the fluctuations in natural gas prices, as gas-fired facilities make a

significant contribution to the formation of British electricity prices. This increase was accentuated by the pound sterling's decline of almost 4% against the euro in the context of Brexit negotiations, which had an impact of close to €2/MWh on the UK's annual contract. In late June, the operator Centrica announced the permanent closure of the Rough storage site, the largest in the United Kingdom, after several technical problems. The site had already been declared unavailable for injections for a one-year period from April 2017. The annual contract price ended the year at €52.9/MWh, down by €1.2/MWh from 2016 when tensions over supply temporarily pushed prices up.

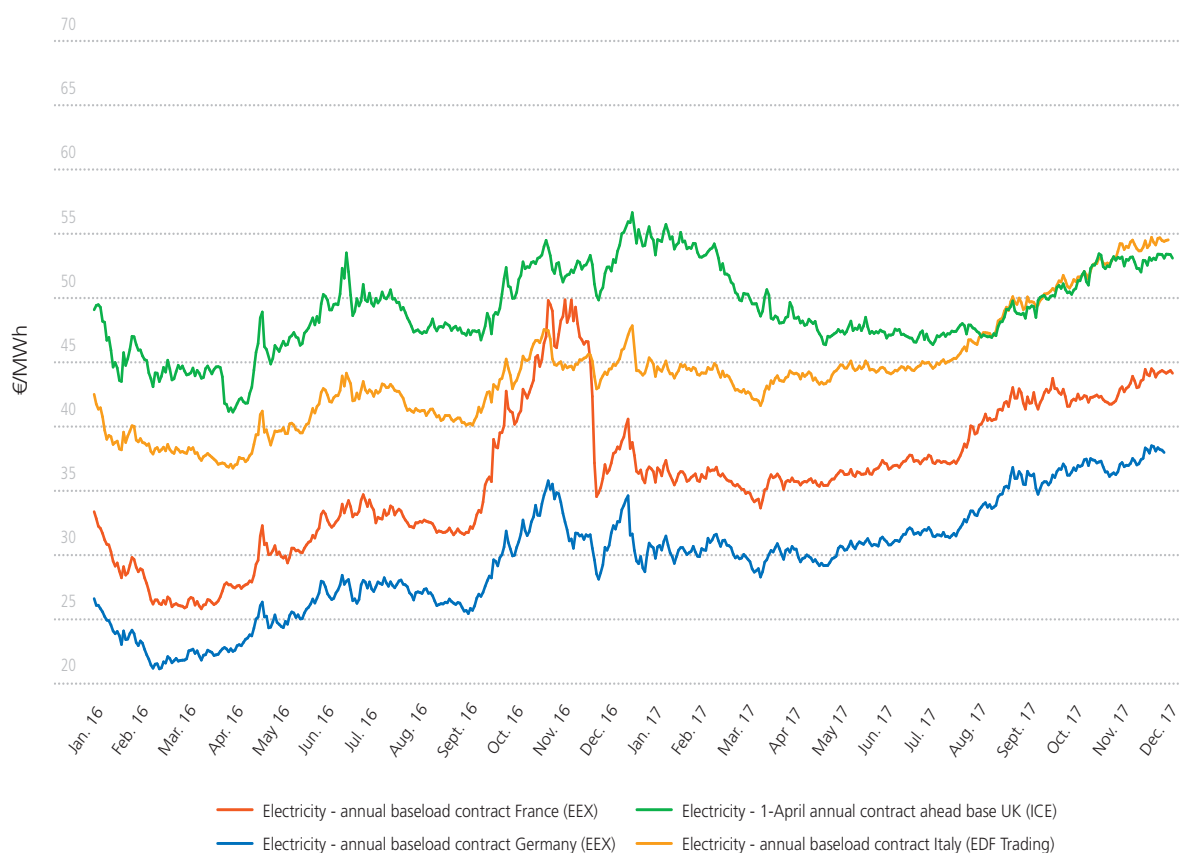
In **Germany**, the average annual contract baseload price registered rise of 21.7%, rising from €30.1/MWh at the start of the year to €37.7/MWh at the end of the year. German prices generally followed the same pattern as French prices over the year, but were more affected by the higher commodity prices, particularly the significant increase late in the year in coal prices, which play a large role in the German energy mix, and CO<sub>2</sub> prices. The German "calendar" became uncoupled from the French "calendar" during tensions concerning the French nuclear fleet, but the France-Germany spread then narrowed. The renewable energy capacities in Germany (wind power and photovoltaic power) expanded further to reach almost 98GW.

In **Italy**, the average annual contract baseload price rose by 13.2% to €46.6/MWh in 2017, ending the year at €54.3/MWh, up by €10.2/MWh from the start of the year. This increase is explained by the rise in gas prices, which are a major factor in electricity prices in Italy.

In **Belgium**, the average annual contract baseload price was 11.6% higher than in 2016, following the same trend as commodity prices to reach €37.2/MWh, despite the resumption of operations by the Doel 1, Doel 3 and Tihange 1 nuclear reactors in Belgium, which were taken offline during the first half of 2016.

(1) **France and Germany**: average year-ahead EEX price;  
**Belgium and Italy**: average year-ahead EDF Trading price;  
**United Kingdom**: average ICE annual contract prices, April 2016 then April 2017 (in the UK, annual contract deliveries take place from 1 April to 31 March).

➔ Principal forward electricity prices in Europe (baseload year ahead)



5.

5.1.2.1.3 CO<sub>2</sub> emission rights prices <sup>(1)</sup>

The price of CO<sub>2</sub> emission rights for delivery in December 2018 ended the year at €8.2/t, up by €1.6/t compared to 2016. After a drop in the early days of January in reaction to the significant rise of late December 2016, then a slow decline sustained by low demand until mid-May, the price of CO<sub>2</sub> emission quotas showed an upturn when a lower-than-expected decrease in CO<sub>2</sub> emissions for 2016 was announced (-2.6% compared to 2015) and political signals supporting higher carbon prices. From August onwards, the rise in these prices was mainly driven by France and Germany's declaration that they intended to work together on a reform to balance the emission quotas market; other factors were the agreement reached to protect the market from being flooded by British quotas in the event of Brexit, and announcements by the ASN stoking fears that part of the French nuclear fleet

would be unavailable and greater use of fossil-fired plants would be needed. In late December, issuance of quotas was halted on the primary market, and this limited the supply and pushed prices upwards.

After two years of discussions, the Council of the European Union and the European Parliament reached an agreement on 9 November 2017 for a reform of the EU-ETS system for the period 2021-2030. The proposed reform, which is still awaiting formal approval by these bodies, expected in the second quarter of 2018, notably includes:

- a measure aiming to reduce the emissions ceiling over that period;
- doubling the Market Stability Reserve's absorption rate of surplus quotas between 2019 and 2023 to 24%.

(1) Average ICE prices for the annual contract, Phase III (2013-2020).

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### → CO<sub>2</sub> emission rights prices



#### 5.1.2.1.4 Fossil fuel prices <sup>(1)</sup>

	Coal (US\$/t)	Oil (US\$/bbl)	Natural gas (€/MWhg)
Average price for 2017	73.7	54.8	17.1
Average price variation, 2017/2016	37.2%	21.3%	10.7%
Highest price in 2017	90.3	67.0	18.9
Lowest price in 2017	60.8	44.8	15.7
Closing price, 2016	70.3	56.8	18.9
Closing price, 2017	90.3	66.9	18.2

**Oil** prices averaged US\$54.8/bbl, 21.3% (+US\$9.6/bbl) higher than in 2016, and ended the year at US\$66.9/bbl, up by US\$10.1/bbl (+17.7%) from 2016. During the first two months of the year prices fluctuated around US\$55.5/bbl. Initial efforts to limit oil production by countries that were signatories to the Vienna agreement (including OPEC countries and Russia) were countered by higher production and a rise in the number of drilling wells in operation in the United States. The high level of American oil stocks also put downward pressure on prices. Subsequently, an increase in US oil production due to a reduction in fracking costs became the dominant trend, and a decline in prices was observed. Then in late June, the price of Brent began an upward movement from US\$44.8/bbl, its lowest point of the year, to reach US\$66.9/bbl, its highest level since May 2015. This recovery is mainly explained by the declarations – especially by Saudi Arabia – in favour of broadening the Vienna agreement and prolonging it to 2018. Other factors (political tensions in Saudi Arabia, military operations in Iraqi Kurdistan, hurricane Harvey, and higher IEA forecasts for 2017 demand) also played a role in the rise in Brent prices.

European year-ahead **coal** prices stood at an average US\$73.7/t in 2017, up by 37.2% from 2016, and ended the year at US\$90.3/t compared to US\$70.3/t at

31 December 2016 (+28.4%). After staying between US\$60/t and US\$70/t during the first five months of 2017, coal prices began to rise. The year-ahead coal price increased from US\$66.6/t at the end of May to US\$90.3/t at the end of the year, its highest level since May 2013. A number of factors contributed to this increase. Australian production was down due to strikes at some mines. Coal production also declined in Indonesia and Colombia due to bad weather. Meanwhile on the demand side, high summer temperatures in China, where coal is the largest element of the energy mix, pushed up demand for electricity and therefore for coal. Late in the year, after a slight drop in November, coal prices saw another upturn driven by the demand crisis as China built up reserves.

The annual **gas** contract for the French PEG Nord hub traded at an average €17.1/MWh in 2017, 10.7% (+€1.7/MWh) more than the previous year, and ended the year €0.8/MWh below its year-end 2016 level. The average rise in prices is explained by the recovery in oil prices (+21.3% on average), since long-term contracts are partly indexed on oil prices. The price variation over the year was smaller than in 2016, remaining within a band of €3.2/MWh as opposed to €6.0/MWh in 2016. Natural gas prices moved downwards until July, following oil

(1) **Coal**: average ICE prices for delivery in Europe (CIF ARA) for the next calendar year (US\$/t);

**Oil**: Brent first reference crude oil barrel, ICE index (front month) (US\$/barrel);

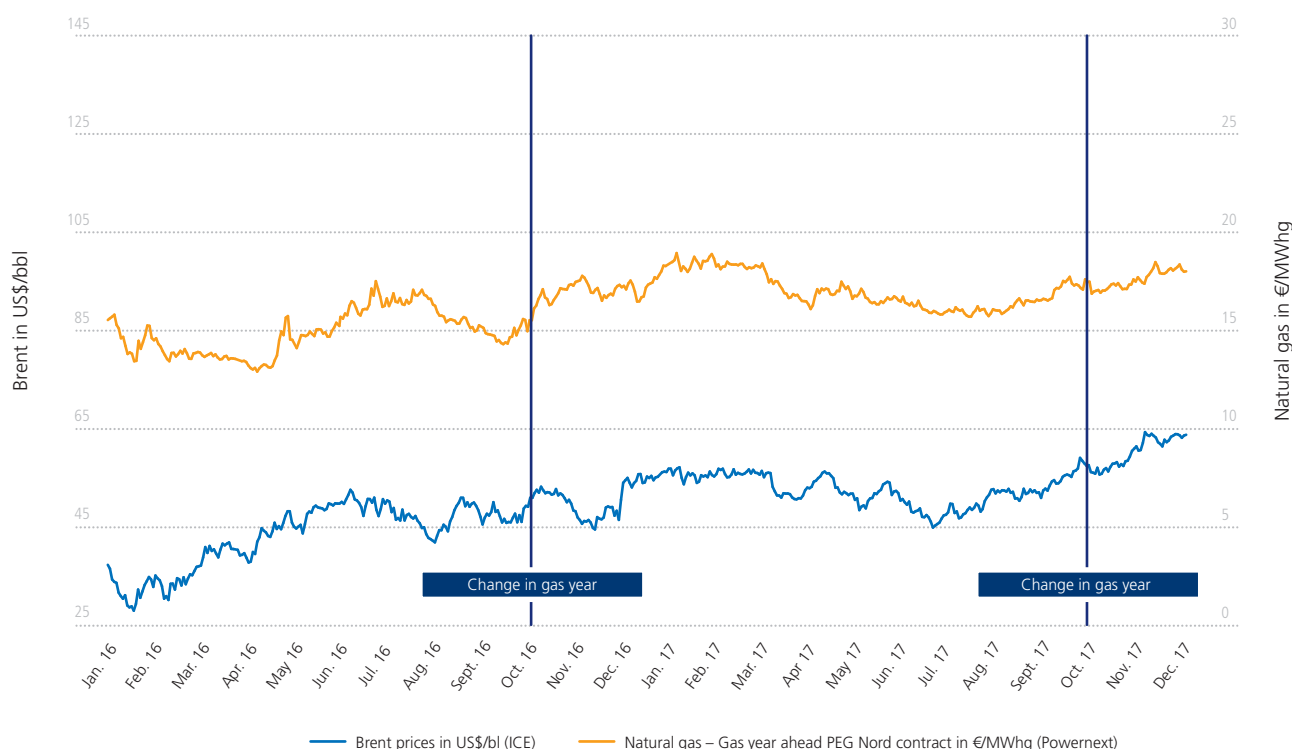
**Natural gas**: average ICE OTC prices, for delivery starting from October of the following year in France (PEG Nord) (€/MWhg).

prices and reflecting good LNG supplies. The lowest price of the year (€15.7/MWh) was registered in July, then prices began to rise from mid-summer onwards. In August, prices were boosted by further unavailability at various Norwegian facilities.

September saw the highest monthly increase: prices soared by €1/MWh to €17.5/MWh by the end of the month. The price rose significantly in the first two weeks of the months, in the wake of Brent prices, due to indexing of long-term contracts on oil prices. The increase in coal and CO<sub>2</sub> prices was also influential as those prices affected the forecast competitiveness of coal-fired power plants and

opened up prospects for greater use of gas-fired plants, thus causing higher demand for gas. The ASN's announcements during the summer about French nuclear units also put pressure on forward demand for gas, and helped to drive prices upwards. In October and November, forward gas prices were essentially driven by rising Brent prices. They remained stable overall in December despite short-term tensions due to several incidents arising on 12 December, including the methane terminal explosion in Austria.

➔ Natural gas and oil prices



5.

5.1.2.2 Electricity <sup>(1)</sup> and gas <sup>(2)</sup> consumption

Electricity consumption in **France** reached 480.9TWh in 2017, slightly less (-0.5%) than in 2016 (which was a leap year). Notable developments included consumption levels in January, which showed a strong year-on-year increase (+14.4%) as temperatures were substantially colder than the previous year. March, in contrast, was warmer than in 2016, resulting in a -9.6% decrease in consumption. After correction for weather effects and the number of days in February, electricity consumption in France was stable compared to 2016.

In the **United Kingdom**, estimated electricity consumption was down by 1.9% compared to 2016 across all sectors, especially the residential customer segment. In **Italy**, electricity consumption was 1.6% higher than in 2016 due to exceptional temperatures in June and August.

Estimated natural gas consumption in **France** rose by 0.4% during 2017 to 493.3TWh. Demand in January leapt by almost 30% year-on-year, as the average January temperature was 3.8°C lower in 2017 than 2016. The rise in demand for heating and the greater drawing on gas-fired plants for electricity generation led to

an overall 18.5TWh increase for this month. However, this rise in January was counterbalanced by marked declines in consumption in the months of March, April and October compared to the same months of 2016 (-8.4TWh, -3.1TWh and -5.0TWh respectively), due to average temperatures that were higher by 3.1°C, 0.7°C and 2.3°C respectively. Demand for gas in September was up by 2.2TWh (+9.4%) between 2016 and 2017, as temperatures for the month were 3.4°C lower in 2017 than 2016.

Estimated natural gas consumption in the **United Kingdom** was down by 2.6% from 2016 thanks to warmer weather in 2017. In **Italy**, domestic demand for natural gas increased by 6.1% due to higher consumption levels, covered by larger imports.

5.1.2.3 Electricity and natural gas sales tariffs

In **France**, the "blue" regulated sales tariffs for residential and non-residential customers increased by 1.7% from 1 August 2017 (see note 4.1 to the 2017 consolidated financial statements).

(1) Sources: **France**: unadjusted data and data adjusted for weather effects provided by RTE (estimated data because not available to date) ; **United Kingdom**: Department of Energy and Climate Change for the first three quarters, local subsidiary estimation for the final quarter ; **Italy**: unadjusted data and data provided by Terna, the Italian national grid operator and adjusted by Edison.  
 (2) Sources: **France**: unadjusted data from Smart GRTgaz ; **United Kingdom**: Department of Energy and Climate Change data for the first three quarters, local subsidiary estimation for the final quarter ; **Italy**: Ministry for Economic Development (MSE), Snam Rete Gas data adjusted by Edison on the basis of 1Bcm = 10.76TWh.

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In the **United Kingdom**, EDF Energy introduced two tariff changes:

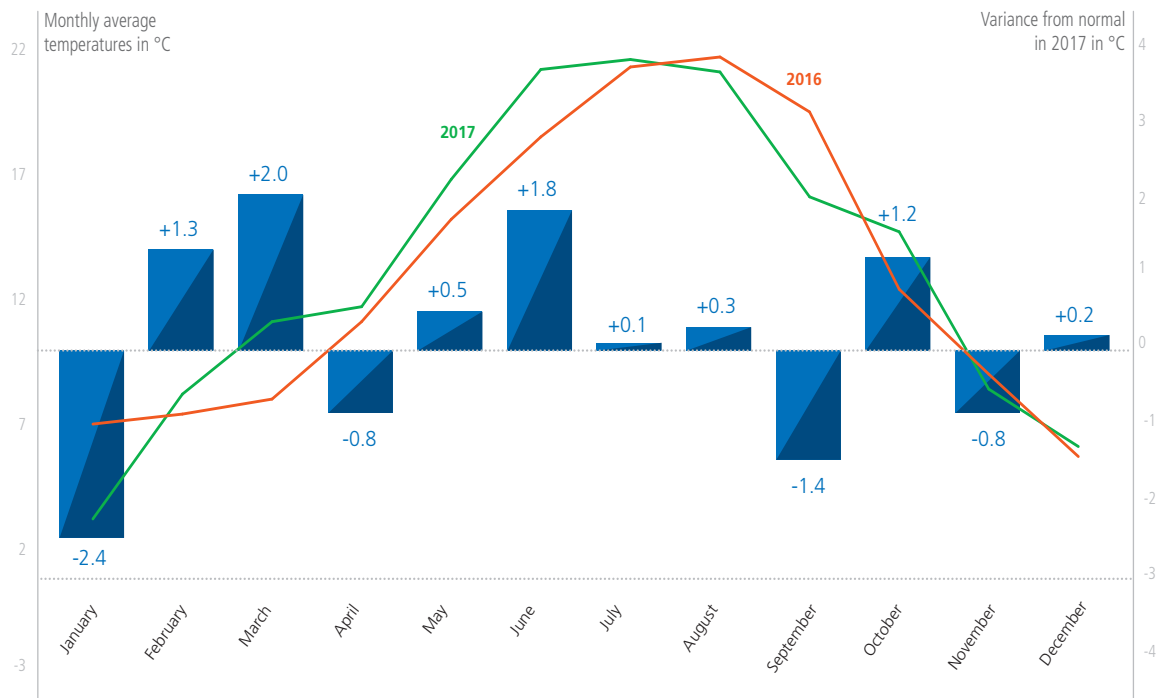
- a 5.2% reduction in gas tariffs from 5 January 2017 and an 8.4% increase in electricity tariffs from 1 March 2017;
- then a 5.5% increase for gas and a second increase of 9% for electricity on 21 June 2017.

The five other principal energy suppliers also increased their tariffs. These increases are mainly explained by the rise in wholesale market prices and non-energy costs.

### 5.1.2.4 Weather conditions: temperatures and rainfall

2017 was a warmer year than 2016, and average temperatures in France were +0.2°C above normal. The temperatures in January and September 2017 were well below normal (-2.4°C and -1.4°C respectively), but March and June 2017 were predominantly warm months.

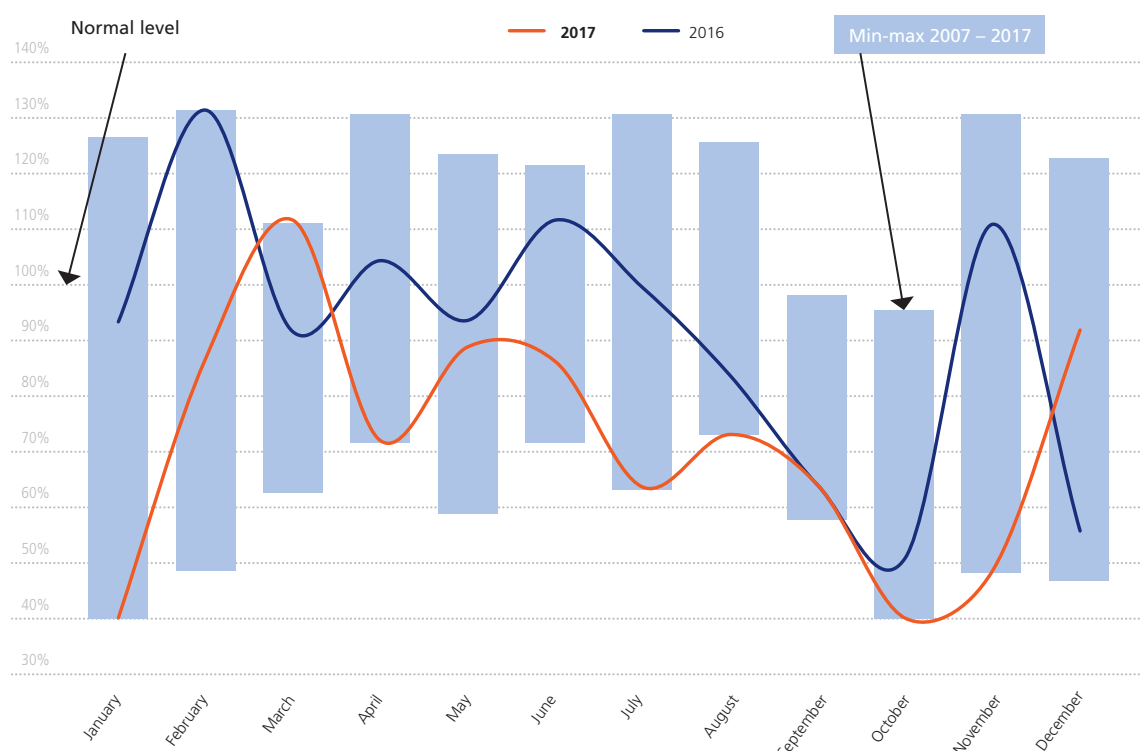
#### ➔ Temperatures <sup>(1) (2)</sup> in France in 2017 and 2016



(1) Average temperatures recorded in 32 cities weighted by electricity consumption.  
 (2) Source: Mirèor (data from Météo-France).

2017 was marked by a shortfall of rain in the extended south-west third of Europe (Spain, France, and Italy in particular) while Scandinavia and North Europe saw more precipitation. Air temperatures were higher than normal throughout Europe, especially in the east.

➔ Water flow coefficients in France in 2017 and 2016 <sup>(1)</sup>



(1) Weekly monitoring by EDF's OSGE energy observatory of French reservoir levels (Miréor project) as far as the coast

In France, there was a shortage of precipitation (and snowfall on most mountain ranges), particularly in January and April and above all in the autumn.

As a result of this unusual situation, water flow coefficients in France were too low in almost every month, and the shortfall gradually increased during the second half of 2017. December saw the return of heavy rainfall.

2017 water flow coefficients in France were among the lowest since 2011.

## 5.1.3 SIGNIFICANT EVENTS OF 2017 <sup>(1)</sup>

### 5.1.3.1 Major events

#### Nuclear industry

- EDF completed the cold functional test phase for the Flamanville EPR (see press release of 8 January 2018).
- On 31 December 2017, EDF finalised the acquisition of a 75.5% stake in New NP capital (see press release of 2 January 2018). On 4 January 2018, New NP was renamed Framatome (see press release of 4 January 2018 on the website: [www.framatome.com](http://www.framatome.com)).
- Temporary shutdown of the four generation units of the Tricastin nuclear power plant (see press release of 28 September 2017).
- Clarifications were made to the Hinkley Point C project (see press release of 3 July 2017): review of the costs and timetable of the HPC project.

- Approval of the Flamanville 3 EPR's vessel: draft opinion of the French Nuclear Safety Authority specifying that the composition of the steel of the vessel head and bottom is not likely to call into question its commissioning under certain conditions and in particular the replacement of the vessel head by the end of 2024 (see press release of 29 June 2017).

- EDF's Board of Directors approved the creation of Edvance, a significant milestone in the reconstruction of the French nuclear industry (see press release of 17 May 2017).

- Board of Directors' meeting held on 6 April 2017: compensation arrangements for the closure of the Fessenheim power plant (see press release of 6 April 2017 and note 3.7.5 to the 2017 consolidated financial statements).

#### Disposal plan

- Edison sold its Milan headquarters (see Edison press release of 21 November 2017 on the website: [www.edison.it](http://www.edison.it)).
- EDF finalised the disposal of EDF Polska's assets to PGE (see press release of 14 November 2017 and note 3.4.2 to the 2017 consolidated financial statements).
- EDF sold a portfolio of around 200 office real estate and business assets to Tikehau Capital (see press release of 31 October 2017).
- Edison announced the sale of ITG (Infrastrutture Trasporto Gas) and a 7.3% interest in Adriatic LNG to Snam (see Edison press release of 13 October 2017 on the website: [www.edison.it](http://www.edison.it)).
- EDF finalised the indirect sale of 49.9% of CTE <sup>(2)</sup> to Caisse des Dépôts and CNP Assurances (see press release of 31 March 2017 and note 3.4.1 to the 2017 consolidated financial statements).

(1) A full list of press releases is available from the EDF website: [www.edf.fr](http://www.edf.fr).

(2) The company that holds 100% of RTE (an independent EDF subsidiary as defined in the French Energy Code).

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- EDF Trading and JERA: sale of the coal trading business (see note 3.4.4 to the 2017 consolidated financial statements).
- EDF and ENKSZ completed the transaction for the sale of 100% of EDF Démász Zrt. (see press release of 1 February 2017 and note 3.4.3 to the 2017 consolidated financial statements).

### Financial structure

- EDF announced the success of its capital increase with preferential subscription rights for an amount of approximately €4 billion (see press release of 28 March 2017 and note 3.1 to the 2017 consolidated financial statements).
- EDF raised JPY111 billion with the largest "Samurai" bond issue with 10-year and longer maturity (see press release of 20 January 2017 and section 5.1.6.1.1.2 "Management of liquidity risks").

### Sustainable development

- The EDF group launched the "Solar Power Plan" with a view to developing 30GW of solar capacity in France by 2035 (see press release of 11 December 2017).
- EDF signed an innovative bilateral Revolving Credit Facility with an interest rate that depends on its sustainability rating (see press release of 22 May 2017).
- EDF raised JPY26 billion through two green bonds on the Japanese "Samurai bonds" market (see press release of 20 January 2017 and note 5.1.6.1.1.2 "Management of liquidity risks").

### 5.1.3.2 New investments, partnerships and investment projects

#### EDF Énergies Nouvelles <sup>(1)</sup>

- In 2017, EDF Énergies Nouvelles commissioned new facilities, signed electricity purchase agreements and undertook new projects.
- On 20 July 2017, EDF Énergies Nouvelles announced that its simplified tender offer for Futuren had been successful (see note 5.1. to the 2017 consolidated financial statements).
- On 5 July 2017, EDF Énergies Nouvelles acquired the offshore wind farm operations and maintenance specialist OWS.

#### Edison

- Edison signed a binding agreement with Gas Natural Fenosa for the acquisition of Gas Natural Vendita Italia and the Shah Deniz II gas contract (see press release of 13 October 2017 and note 44.1.2.2. to the 2017 consolidated financial statements).

#### Energy services

- On 6 July 2017, EDF Energy Services completed its purchase of Imtech. Imtech is a leading engineering services company and provider of technical services to construction, industrial, commercial and public sector clients in the United Kingdom and Ireland.

### 5.1.3.3 Regulatory environment

Regulatory changes are detailed in the following notes to the 2017 consolidated financial statements:

- note 4.1 "Regulated electricity sales tariffs in France";
- note 4.2 "TURPE network access tariffs";
- note 4.3 "CSPE compensation mechanism for public energy service charges" (CSPE);
- note 4.4 "French capacity mechanism";
- note 4.5 "Regulated gas sales tariffs in France";
- note 4.6 "Energy savings certificates: preparation for the fourth period" (2018-2020);
- note 4.7 "ARENH".

### 5.1.3.4 Other significant events

- Interim dividend distribution for fiscal year 2017 (see press release of 7 November 2017 and note 27.3 to the 2017 consolidated financial statements).
- New Leadership roles announced at EDF Energy (see press release of 27 July 2017).
- Results of the option for payment of the balance of the dividend in respect of the 2016 financial year (see press release of 28 June 2017 and note 27.3 to the 2017 consolidated financial statements).
- Appointments to the EDF group Executive Committee (see press release of 12 June 2017).
- EDF's Board of Directors considered the strategic plan for the first period of the French multiannual energy program (see press release of 6 April 2017).

(1) A full list of press releases is available from the EDF Énergies Nouvelles website: [www.edf-energies-nouvelles.com](http://www.edf-energies-nouvelles.com).



## 5.1.4 ANALYSIS OF THE BUSINESS AND THE CONSOLIDATED INCOME STATEMENTS FOR 2016 AND 2017

Presentation and analysis of the consolidated income statements for 2016 and 2017 is shown at two levels of analysis for Sales and EBITDA: a first focusing on the Group, then a second reporting on the different business segments (France -

Generation and supply activities, France - Regulated activities, United Kingdom, Italy, Other international and Other activities). EBIT (operating profit) and net income are analysed from a more general standpoint.

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
<b>Sales</b>	<b>69,632</b>	<b>71,203</b>
Fuel and energy purchases	(37,641)	(36,050)
Other external purchases	(8,739)	(8,902)
Personnel expenses	(12,456)	(12,543)
Taxes other than income taxes	(3,541)	(3,656)
Other operating income and expenses	6,487	6,362
<b>Operating profit before depreciation and amortisation (EBITDA)</b>	<b>13,742</b>	<b>16,414</b>
Net changes in fair value on Energy and Commodity derivatives, excluding trading activities	(355)	(262)
Net depreciation and amortisation	(8,537)	(7,966)
Net increases in provisions for renewal of property, plant and equipment operated under concessions (Impairment)/reversals	(58)	(41)
Other income and expenses	1,363	8
<b>Operating profit (EBIT)</b>	<b>5,637</b>	<b>7,514</b>
Cost of gross financial indebtedness	(1,778)	(1,827)
Discount effect	(2,959)	(3,417)
Other financial income and expenses	2,501	1,911
<b>Financial result</b>	<b>(2,236)</b>	<b>(3,333)</b>
<b>Income before taxes of consolidated companies</b>	<b>3,401</b>	<b>4,181</b>
Income taxes	(147)	(1,388)
Share in net income of associates and joint ventures	35	218
<b>GROUP NET INCOME</b>	<b>3,289</b>	<b>3,011</b>
EDF net income	3,173	2,851
Net income attributable to non-controlling interests	116	160
<b>EARNINGS PER SHARE (EDF SHARE) IN EUROS</b>		
Earnings per share	0.98	1.15
Diluted earnings per share	0.98	1.15

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### 5.1.4.1 Sales

Consolidated sales were down by 2.2% while showing an organic decline of 1.0%.

#### 5.1.4.1.1 Change in Group sales

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>	<b>Variation</b>	<b>Variation (%)</b>	<b>Organic growth (%)</b>	<b>Organic growth (%) (excluding the sales tariff adjustment)</b>
<b>Sales</b>	<b>69,632</b>	<b>71,203</b>	<b>(1,571)</b>	<b>-2.2</b>	<b>-1.0</b>	<b>+0.4</b>

Sales amounted to €69,632 million in 2017, down by €1,571 million (-2.2%) from 2016.

Excluding the effects of exchange rates (-€567 million), principally the pound sterling's decline against the Euro and changes in the scope of consolidation

(-€279 million), and eliminating the impact of the regulated sales tariff adjustment for the period 1 August 2014 to 31 July 2015 which took place in 2016, sales show an organic increase of +0.4%.

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### 5.1.4.1.2 Change in sales by segment

The following table shows sales by segment, excluding inter-segment eliminations.

(in millions of euros)	2017	2016	Variation	Variation (%)	Organic growth (%)	Organic growth (%) (excluding the sales tariff adjustment)
France - Generation and supply activities <sup>(1)</sup>	35,606	35,191	415	+1.2	+1.2	+4.1
France - Regulated activities <sup>(2)</sup>	15,896	15,728	168	+1.1	+1.1	+1.3
United Kingdom	8,688	9,267	(579)	-6.2	-0.8	-0.8
Italy	9,940	11,125	(1,185)	-10.7	-10.6	-10.6
Other international	4,822	5,286	(464)	-8.8	+0.5	+0.5
Other activities	7,813	7,734	79	+1.0	-1.0	-1.0
Eliminations	(13,133)	(13,128)	(5)	-	-	-
<b>GROUP SALES</b>	<b>69,632</b>	<b>71,203</b>	<b>(1,571)</b>	<b>-2.2</b>	<b>-1.0</b>	<b>+0.4</b>

(1) Generation, supply and optimisation in mainland France, and sales of engineering and consulting services.

(2) Regulated activities comprise distribution in mainland France, which is carried out by Enedis <sup>(1)</sup>, transmission, EDF's island activities and the activities of Électricité de Strasbourg. In mainland France, distribution network activities are regulated via the network access tariff TURPE (tarifs d'utilisation des réseaux publics d'électricité). Sales of Enedis include the share of delivery costs for customers of alternative suppliers in mainland France.

#### 5.1.4.1.2.1 France - Generation and supply activities

Sales by the **France - Generation and supply activities** segment amounted to €35,606 million, an organic increase of €415 million (+1.2%) from 2016. Without the €988 million impact of regulated sales tariff adjustment for the period 1 August 2014 to 31 July 2015 which took place in 2016, sales showed organic growth of €1,403 million (+4.1%).

2017 was marked by 82.1TWh of subscriptions to the ARENH scheme (for regulated access to historical nuclear electricity), whereas no applications for ARENH were made in 2016. This favourable effect on sales (€3,448 million) was largely offset by the lower level of net sales on the market, which were down by €2,060 million <sup>(2)</sup>.

The changes of 1 August 2016 and 2017 in regulated sale tariffs for electricity, excluding capacity remuneration, led to a €194 million decrease in sales.

Weather-related impacts (-0.5TWh) and the "leap year effect" of 2016 (-1.1TWh) had an adverse effect of €251 million.

In an intensely competitive environment, there was a -8.6TWh decrease in volumes supplied in 2017 due to losses of customers, with an estimated unfavourable impact of €505 million on sales. Price effects on market-price offers and changes in demand had a negative impact of €194 million.

The introduction of a capacity mechanism from 1 January 2017 affected tariffs, purchases and sales on the wholesale markets and market-price offers, and led to a €758 million increase in sales.

Finally, the higher resale volumes of renewable electricity subject to purchase obligations increased sales by €262 million.

#### Electricity generation

Nuclear output stood at 379.1TWh in 2017, a decrease of 4.9TWh from 2016.

There was a -8.0TWh (-3.9%) year-on-year decrease for the first half-year, essentially explained by the fact that Gravelines 5 and Fessenheim 2 were offline for the entire six-month period in 2017 for checks in connection with the Creusot Forge manufacturing records, and also by completion of tests of steam generators concerned by the carbon segregation issue. Unplanned reactor outages at Flamanville 1 and Cattenom 1 were largely counterbalanced by higher utilisation of the reactors in operation.

For the 2017 second half-year, nuclear output registered a year-on-year increase of +3.1TWh compared to 2016 second half-year, that was marked by additional tests of steam generators that led to extended or further outages at several reactors. However, in view of the provisional shutdown of four generation units at the Tricastin plant following the ASN's decision of 28 September 2017, and extensions of outages, the Group revised its nuclear output target for 2017 from the initial 390-400TWh to 383-387TWh <sup>(3)</sup>. The Group subsequently announced on 13 November 2017 that final production would be slightly below this target.

Due to mild weather at the end of the year, there was less dispatch from reactors in operation.

Hydropower output stood at 37.1TWh <sup>(4)</sup>, down by 5.3TWh from 2016 due to particularly unfavourable hydrological conditions in 2017 (see section 5.1.2.4 "Weather conditions: temperatures and rainfall").

Dispatch of thermal generation facilities increased in relation with lower nuclear and hydro output. Their output, up 4.1TWh compared to 2016, reached 16.1TWh.

Sales volumes to final customers (a market segment that includes local distribution firms and excludes foreign operators) were down by 10.3TWh, including 8.6TWh resulting from loss of customers.

EDF was a net seller on the wholesale markets to the extent of 52.5TWh. The -70TWh decrease in net wholesale market sales compared to 2016 is principally explained by ARENH subscriptions, which were partly offset by a decrease in volumes sold to final customers.

#### 5.1.4.1.2.2 France - Regulated activities

Sales by the **France - Regulated activities** segment amounted to €15,896 million, an organic rise of €168 million (+1.1%) from 2016. Without the €42 million impact of regulated sales tariff adjustment for the period 1 August 2014 to 31 July 2015 which took place in 2016, sales showed organic growth of €210 million (+1.3%).

Sales benefited from the positive movement in the TURPE's adjustment index at 1 August 2017, which had an impact of €238 million. However, weather factors and the fact that 2016 was a leap year, both effects with no equivalent in 2017, contributed to a decrease in sales estimated at €55 million.

Excluding these weather effects and the "leap year effect" of 2016, the volumes delivered in mainland France were down slightly by -0.1TWh, including -0.4TWh (-0.2%) caused by lower demand.

(1) Enedis is an independent EDF subsidiary as defined in the French Energy Code.

(2) Excluding necessary additional energy purchases on the markets.

(3) See the press release of 27 October 2017.

(4) After deduction of pumped volumes, hydropower production stood at 30.0TWh for 2017 (35.8TWh for 2016).

### 5.1.4.1.2.3 United Kingdom

The **United Kingdom's** contribution to Group sales amounted to €8,688 million in 2017, €579 million lower than in 2016. The pound sterling's decline against the euro in connection with the Brexit negotiations had an unfavourable impact of €608 million. Excluding foreign exchange effects and changes in the scope of consolidation, the organic decrease in sales compared to 2016 was 0.8%.

This decline in UK sales is mainly explained by the lower realised prices for nuclear power, and to a lesser extent by the downturn in consumption by residential customers. Meanwhile, the number of residential customer accounts declined only slightly compared to 2016, indicating resilience in a highly competitive market.

### 5.1.4.1.2.4 Italy

**Italy** contributed €9,940 million to consolidated sales, down by €1,185 million (-10.7%) from 2016 (-10.6% in organic terms).

In the hydrocarbons business, the decrease in sales was particularly caused by the "derivatives" component of hedges, although the margin was not significantly affected. Exploration and production activities benefited from the rise in Brent oil prices. The volumes for gas sales on the wholesale markets declined following a rise in consumption levels by industrial customers and thermal power plants.

In the electricity business, sales were also penalised by the lower volumes sold, though this was partly counterbalanced by more favourable price effects.

### 5.1.4.1.2.5 Other international

The **Other international** segment principally covers operations in Europe, excluding the United Kingdom and Italy, and operations in Brazil, the United States and Asia (China, Vietnam and Laos).

This segment contributed €4,822 million to Group sales in 2017, €464 million or -8.8% less than in 2016. Excluding foreign exchange effects (+€55 million) and changes in the scope of consolidation (-€547 million), mainly relating to the sale of Demász and EDF Polska's assets, sales increased by 0.5% in organic terms.

This increase essentially comes from:

- **Belgium** (organic growth of +€149 million), mainly due to purchase and sale operations on the market undertaken to balance positions. A further notable factor in this growth was the steady expansion of service activities. There were unfavourable developments in price effects concerning electricity and gas activities, and volumes sold to residential customers; these effects were partly offset by an increase in electricity sales to business customers.

However, sales were down in:

- **Brazil** (organic decline of €70 million), due to the annual revision of the Power Purchase Agreement (PPA) sales tariff. The recovery by spot prices largely made up for the lower sales of system services;
- **Asia** (organic decline of €27 million), where the decrease in sales is essentially explained by lower generation output following the shutdown of the MECO plant in Vietnam in line with the maintenance programme.

### 5.1.4.1.2.6 Other activities

**Other activities** comprise, among other entities, EDF Énergies Nouvelles, EDF Trading, Dalkia and the gas activities.

The contribution by the **Other activities** segment to Group sales amounted to €7,813 million in 2017, an increase of €79 million from 2016. Excluding foreign exchange effects (-€14 million) and changes in the scope of consolidation (+€168 million), sales declined by -1.0% in organic terms.

Sales by **Dalkia** contributed €4,051 million to 2017 Group sales. This organic increase of €221 million (+6.1%) is mainly explained by the positive impact of business development, higher energy prices and favourable developments in the index for revising service prices.

**EDF Énergies Nouvelles'** contribution to Group sales was €1,280 million in 2017, an organic increase of 3.6% from 2016, driven mainly by production from new facilities first commissioned in 2016.

**EDF Trading's** sales<sup>(1)</sup> amounted to €590 million, an organic decline of €354 million (-35.1%) following an exceptional year in 2016 when electricity prices rose substantially and volatility in Europe was high at the end of the year. This change also reflects difficult market conditions in North America.

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## 5.1.4.2 Operating profit before depreciation and amortisation (EBITDA)

EBITDA decreased by 16.3% while the organic decline was -14.8%.

(in millions of euros)	2017	2016	Variation	Variation (%)	Organic growth (%)	Organic growth (%) (excluding the sales tariffs adjustment)
<b>Sales</b>	<b>69,632</b>	<b>71,203</b>	<b>(1,571)</b>	<b>-2.2</b>	<b>-1.0</b>	<b>+0.4</b>
Fuel and energy purchases	(37,641)	(36,050)	(1,591)	+4.4	+6.2	
Other external expenses	(8,739)	(8,902)	163	-1.8	-3.1	
Personnel expenses	(12,456)	(12,543)	87	-0.7	-0.4	
Taxes other than income taxes	(3,541)	(3,656)	115	-3.1	-2.3	
Other operating income and expenses	6,487	6,362	125	+2.0	+2.1	
<b>EBITDA</b>	<b>13,742</b>	<b>16,414</b>	<b>(2,672)</b>	<b>-16.3</b>	<b>-14.8</b>	<b>-10.0</b>

### 5.1.4.2.1 Change in consolidated EBITDA and analysis

Consolidated **EBITDA** for 2017 amounted to €13,742 million, a decrease of 16.3% from 2016. Excluding foreign exchange effects (-€81 million), changes in the scope of consolidation (-€162 million), and after eliminating the impact of regulated sales tariff adjustment for the period 1 August 2014 to 31 July 2015 which took place in 2016, the organic change in EBITDA was a decline of -10.0%.

The Group's **fuel and energy purchases** amounted to €37,641 million in 2017, up by €1,591 million (+4.4%) from 2016, or an organic increase of €2,253 million (+6.2%):

- in the **France - Generation and supply activities** and **France - Regulated activities** segments, fuel and energy purchases registered an organic increase of €3,114 million (+19.3%) to €19,260 million, principally due to lower generation output and sourcing of ARENH subscriptions;

(1) EDF Trading's sales consist of its trading margin.

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- the organic increase observed in the **United Kingdom** (+€415 million or +7.8%) principally relates to the rise in costs for coal and gas;

- in **Italy**, the organic decrease was €1,332 million (-14.0%), essentially due to the favourable impact of derivatives consistent with the evolution of sales.

**Other external expenses** amounted to €8,739 million, €163 million lower than in 2016 (-1.8%) corresponding to an organic decline of €274 million (-3.1%).

- in the **France - Generation and supply activities** and **France - Regulated activities** segments, other external expenses totalled €4,848 million. The organic decrease of €332 million (-6.5%) notably reflects cost-cutting actions implemented as part of performance improvement plans across all areas of business.

The Group's **personnel expenses** totalled €12,456 million, down by €87 million from 2016, corresponding to an organic decrease of €54 million (-0.4%):

- in the **France - Generation and supply activities** segment, personnel expenses totalled €6,134 million, €181 million less than in 2016. The average workforce shrank by 4.6% over 2017, with decreases in all areas of business;

- in the **France - Regulated activities** segment, personnel expenses totalled €3,158 million, up by €52 million from 2016. Average workforce numbers were down by 0.7% from 2016;

- in the **United Kingdom**, personnel expenses amounted to €1,129 million. The organic increase of €80 million (+7.4%) resulted from the impact of a lower discount rate for pensions, and to a lesser degree the favourable effect of

pension renegotiations on pension costs in 2016, which had no equivalent in 2017. Excluding these factors, personnel expenses were down.

**Taxes other than income taxes** amounted to €3,541 million for 2017, €115 million or -3.1% less than in 2016 (-2.3% in organic terms):

- this decrease mainly concerns the **France - Generation and supply activities** segment, where these taxes were down by €86 million.

**Other operating income and expenses** generated net income of €6,487 million in 2017, €125 million more than in 2016 (an organic change of €136 million or +2.1%):

- in the **France - Generation and supply activities** segment, the income generated by other operating income and expenses was up by €562 million. This increase particularly reflects movements in provisions and the rise in CSPE subsidies associated with the increase in obligations to purchase renewable energies;

- in the **France - Regulated activities** segment, the income generated by other operating income and expenses was down by €249 million. This decrease principally reflects non-recurring items registered in 2016 and the higher power cut indemnities in 2017 following the stormy weather in mainland France;

- in **Italy** the organic increase in other operating income and expenses was €85 million, mainly resulting from sale of the Milan headquarters;

- EDF Énergies Nouvelles** registered an organic decrease of €114 million (-23.7%), caused notably by lower levels of activity in Development and Sales of Structured Assets in 2017.

#### 5.1.4.2.2 Change in consolidated EBITDA and analysis by segment

(in millions of euros)	2017	2016	Variation	Variation (%)	Organic growth (%)	Organic growth (%) (excluding the sales tariff adjustment)
France - Generation and supply activities	4,876	6,156	(1,280)	-20.8	-20.8	-7.9
France - Regulated activities	4,898	5,102	(204)	-4.0	-4.0	-3.8
United Kingdom	1,035	1,713	(678)	-39.6	-33.3	-33.3
Italy	910	641	269	+42.0	+42.1	+42.1
Other international	457	711	(254)	-35.7	-17.9	-17.9
Other activities	1,566	2,091	(525)	-25.1	-24.7	-24.7
<b>GROUP EBITDA</b>	<b>13,742</b>	<b>16,414</b>	<b>(2,672)</b>	<b>-16.3</b>	<b>-14.8</b>	<b>-10.0</b>

##### 5.1.4.2.2.1 France - Generation and supply activities

EBITDA for the **France - Generation and supply activities** segment amounted to €4,876 million, corresponding to an organic decline of €1,280 million (-20.8%) from 2016. Without the €859 million impact of regulated sales tariff adjustment for the period 1 August 2014 to 31 July 2015 which took place in 2016, EBITDA registered an organic decline of -7.9%.

The lower level of nuclear power and hydropower output compared to 2016 had an unfavourable impact estimated at -€504 million.

EBITDA also declined by around €311 million in 2017 due to the net effect of operations on the wholesale markets, particularly for additional purchases while prices were high, required to cover 2017 ARENH subscriptions. These purchases were also to make up for lower nuclear power output due to further testing in connection with the carbon segregation issue. This effect was partly counterbalanced in the second half-year of 2017 as purchases had been made at

particularly high prices in the final quarter of 2016 due to lower nuclear plant availability.

Tariff changes, excluding remuneration of capacity in the tariff "stacking" calculation, led to an estimated decrease of -€363 million<sup>(1)</sup> compared to 2016.

Heightened competition, reflected in a net loss of around one million residential customers, and negative price effects on new offers also had an estimated net effect of -€341 million on EBITDA.

The weather, which was generally milder than in 2016 with a particularly cold spell early in 2017, and the "leap year effect" of 2016 had a negative effect estimated at -€186 million in 2017.

The introduction of the capacity mechanism<sup>(2)</sup> had a favourable +€580 million estimated impact on EBITDA for 2017. The capacity price is included in regulated tariffs and market-price offers, and excess capacities are sold off on the wholesale markets.

(1) Tariffs excluding the incorporation of the cost of capacity obligation in the tariff "stacking" - tariff changes of -0.5% and -1.5% at 1 August 2016 respectively on the "blue" residential and non-residential tariffs, and +1.7% at 1 August 2017 on both segments.

(2) The capacity mechanism was introduced from 1 January 2017.

Under the EDF group's performance plan, operating expenses <sup>(1)</sup> were brought down by an estimated €494 million (-5.2%) through actions to improve operating performance and control of payroll costs. These measures are being applied across all entities, notably through cost-cutting of support functions and adjustment of the costs of commercial activities.

#### 5.1.4.2.2.2 France - Regulated activities

EBITDA for the **France - Regulated activities** segment stood at €4,898 million, an organic decrease of €204 million (-4.0%). Without the €13 million impact of regulated sales tariff adjustment for the period 1 August 2014 to 31 July 2015 which took place in 2016, EBITDA registered an organic decline of -3.8%, including the unfavourable €42 million effect of a decline in volumes delivered by Enedis <sup>(2)</sup>.

2017 was also marked by exceptionally fierce storms in mainland France, with an estimated negative impact of -€60 million corresponding to the operating expenses incurred for work and power cut indemnities. The hurricanes on St Martin and St Barthélemy generated costs estimated at -€23 million.

All these unfavourable factors were only partially offset by tariff rises for Enedis associated with the introduction of the TURPE5 tariff from 1 August 2017 (raising delivery tariffs on the distribution network by +2.71%) amounting to an estimated +€102 million.

The residual decrease of €168 million in EBITDA is essentially caused by the existence of favourable developments in 2016 that had no equivalent in 2017, principally concerning the island activities.

#### 5.1.4.2.2.3 United Kingdom

The **United Kingdom's** contribution to Group EBITDA for 2017 was €1,035 million, down by 33.3% in organic terms from 2016. The pound sterling's decline against the Euro, especially since the Brexit referendum, had an unfavourable impact of €112 million compared to 2016.

EBITDA in the United Kingdom was penalised by the effect of the downturn in realised prices for nuclear power (-12%). The drop in consumption by residential customers following milder weather and rising energy efficiency also adversely affected EBITDA. Meanwhile, the number of residential customer accounts declined only slightly compared to end 2016, indicating resilience in a highly competitive market.

Nuclear output amounted to 63.9TWh, confirming the good operating performance by the fleet. The slight decrease of 1.2TWh from 2016 principally reflects the shutdown of Sizewell in late 2017 and a low level of scheduled outages in 2016.

#### 5.1.4.2.2.4 Italy

The **Italy** segment contributed €910 million to the Group's consolidated EBITDA, corresponding to an organic increase of 42.1% compared to 2016.

EBITDA for the electricity activities showed organic growth of €26 million or +10.0% from 2016. It benefited from favourable trends in sale prices and optimisation of the gas-fired plants' generation capacities.

EBITDA for the hydrocarbon activities registered organic growth of €96 million or +19.7% compared to 2016. It benefited from favourable movements in Brent oil and gas prices, and higher output after a new platform came online in Egypt. Maintenance costs for the exploration-production activity were also optimised.

EBITDA also benefited from the positive effect of the sale of the Milan headquarters for around €100 million <sup>(3)</sup>.

#### 5.1.4.2.2.5 Other international

EBITDA for the **Other international** segment stood at €457 million in 2017, an organic decrease of €127 million (-17.9%) compared to 2016.

This decrease was essentially attributable to:

- **Belgium** (organic decline of -€62 million), mainly as a result of the downturn in electricity prices and lower nuclear power generation due in particular to the maintenance programme, and unplanned outages at Doel 3. Wind power continued to grow as installed capacities were increased, reaching 376MW at 31 December 2017 (+25% compared with 31 December 2016);
- **Brazil** (organic decline of -€54 million), due to the annual revision of the Power Purchase Agreement (PPA) price, partly offset by optimisation actions on the markets as spot prices were high while unplanned unavailability was at its lowest point, and also by a steady decrease in operating expenses.

2017 also saw the sale of **EDF Polska's** assets, on 13 November 2017 <sup>(4)</sup>.

#### 5.1.4.2.2.6 Other activities

**Other activities** contributed €1,566 million to Group EBITDA for 2017, an organic decrease of €517 million (-24.7%) from 2016.

**EDF Énergies Nouvelles'** contribution to consolidated EBITDA totalled €751 million, corresponding to an organic decrease of €127 million (-14.8%) from 2016, due to lower sales of assets than in 2016 which registered a high level of such operations. However, production (including Futuren) showed strong growth of close to +11% (+1.2TWh) and contributed €741 million to 2017 EBITDA. Sales of assets covered the structure and development costs. Against this background, the net installed capacity was up by +1.6GW to 7.8GW at 31 December 2017. The portfolio of projects under construction by EDF Énergies Nouvelles totalled 1.9GW, a significant share of 0.9GW concerning solar power projects.

EBITDA at **EDF Trading** amounted to €358 million in 2017, an organic decline of €341 million (-46.8%) from 2016. This change follows the fall in the trading margin (see section 5.1.4.1.2.6).

**Dalkia's** EBITDA was €259 million, corresponding to an organic decrease of €4 million (-1.6%). Conclusions and renewals of a large number of commercial contracts, favourable trends in the indexes for revising service prices, and the positive effect of rising energy prices all made positive contributions to EBITDA. However, this financial performance was particularly counterbalanced by occasional operating difficulties concerning one contract owned by a subsidiary.

(1) Sum of personnel expenses and other external expenses. At comparable consolidation scope and exchange rates. At constant pension discount rates. Excluding change in operating expenses of the service activities.

(2) Including the impacts of weather changes and the "leap year effect".

(3) In line with the Group's practice.

(4) See the EDF press release of 14 November 2017.

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#### 5.1.4.3 Operating profit (EBIT)

EBIT was down by 25.0% from 2016.

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>	<b>Variation</b>	<b>Variation (%)</b>
<b>EBITDA</b>	<b>13,742</b>	<b>16,414</b>	<b>(2,672)</b>	<b>-16.3</b>
Net changes in fair value on Energy and Commodity derivatives, excluding trading activities	(355)	(262)	(93)	+35.5
Net depreciation and amortisation	(8,537)	(7,966)	(571)	+7.2
Net increases in provisions for renewal of property, plant and equipment operated under concessions	(58)	(41)	(17)	+41.5
(Impairment)/reversals	(518)	(639)	121	-18.9
Other income and expenses	1,363	8	1,355	n. a.
<b>EBIT</b>	<b>5,637</b>	<b>7,514</b>	<b>(1,877)</b>	<b>-25.0</b>

n. a.: not applicable.

The Group's consolidated EBIT amounted to €5,637 million for 2017, down by €1,877 million from 2016. This decrease and the higher level of net depreciation and amortisation are partly offset by the rise in other income and expenses.

##### 5.1.4.3.1 Net changes in fair value on Energy and Commodity derivatives, excluding trading activities

The net changes in fair value on Energy and Commodity derivatives, excluding trading activities, decreased from -€262 million in 2016 to -€355 million in 2017.

##### 5.1.4.3.2 Net depreciation and amortisation

Net depreciation and amortisation was up by €571 million compared to 2016.

The **France - Generation and supply activities** segment registered a €447 million increase in net depreciation and amortisation, essentially explained by the accelerated depreciation of oil-fired facilities in the thermal fleet, an increase in assets associated with provisions following revision of the discount rate, and a volume effect on maintenance investments in the nuclear fleet.

The **France - Regulated activities** segment registered a €123 million increase in net depreciation and amortisation, much of it attributable to the impact of the Linky<sup>(1)</sup> smart meter rollout.

##### 5.1.4.3.3 Net increases in provisions for renewal of property, plant and equipment operated under concessions

The €17 million increase between 2016 and 2017 in net increases in provisions for renewal of property, plant and equipment operated under concessions is attributable to the **France - Regulated activities** segment.

##### 5.1.4.3.4 Impairment/reversals

In 2017, impairment amounted to €518 million and principally concerned the United Kingdom (€246 million) and Italy (€150 million) (see note 13 to the 2017 consolidated financial statements).

In 2016, impairment amounted to €639 million.

##### 5.1.4.3.5 Other income and expenses

In 2017, other income and expenses amounted to €1,363 million and principally concerned a gain of €1,462 million on the sale of 49.9% of the Group's investment in CTE (see note 14 to the 2017 consolidated financial statements).

In 2016, other income and expenses principally comprised income of €112 million following the favourable outcome of a dispute with the Hungarian State.

#### 5.1.4.4 Financial result

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>	<b>Variation</b>	<b>Variation (%)</b>
Cost of gross financial indebtedness	(1,778)	(1,827)	49	-2.7
Discount effect	(2,959)	(3,417)	458	-13.4
Other financial income and expenses	2,501	1,911	590	+30.9
<b>FINANCIAL RESULT</b>	<b>(2,236)</b>	<b>(3,333)</b>	<b>1,097</b>	<b>-32.9</b>

The financial result for 2017 corresponds to a financial expense of €2,236 million, €1,097 million improvement from 2016. This change is explained by:

- a decrease in the cost of gross financial indebtedness, as charges on the bond issues of 2017 and the full-year effect of charges on the bond issues of October 2016 were offset by repayments over the year and a favourable foreign exchange effect, mainly concerning the USD;
- a decrease of €458 million in discount effect, principally due to a less pronounced year-on-year decrease in the discount rate for nuclear provisions in

France at 31 December 2017 than 31 December 2016 (-0.1% for real rates, compared to -0.2% in 2016). At 31 December 2017, the discount rate stood at 4.1% including an average inflation rate of 1.5% (4.2% and 1.5% at 31 December 2016);

- a €590 million improvement in other financial income and expenses, notably due to the rise in gains on sales of dedicated assets (€985 million in 2017 compared to €428 million in 2016).

(1) Linky is a project led by Enedis, an independent EDF subsidiary as defined in the French Energy Code.

#### 5.1.4.5 Income taxes

Income taxes amounted to €147 million in 2017, €1,241 million less than in 2016. This decrease reflects the Group's lower consolidated income before taxes in 2017, but also results from sales of investments that benefit from reduced-rate taxation, the favourable outcome in France of challenges to the 3% contribution on dividend distributions, and the lower corporate income tax rates in the United States and Belgium.

#### 5.1.4.6 Share in net income of associates and joint ventures

The Group's share in net income of associates and joint ventures was a positive €35 million in 2017, compared to €218 million in 2016.

This change results primarily from the smaller contribution from RTE after 49.9% of the Company was sold on 31 March 2017.

The share in net income of associates in 2017 includes impairment totalling €618 million. Details of this impairment are given in note 23 to the 2017 consolidated financial statements "Investments in associates and joint ventures".

#### 5.1.4.7 Net income attributable to non-controlling interests

Net income attributable to non-controlling interests amounted to €116 million in 2017, €44 million less than in 2016. This change is essentially explained by the decrease in Centrica's revenues from nuclear generation activities in the **United Kingdom**, due to lower market prices for electricity.

#### 5.1.4.8 EDF net income

EDF net income totalled €3,173 million for 2017, up by €322 million (+11.3%) from 2016.

#### 5.1.4.9 Net income excluding non-recurring items

The Group's net income excluding non-recurring items <sup>(1)</sup> stood at €2,820 million for 2017, down by 31.0% from 2016.

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(1) Group net income excluding non-recurring items and net changes in fair value on Energy and Commodity derivatives, excluding trading activities, net of tax. Non-recurring items and net changes in fair value on Energy and Commodity derivatives, excluding trading activities, net of tax: +€617 million for miscellaneous risks and impairment in 2017 (including a €1,289 million gain on the sale of 49.9% of CTE), compared to -€1,039 million in 2016; -€264 million of net changes in fair value on Energy and Commodity derivatives, excluding trading activities, net of tax in 2017, compared to -€195 million in 2016.

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#### 5.1.5 CASH FLOWS AND NET INDEBTEDNESS

##### 5.1.5.1 Cash flows

<i>(in millions of euros)</i>	2017	2016	Variation	Variation (%)
<b>Net cash flow from operating activities</b>	<b>11,663</b>	<b>11,125</b>	<b>538</b>	<b>+4.8</b>
<b>Net cash flow used in investing activities</b>	<b>(11,713)</b>	<b>(16,557)</b>	<b>4,844</b>	<b>-29.3</b>
<b>Net cash flow from financing activities</b>	<b>712</b>	<b>4,138</b>	<b>(3,426)</b>	<b>-82.8</b>
<b>NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS</b>	<b>662</b>	<b>(1,294)</b>	<b>1,956</b>	<b>-151.2</b>
<b>Cash and cash equivalents - opening balance</b>	<b>2,893</b>	<b>4,182</b>	<b>(1,289)</b>	<b>-30.8</b>
Net increase (decrease) in cash and cash equivalents	662	(1,294)	1,956	-151.2
Effect of currency fluctuations	(13)	102	(115)	-112.7
Financial income on cash and cash equivalents	21	20	1	+5.0
Effect of reclassifications	129	(117)	246	-210.3
<b>CASH AND CASH EQUIVALENTS - CLOSING BALANCE</b>	<b>3,692</b>	<b>2,893</b>	<b>799</b>	<b>+27.6</b>

##### 5.1.5.1.1 Net cash flow from operating activities

<i>(in millions of euros)</i>	2017	2016	Variation	Variation (%)
<b>Income before taxes of consolidated companies</b>	<b>3,401</b>	<b>4,181</b>	<b>(780)</b>	<b>-18.7</b>
(Impairment)/reversals	518	639	(121)	-18.9
Accumulated depreciation and amortisation, provisions and changes in fair value	9,980	9,814	166	+1.7
Financial income and expenses	764	948	(184)	-19.4
Dividends received from associates and joint ventures	243	330	(87)	-26.4
Capital gains/losses	(2,739)	(877)	(1,862)	+212.3
Change in working capital	1,476	(1,935)	3,411	-176.3
<b>Net cash flow from operations</b>	<b>13,643</b>	<b>13,100</b>	<b>543</b>	<b>+4.1</b>
Net financial expenses disbursed	(1,209)	(1,137)	(72)	+6.3
Income taxes paid	(771)	(838)	67	-8.0
<b>NET CASH FLOW FROM OPERATING ACTIVITIES</b>	<b>11,663</b>	<b>11,125</b>	<b>538</b>	<b>+4.8</b>

The net cash flow from operating activities amounted to €11,663 million in 2017, €538 million more than in 2016.

This change primarily reflects a €543 million increase in the net cash flow from operations, resulting from:

- the improvement in working capital (+€3,411 million compared to 2016);
- an increase in capital gains (-€1,862 million compared to 2016, essentially corresponding to the sale of 49.9% of CTE for €1,462 million).

##### 5.1.5.1.2 Net cash flow used in investing activities

The net cash outflow for investing activities amounted to €11,713 million in 2017, compared to €16,557 million in 2016. The following table sets forth the breakdown of the net cash flow used in investing activities between purchases and disposals of property, plant and equipment and intangible assets, acquisitions and disposals of companies net of cash acquired/transferred, and the change in financial assets:

<i>(in millions of euros)</i>	2017	2016	Variation	Variation (%)
Investments in intangible assets and property, plant and equipment	(14,747)	(14,397)	(350)	+2.4
Net proceeds from sale of intangible assets and property, plant and equipment	1,140	508	632	+124.4
<b>Net capex</b>	<b>(13,607)</b>	<b>(13,889)</b>	<b>282</b>	<b>-2.0</b>
Acquisitions of equity investments, net of cash acquired	(2,463)	(127)	(2,336)	+1,839.4
Disposals of equity investments, net of cash transferred	2,472	372	2,100	+564.5
Changes in financial assets	1,885	(2,913)	4,798	-164.7
<b>NET CASH FLOW USED IN INVESTING ACTIVITIES</b>	<b>(11,713)</b>	<b>(16,557)</b>	<b>4,844</b>	<b>-29.3</b>



### Net capex

Net capital expenditure amounted to €13,607 million in 2017, down by €282 million (-2.0%) from 2016.

Changes in the Group's net capital expenditure over the period were as follows:

<i>(in millions of euros)</i>	2017	2016	Variation	Variation (%)
France - Generation and supply activities	5,813	5,745	68	+1.2
France - Regulated activities	3,995	3,770	225	+6.0
United Kingdom	2,386	1,911	475	+24.9
Italy	182	406	(224)	-55.2
Other international	309	493	(184)	-37.3
Other activities	922	1,564	(642)	-41.0
<b>NET CAPEX</b>	<b>13,607</b>	<b>13,889</b>	<b>(282)</b>	<b>-2.0</b>

Capital expenditure is one of the components of net investments for which details are given in section 5.1.5.2 "Net indebtedness".

### Acquisitions/disposals of equity investments, net of cash acquired/transferred

New investments in 2017, net of cash acquired, increased by €2,336 million from 2016 to €2,463 million. The major investment was the acquisition of 75.5% of Framatome for €1,868 million.

Disposals of investments, net of cash transferred, were up by €2,100 million in 2017 to €2,472 million. The main disposal was the sale of 49.9% of CTE for €1,282 million.

### Changes in financial assets

The change in financial assets in 2017 was an increase of +€1,885 million, principally corresponding to sales of liquid assets (other than dedicated assets).

The overall change in financial assets in 2016 was -€2,913 million, mainly reflecting the acquisition of liquid assets and the assignment of the portion of the CSPE receivable that was not allocated to dedicated assets (see section 5.1.6.1.6 "Management of financial risk on EDF's dedicated asset portfolio").

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#### 5.1.5.1.1.3 Net cash flow from financing activities

<i>(in millions of euros)</i>	2017	2016	Variation	Variation (%)
EDF capital increase	4,005	-	4,005	+100.0
Transactions with non-controlling interests <sup>(1)</sup>	481	1,368	(887)	-64.8
Dividends paid by parent company	(109)	(165)	56	-33.9
Dividends paid to non-controlling interests	(183)	(289)	106	-36.7
Purchases/sales of treasury shares	(6)	(2)	(4)	+200.0
<b>Cash flows with shareholders</b>	<b>4,188</b>	<b>912</b>	<b>3,276</b>	<b>+359.2</b>
Issuance of borrowings	2,901	9,424	(6,523)	-69.2
Repayment of borrowings	(6,304)	(6,176)	(128)	+2.1
Issuance of perpetual subordinated bonds	(565)	(582)	17	-2.9
Funding contributions received for assets operated under concessions	144	143	1	+0.7
Investment subsidies	348	417	(69)	-16.5
<b>Other cash flows from financing activities</b>	<b>(3,476)</b>	<b>3,226</b>	<b>(6,702)</b>	<b>-207.7</b>
<b>NET CASH FLOW FROM FINANCING ACTIVITIES</b>	<b>712</b>	<b>4,138</b>	<b>(3,426)</b>	<b>-82.8</b>

(1) Contributions via capital increases and reductions and acquisitions of additional interests in controlled companies.

Cash flows related to financing activities generated a net inflow of €712 million in 2017, a decrease of €3,426 million from 2016. This change primarily reflects the following:

- EDF's capital increase of €4,005 million;
- a decrease of €887 million from transactions with non-controlling investments. In 2017 these transactions include an amount of €501 million for CGN's

contribution to the Hinkley Point C capital increases. In 2016, transactions with non-controlling interests included an amount of €830 million received on the sale to CGN of 33.5% of Hinkley Point C (HPC) Holding Co and 20% of Sizewell C Holding Co, and an amount of €469 million concerning CGN's contribution to the capital increases by Hinkley Point C and Sizewell C.

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#### 5.1.5.2 Net indebtedness

Net indebtedness comprises total loans and financial liabilities, less cash and cash equivalents and liquid assets. Liquid assets are financial assets consisting of funds or securities with initial maturity of over three months that are readily convertible into cash and are managed according to a liquidity-oriented policy.

The Group's net indebtedness stood at €33,015 million at 31 December 2017 compared to €37,425 million at 31 December 2016.

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>	<b>Variation</b>	<b>Variation (%)</b>
<b>Operating profit before depreciation and amortisation (EBITDA)</b>	<b>13,742</b>	<b>16,414</b>	<b>(2,672)</b>	<b>-16.3</b>
Cancellation of non-monetary items included in EBITDA	(1,796)	(1,703)		
Net financial expenses disbursed	(1,209)	(1,137)		
Income taxes paid	(771)	(838)		
Other items including dividends received from associates and joint ventures	221	323		
<b>Operating cash flow <sup>(1)</sup></b>	<b>10,187</b>	<b>13,059</b>	<b>(2,872)</b>	<b>-22.0</b>
Change in working capital	1,476	(1,935)		
Net investments <sup>(2)</sup>	(9,810)	(11,663)		
<b>Cash flow after net investments</b>	<b>1,853</b>	<b>(539)</b>		
Dedicated assets	(1,171)	10		
<b>Cash flow before dividends <sup>(3)</sup></b>	<b>682</b>	<b>(529)</b>		
Dividends paid in cash	(891)	(1,036)		
<b>Group cash flow</b>	<b>(209)</b>	<b>(1,565)</b>		
Other monetary changes	3,855	549		
<b>(Increase)/decrease in net indebtedness, excluding the impact of changes in exchange rate</b>	<b>3,646</b>	<b>(1,016)</b>		
Effect of change in exchange rates	701	1,107		
Effect of other non-monetary changes	63	(121)		
<b>(Increase)/decrease in net indebtedness</b>	<b>4,410</b>	<b>(30)</b>		
<b>Net indebtedness at beginning of period</b>	<b>37,425</b>	<b>37,395</b>		
<b>NET INDEBTEDNESS AT END OF PERIOD</b>	<b>33,015</b>	<b>37,425</b>		

(1) Operating cash flow is not an aggregate defined by IFRS as a measure of financial performance, and is not directly comparable with indicators of the same name reported by other companies. This indicator, also known as Funds From Operations ("FFO"), is equivalent to net cash flow from operating activities excluding changes in working capital after adjustment where relevant for the impact of non-recurring effects, less net financial expenses disbursed and income taxes paid.

(2) Net investments are operating investments and financial investments for growth, net of disposals. They also include net debts acquired or transferred in acquisitions or disposals of securities, investment subsidies received, non-Group partner investments, Linky, new developments and 2015-2020 assets disposal plan.

(3) Cash flow before dividends is not an aggregate defined by IFRS as a measure of financial performance, and is not comparable with indicators of the same name reported by other companies. It is equal to the operating cash flow defined in note (1) after the change in working capital, net investments defined in note (2), and net allocations to dedicated assets.

##### 5.1.5.2.1 Operating cash flow

The operating cash flow amounted to €10,187 million in 2017 compared to €13,059 million in 2016, a decrease of €2,872 million (-22.0%).

This change mainly reflects:

- the lower EBITDA (-€2,672 million);
- an increase in net financial expenses disbursed (-€1,209 million in 2017 against -€1,137 million in 2016), essentially explained by the full-year effect in 2017 of the bond issues made in October 2016, and the bond issues of early 2017;
- a decrease in income taxes paid (-€771 million in 2017 versus -€838 million in 2016), mainly due to lower taxable income in the United Kingdom;
- a decrease in "Other items including dividends received from associates and joint ventures" (€221 million in 2017 against €323 million in 2016), principally due to the lower level of dividends received after the sale of 49.9% of CTE in March 2017.

##### 5.1.5.2.2 Change in working capital

Working capital improved by €1,476 million in 2017.

This change is mainly explained by:

- receipts of +€814 million for adjustment of 2014 French regulated sales tariff;
- gains resulting from the working capital improvement plan, essentially on inventories and trade receivables (approximately +€422 million);
- favourable weather effects in France (+€228 million).

The difference between the 2016 and 2017 change in working capital (+€3,411 million) is explained by the effect of the 2014 French regulated sales tariff adjustment (+€1,753 million) and a favourable weather effect in France (+€963 million). It also reflects a reduction in inventories of the optimisation and trading activity in 2017 (+€460 million) due to the disposal of the coal trading activity (EDF Trading) and the sale of EDF Polska's assets to PGE.

### 5.1.5.2.3 Net investments

Net investments amounted to €9,810 million in 2017 compared to €11,663 million in 2016, a decrease of €1,853 million (-15.9%). Details are as follows:

(in millions of euros)	2017	2016	Variation	Variation (%)
France - Generation and supply activities	5,849	5,692	157	+2.8
France - Regulated activities	3,212	3,301	(89)	-2.7
United Kingdom	643	806	(163)	-20.2
Italy	511	458	53	+11.6
Other international	553	607	(54)	-8.9
Other activities	1,200	952	248	+26.1
<b>NET INVESTMENTS EXCLUDING LINKY, NEW DEVELOPMENTS AND 2015-2020 ASSETS DISPOSALS PLAN</b>	<b>11,968</b>	<b>11,816</b>	<b>152</b>	<b>+1.3</b>
<b>LINKY, NEW DEVELOPMENTS AND 2015-2020 ASSETS DISPOSAL PLAN</b>	<b>(2,158)</b>	<b>(153)</b>	<b>(2,005)</b>	<b>N.A.</b>
<b>NET INVESTISSEMENTS</b>	<b>9,810</b>	<b>11,663</b>	<b>(1,853)</b>	<b>- 15.9</b>

N.A. = not applicable.

#### 5.1.5.2.3.1 Net investments excluding Linky, new developments and 2015-2020 assets disposal plan

Net investments by the **France – Generation and supply activities** segment rose by €157 million or +2.8%. The increase is mainly attributable to investments in the Bouchain thermal power plant.

Net investments by the **France – Regulated activities** segment were down by €89 million (-2.7%), notably reflecting the falling number of metering stations and transformers due to rollout of the Linky meter.

Outside France, net investments decreased by €164 million or -8.8%.

- In the **United Kingdom**, the decrease of €163 million or -20.2% is mainly explained by lower investments in coal-fired and nuclear power plants, and slower-paced investment in smart metering and to a lesser extent renewable energies.
- In **Italy**, net investments were up by €53 million due to investments made in energy services.
- In the **Other international** segment, net investments were practically stable (-€54 million). This stability results mainly from fact that the end of the modernisation and environmental compliance programme for coal and cogeneration plants in Poland was counterbalanced by rising investments in China.

Net investments by the **Other activities** segment were up by €248 million or +26.1%, reflecting the faster development of renewable energies. This rise primarily concerned EDF Énergies Nouvelles, which stepped up its investments in Europe and Brazil, while investments declined in North America.

#### 5.1.5.2.3.2 Linky, new developments and 2015-2020 assets disposal plan

- Investments in the Linky programme, which was stepped up in 2017, amounted to €612 million.
- New developments correspond to the Group's new development projects. In 2017, these new developments concerned investments for the acquisition of Framatome (€1,868 million), New Nuclear investments in the United Kingdom (the ramp-up of the Hinkley Point C project was partly offset by a favourable foreign exchange effect), and to a lesser extent, investments in offshore wind farm projects in the United Kingdom and France, and the takeover of a service company in the United Kingdom.
- Assets disposals essentially concerned the sales of 49.9% of CTE, Polish companies, EDF Démász Zrt in Hungary, network and regasification assets in Italy and real estate assets in France and Italy, and amount to €6,193 million.

#### 5.1.5.2.4 Dedicated assets

In compliance with the French Law no. 2006-739 of 28 June 2006 on the sustainable management of radioactive materials and waste, EDF has built up a portfolio of dedicated assets for secure financing of its long-term nuclear obligations which amounted to €26,502 million at 31 December 2017.

Overall, the changes in dedicated assets comprise:

- allocations to reach full coverage of obligations;
- reinvestment of financial income (dividends and interest) generated by these assets;
- withdrawals of assets corresponding to the costs incurred over the period in application of long-term nuclear obligations falling within the scope of the Law of 28 June 2006;
- exceptional withdrawals proposed to the governance bodies in charge of managing dedicated assets when the value of the portfolio exceeds the amount of the obligations to be financed; such withdrawals must be validated by these bodies.

The net change of -€1,171 million in dedicated assets in 2017 corresponds to the first three categories above, including a regulatory allocation of €1,095 million in compliance with the letter of 10 February 2017 from the Ministers for the Economy and Finance, and for the Environment, Energy and the Sea.

#### 5.1.5.2.5 Cash flow before dividends

The cash flow before dividends in 2017 was positive at €682 million (compared to a negative -€529 million in 2016) and is mainly explained by the following factors:

- operating cash flow of €10,187 million;
- net investments of -€9,810 million;
- a net allocation to dedicated assets of -€1,171 million;
- a favourable change of €1,476 million in working capital.

The €1,211 million difference from 2016 is essentially due to favourable developments in the change in working capital and disposals, although their impact was mitigated by lower operating cash flow (-€2,672 million) and a higher net allocation to dedicated assets (-€1,181 million).

#### 5.1.5.2.6 Dividends paid in cash

Dividends paid in cash during 2017 (-€891 million) comprise:

- the balance of the 2016 dividend (-€75 million);
- the interim dividend for 2017 (-€35 million) decided by the Board of Directors on 7 November 2017 and paid on 11 December 2017 at the rate of €0.15 per share, for shareholders who did not take up the scrip dividend option;

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- payments made in 2017 to bearers of perpetual subordinated bonds for the "hybrid" bond issues of January 2013 and January 2014 (-€565 million);
- dividends paid by Group subsidiaries to their minority shareholders (-€217 million).

### 5.1.5.2.7 Group cash flow

The Group cash flow amounted to -€209 million, versus -€1,565 million in 2016. The €1,356 million improvement primarily reflects the change in cash flow before dividends (+€1,211 million) and the decrease in dividends paid in cash (+€145 million).

### 5.1.5.2.8 Effect of change in exchange rates

The foreign exchange effect (mainly resulting from a decline by the pound sterling and a rise by the US dollar against the Euro<sup>(1)</sup>) had a favourable impact of +€701 million on the Group's net indebtedness at 31 December 2017.

### 5.1.5.2.9 Other monetary changes

Other monetary changes had a favourable impact of +€3,855 million on the Group's net indebtedness at 31 December 2017, principally in line with the cash capital increase with preferential subscription rights for shareholders that took place in March 2017. This operation reduced the Group's net indebtedness by €4,005 million net of expenses.

## 5.1.6 MANAGEMENT AND CONTROL OF MARKET RISKS

### 5.1.6.1 Management and control of financial risks

This section sets forth the policies and principles for management of the Group's financial risks defined in the Strategic financial management framework (liquidity, interest rate, foreign exchange rate and equity risks), and the Group counterparty risk management policy set up by the EDF group. These principles apply only to EDF and operationally controlled subsidiaries or subsidiaries that do not benefit by law from specific guarantees of independent management such as Enedis. In compliance with IFRS 7, the following paragraphs describe the nature of risks resulting from financial instruments, based on analyses of sensitivities and credit (counterparty) risks.

Since 2002, a dedicated body - the Financial Risks Control Department (*département Contrôle des Risques Financiers et Investissements* - CRFI) - has been in charge of financial risk control at Group level, mainly by ensuring correct application of the principles of the Strategic Financial Management Framework (July 2015). This department, which has reported to the Group's Risk Division since 2008, is an independent unit that also has the task of carrying out a second-level check of the risk of counterparty default (methodology and organisation) for EDF entities and

operationally controlled Group subsidiaries (excluding Enedis), and a first-level check of financing activities by EDF SA's Trading room. The CRFI department also carries out a second-level check of management activities concerning the dedicated asset portfolio.

The CRFI department issues daily and weekly monitoring reports of risk indicators relevant to activities in EDF SA's trading room.

Regular internal audits are carried out to ensure controls are actually applied and are effective.

### 5.1.6.1.1 Liquidity position and management of liquidity risks

#### 5.1.6.1.1.1 Liquidity position

At 31 December 2017, the Group's liquidities, consisting of liquid assets, cash and cash equivalents, totalled €22,655 million and available credit lines amounted to €11,943 million.

For 2018, the Group's scheduled debt repayments (principal and interest) are forecast at 31 December 2017 at €10,429 million, including €3,712 million for bonds (excluding hybrid bonds).

No Group company was in default on any borrowing at 31 December 2017.

#### 5.1.6.1.1.2 Management of liquidity risks

On 20 January 2017, EDF raised ¥137 billion, i.e. around €1.1 billion, through four senior bond issues on the Japanese market ("Samurai bonds") with maturities of 10 years and more:

- ¥107.9 billion bond, with a 10-year maturity and a fixed coupon of 1.088%;
- ¥19.6 billion green bond, with a 12-year maturity and a fixed coupon of 1.278%;
- ¥6.4 billion green bond, with a 15-year maturity and a fixed coupon of 1.569%;
- ¥3.1 billion bond, with a 20-year maturity and a fixed coupon of 1.870%.

This operation contributes to the Group's investment strategy and is part of its policy to extend the average maturity of its debt.

Details of the Group's bond borrowings are given in note 38.2 to the 2017 consolidated financial statements "Loans and other financial liabilities".

The average maturity of Group debt was 13.7 years at 31 December 2017, compared to 13.4 years at 31 December 2016. For EDF SA, the average maturity of debt was 14.3 years at 31 December 2017, against 14.4 years at 31 December 2016.

At 31 December 2017, the residual maturities of financial liabilities (including interest payments) are as follows under IAS 39 (valued on the basis of exchange and interest rates at 31 December 2017):

31 December 2017 <i>(in millions of euros)</i>	Debt	Hedging instruments <sup>(1)</sup>		Debt
		Interest rate swaps	Currency swaps	
2018	10,429	(543)	(21)	349
2019-2022	20,876	(1,862)	(70)	144
2023 and later	64,764	(3,029)	(806)	120
<b>TOTAL</b>	<b>96,069</b>	<b>(5,434)</b>	<b>(897)</b>	<b>613</b>
debt repayment	55,512			
interest expense	40,557			

(1) Data on hedging instruments include both assets and liabilities.

The EDF group was able to meet its financing needs by conservative liquidity management, and has obtained financing on satisfactory terms.

(1) The pound sterling fell by -3.51% against the Euro, from €1.168/£1 at 31 December 2016 to €1.127/£1 at 31 December 2017. The US dollar fell by -12.12% against the Euro, from €0.949/\$1 at 31 December 2016 to €0.834/\$1 at 31 December 2017.

A range of specific levers are used to manage the Group's liquidity risk:

- the Group's cash pooling system, which centralises cash management for controlled subsidiaries. The subsidiaries' cash balances are made available to EDF SA in return for interest, so as to optimise the Group's cash management and provide subsidiaries with a system that guarantees them market-equivalent financial terms;
- centralisation of financing for controlled subsidiaries at the level of the Group's cash management department. Changes in subsidiaries' working capital are financed by this department in the form of stand-by credit lines provided for subsidiaries, which may also be granted revolving credit from the Group. EDF SA and the investment subsidiary EDF Investissements Groupe (EDF IG), set up in partnership with the bank Natixis Belgique Investissements, also provide medium and long-term financing for EDF group operations outside France, arranged by EDF SA and EDF IG on a totally independent basis: each company sets its own terms, which are the same as the subsidiary would have in an arm's-length market transaction;

- active management and diversification of financing sources used by the Group: the Group has access to short-term resources on various markets through programmes for French commercial paper (*billets de trésorerie*), US commercial paper and Euro market commercial paper. For EDF, the ceilings for these programmes are €6 billion for its French commercial paper, \$10 billion for its US commercial paper and €1.5 billion for its Euro market commercial paper.

At 31 December 2017, the amount of commercial paper outstanding was €700 million for French commercial paper, and \$1,496 million for US commercial paper. No Euro market commercial paper was issued in 2017. EDF has access to the world's main bond markets: the Euro markets through its EMTN programme, which currently has a ceiling of €45 billion, particularly for Euro and sterling issues; and the domestic markets used for stand-alone issues in US dollars (144A bonds), yen (Samurai bonds) and Swiss francs.

The Group's main borrowings at 31 December 2017 are as follows:

### Type of borrowing

(in millions of currency units)

	Entity	Issue date <sup>(1)</sup>	Maturity	Nominal amount	Currency	Rate
Euro MTN	EDF	02/2008	02/2018	1,500	EUR	5.00%
Bond	EDF	01/2009	01/2019	2,000	USD	6.50%
Bond	EDF	01/2014	01/2019	1,250	USD	2.15%
Bond	EDF	01/2010	01/2020	1,400	USD	4.60%
Euro MTN	EDF	05/2008	05/2020	1,200	EUR	5.38%
Bond	EDF	10/2015	10/2020	1,500	USD	2.35%
Euro MTN	EDF	01/2009	01/2021	2,000	EUR	6.25%
Euro MTN (green bond)	EDF	11/2013	04/2021	1,400	EUR	2.25%
Euro MTN	EDF	01/2012	01/2022	2,000	EUR	3.88%
Euro MTN	EDF	09/2012	03/2023	2,000	EUR	2.75%
Euro MTN	EDF	09/2009	09/2024	2,500	EUR	4.63%
Bond (green bond)	EDF	10/2015	10/2025	1,250	USD	3.63%
Euro MTN	EDF	11/2010	11/2025	750	EUR	4.00%
Euro MTN (green bond)	EDF	10/2016	10/2026	1,750	EUR	1.00%
Bond	EDF	01/2017	01/2027	107,900	JPY	1.09%
Euro MTN	EDF	03/2012	03/2027	1,000	EUR	4.13%
Euro MTN	EDF	04/2010	04/2030	1,500	EUR	4.63%
Euro MTN	EDF	07/2001	07/2031	650	GBP	5.88%
Euro MTN	EDF	02/2003	02/2033	850	EUR	5.63%
Euro MTN	EDF	06/2009	06/2034	1,500	GBP	6.13%
Euro MTN	EDF	10/2016	10/2036	750	EUR	1.88%
Bond	EDF	01/2009	01/2039	1,750	USD	6.95%
Euro MTN	EDF	11/2010	11/2040	750	EUR	4.50%
Euro MTN	EDF	10/2011	10/2041	1,250	GBP	5.50%
Bond	EDF	01/2014	01/2044	1,000	USD	4.88%
Bond	EDF	10/2015	10/2045	1,500	USD	4.75%
Bond	EDF	10/2015	10/2045	1,150	USD	4.95%
Euro MTN	EDF	09/2010	09/2050	1,000	GBP	5.13%
Euro MTN	EDF	10/2016	10/2056	2,164	USD	4.99%
Bond	EDF	01/2014	01/2114	1,350	GBP	6.00%

(1) Date funds were received.

At 31 December 2017, EDF has an overall amount of €10,280 million in available credit facilities (syndicated credit and bilateral lines):

- the syndicated credit line amounts to €4 billion with expiry dates extending to November 2020. No drawings had been made on this syndicated credit line at 31 December 2017;
- bilateral lines represent an available amount of €6,150 million, with expiry dates extending to December 2020. The level of this available financing is very frequently reviewed to ensure the Group has sufficient backup credit facilities;

- the amount available from the credit lines with the European Investment Bank is €130 million. €70 million had been drawn on the total credit line of €200 million at 31 December 2017. Three other credit lines were fully drawn at 31 December 2017 for amounts of €225 million, €500 million and €500 million.

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EDF Investissements Groupe has a syndicated credit facility for €1,000 million (expiring in September 2020). At 31 December 2017, there were no drawings on this credit facility.

Edison has a credit line with the European Investment Bank for €275 million (which is fully drawn) and a credit line with a pool of banks for €300 million, on which no drawings on had been made at 31 December 2017.

#### 5.1.6.1.2 Credit rating

The financial ratings agencies Standard & Poor's, Moody's and Fitch Ratings attributed the following long-term and short-term ratings to EDF group entities at 31 December 2017:

Company	Agency	Long-term rating	Short-term rating
EDF	Standard & Poor's	A-, negative outlook <sup>(1)</sup>	A-2
	Moody's	A3, stable outlook	P-2
	Fitch Ratings	A-, stable outlook	F2
EDF Trading	Moody's	Baa2, stable outlook	n.a.
EDF Energy	Standard & Poor's	BBB-, stable outlook <sup>(2)</sup>	A-3
Edison	Standard & Poor's	BB+, stable outlook	B
	Moody's	Baa3, stable outlook	n.a.

n.a. = not applicable.

(1) S&P revised EDF's outlook from stable to negative on 20 November 2017

(2) S&P revised EDF Energy's outlook from stable to negative on 20 November 2017.

#### 5.1.6.1.3 Management of foreign exchange risk

Due to the diversification of its activities and geographical locations, the Group is exposed to the risk of exchange rate fluctuations, which may have an impact on the translation differences affecting balance sheet items, Group financial expenses, equity and net income.

To limit exposure to foreign exchange risks, the Group has introduced the following management principles:

- local currency financing: to the extent possible given the local financial markets' capacities, each entity finances its activities in its own accounting currency. When financing is contracted in other currencies, derivatives may be used to limit foreign exchange risk;
- matching of assets and liabilities: the net assets of subsidiaries located outside the Euro zone expose the Group to a foreign exchange risk. The foreign exchange risk in the consolidated balance sheet is managed by market hedging involving use of financial derivatives. Hedging of net assets in foreign currencies complies with risk/return targets, and the hedging ratio varies depending on the currency,

ranging from 36% to 66% for the principal exposures. If no hedging instruments are available, or if hedging costs are prohibitive, the foreign exchange positions remain open and the risk on such positions is monitored by sensitivity calculations;

- hedging of operating cash flows in foreign currencies: in general, the operating cash flows of EDF and its subsidiaries are in the relevant local currencies, with the exception of flows related to fuel purchases which are primarily in US dollars, and certain flows related to purchases of equipment, which concern lower amounts. Under the principles laid down in the Strategic financial management framework, EDF and the main subsidiaries concerned by foreign exchange risks (EDF Energy, EDF Trading, Edison, EDF Énergies Nouvelles) are required to hedge firm or highly probable commitments related to these future operating cash flows.

As a result of the financing and foreign exchange risk hedging policy, the Group's gross debt at 31 December 2017 breaks down as follows by currency after hedging:

#### GROSS DEBT STRUCTURE BY CURRENCY BEFORE AND AFTER HEDGING

31 December 2017 (in millions of euros)	Initial debt structure	Impact of hedging instruments <sup>(1)</sup>	Debt structure after hedges	% of debt
Borrowings in EUR	27,609	18,454	46,063	81%
Borrowings in USD	17,224	(14,752)	2,472	4%
Borrowings in GBP	9,495	(2,331)	7,164	13%
Borrowings in other currencies	2,518	(1,371)	1,147	2%
<b>TOTAL DEBT</b>	<b>56,846</b>	<b>-</b>	<b>56,846</b>	<b>100%</b>

(1) Hedges of liabilities and net assets of foreign subsidiaries.

The table below presents the impact on equity of a variation in exchange rates on the Group's gross debt at 31 December 2017.

#### EXCHANGE RATE SENSITIVITY OF THE GROUP'S GROSS DEBT

31 December 2017 (in millions of euros)	Debt after hedging instruments converted into Euros	Impact of a 10% unfavourable variation in exchange rates	Debt after a 10% unfavourable variation in exchange rates
Borrowings in EUR	46,063	-	46,063
Borrowings in USD	2,472	247	2,719
Borrowings in GBP	7,164	716	7,880
Borrowings in other currencies	1,147	115	1,262
<b>TOTAL DEBT</b>	<b>56,846</b>	<b>1,078</b>	<b>57,924</b>

Due to the Group's hedging policy for foreign exchange risk on the Group's gross debt, the income statement for companies controlled by the Group is marginally exposed to foreign exchange rate risk.

The table below sets forth the foreign exchange position relating to net assets in foreign currencies of the Group's subsidiaries.

## NET ASSET POSITION

### 31 December 2017 <sup>(1)</sup>

<i>(in millions of currencies)</i>	Net assets	Bonds	Derivatives	Net assets after management
USD	4,426	3,200	(1,380)	2,606
CHF (Switzerland)	713	-	468	245
GBP (United Kingdom)	14,411	5,435	(177)	9,153
CLP (Chile)	1,135	-	-	1,135
PLN (Poland)	340	-	305	35
BRL (Brazil)	1,066	-	-	1,066
CNY (China)	10,028	-	-	10,028

(1) Net assets as stated at 31 December 2017; bonds and derivatives as stated at 31 December 2017. The net positions shown exclude certain non-significant exposures.

The above table shows the assets of the Group's foreign subsidiaries in foreign currencies, adjusted for changes in the fair value of cash flow hedges and available-for-sale financial assets recorded in equity, and changes in the fair value of financial instruments recorded in income.

The following table sets forth the risk for equity of foreign exchange losses on net assets in foreign currencies of the Group's principal subsidiaries at 31 December 2017, assuming unfavourable, uniform exchange rate variations of 10% against the Euro. Net assets are converted at the closing rate and impacts are reported in absolute value.

5.

## EXCHANGE RATE SENSITIVITY OF NET ASSETS

<i>(in millions of currencies)</i>	At 31 December 2017			At 31 December 2016		
	Net assets after management, into currency	Net assets after management, converted into euros	Impact on equity of a 10% variation in exchange rates	Net assets after management, into currency	Net assets after management, converted into euros	Impact on equity of a 10% variation in exchange rates
USD	2,606	2,173	217	2,857	2,710	271
CHF (Switzerland)	245	209	21	169	157	16
GBP (United Kingdom)	9,153	10,316	1,032	8,058	9,412	941
CLP (Chile)	1,135	2	-	2,607	4	-
PLN (Poland)	35	8	1	164	37	4
BRL (Brazil)	1,066	268	27	1,377	401	40
CNY (China)	10,028	1,285	129	10,141	1,385	139

The foreign exchange risk on available-for-sale securities is mostly concentrated in EDF's dedicated asset portfolio, which is discussed in section 5.1.6.1.6 "Management of financial risk on EDF SA's dedicated asset portfolio".

The foreign exchange risk associated with short-term investments and operating liabilities in foreign currencies remains restricted for the Group at 31 December 2017.

### 5.1.6.1.4 Management of interest rate risk

The exposure of the Group's net indebtedness to interest rate fluctuations covers two types of risk: a risk of change in the net financial expenses on floating-rate financial assets and liabilities, and a risk of change in the value of financial assets invested at fixed rates. These risks are managed by monitoring the floating-rate

portion of net indebtedness, defined by reference to the risk/return for net financial expenses, taking into consideration expected movements in interest rates.

Some of the debt is variabilised and the Group may use interest rate derivatives for hedging purposes. The distribution of exposure between fixed and floating rates is monitored.

The Group's debt after hedging instruments at 31 December 2017 comprised 55.3% at fixed rates and 44.7% at floating rates.

A 1% uniform annual rise in interest rates would generate an approximate €254 million increase in financial expenses at 31 December 2017, based on gross floating-rate debt after hedging.

The average cost of Group debt (weighted interest rate on outstanding amounts) was 2.95% at the end of 2017.

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The table below sets forth the structure of Group debt and the impact of a 1% variation in interest rates at 31 December 2017. The impact of the change in interest rates was €49 million lower than in 2016.

#### STRUCTURE AND INTEREST RATE SENSITIVITY OF GROUP DEBT

31 December 2017		Impact of hedging instruments	Debt structure after hedging	Impact on income of a 1% variation in interest rates
(in millions of euros)	Initial debt structure			
Fixed rate	52,900	(21,469)	31,431	-
Floating rate	3,946	21,469	25,415	254
<b>TOTAL</b>	<b>56,846</b>	<b>-</b>	<b>56,846</b>	<b>254</b>

Concerning financial assets, the table below presents the interest rate risk on floating-rate bonds and negotiable debt securities held by EDF, and their sensitivity to interest rate risks (impact on net income).

#### INTEREST RATE SENSITIVITY OF FLOATING-RATE INSTRUMENTS

31 December 2017		Value	Impact on income of a 1% variation of interest rates	Value after a 1% variation in interest rates
(in millions of euros)	FLOATING-RATE INSTRUMENTS			
		1,205	(12)	1,193

The Group's interest rate risk notably relates to the value of the Group's long-term nuclear commitments (see note 29 to the 2017 consolidated financial statements) and its commitments for pensions and other specific employee benefits (see note 31 to the 2017 consolidated financial statements), which are adjusted to present value using discount rates that depend on interest rates at various time horizons, and debt instruments held for the management of the dedicated assets set aside to cover these commitments (see section 5.1.6.1.6 "Management of financial risk on EDF's dedicated asset portfolio").

##### 5.1.6.1.5 Management of equity risks

The equity risk is concentrated in the following areas:

##### Coverage of EDF's nuclear obligations

Analysis of the equity risk is presented in section 5.1.6.1.6 "Management of financial risk on EDF SA's dedicated asset portfolio".

##### Coverage of employee benefit obligations for EDF SA, EDF Energy and British Energy

Assets covering EDF's employee benefit liabilities are partly invested on the international and European equities markets. Market trends therefore affect the value of these assets, and a downturn in equity prices would lead to a rise in balance sheet provisions.

30.9% of the assets covering EDF's employee benefit obligations were invested in equities at 31 December 2017, representing an amount of €3.6 billion of equities.

At 31 December 2017, the two pension funds sponsored by EDF Energy (EDF Energy Pension Scheme and EDF Energy Group Electricity Supply Pension Scheme) were invested to the extent of 38.0% in equities and 33.6% in equity funds, representing an amount of £654 million of equities.

At 31 December 2017, the British Energy pension funds were invested to the extent of 25.0% in equities and equity funds, representing an amount of £1,688 million of equities.

##### CENG fund

CENG is exposed to equity risks in the management of its funds established to cover nuclear decommissioning expenses.

##### EDF's long-term cash management

As part of its long-term cash management policy, EDF has continued its strategy to reduce the portion of equity-correlated investments, resulting in a non-significant position well below €1 million at 31 December 2017.

##### 5.1.6.1.6 Management of financial risk on EDF's dedicated asset portfolio

Dedicated assets have been built up progressively by EDF since 1999 to secure financing of its long-term nuclear commitments. The Law of 28 June 2006 and its implementing regulations defined provisions not related to the operating cycle,

which must therefore be covered by dedicated assets; they are listed in note 47 to the 2017 consolidated financial statements, "Dedicated assets".

The dedicated asset portfolio is managed under the supervision of the Board of Directors and its advisory Committees (Nuclear commitments monitoring Committee, Audit Committee).

The **Nuclear Commitments Monitoring Committee (CSEN)** is a specialised Committee set up by EDF's Board of Directors in 2007.

A **Nuclear Commitments Financial Expertise Committee (CEFEN)** exists to assist the Company and its governance bodies on questions of matching assets and liabilities and asset management. The members of this Committee are independent of EDF. They are selected for their skills and diversity of experience, particularly in the fields of asset/liability management, economic and financial research, and asset management.

##### Governance and management principles

The governance principles setting forth the structure of dedicated assets, and the relevant decision-making and control processes for their management, are validated by EDF's Board of Directors. These principles also lay down rules for the asset portfolio's structure, selection of financial managers, and the legal, accounting and tax structure of the funds.

Strategic asset allocation is based on asset/liability reviews carried out to define the most appropriate target portfolio for financing long-term nuclear expenses. Strategic allocation is validated by EDF's Board of Directors and reviewed every three years unless circumstances require otherwise. Since 2013, this target allocation has consisted of a financial portfolio and around one quarter of unlisted assets (the proportion of 19.2% had been reached at 31 December 2017). The unlisted assets are managed by EDF Invest (formed in 2013 following the decree of 24 July 2013) and comprise infrastructures, real estate and investment funds.

The financial portfolio contains two sub-portfolios, "equities" and "bonds", themselves divided into "secondary asset classes" or "pockets" that correspond to specific markets. The strategic allocation of the financial portfolio is 49% international equities and 51% bonds.

A benchmark index is set for monitoring performance and controlling the risk on the financial portfolio:

- MSCI World AC DN hedged in Euros 50% (excluding emerging country currencies) for the equities sub-portfolio, and
- a composite index of 60% Citigroup EGBl and 40% Citigroup EuroBIG corporate for the bonds sub-portfolio.

A third "cash" sub-portfolio exists to provide secure coverage for the disbursements related to the purpose of the asset covered, and may be reinforced tactically, particularly when a conservative approach is required in the event of a market crisis.

The CSPE receivable was allocated to dedicated assets on 13 February 2013 (see note 47 to the 2017 consolidated financial statements).



Tactical management of the financial portfolio has several focal areas:

- monitoring of exposure between the "equities" and "bonds" sub-portfolios;
- within each sub-portfolio, allocation by "secondary asset class";
- selection of investment funds, aiming for diversification:
  - by style (growth securities, unlisted securities, high-return securities),
  - by capitalisation (major stocks, medium and small stocks),
  - by investment process (macroeconomic and sector-based approach, selection of securities on a "quantitative" basis, etc.),
  - by investment vehicle (for compliance with maximum investment ratios);
- for bonds, a choice of securities held directly, through brokers, or *via* investment funds incorporating the concern for diversification:
  - by type of issue (fixed income, indexed income),
  - by type of instrument (government or supranational bonds, covered bonds and similar, corporate bonds),
  - by issuer and by maturity.

The allocation policy for the financial portfolio was developed by the Operational Management Committee <sup>(1)</sup> on the basis of the economic and financial outlook for each market and geographical area, a review of market appreciation in different markets and market segments, and risk analyses produced by the CRFI department.

### Changes in the portfolio during 2017

On 31 March 2017, following the approval by the relevant merger control authorities, EDF finalised the sale to Caisse des Dépôts and CNP Assurances of a 49.9% stake in the electricity transmission entity Coentreprise de transport d'électricité (CTE), which had held 100% of the shares of RTE since December 2016. The sale was based on a valuation of €8.2 billion for 100% of the equity of RTE. After completion of this operation, EDF's entire investment in CTE, *i.e.* 50.1%, was allocated to dedicated assets carried by EDF Invest.

EDF Invest continued to build up its portfolio of infrastructures, real estate property and investment funds over 2017, notably with the following operations.

In April 2017, Atlantia's Board of Directors accepted a binding offer from the consortium consisting of Allianz, EDF Invest and the investment fund DIF for 5% of the capital of Autostrade per l'Italia. This transaction was completed in July 2017. The stake in Autostrade per l'Italia acquired by the consortium was raised from the initially planned 5% to 6.94% through the exercise of a call option granted by Atlantia.

Autostrade per l'Italia is one of Europe's largest motorway concession operators, managing more than 50% of the Italian motorway network and 61% of all kilometres of motorway in Italy. The Company's network comprises a total 21 motorways covering approximately 3,000km across 16 regions of Italy.

In June and September 2017, EDF Invest, together with Beni Stabili, the Italian subsidiary of Foncière des Régions, and Predica, acquired a non-controlling interest in Central Sicaf, which manages a portfolio of offices and technical premises that are all leased to Telecom Italia and were previously owned 100% by Beni Stabili.

In October 2017, EDF Invest, together with KKR Infrastructure, finalised the acquisition of a minority interest in the Dutch carpark operator Q-Park NV. Q-Park is one of Europe's largest carpark operators, with more than 870,000 parking spaces on over 6,300 sites across 10 countries in North-West Europe. It specialises in investment, construction and management for high-quality carparks in strategic locations and has 2,100 employees.

In December 2017, EDF Invest acquired 50% of the Ecowest real estate development in Levallois-Perret, which is leased principally to L'Oreal's Luxury division. This new 59,000m<sup>2</sup> property with 1,085 parking spaces was delivered in June 2017, and has been awarded both BREEAM "Excellent" and HQE "exceptional" environmental certifications.

After four years of activity, EDF Invest has thus built up a diversified portfolio of unlisted assets totalling €2.7 billion (excluding CTE) at 31 December 2017. For the first time since EDF Invest was launched, its investments outside the Group are equivalent to the equity investment in CTE. A fuller description of EDF Invest's activity and assets is available from its website, [www.edfinvest.com](http://www.edfinvest.com).

The internal rate of return (IRR) since 2013 on the EDF Invest portfolio (excluding CTE) is approximately 11% on infrastructures and real estate property, including a recurring cash yield (cash transferred to EDF SA in dedicated assets, excluding non-recurring items and partial sales) of 7%, particularly concerning infrastructures.

In infrastructures, with €1.6 billion invested in 8 operations in Europe alongside partners who are key actors on the market (insurers such as Allianz, institutional actors such as GIC, the Singapore sovereign fund and industrial entities including Atlantia and SNAM), EDF Invest has demonstrated its capacity for expansion across Europe (6 countries) and in a variety of sectors.

In real estate, with €0.7 billion invested in more than 10 operations in France, Germany and Italy, EDF Invest is a recognised institutional investor on the market for its ability to take positions in significant operations, as reflected in the operations undertaken this year.

Changes in the financial portfolio are presented below under the heading "Performance of EDF's dedicated assets portfolio".

At 31 December 2017, the degree of coverage of provisions by dedicated assets was 108.5% applying the regulatory calculations.

Withdrawals from dedicated assets totalled €378 million, equivalent to the payments made in respect of the long-term nuclear obligations to be covered in 2017 (€377 million in 2016). The regulatory allocation to dedicated assets (required by Article 2-IV of decree 2007-243, amended) for 2016, amounting to €1,095 million, was made in March 2017 in compliance with the letter of 10 February 2017 from the Ministers of the Economy and Finance, and of the Environment, Energy and the Sea (no allocations were made in 2016). The regulatory allocation to dedicated assets for 2017 amounts to €386 million (taking the coverage ratio to 110%) and will be made during 2018.

(1) A permanent internal Committee for evaluation, consultation and operational decision-making in the management of dedicated assets.

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#### Content and performance of EDF's dedicated asset portfolio

##### BREAKDOWN OF THE PORTFOLIO

	31/12/2017	31/12/2016
Equities sub-portfolio	35.5%	31.1%
Bonds sub-portfolio	33.0%	26.8%
Cash sub-portfolio	0.4%	3.5%
CSPE after funding	11.9%	16.7%
Unlisted assets (EDF Invest)	19.2%	21.9%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

At 31 December 2017, the total value of the portfolio was €28,115 million compared to €25,677 million in 2016.

The content of the financial portfolio is also presented in note 47 to the 2017 consolidated financial statements, "Dedicated assets".

##### PORTFOLIO CONTENT UNDER THE CLASSIFICATION FROM ARTICLE 4, DECREE 2007-243 OF 23 FEBRUARY 2007

Categories (in millions of euros)	31 December 2017		31 December 2016	
	Net book value <sup>(1)</sup>	Realisable value	Net book value <sup>(1)</sup>	Realisable value
OECD government bonds and similar	4,261	4,363	3,167	3,335
OECD corporate (non-government) bonds	618	636	542	593
Funds investing in the above two categories	4,352	4,544	3,910	4,058
Funds not exclusively invested in OECD bonds	8,230	9,785	6,059	7,790
Hedges, deposits, amounts receivable	-	30	(18)	(18)
<b>TOTAL FINANCIAL PRODUCT PORTFOLIO</b>	<b>17,461</b>	<b>19,358</b>	<b>13,660</b>	<b>15,758</b>
CTE (the holding company that holds 100% of RTE) <sup>(2)</sup>	2,705	2,705	3,905	3,905
Other unlisted securities and real estate assets	2,427	2,703	1,530	1,728
<b>TOTAL EDF INVEST</b>	<b>5,132</b>	<b>5,408</b>	<b>5,435</b>	<b>5,633</b>
CSPE after funding	3,294	3,349	4,182	4,286
<b>TOTAL DEDICATED ASSETS</b>	<b>25,887</b>	<b>28,115</b>	<b>23,277</b>	<b>25,677</b>

(1) Net book value in the parent company financial statements.

(2) In 2017, dedicated assets include 50.1% of Coentreprise de Transport d'Électricité (CTE) (75.9% in 2016).

The table below presents the performance by portfolio at 31 December 2017 and 31 December 2016:

PERFORMANCE OF EDF'S DEDICATED ASSET PORTFOLIO

	31/12/2017	Performance for 2017		31/12/2016	Performance for 2016	
	Stock market or realisable value	Portfolio	Benchmark index <sup>(1)</sup>	Stock market or realisable value	Portfolio	Benchmark index <sup>(1)</sup>
<i>(in millions of euros)</i>						
Equities sub-portfolio	9,972	12.9%	13.0%	7,992	7.8%	9.8%
Bonds sub-portfolio	9,282	2.1%	0.8%	6,866	4.3%	3.8%
<b>TOTAL FINANCIAL PORTFOLIO</b>	<b>19,254</b>	<b>7.7%</b>	<b>6.6%</b>	<b>14,858</b>	<b>6.2%</b>	<b>6.8%</b>
Cash sub-portfolio	104	-0.1%	-0.4%	900	0.2%	-0.3%
<b>TOTAL FINANCIAL AND CASH PORTFOLIO</b>	<b>19,358</b>	<b>7.7%</b>	-	<b>15,758</b>	<b>5.9%</b>	-
CSPE after funding	3,349 <sup>(2)</sup>	0.4%	-	4,286 <sup>(2)</sup>	4.2% <sup>(2)</sup>	-
<b>EDF INVEST <sup>(3)</sup></b>	<b>5,408</b>	<b>8.9%</b>	-	<b>5,633</b>	<b>40.1% <sup>(5)</sup></b>	-
<i>including CTE shares <sup>(4)</sup></i>	2,705	7.3%	-	3,905	55.4% <sup>(5)</sup>	-
<i>including other unlisted assets</i>	2,703	11.2%	-	1,728	7.9%	-
<b>TOTAL DEDICATED ASSETS</b>	<b>28,115</b>	<b>6.6%</b>	-	<b>25,677</b>	<b>11.1% <sup>(5) (6)</sup></b>	-

- (1) Benchmark index: MSCI World AC DN hedged in Euros 50% (excluding emerging country currencies) for the equities sub-portfolio, composite index of 60% Citigroup EGBI and 40% Citigroup EuroBIG corporate for the bonds sub-portfolio, Eonia Capitalisé for the cash subportfolio, 49% equities index and 51% bonds index for the total financial portfolio.
- (2) Including a €55 million adjustment at 31 December 2017 (€103 million after the €22 million gain on the €872 million of receivable assigned at 31 December 2016). For the unadjusted receivable, the performance for 2016 was 1.7%.
- (3) Performance for assets held at the start of the year.
- (4) At 31 December 2017, 50.1% of the Group's investment in Coentreprise de Transport d'Électricité (CTE), the Company that holds 100% of RTE. At 31 December 2016, 75.9% of the Group's investment in CTE.
- (5) Excluding adjustments related to the CTE operation, in 2016, RTE's performance was 1.6%, EDF Invest's performance was 3.8% and the overall performance by all dedicated assets was 5.2%. The performance for 2017 reflects the final valuation, corresponding to completion of the sale on 31 March 2017.
- (6) Including adjustments of RTE and the CSPE receivable; 4.8% without these two adjustments. The performance by dedicated assets excluding RTE was 5.7% in 2016.

2017 began in a climate of great political uncertainty in Europe. But apart from some short-lived episodes of tension over French government bonds just before France's presidential elections, there was ultimately little tension on the markets. This situation was helped by the fact that election outcomes were generally as hoped. The quiet political front, after more unexpected events in 2016, combined with simultaneous worldwide economic growth, the absence of inflation, and monetary policies that remained generous, were all welcomed by investors. 2017 was an exceptional year on the stock markets. The US market saw record close-of-trade results on 62 of the year's 251 trading days, almost one day in four. The Japanese market registered its highest results in 25 years. In Europe, the DAX (admittedly boosted by dividend reinvestment) also attained record levels. The horizon looks clear for the time being. Optimism on the markets has not been affected by the Fed's rate increases, which should continue in 2018, nor by the slower pace of stock purchases by the ECB. This optimism is indicated by the very low volatility observed: the VIX (US market volatility index) stood at an average 11% for the year, a level never before attained over such a long period. Also, the volatility of the dedicated asset benchmark index was 3.4%, against 7.6% one year earlier.

Against this background, the investment policy followed for the financial portfolio brought good results, achieving an increase of +7.7% while the composite benchmark index rose by +6.6%. The main factor in this above-benchmark performance was the prudent positioning taken as regards sensitivity and exposure to core Euro zone sovereign bonds in a market of gradually rising long rates. The credit portfolio also significantly outperformed its benchmark index thanks to strong exposure to subordinated bank securities. Finally, the slight overexposure on equities maintained throughout the year was beneficial, since the MSCI World All Countries net index hedged in Euros 50%, excluding emerging country currencies, rose by +13.0% whereas the bond section of the benchmark index (60% Citigroup EGBI and 40% Citigroup EuroBIG corporate) only increased by +0.8%. Finally, dynamic management of the investment vehicles in the equity portfolio was particularly successful: after a mediocre year in 2016, vigorous reallocation in early 2016 towards high-performance active equity management in both Europe and Japan was a good decision. The managers outperformed their benchmarks in these regions, achieving more than +3.5% growth in Japan and more than +1.5% growth in Europe.

In 2017, the overall after-tax performance of dedicated assets (impacts on reserves and net income) was +€1,035 million: +€733 million on the financial portfolio and cash portfolios (+€1,319 million before tax), +€35 million for the CSPE receivable after funding (+€63 million before tax) and +€267 million for EDF Invest (including +€210 million for the CTE/RTE shares allocated to dedicated assets).

Dedicated assets' exposure to risks

EDF is exposed to equity risks, interest rate risks and foreign exchange risks through its dedicated asset portfolio.

The market value of the equities sub-portfolio in EDF's dedicated asset portfolio was €9,972 million at 31 December 2017. The volatility of the equities sub-portfolio can be estimated through the volatility of its benchmark index, which at 31 December 2017 was 6.0% based on 52 weekly performances, compared to 15.2% at 31 December 2016. Applying this volatility to the value of equity assets at the same date, the Group estimates the annual volatility of the equities portion of dedicated assets at €598 million. This volatility is likely to affect the Group's equity.

At 31 December 2017, the sensitivity of the bond sub-portfolio (€9,282 million) was 5.08, i.e. a uniform 100 base point rise in interest rates would result in a €472 million decline in market value which would be recorded in consolidated equity. The sensitivity was 4.89 at the end of 2016. The sensitivity of the bond sub-portfolio was thus well below the sensitivity of the benchmark index (6.5).

5.1.6.1.7 Management of counterparty/credit risks

Counterparty risk is defined as the total loss that the EDF group would sustain on its business and market transactions if a counterparty defaulted and failed to perform its contractual obligations.

The Group has a counterparty risk management policy which applies to the parent company and all operationally controlled subsidiaries. This policy sets out the governance associated with monitoring for this type of risk, and organisation of the counterparty risk management and monitoring. The policy also involves monthly consolidation of the Group's exposures, updated monthly for financial and energy market activities and quarterly for other activities. The CRFI (Financial Risks Control) department closely monitors Group counterparties (daily review of alerts, special cautionary measures for certain counterparties).

## 5. THE GROUP'S PERFORMANCE IN 2017 AND FINANCIAL OUTLOOK

### Operating and financial review

The table below gives details, by rating, of the EDF group's consolidated exposure to counterparty risk. At 30 September 2017, 79% of the Group's exposure concerns "investment grade" counterparties, mainly as a result of the predominance of

exposures generated by the cash and asset management activity, with most short-term investments concerning low-risk assets:

	Good credit rating	Poor credit rating	No internal rating	Total
31/03/2017	80%	12%	8%	100%
30/09/2017	79%	12%	9%	100%

The exposure to counterparty risk by nature of activity is distributed as follows:

	Purchases	Insurance	Distribution and sales	Cash and asset management	Fuel purchases and energy trading	Total
31/03/2017	13%	0%	10%	71%	6%	100%
30/09/2017	14%	1%	8%	71%	6%	100%

Exposure in the energy trading activities is concentrated at the level of EDF Trading, where each counterparty is assigned a limit that depends on its financial robustness. A range of methods are used to reduce counterparty risk at EDF Trading, primarily position netting agreements, cash-collateral agreements and establishment of guarantees from banks or affiliates.

For counterparties dealing with EDF's trading room, the CRFI department has drawn up a framework specifying counterparty authorisation procedures and the methodology for calculation of allocated limits. The level of exposure can be consulted in real time and is systematically monitored on a daily basis. The suitability of limits is reviewed without delay in the event of an alert or unfavourable development affecting a counterparty.

As the political and financial situation in the Euro zone is still uncertain, EDF has continued to apply a conservative management policy for its cash investments in non-core countries. Apart from dedicated assets, purchases of sovereign debt are restricted to maximum maturities of three years for Italy and Spain. Only banking, sovereign and corporate counterparties with good credit ratings are authorised, for limited amounts and maturities.

#### 5.1.6.2 Management and control of energy market

##### 5.1.6.2.1 Management and control of energy market risks

In keeping with the opening of the final customer market, the growth of wholesale markets and its international development, the EDF group is exposed to price variations on the energy market which can significantly affect its financial statements.

Consequently, the Group has an "energy markets" risk policy for all energy commodities, applicable to EDF and entities over which it has operational control.

The purpose of this policy is to:

- define the general framework for management of energy market risks, governing the various Group entities' asset portfolio management activities (energy generation, optimisation and sale), and trading for EDF Trading;
- define the responsibilities of asset managers and traders, and the various levels of control of activities;
- implement a coordinated Group-wide hedging policy that is coherent with the Group's financial commitments;

- consolidate the exposure of the various entities operationally controlled by EDF on the structured energy-related markets.

At entities not operationally controlled by EDF, the risk management framework is reviewed by the governance bodies.

##### 5.1.6.2.2 Organisation of risk control and general risk hedging principle

The process for controlling energy market risks for entities operationally controlled by the Group is based on:

- a governance and market risk exposure measurement system, clearly separating management and risk control responsibilities;
- an express delegation to each entity, defining hedging strategies and establishing the associated risk limits. This enables the Executive Committee to set out and monitor an annual Group risk profile consistent with the financial objectives, and thus direct operational management of energy market risks over market horizons (generally three years).

The basic principle for hedging is:

- netting of upstream/downstream positions; wherever possible, sales to final customers are hedged by Internal sales;
- gradual closing of net positions before the end of the budget year, based on a predefined hedging trajectory <sup>(1)</sup> that captures an average price, potentially with overweighting in year N-1 in view of liquidity constraints on the forward markets.

On the French electricity market, EDF is exposed to very high uncertainty over its net exposure due to the fact that the ARENH system is optional. Since the volumes subscribed are only known shortly before the delivery period, EDF is obliged to use assumptions for ARENH subscriptions, which include prudence margins. EDF thus remains subject to risks that the assumptions may not correspond to reality, such that during the year it could find itself obliged to sell reserved volumes that in the end were not actually subscribed, or conversely to purchase volumes sold before the ARENH bids took place on the assumption that there would be no subscriptions.

Given its close interaction with the decisions made in the generation, supply and trading activities, the energy risk management process involves Group management and is based on a risk indicator and measurement system incorporating escalation procedures in the event risk limits are exceeded.

The Group's exposure to energy market risks through operationally controlled entities is reported to the Executive Committee on a quarterly basis. The control processes are regularly evaluated and audited.

(1) The risk management frameworks, which are approved annually by the Group for each entity with exposure to energy market risks, may include acceleration or deceleration plans allowing departures from these trajectories if predefined price thresholds are exceeded. Since these plans do not comply with the general principle of gradual hedging, they can only be applied under strict conditions.

### 5.1.6.2.3 Principles for operational management and control of energy market risks

The principles for operational management and control of energy market risks for the Group's operationally controlled entities are based on strict segregation of responsibilities for managing those risks, distinguishing between management of assets (generation and supply) and trading.

Managers of generation and supply assets are responsible for implementing a risk management strategy that minimises the impact of energy market risks on the variability of their financial statements (the accounting classifications of these hedges are described in note 41 to the 2017 consolidated financial statements, "Derivatives and Hedge accounting"). However, a residual risk remains that cannot be hedged on the market due to factors such as insufficient liquidity or market depth, and uncertainty over volumes.

For operationally controlled entities in the Group, positions on the energy markets are taken predominantly by EDF Trading, the Group's trading entity, which operates on the markets on behalf of other Group entities and for the purposes of its own trading activity associated with the Group's industrial assets. Consequently, EDF Trading is subject to a strict governance and control framework, particularly the European regulations on trading companies.

EDF Trading trades on organised or OTC markets in derivatives such as futures, forwards, swaps and options (regardless of the accounting classification applied at Group level). Its exposure on the energy markets is strictly controlled through daily limit monitoring overseen by the subsidiary's management and by the division in charge of energy market risk control at Group level. Automatic escalation procedures also exist to inform members of EDF Trading's Board of Directors of any breach of risk limits (value at risk limit) or loss limits (stop-loss limits). Value at Risk (VaR) is a statistical measure of the potential maximum loss in market value on a portfolio in the event of unfavourable market movements, over a given time horizon and with a given confidence interval<sup>(1)</sup>. Specific Capital at Risk (CaR) limits are also used in certain areas (operations on illiquid markets, long-term contracts and structured contracts) where VaR is difficult to apply. The stop-loss limit stipulates the acceptable risk for the trading business, setting a maximum level of loss over a rolling three-month period. If these limits are exceeded, EDF Trading's Board of Directors takes appropriate action, which may include closing certain positions.

During 2017, the VaR limit was reduced from €50 million to €35 million in view of the significant price volatility on energy markets at the end of the winter of 2016-2017, and the CaR limit for long-term contracts was reduced from €300 million to €250 million. CaR limits for operations on illiquid markets and the stop-loss were unchanged and remain at €250 million and €180 million respectively.

These limits were not exceeded and EDF Trading managed its risks within the boundaries of its mandate from EDF at all times. The stop-losses have never been triggered since their introduction.

For an analysis of fair value hedges of the Group's commodities, see note 41.4.3 to the 2017 consolidated financial statements. For details of commodity derivatives not classified as hedges by the Group, see note 42.3 to the same consolidated financial statements.

### 5.1.6.3 Management of insurable risks

The EDF group has insurance programmes that cover EDF SA and its controlled subsidiaries as they are integrated. The coverage, exclusions, excesses and limits are appropriate to each business and the specificities of these subsidiaries.

The main insurance programmes cover:

- **conventional damage to Group property:** EDF is a member of the international mutual insurance company for energy operators, OIL<sup>(2)</sup>. Additional insurance coverage is provided by EDF's captive insurance company Wagram Insurance Company DAC<sup>(3)</sup>, as well as other insurers and reinsurers;
- **damage to the EDF group's nuclear facilities:** in addition to coverage through EDF's membership of OIL, physical damage (including following a nuclear accident) to EDF's nuclear installations in France and EDF Energy's nuclear facilities in the United Kingdom, and nuclear decontamination costs, are covered by a Group insurance policy involving the French nuclear pool (Assuratome), the British atomic pool National Risk Insurers (NRI), the European Mutual Association for Nuclear Insurance (EMANI), and the insurer Northcourt.

In connection with CENG's operations in the United States, EDF Inc. is a member of NEIL<sup>(4)</sup>.

- **damage to merchandise transported:** this programme covers damage to goods in transit, for all Group entities and subsidiaries;
- **nuclear operator's civil liability:**

In **France**, EDF's insurance policies comply with French laws 68-943 of 30 October 1968, 90-488 of 16 June 1990 and 2006-686 of 13 June 2006 (the "TSN" law on nuclear transparency and safety) which are now part of the French Environment Code. These laws transposed the civil liability obligations imposed on nuclear facility operators by the Paris convention (for more information in the regulations concerning the nuclear operator's civil liability, see section 1.5.6.2.2 "Specific regulations applicable to basic nuclear facilities").

The Law on the Energy Transition for Green Growth enacted on 17 August 2015 amended the provisions of Articles L.597-28 and L.597-32 of the French Environment Code. Among the changes, the civil liability limits for nuclear operators were raised with effect from 18 February 2016 to €700 million for nuclear facilities, €70 million for reduced-risk facilities, and €80 million for risks during transport.

To comply with the new legal thresholds, EDF published a contract notice on 10 August 2015 entitled "EDF SA Nuclear Civil Liability Insurance Programme" to obtain and set up the insurance coverage needed for its nuclear civil liability and management of the associated claims.

With the insurance obtained in response to this notice, the Group meets its new obligations. The insurance is shared between the nuclear insurance market (AXA, reinsured by the French nuclear pool Assuratome) the Group's captive insurance companies, and the mutual insurance company ELINI.

This cover took effect on 18 February 2016 for a three-year term. In view of the changes likely to be made to nuclear operators' obligations during this period (particularly the application of protocols amending the Paris and Brussels conventions), withdrawal clauses have been included in the contract.

5.

(1) EDF Trading estimates the VaR by the "Monte Carlo" method, which is based on volatilities and historical correlations measured using observed market prices over the 40 most recent business days. The VaR limit applies to the total EDF Trading portfolio.

(2) Oil Insurance Limited.

(3) An Irish insurance company fully-owned by EDF.

(4) Nuclear Electric Insurance Limited.

## 5. THE GROUP'S PERFORMANCE IN 2017 AND FINANCIAL OUTLOOK

### Operating and financial review

Management of claims is the responsibility of ELINI, which has a computerised claim processing system, and EQUAD, which has the necessary human and network resources.

In the **United Kingdom**, where EDF Energy operates nuclear power plants, the nuclear operator's civil liability rules are similar to French rules. On 4 May 2016 the British parliament approved the Nuclear Installations Order (for transposition of the protocols of February 2004 amending the existing conventions) which in substance makes the same changes as the French TSN law of 2006, but will mostly only come into force at the same time as the protocols.

This Order raises the British operators' obligations from the current limit of £140 million to the equivalent of €700 million, and they will be progressively increased over a five-year period to reach a ceiling of €1.2 billion.

EDF Energy is currently insured by ELINI and Wagram Insurance Company DAC. The captive insurer Océane Re also bears the risk *via* a reinsurance contract for Wagram Insurance Company DAC.

The entry into force of France's Energy Transition law on 18 February 2016 led to a 40% increase in the Group's insurance premiums. The forthcoming implementation of the protocols amending the Paris and Brussels conventions will also lead to a substantial increase in the Group's insurance premiums:

- **general civil liability:** this programme covers the Group against the possible financial consequences for third parties of the (non-nuclear) risks inherent to the EDF group's businesses;
- **civil liability of directors and senior executives:** EDF's insurance programme covers defence costs and other financial consequences arising from

third party claims of liability against the Group's managers and key executives in connection with their duties;

- **construction risks:** EDF takes out insurance policies covering specific worksite risks (general worksite risks/general assembly and testing risks). These policies are not part of a Group programme but are purchased on an *ad hoc* basis for major projects such as the Flamanville EPR and Hinkley Point C, or construction or renovation of generation or distribution units. The Group has put framework agreements in place for work on similar facilities (source substations, hydropower plants);
- **exploration and production:** Edison has a specific "Exploration and Production" programme that is open to all Group subsidiaries, providing damage and civil liability coverage for onshore and offshore assets. This programme is based on the insurance provided by OIL, plus additional coverage purchased on the market;
- **Enedis' overhead distribution network:** to renew its insurance cover for storm and gale damage, on 27 June 2016 Enedis signed a parametric insurance contract for significant storm damage to the overhead distribution network. In the event of damage, this innovative five-year contract with total capacity of €275 million provides payouts based on a composite parametric index referring to wind speeds recorded by Météo France weather stations, weighted by the distribution network's vulnerability for each region included in the scope of Enedis' concession.

The total value of premiums for all types of coverage provided by EDF's insurance programmes and Group programmes managed by EDF Assurances was €199 million in 2017.

### 5.1.7 INFORMATION ON INVOICE SETTLEMENT TIMES (ACCOUNTS PAYABLE AND RECEIVABLE REQUIRED BY ARTICLE L. 441-6-1 OF THE FRENCH COMMERCIAL CODE)

As required by the LME law, modified by law 2015-990 for economic growth, activity and equal opportunities, EDF SA reports below the amounts (including taxes) of payables and receivables that are due at the year-end, by period overdue, and as

a percentage of the total amount of purchases and sales for the year (including taxes).

	Article D. 441 I.-1: invoices received and due at the year-end but not yet settled					Article D. 441 I.-2: invoices issued and due at the year-end but not yet settled					Total	
	0 day	1-30 days	31-60 days	61-90 days	91 days and more	0 day	1-30 days	31-60 days	61-90 days	91 days and more		
<b>(A) PERIOD OVERDUE</b>												
Number of invoices	78,075	-	-	-	-	4,154	4,583,549	-	-	-	-	8,501,791
Total amount of invoices (including taxes) in million of euros	2,316	4	2	2	-	8	1,454	165	98	65	742	1,070
% of the total amount of purchases of the year	4.7	-	-	-	-	-	-	-	-	-	-	-
% of total amount of sales of the year (including taxes)							2.6	0.3	0.2	0.1	1.3	1.9
<b>(B) INVOICES EXCLUDED FROM (A) RELATING TO PAYABLES AND RECEIVABLES IN DISPUTE OR UNRECOGNISED</b>												
Number of invoices excluded						0						0
Total amount of invoices excluded						0						0
<b>(C) PAYMENT TERMS APPLIED (CONTRACTUAL OR STATUTORY – ARTICLE L. 441-6 OR ARTICLE L. 43-1 OF THE FRENCH COMMERCIAL CODE)</b>												
Payment terms used for calculating periods overdue							contractual and statutory					statutory

### 5.1.8 INFORMATION ON EXISTING BRANCHES REQUIRED BY ARTICLE L. 232-1 OF THE COMMERCIAL CODE

At 31 December 2017, the Group had 174 secondary establishments registered with the French Commercial Court registries stated in the Company's "K-bis" document, and operated on French territory through several thousand different offices which do not fulfil the independent management criterion to qualify as a branch.

EDF SA's branches <sup>(1)</sup> outside mainland France are listed below:

- Saint-Barthélemy;
- Saint-Pierre-et-Miquelon;
- Saint Martin;
- United Arab Emirates: Abu Dhabi;
- Qatar;
- Bahrain;
- Benin;
- China:
  - Taishan,
  - Daya Bay (*OS Contract*);
- South Africa.

(1) In fiscal terms, this is a list of permanent establishments located outside France.

# 5. THE GROUP'S PERFORMANCE IN 2017 AND FINANCIAL OUTLOOK

## Subsequent events

### 5.2 SUBSEQUENT EVENTS

- Confirmation of the decision of the European Commission regarding the treatment of provisions established between 1987 and 1996 for the renewal of French General Electricity Network (see press release of 16 January 2018 and note 50.1 to the consolidated financial statements for the year ended 31 December 2017).
- EDF group announced on 22 February 2018 that it has identified a quality discrepancy in relation to the weldings of the circuit which evacuates the steam from steam generators to the turbine of Flamanville 3 EPR. On this basis, the Group declared on 30 November 2017 a significant event to the ASN (see section 1.4.1.2.2 "Update on the Flamanville EPR project").
- On 10 March 2018, EDF and NPCIL (Nuclear Power Corporation of India Limited), the government-owned Indian energy company, signed an Industrial Way Forward Agreement for the implementation of six EPR reactors at the Jaitapur site in India. Jaitapur is set to be the biggest nuclear project in the world, with a total power capacity of around 10GW.

The agreement defines the project's industrial framework, the roles and responsibilities of the partners, as well as a planned timetable for the next steps.

Under the terms of the agreement, EDF will act as supplier of the EPR technology. EDF will undertake all engineering studies and all component

procurement activities for the first two reactors. For the other four units, the responsibility for some purchasing activities and studies may be assigned to local companies. EDF will also provide NPCIL with its valuable experience from the construction of EPR reactors. In its capacity as owner and future operator of the Jaitapur Nuclear Power Plant, NPCIL shall be responsible for obtaining all authorisations and certifications required in India, and for constructing all six reactors and site infrastructures. EDF and its industrial partners will assist NPCIL during the construction phase.

This industrial framework has already been experienced in India and will be bolstered by the complementary skills and experience of the partners involved. In this manner, the knowledge and expertise required to operate the plant can be readily shared. It will also pave the way for the industrial involvement of Indian companies in the project, opening up possibilities for partnerships within the French nuclear power sector. In this way, the project will be developed in line with Indian policies "Make in India" and "Skill India", with the ever-increasing participation of local companies, reaching a potential 60% for last two of the six reactors.

The framework agreement has provisions for a preliminary tender by EDF to be submitted in the weeks following its signature, with the objective of producing a binding EDF tender towards the end of 2018.

### 5.3 CHANGES IN MARKET PRICES IN JANUARY AND FEBRUARY 2018

Brent oil prices closed in February 2018 at \$65.8/bbl. The average price for January and February 2018 was \$67.5/bbl, an increase of \$11.7/bbl compared to the average prices in January and February 2017. This upswing is mainly due to the statements made in 2017 supporting the enlargement and extension of the Vienna agreement until the end of 2018. Additional factors include the limitation of Nigerian production (previously unaffected by the agreement) to 1.8 million barrels per day, political tensions in Saudi Arabia, military operations that are restricting exports from Iraqi Kurdistan, as well as tensions between Iran and the United States in 2018. To a lesser extent, the uncertainty in global demand has also resulted in a drop in the Brent price in February 2018.

In January and February 2018, gas spot prices in the French market PEG North reached €19.7/MWh on average, down by €0.9/MWh compared with January and February 2017 average prices. Average temperatures in January and February 2017 were 0.6°C below normal due to a cold spell in France and Europe in mid-January, with temperatures up to 6.7°C below the norm. January 2018 temperatures were particularly mild although a cold spell briefly struck France and Europe in late February with temperatures up to 10.9°C below normal. Average temperatures in January and February 2018 were 0.1°C below normal, i.e. 0.5°C higher than during the January-February 2017 period. The cold spells led to an increase in gas spot prices in January 2017 and February 2018 respectively due to higher consumption. On 28 February 2018, spot prices reached their highest level since October 2013 at €37.0/MWh as a result of the weather conditions impacting all of Europe, an unforeseen shutdown of the Kollsnes facility and low storage levels.

The price of CO<sub>2</sub> emissions certificate for delivery in December 2018 closed in February 2018 at €10.1/t against €5.2/t at the end of February 2017 for December 2017 delivery contracts. Prices followed an upward trend in 2017, supported by the announcement of a Franco-German collaboration on the reform of emission certificates trading aimed at rebalancing the market as well as the establishment of an agreement protecting the market from a brutal withdrawal from the EU-ETS by the United Kingdom in the event of Brexit. In addition, on 9 November 2017, after two years of discussions, the EU Council and the European Parliament agreed on EU-ETS reform for the 2021-2030 period. The draft of this reform was approved by the European Parliament on 6 February and 27 February 2018, which contributed to an increase in prices.

The price of coal for delivery in Europe in 2019 ended February 2018 at \$79.3/t, up by \$12.6/t compared to the 2018 contract closed at the end of February 2017. On average, in January and February 2018, the N+1 prices for coal for delivery were \$16.9/t higher than during January and February of last year, ending at \$83.2/t. Prices were pushed upward during 2017 due to decreases in supply particularly during the passage of cyclone Debbie in Australia which affected mines and infrastructures, and following strikes, mainly in Australia. Moreover, an increase in demand, particularly in China, during high summer temperatures and at the end of the year to rebuild stocks, led to a sharp increase in prices during the second half of 2017. In February 2018, this increase was mitigated by the drop in extraction and transportation costs associated with the slight reduction in oil prices.

Spot prices for day-to-day electricity in France in January and February 2018 reached on average a baseload price of €41.5/MWh and a peak demand price of €49.7/MWh. Prices in January and February 2017 reached much higher levels, with on average a baseload price of €65.3/MWh and a peak demand price of €78.9/MWh. These 2017 price increases were due to high consumption as a result of the cold spell in January. The hourly maximum consumption exceeded 93GW on Friday 20 January 2017, whereas the spot price reached a daily maximum of €121.1/MWh on Wednesday 25 January 2017. Moreover, this period was marked by diminished nuclear power availability caused by the shutdowns required for the verifications of the units affected by the Le Creusot matter. In January 2018, the supply-demand balance was very slack, marked by diminishing consumption caused by temperatures largely above normal on the one hand, and by strong production of renewable and nuclear energy on the other hand. In February 2018, consumption was affected by a short cold spell. Consumption exceeded 94 GW over several time brackets on 28 February 2018, and the highest daily price was recorded on 27 February 2018 at €83.8/MWh. German spot prices settled at an average baseload price of €34.5/MWh and a peak demand price of €42.7/MWh in January and February 2018. Average prices in 2017 were €46.4/MWh baseload and €61.9/MWh at peak demand, driven by the January cold spell that also affected Germany.

At the end of February 2018, the prices of French annual contracts for baseload and peak demand deliveries in 2019 were respectively €39.3/MWh and €50.8/MWh. Forward electricity prices for delivery in France in 2018 closed in February 2017 at a baseload price of €35.9/MWh and a peak demand price of €47.3/MWh. The increase in price is mainly due to the increase of fuel prices.



## 5.4 OUTLOOK

### 2018 targets confirmed

The Group is continuing with the deployment of its strategic plan and confirms its 2018 targets <sup>(1)</sup> :

- Operating expenses <sup>(2)</sup>: €800 million decrease compared with 2015;
- EBITDA <sup>(3)</sup>: between €14.6 billion and €15.3 billion;
- Cash flow <sup>(3)</sup> <sup>(4)</sup> excluding Linky, new developments and 2015-2020 assets disposal plan: slightly positive or close to balance;
- Net investments excluding Linky, new developments and 2015-2020 assets disposal plan: around €11 billion;
- Total net investments excluding acquisitions and 2015-2020 assets disposal plan: less than or equal to €15 billion;
- Assets disposal plan: around €10 billion over the 2015-2018 period <sup>(5)</sup>;
- Net financial debt/EBITDA <sup>(3)</sup>: less than or equal to 2.7x;
- Targetted payout ratio, based on net income excluding non-recurring items <sup>(6)</sup>: 50%.

### Beyond 2018

In 2019, in a context marked by an expected decline in nuclear generation in France compared to 2018, the measures to reduce operating expenses <sup>(2)</sup> will be increased, with the target being revised upwards to €1.1 billion compared to 2015.

The 2019 target payout ratio of net income excluding non-recurring items <sup>(6)</sup> is confirmed at 45-50%.

(1) See press release of 13 November 2017.

(2) Sum of personnel expenses and other external expenses. At comparable scope and exchange rates. At constant pension discount rates. Excluding change in the operating expenses of the service activities.

(3) At comparable exchange rates and "normal" weather conditions, on the basis of a nuclear output in France of >395TWh. At constant pension discount rates.

(4) Excluding any interim dividend for the 2018 fiscal year.

(5) Asset disposals signed or realised.

(6) Adjusted for the remuneration of hybrid bonds accounted for in equity.

# 5. THE GROUP'S PERFORMANCE IN 2017 AND FINANCIAL OUTLOOK

# 6. FINANCIAL STATEMENTS

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# 6. FINANCIAL STATEMENTS

Consolidated financial statements at 31 December 2017

## 6.1 CONSOLIDATED FINANCIAL STATEMENTS AT 31 DECEMBER 2017

In application of Article 28 of European Commission regulation 809/2004/EC, the following information is incorporated by reference in this Reference Document:

■ the EDF group's consolidated financial statements (under international accounting standards) for the year ended 31 December 2016 and the Statutory Auditors' report on those financial statements, which are to be found in chapter 6, sections 6.1 (pages 320 to 436) and 6.2 (pages 437 and 438) of the EDF group's 2016 Reference Document;

■ the EDF group's consolidated financial statements (under international accounting standards) for the year ended 31 December 2015 and the Statutory Auditors' report on those financial statements, which are to be found in chapter 6, sections 6.1 (pages 306 to 412) and 6. (pages 413 and 414) of the EDF group's 2015 Reference Document.

The Group's consolidated financial statements for the year ended 31 December 2017, prepared under IAS-IFRS, are presented below. They will be submitted for approval at the General Shareholders' Meeting to be held on 15 May 2018.

### CONSOLIDATED INCOME STATEMENT

<i>(in millions of euros)</i>	Notes	2017	2016
Sales	7	69,632	71,203
Fuel and energy purchases	8	(37,641)	(36,050)
Other external expenses	9	(8,739)	(8,902)
Personnel expenses	10	(12,456)	(12,543)
Taxes other than income taxes	11	(3,541)	(3,656)
Other operating income and expenses	12	6,487	6,362
<b>Operating profit before depreciation and amortisation</b>		<b>13,742</b>	<b>16,414</b>
Net changes in fair value on Energy and Commodity derivatives, excluding trading activities		(355)	(262)
Net depreciation and amortisation	22.2	(8,537)	(7,966)
Net increases in provisions for renewal of property, plant and equipment operated under concessions		(58)	(41)
(Impairment)/reversals	13	(518)	(639)
Other income and expenses	14	1,363	8
<b>Operating profit</b>		<b>5,637</b>	<b>7,514</b>
Cost of gross financial indebtedness	15.1	(1,778)	(1,827)
Discount effect	15.2	(2,959)	(3,417)
Other financial income and expenses	15.3	2,501	1,911
<b>Financial result</b>	<b>15</b>	<b>(2,236)</b>	<b>(3,333)</b>
<b>Income before taxes of consolidated companies</b>		<b>3,401</b>	<b>4,181</b>
Income taxes	16	(147)	(1,388)
Share in net income of associates and joint ventures	23	35	218
<b>GROUP NET INCOME</b>		<b>3,289</b>	<b>3,011</b>
<b>EDF net income</b>		<b>3,173</b>	<b>2,851</b>
<b>Net income attributable to non-controlling interests</b>		<b>116</b>	<b>160</b>
<b>Earnings per share (EDF share) in euros:</b>	<b>17</b>		
Earnings per share		0.98	1.15
Diluted earnings per share		0.98	1.15

## CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

	2017			2016		
	EDF net income	Net income attributable to non-controlling interests	Total	EDF net income	Net income attributable to non-controlling interests	Total
<i>(in millions of euros)</i>						
<b>Group net income</b>	<b>3,173</b>	<b>116</b>	<b>3,289</b>	<b>2,851</b>	<b>160</b>	<b>3,011</b>
Gross change in fair value of available-for-sale financial assets <sup>(1)</sup>	107	-	107	318	-	318
Related tax effect	(61)	-	(61)	(116)	-	(116)
Associates' and joint ventures' share of fair value of available-for-sale financial assets	77	-	77	21	-	21
<b>Change in fair value of available-for-sale financial assets</b>	<b>123</b>		<b>123</b>	<b>223</b>	<b>-</b>	<b>223</b>
Gross change in fair value of hedging instruments <sup>(1)</sup>	1,513	4	1,517	290	26	316
Related tax effect	(361)	(2)	(363)	268	(8)	260
Associates' and joint ventures' share of fair value of hedging instruments	6	-	6	(15)	-	(15)
<b>Change in fair value of hedging instruments</b>	<b>1,158</b>	<b>2</b>	<b>1,160</b>	<b>543</b>	<b>18</b>	<b>561</b>
Translation adjustments – controlled entities	(970)	(169)	(1,139)	(2,755)	(380)	(3,135)
Translation adjustments – associates and joint ventures	(531)	-	(531)	43	-	43
<b>Translation adjustments</b>	<b>(1,501)</b>	<b>(169)</b>	<b>(1,670)</b>	<b>(2,712)</b>	<b>(380)</b>	<b>(3,092)</b>
<b>Gains and losses recorded in equity that will be reclassified subsequently to profit or loss</b>	<b>(220)</b>	<b>(167)</b>	<b>(387)</b>	<b>(1,946)</b>	<b>(362)</b>	<b>(2,308)</b>
Gross change in actuarial gains and losses on post-employment benefits <sup>(2)</sup>	1,061	60	1,121	468	93	561
Related tax effect	(337)	(12)	(349)	(175)	(16)	(191)
Associates' and joint ventures' share of change in actuarial gains and losses on post-employment benefits	16	-	16	(352)	-	(352)
<b>Actuarial gains and losses on post-employment benefits</b>	<b>740</b>	<b>48</b>	<b>788</b>	<b>(59)</b>	<b>77</b>	<b>18</b>
<b>Gains and losses recorded in equity that will not be reclassified subsequently to profit or loss</b>	<b>740</b>	<b>48</b>	<b>788</b>	<b>(59)</b>	<b>77</b>	<b>18</b>
<b>Total gains and losses recorded in equity</b>	<b>520</b>	<b>(119)</b>	<b>401</b>	<b>(2,005)</b>	<b>(285)</b>	<b>(2,290)</b>
<b>CONSOLIDATED COMPREHENSIVE INCOME</b>	<b>3,693</b>	<b>(3)</b>	<b>3,690</b>	<b>846</b>	<b>(125)</b>	<b>721</b>

(1) Gross changes in fair value transferred to income in respect of available-for-sale financial assets and hedging instruments are presented in notes 36.2.2 and 41.4 respectively.

(2) Gross changes in actuarial gains and losses are presented in note 31.1.2.

## CONSOLIDATED BALANCE SHEET

### ASSETS

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
Goodwill	18	10,036	8,923
Other intangible assets	19	8,896	7,450
Property, plant and equipment operated under French public electricity distribution concessions	20	54,739	53,064
Property, plant and equipment operated under concessions for other activities	21	7,607	7,616
Property, plant and equipment used in generation and other tangible assets owned by the Group	22	75,622	70,573
Investments in associates and joint ventures	23	7,249	8,645
Non-current financial assets	36	36,787	35,129
Other non-current receivables	26	2,168	2,268
Deferred tax assets	16.3	1,220	1,641
<b>Non-current assets</b>		<b>204,324</b>	<b>195,309</b>
Inventories	24	14,138	14,101
Trade receivables	25	23,411	23,296
Current financial assets	36	24,953	29,986
Current tax assets		673	183
Other current receivables	26	9,561	10,652
Cash and cash equivalents	37	3,692	2,893
<b>Current assets</b>		<b>76,428</b>	<b>81,111</b>
Assets classified as held for sale	46	-	5,220
<b>TOTAL ASSETS</b>		<b>280,752</b>	<b>281,640</b>

### EQUITY AND LIABILITIES

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
Capital	27	1,464	1,055
EDF net income and consolidated reserves		39,893	33,383
<b>Equity (EDF share)</b>		<b>41,357</b>	<b>34,438</b>
Equity (non-controlling interests)	27.5	7,341	6,924
<b>Total equity</b>	<b>27</b>	<b>48,698</b>	<b>41,362</b>
Provisions related to nuclear generation - back-end of the nuclear cycle, plant decommissioning and last cores		46,410	44,843
Other provisions for decommissioning		1,977	1,506
Provisions for employee benefits	31	20,630	21,234
Other provisions	28	2,356	2,155
<b>Non-current provisions</b>	<b>28</b>	<b>71,373</b>	<b>69,738</b>
Special French public electricity distribution concession liabilities	33	46,323	45,692
Non-current financial liabilities	38	51,365	54,276
Other non-current liabilities	35	4,864	4,810
Deferred tax liabilities	16.3	2,362	2,272
<b>Non-current liabilities</b>		<b>176,287</b>	<b>176,788</b>
Current provisions	28	5,484	5,228
Trade payables	34	13,994	13,031
Current financial liabilities	38	11,142	18,289
Current tax liabilities		187	419
Other current liabilities	35	24,960	24,414
<b>Current liabilities</b>		<b>55,767</b>	<b>61,381</b>
Liabilities related to assets classified as held for sale	46	-	2,109
<b>TOTAL EQUITY AND LIABILITIES</b>		<b>280,752</b>	<b>281,640</b>

## CONSOLIDATED CASH FLOW STATEMENT

<i>(in millions of euros)</i>	Notes	2017	2016
<b>Operating activities:</b>			
<b>Income before taxes of consolidated companies</b>		<b>3,401</b>	<b>4,181</b>
Impairment/(reversals)		518	639
Accumulated depreciation and amortisation, provisions and changes in fair value		9,980	9,814
Financial income and expenses		764	948
Dividends received from associates and joint ventures		243	330
Capital gains/losses		(2,739)	(877)
Change in working capital	43.1	1,476	(1,935)
<b>Net cash flow from operations</b>		<b>13,643</b>	<b>13,100</b>
Net financial expenses disbursed		(1,209)	(1,137)
Income taxes paid		(771)	(838)
<b>Net cash flow from operating activities</b>		<b>11,663</b>	<b>11,125</b>
<b>Investing activities:</b>			
Acquisitions of equity investments, net of cash acquired <sup>(1)</sup>		(2,463)	(127)
Disposals of equity investments, net of cash transferred <sup>(2)</sup>		2,472	372
Investments in intangible assets and property, plant and equipment	43.2	(14,747)	(14,397)
Net proceeds from sale of intangible assets and property, plant and equipment		1,140	508
Changes in financial assets		1,885	(2,913)
<b>Net cash flow used in investing activities</b>		<b>(11,713)</b>	<b>(16,557)</b>
<b>Financing activities:</b>			
EDF capital increase		4,005	-
Transactions with non-controlling interests <sup>(3)</sup>		481	1,368
Dividends paid by parent company	27.3	(109)	(165)
Dividends paid to non-controlling interests		(183)	(289)
Purchases/sales of treasury shares		(6)	(2)
<b>Cash flows with shareholders</b>		<b>4,188</b>	<b>912</b>
Issuance of borrowings		2,901	9,424
Repayment of borrowings		(6,304)	(6,176)
Payments to bearers of perpetual subordinated bonds	27.4	(565)	(582)
Funding contributions received for assets operated under concessions		144	143
Investment subsidies		348	417
<b>Other cash flows from financing activities</b>		<b>(3,476)</b>	<b>3,226</b>
<b>Net cash flow from financing activities</b>		<b>712</b>	<b>4,138</b>
<b>Net increase/(decrease) in cash and cash equivalents</b>		<b>662</b>	<b>(1,294)</b>
<b>CASH AND CASH EQUIVALENTS – OPENING BALANCE</b>		<b>2,893</b>	<b>4,182</b>
Net increase/(decrease) in cash and cash equivalents		662	(1,294)
Effect of currency fluctuations		(13)	102
Financial income on cash and cash equivalents		21	20
Effect of reclassifications		129	(117)
<b>CASH AND CASH EQUIVALENTS – CLOSING BALANCE</b>	<b>37</b>	<b>3,692</b>	<b>2,893</b>

(1) Including the acquisition price for Framatome: €1,868 million (see note 3.2).

(2) In 2017, this item includes an amount of €1,282 million relating to the partial sale of Coentreprise de Transport d'Électricité or CTE (formerly C25), the company that holds RTE's shares (see note 3.4.1).

(3) Capital increases or reductions and acquisitions or disposals of interests in controlled companies.  
In 2017, this item includes the €501 million contribution received from CGN for the NNB Holding Ltd. and Sizewell C Holding Co capital increases.

## CHANGE IN CONSOLIDATED EQUITY

<i>(in millions of euros)</i>	Capital	Treasury shares	Translation adjustments <sup>(1)</sup>	Impact of fair value adjustment of financial instruments <sup>(2)</sup>	Other consolidated reserves and net income	Equity (EDF share)	Equity (non-controlling interests)	Total equity
<b>EQUITY AT 31/12/2015</b>	<b>960</b>	<b>(38)</b>	<b>4,349</b>	<b>(2,353)</b>	<b>31,831</b>	<b>34,749</b>	<b>5,491</b>	<b>40,240</b>
Gains and losses recorded in equity	-	-	(2,712)	766	(59)	(2,005)	(285)	(2,290)
Net income	-	-	-	-	2,851	2,851	160	3,011
<b>Consolidated comprehensive income</b>	<b>-</b>	<b>-</b>	<b>(2,712)</b>	<b>766</b>	<b>2,792</b>	<b>846</b>	<b>(125)</b>	<b>721</b>
Payments on perpetual subordinated bonds	-	-	-	-	(582)	(582)	-	(582)
Dividends paid	-	-	-	-	(2,026)	(2,026)	(288)	(2,314)
Purchases/sales of treasury shares	-	9	-	-	-	9	-	9
Capital increase by EDF <sup>(3)</sup>	95	-	-	-	1,767	1,862	-	1,862
Other changes <sup>(4)</sup>	-	-	-	-	(420)	(420)	1,846	1,426
<b>EQUITY AT 31/12/2016</b>	<b>1,055</b>	<b>(29)</b>	<b>1,637</b>	<b>(1,587)</b>	<b>33,362</b>	<b>34,438</b>	<b>6,924</b>	<b>41,362</b>
Gains and losses recorded in equity	-	-	(1,501)	1,281	740	520	(119)	401
Net income	-	-	-	-	3,173	3,173	116	3,289
<b>Consolidated comprehensive income</b>	<b>-</b>	<b>-</b>	<b>(1,501)</b>	<b>1,281</b>	<b>3,913</b>	<b>3,693</b>	<b>(3)</b>	<b>3,690</b>
Payments on perpetual subordinated bonds	-	-	-	-	(565)	(565)	-	(565)
Dividends paid	-	-	-	-	(1,532)	(1,532)	(183)	(1,715)
Purchases/sales of treasury shares	-	(11)	-	-	-	(11)	-	(11)
Capital increase by EDF <sup>(5)</sup>	409	-	-	-	5,018	5,427	-	5,427
Other changes <sup>(6)</sup>	-	-	-	-	(93)	(93)	603	510
<b>EQUITY AT 31/12/2017</b>	<b>1,464</b>	<b>(40)</b>	<b>136</b>	<b>(306)</b>	<b>40,103</b>	<b>41,357</b>	<b>7,341</b>	<b>48,698</b>

(1) Changes in translation adjustments amount to €(1,501) million at 31 December 2017, mainly relating to the fall of the pound sterling and the US dollar against the euro.

(2) These changes correspond to the effects of fair value adjustments, amounts transferred to income following changes in the fair value of available-for-sale financial assets, the effects of fair value adjustment of financial instruments hedging cash flows and net foreign investments, and amounts transferred to income in respect of terminated contracts. For details see the statement of consolidated comprehensive income.

(3) In 2016, the capital increase and issue premium, totalling €1,862 million, relate to payment of the balance of the scrip dividend for 2015 and the scrip interim dividend for 2016.

(4) "Other changes" in 2016 included the effect of the sale to CGN of 33.5% of HPC Holding Co and 20% of Sizewell C Holding Co on 29 September 2016. This transaction had an effect of €(548) million on Equity (EDF share) and an effect of €1,510 million on equity (non-controlling interests) in 2016 (see note 3.7.2).

"Other changes" in 2016 also included the effects of the Cogestar operation, amounting to €119 million (see note 5.2).

(5) In 2017, the changes in capital and other consolidated reserves (issue premium) relate to EDF's capital increase amounting to €4,005 million net of expenses (see note 3.1) and payment of the balance of the scrip dividend for 2016 totalling €1,024 million and the scrip interim dividend for 2017 totalling €398 million (see note 27.3).

(6) "Other changes" in equity (non-controlling interests) include the effect of capital increases funded by CGN for NNB Holding Ltd. and Sizewell C Holding Co. amounting to €501 million. They also include the effects of the acquisition of Framatome, amounting to €209 million (see note 3.2), and the effects of the Cogestar operation, amounting to €48 million (see note 5.2).



## NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

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# 6. FINANCIAL STATEMENTS

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# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

### NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

Electricité de France (EDF or the "Company") is a French *société anonyme* governed by French law, and registered in France.

The consolidated financial statements reflect the accounting position of the Company and its subsidiaries (which together form the "Group") and the Group's interests in associates, joint arrangements classified as joint operations, and joint ventures, for the year ended 31 December 2017.

The Group is an integrated energy operator engaged in all aspects of the energy business: generation, transmission, distribution, supply, energy trading and services.

As of 31 December 2017, it includes the activities of Framatome: services and production of equipment and fuel for reactors (see note 3.2).

The Group's consolidated financial statements at 31 December 2017 were prepared under the responsibility of the Board of Directors and approved by the Directors at the Board meeting held on 15 February 2018. They will become final after approval at the General Shareholders' Meeting to be held on 15 May 2018.

## NOTE 1 GROUP ACCOUNTING STANDARDS

### 1.1 DECLARATION OF CONFORMITY AND GROUP ACCOUNTING POLICIES

Pursuant to European regulation 1606/2002 of 19 July 2002 on the adoption of international accounting standards, the EDF group's consolidated financial statements for the year ended 31 December 2017 are prepared under the international accounting standards published by the IASB and approved by the European Union for application at 31 December 2017. These international standards are IAS (International Accounting Standards), IFRS (International Financial Reporting Standards), and SIC and IFRIC interpretations.

The Group has not opted for early application of standards and interpretations that were not yet mandatory in 2017.

### 1.2 CHANGES IN ACCOUNTING METHODS AT 31 DECEMBER 2017

The accounting and valuation methods applied by the Group in the consolidated financial statements for the year ended 31 December 2017 are identical to those used in the consolidated financial statements for the year ended 31 December 2016, with the exception of the following changes:

#### 1.2.1 Accounting standard amendments adopted by the European Union that became mandatory as of 1 January 2017

The following amendments to accounting standards have been adopted by the European Union and are mandatory for financial years beginning on or after 1 January 2017:

- amendments to IAS 12 "Income Taxes" entitled "Recognition of Deferred Tax Assets for Unrealised Losses": no impact for the Group;
- amendments to IAS 7 "Statement of cash flows" entitled "Disclosure Initiative". These amendments require companies to disclose information that can be used to reconcile the changes in balance sheet assets and liabilities reported in the "cash flows from operating activities" section of the cash flow statement, separating cash movements from non-cash movements (see note 38.2.1).

#### 1.2.2 Standards and amendments adopted by the European Union for mandatory application after 31 December 2017

##### 1.2.2.1 IFRS 15 – Revenue from Contracts with Customers

On 22 September 2016, the European Union (EU) adopted IFRS 15 "Revenue from Contracts with Customers", which will be mandatory for financial years beginning on or after 1 January 2018. The associated amendments were adopted on 31 October 2017 and will be applicable at the same date as the standard itself.

Preparatory work for application of IFRS 15 continued during 2017, and the operations for which the accounting treatment will be changed were identified. The two principal changes concern the following:

- **Recognition of income from energy delivery (principal versus agent considerations).**

In accordance with IAS 18, the delivery component of an energy supply contract is automatically included in sales revenues by all Group entities that supply electricity or gas.

IFRS 15 requires analysis of whether or not this energy delivery is a distinct performance obligation within the energy supply contract. It also sets out the conditions in which an entity operates as principal or agent for the supply of a good or service with third party involvement. If the entity is classified as a principal, it can recognise the sales revenue from the delivery service. Otherwise,

it is classified as an agent, and can only include the amount of commission, if any, in its sales revenues.

A review of contracts and the applicable regulatory framework has been conducted for each country where customers have single contracts covering the supply and delivery of gas and/or electricity (France, Belgium, the United Kingdom and Italy).

- In France and Belgium, the Group has concluded that delivery is a distinct service from the supply of energy, and that the energy supplier is acting as an agent in providing this delivery service, as the supplier is not responsible for performance of this service, is not exposed to any risk related to stocks or capacity, and cannot pass on to the final customer any price other than the price charged by the distributor for the delivery. Also, in France the credit risk is borne by the distributor as of 1 January 2018, and energy suppliers will be remunerated by a commission paid by distributors for management of clients on a single contract (see note 4.2).

In France, the vast majority of electricity delivery services are performed by Enedis, the Group's regulated subsidiary that is the French distribution network operator. As a result the principal-agent analysis concerning electricity delivery in France will only have an impact on presentation of sales in the operating segment reporting. Currently, the Group's operating segment reporting presents revenues on electricity delivery in the "France – Regulated activities" segment, as inter-segment sales. When IFRS 15 is applied, these revenues will be presented as external sales.

This analysis will lead to a reduction in Group sales equivalent to the amount of gas and electricity delivery services in Belgium and gas delivery services in France.

To give an illustration, the amounts for 2017 would have been €1,065 million for Belgium, in the "Other international" segment, €387 million for the "France – Generation and Supply" segment and €56 million for the "France – Regulated activities" segment. These figures are not necessarily representative of the amounts for 2018, since they are sensitive to delivery volumes, which notably depend on weather conditions and the level of demand, as well as delivery tariffs.

In correlation, purchases of delivery (included in fuel and energy purchases) will be reduced by the same amount. Classification as an agent will therefore have no impact on the Group's operating profit before depreciation and amortisation.

- In Italy and the UK, however, the energy supplier will continue to be classified as a principal for delivery services.

In the United Kingdom, the Group has concluded that supply and delivery formed a single performance obligation, for which the supplier is the principal. In Italy, the risk borne by the supplier on capacity reservations with network operators and the fact that the supplier can set its price for delivery to the final customer justify its classification as a principal.

- **Recognition of market energy purchase and sale transactions that are part of optimisation activities**

Some Group entities undertake operations on the wholesale electricity and gas markets, in application of the Group's risk management policy. Depending on the net position to be hedged, an entity may make purchases and sales on the forward and spot markets. These hedges are executed progressively and give rise to optimisation activities (supply/demand adjustment at different timeframes, and decisions between using the Group's own generation facilities or purchasing from the markets).

The analysis of contracts for implementation of IFRS 15 has led the Group to consider that accounting on a net basis provides a more relevant reflection of the economic reality of optimisation transactions. Some Group entities (Edison – "Italy" segment, EDF Luminus – "Other international" segment, Dalkia – "Other activities" segment) have so far reported such sales on a gross basis, and booked a corresponding entry in energy purchases. Based on 2017 data, this change would reduce revenue and energy purchases by €2,793 million, with no impact on operating profit before depreciation and amortisation. These figures are not necessarily representative of the future amount for 2018, as the amount is by nature very variable from one year to the next.

# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

The other subjects identified as potentially subject to a change of accounting treatment due to application of IFRS 15 should not have any significant impact on the Group's sales or net income.

In addition, the Group is currently finalising its assessment of the impacts of IFRS 15 on the accounting methods for the sales applied by Framatome, an entity that is fully consolidated from 31 December 2017. The subjects identified mainly concern the level of contract combinations, the financing component, contractual penalties and calculation of losses at completion.

The full retrospective approach will be applied. This will have no significant impact on Group's equity.

Finally, in connection with future application of IFRS 15, the Group is continuing to follow changes in international standards that could affect the current accounting treatment of regulated-tariff activities.

### 1.2.2.2 IFRS 9 – Financial Instruments

IFRS 9 "Financial Instruments", adopted by the European Union on 22 November 2016, will replace IAS 39 "Financial Instruments: Recognition and Measurement" from 1 January 2018. This standard introduces new principles for classification and measurement of financial instruments, impairment for credit risk on financial assets, and hedge accounting.

The Group began analyses in 2015 to assess the consequences of IFRS 9's application. In 2016 and 2017 preparatory work for implementation of the new standard continued, identifying the instruments for which the accounting treatment will be changed, as well as the necessary adjustments to the information systems.

### Classification and measurement

Apart from the financial assets carried at amortised cost in application of IAS 39 such as loans, trade receivables and certain financial receivables, almost all of the Group's financial asset portfolio is currently classified as available-for-sale financial assets under IAS 39. Consequently, these assets are measured at fair value in the balance sheet, and changes in fair value are recorded in other comprehensive income (OCI); unrealised gains and losses recognised in OCI while the asset is held are transferred to profit and loss upon its derecognition.

A detailed, in-depth review of the Group's financial asset portfolio was conducted to determine its future accounting treatment under IFRS 9, based on the characteristics of its contractual cash flows and business model. The main impacts will concern financial assets held in the form of shares in investment funds, and to a lesser degree equity instruments (shares).

More specifically, a large share of the financial assets affected by these changes concerns the financial portfolio (amounting to €20,848 million at 31 December 2017 – see note 36.2.2) that forms part of the dedicated assets held to cover expenses for the back-end of EDF's nuclear cycle in France (see note 47).

The table below summarises changes in the classification of financial assets held by the Group at 31 December 2017 between IAS 39 and IFRS 9, and the impacts on the Group's financial statements. Further details of these changes are provided in the following paragraphs.

<i>(in billions of euros)</i>	Balance at 31/12/2017	IFRS 9 classification				Fair value in OCI at 31/12/2017
		Amortised cost	Fair value through OCI	Fair value through OCI without recycl. to P&L	Fair value through P&L	
<b>IAS 39 classification</b>						
<b>Available-for-sale financial assets</b>	<b>40.9</b>	-	<b>20.8</b>	<b>0.5</b>	<b>19.6</b>	<b>2.2</b>
EDF's dedicated assets	20.8	-	5.0	-	15.9	2.1
Liquid assets	19.0	-	15.8	-	3.1	0.1
Other securities	1.1	-	-	0.5	0.6	-
<b>Loans and receivables</b>	<b>14.6</b>	<b>14.3</b>	-	-	<b>0.3</b>	-
<b>Trade receivables</b>	<b>23.4</b>	<b>21.8</b>	<b>1.6</b>	-	-	-

- For **shares in investment funds**, which account for a significant portion of the dedicated asset financial portfolio, unrealised gains or losses, which were previously recognised in OCI and transferred to profit and loss upon their derecognition, will be recorded directly in the Group's income statement because these instruments will be classified as "at fair value through profit and loss".

As well as holding shares in investment funds, to meet the needs of its dedicated asset portfolio the Group also makes significant investments in exchange-traded funds (ETFs). ETFs are traded on stock exchanges and generally passively managed with the aim of replicating upward or downward movements in an index. Market discussions in recent months about the classification of these "hybrid" instruments led to the conclusion that these instruments should not be classified as equity instruments under IAS 32 – which was the Group's initial analysis – but as puttable debt instruments. As a result, shares in ETFs will be treated under IFRS 9 in the same way as shares in investment funds, and unrealised gains and losses will be recorded in the Group's income statement.

The accumulated fair value changes on these instruments at 1 January 2018, amounting to €1.8 billion before taxes, will be reclassified as reserves that will not be subsequently transferred to profit and loss.

The impact on the Group's financial result at 31 December 2017 of applying IFRS 9 instead of IAS 39 to these instruments, all other things being equal, would have been around €349 million, comprising:

- non-recognition of unrealised gains and losses of 2016 that were realised in 2017 (€(800) million);
- recognition in the income statement of unrealised gains and losses in 2017 (including the effect of foreign exchange hedges), which represent the annual volatility (€1,149 million).

An estimate of the main impacts of the standard's application, based on figures at 31 December 2017, is presented below for information.

The amounts shown are not necessarily representative of the amounts that will be recognized in 2018 or in later years, as unrealised gains or losses depend primarily on stock market movements over each period concerned. Unrealised gains on certain financial instruments and markets in one period may reverse during another.

- For **equity instruments** not held for trading (investments in shares and similar), the Group will record fair value changes on most of the instruments in the portfolio at 31 December 2017 in profit and loss. However, the Group has exercised the irrevocable option to recognise fair value changes on some of the securities in the portfolio at 31 December 2017 in OCI. For the securities concerned, as IFRS 9 requires, only dividends received can be included in profit and loss; it will not be possible to transfer gains and losses to the income statement upon derecognition of the instrument.

The accumulated fair value changes on equity instruments at 1 January 2018, amounting to €0.1 billion before taxes, will be reclassified as reserves that will not be subsequently transferred to profit and loss.

The impact on the Group's financial result at 31 December 2017 of applying IFRS 9 instead of IAS 39 to these instruments, all other things being equal, would have been non-significant.

- The whole portfolio of **debt instruments, particularly the bond portfolio**, is managed under the "collect and sell" business model. Detailed analyses for each type of instrument have shown that the cash flows associated with this portfolio consist entirely of payments of principal and interest (the "SPPI" (Solely Payment of Principal and Interests) test from IFRS 9). As a result, fair value changes on this portfolio will be recorded in OCI, with no change from the current accounting treatment.

As stated earlier, a large portion of the financial assets affected by these changes belongs to the portfolio of financial assets that is part of the dedicated assets held to cover future expenses for the back-end of EDF's nuclear cycle in France. In general, application of IFRS 9 will lead to greater volatility in the Group's income statement, while dedicated assets are held to cover provisions for the back-end of the nuclear cycle, which give rise to a recurring cost of unwinding the discount, which is included in the financial result.

### Impairment

IFRS 9 introduces an impairment model based on expected credit losses, whereas IAS 39 referred to incurred losses. This new "expected credit loss" (ECL) model could lead to earlier recognition of impairment than under IAS 39. It applies to financial assets carried at amortised cost, debt instruments carried at fair value through other comprehensive income, off-balance sheet commitments and financial guarantees previously governed by IAS 37, and contract assets measured in accordance with IFRS 15.

The Group has reviewed the rules for assessing the deterioration of credit risk and measuring expected losses for a one-year horizon and at maturity.

For debt instruments, the Group applies a rating-based approach for counterparties with low credit risk. As the standard allows, the Group defines the level of the "low credit risk" as the lowest rating for "Investment Grade" counterparties. In application of the risk management policy, the Group's bond portfolio consists almost entirely of instruments issued by Investment Grade entities. The threshold marking a significant increase in credit risk on debt instruments is reached when the counterparty ceases to be rated "Investment Grade".

Across all the financial assets concerned, the analyses conducted lead to an estimated ECL that is not significant at 31 December 2017.

For trade receivables that mainly relate to the Group entities' customer portfolios, the Group will apply IFRS 9's simplified impairment approach, based on indicators such as a provision matrix to calculate expected credit losses on trade receivables. Across all the financial assets concerned, the analyses conducted lead to an estimated ECL that is not significant at 31 December 2017.

For loans, the Group has chosen an approach based on the probability of default by the counterparty and assessment of changes in the credit risk.

Retrospective application of the new impairment model would lead to recognition of a non-material amount in equity at the transition date (not subsequently transferrable to profit and loss).

### Hedge accounting

The new IFRS 9 model aims to simplify hedge accounting, align hedge accounting more closely with risk management activities and allow application of hedge accounting to a broader range of hedging instruments and items qualifying as hedged items. The new standard does not explicitly cover macro-hedging activities, which are the subject of a separate IASB project.

Two approaches are allowed for the first application of IFRS 9: (i) use of IFRS 9's "general hedge accounting model", or (ii) continued use of IAS 39 until the new macro-hedging standard is released by the IASB and adopted by the EU.

The Group intends to apply the new rules introduced by IFRS 9 for hedge accounting from 1 January 2018. Application of this section of the new standard is not expected to have any significant impacts on the consolidated financial statements at the transition date. Implementation of these provisions is currently ongoing in the Group.

### Other aspects of IFRS 9: debt modification

The accounting treatment under IFRS 9 of debt modifications that do not result in derecognition was clarified by the IASB in July 2017. In such situations the only approach considered compatible with the currently adopted wording of IFRS 9 is to recognise an adjustment to the net income, corresponding to the change in the amortised cost of the debt at the restructuring date. This decision puts an end to the current practice (an IAS 39 option) of spreading the expected saving (or additional expense) over the residual term of the modified debt, through a prospective adjustment to the effective interest rate applied.

The impact of retrospective application at 1 January 2018 of this clarification of IFRS 9 to all modifications of debts that do not result in their derecognition (because they are non-substantial) remains non-material for the Group.

### 1.2.2.3 IFRS 16 – Leases

IFRS 16, "Leases" was adopted by the European Union on 31 October 2017 and will be mandatory for financial years beginning on or after 1 January 2019. The Group has no plans for early application of this standard.

IFRS 16 requires all leases other than short-term leases and leases of low-value assets to be recognised in the lessee's balance sheet in the form of a right-of-use asset, with a corresponding financial liability. Current contracts classified as "operating leases" are reported as off-balance sheet items. The Group's lease contracts essentially concern real estate assets (office and residential properties), industrial installations (land, wind farms) and to a lesser extent vehicles and IT equipment. The amount of the liability included in financial debt is thus noticeably dependent on the assumptions used regarding the discount rate and the duration of commitments, since options for renewal, extension or early termination of contracts must be incorporated into calculation of the liability if it is considered reasonably certain, when the contract is first signed, that they will be exercised.

The Group has worked to identify the impacts of application of IFRS 16 by sending a questionnaire to all the subsidiaries concerned to collect information about the features of leases classified as "operating leases" in existence at 31 December 2016, and updating the information at 31 December 2017. On this basis, the Group has analysed the standard in order to quantify its impacts on key consolidated totals (*i.e.* operating profit before depreciation and amortisation, consolidated net income, and net indebtedness) and the changes it may entail in reported information.

Data collection and analysis works are today currently being finalised. The assumptions concerning the duration of certain contracts are still being defined, and the Group is continuing its calculations regarding the impact of the first application of IFRS 16 on the balance sheet.

As a result of this work, the Group intends to apply the "modified" retrospective method (IFRS 16.C5.b).

The choice of appropriate IT systems to enable the Group to implement IFRS 16 is under consideration.

### 1.2.2.4 Amendments to IFRS 4

The amendments to IFRS 4 entitled "Applying IFRS 9 'Financial Instruments' with IFRS 4 'Insurance Contracts'", applicable from 1 January 2018, were adopted on 3 November 2017. The potential impacts for the Group have not yet been evaluated.

# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

### 1.2.3 Standards and amendments published by the IASB but not yet adopted by the European Union

The following IASB publications related to the accounting principles applied by the Group have not yet been adopted by the European Union:

- IFRIC 22 "Foreign Currency Transactions and Advance Consideration" (application date: 1 January 2018). Subject to adoption by the European Union, this interpretation will be applied prospectively by the Group from 1 January 2018. This interpretation requires payment or receipt of a non-monetary advance in a foreign currency to be translated at the exchange rate of the transaction date, with no subsequent adjustment. Based on the analyses conducted to date, the Group considers that future application of IFRIC 22 will not have a significant impact on the EDF group's consolidated financial statements;
- IFRIC 23 "Uncertainty over Income Tax Treatments" (application date: 1 January 2019). IFRIC 23 clarifies the application of IAS 12 "Income Taxes" regarding recognition and measurement when there is uncertainty over the income tax treatment. Analyses are in process to estimate the potential impact of this interpretation;
- amendments to IAS 28 "Investments in Associates" entitled "Long-term Interests in Associates and Joint Ventures" (application date: 1 January 2019). Analyses are in process to estimate the potential impact of these amendments;
- amendments to IFRS 9 entitled "Prepayment Features with Negative Compensation", published by the IASB on 12 October 2017 (application date: 1 January 2019, early application allowed);
- IFRS 17 "Insurance Contracts" (application date: 1 January 2021).

In addition, the Group has not yet evaluated the potential impact of the following amendments:

- amendments to IAS 40 "Investment property" entitled "Transfers of Investment Property" (application date: 1 January 2018);
- amendments to IFRS 2 "Share-based Payment" entitled "Classification and measurement of share-based payment Transactions" (application date: 1 January 2018).

### 1.3 SUMMARY OF THE PRINCIPAL ACCOUNTING AND VALUATION METHODS

The following accounting methods have been applied consistently through all the periods presented in the consolidated financial statements.

#### 1.3.1 Valuation

The consolidated financial statements are based on historical cost valuation, with the exception of assets acquired and liabilities assumed through business combinations, and of certain financial instruments, which are stated at fair value.

#### 1.3.2 Management judgements and estimates

The preparation of the financial statements requires the use of judgements, best estimates and assumptions in determining the value of assets and liabilities, income and expenses recorded for the period, considering positive and negative contingencies existing at year-end. The figures in the Group's future financial statements could differ significantly from current estimates due to changes in these assumptions or economic conditions.

In a context characterised by financial market volatility, the parameters used to prepare estimates are based on macro-economic assumptions appropriate to the very long-term cycle of Group assets.

The principal operations for which the Group uses estimates and judgements are the following:

#### 1.3.2.1 Depreciation period of nuclear power plants in France

In the specific case of the depreciation period of its French nuclear power plants, the EDF group's industrial strategy is to continue operation beyond 40 years, in optimum conditions as regards safety and efficiency.

During 2016, all the technical, economic and governance conditions for extending the depreciation period of 900MW series power plants were fulfilled. The Group therefore extended this period as of 1 January 2016 for all 900MW power plants, with the exception of Fessenheim (see note 3.7.1: Extension to 50 years of the depreciation period of the 900MW PWR series in France).

The depreciation period of other Group series in France (1,300MW and 1,450MW), which are more recent, is currently unchanged at 40 years, as the conditions for extension are not yet fulfilled.

These depreciation periods take into account the date of recoupling with the network after the most recent 10-year inspection.

#### 1.3.2.2 Nuclear provisions

The measurement of provisions for the back-end of the nuclear cycle, decommissioning and last cores is sensitive to assumptions concerning technical processes, costs, inflation rates, long-term discount rates, the depreciation period of plants currently in operation and disbursement schedules.

These parameters are therefore re-estimated at each closing date to ensure that the amounts accrued correspond to the best estimate of the costs eventually to be borne by the Group.

The Group considers that the assumptions used at 31 December 2017 are appropriate and justified. However, any future change in assumptions could have a significant impact on the Group's balance sheet and income statement.

The main assumptions and sensitivity analyses relating to nuclear provisions are presented in note 29.1.5.

The calculation of provisions incorporates a level of risks and unknowns as appropriate to the operations concerned. The valuation of costs carries uncertainty factors such as:

- changes in the regulations, particularly on safety, security and environmental protection, and financing of nuclear expenses;
- changes in the regulatory decommissioning process and the time necessary for issuance of administrative authorisation;
- future methods for storing long-lived radioactive waste and provision of storage facilities by the French agency for radioactive waste management ANDRA (Agence Nationale pour la Gestion des Déchets Radioactifs);
- changes in certain financial parameters such as discount rates, notably in relation to the regulatory limit, inflation rates, or changes in the contractual terms of spent fuel management.

#### 1.3.2.3 Pensions and other long-term and post-employment benefit obligations

The value of pensions and other long-term and post-employment benefit obligations is based on actuarial valuations that are sensitive to all the actuarial assumptions used, particularly concerning discount rates, inflation rates and wage increase rates.

The principal actuarial assumptions used to calculate these post-employment and long-term benefits at 31 December 2017 are presented in note 31. These assumptions are updated annually. The Group considers the actuarial assumptions used at 31 December 2017 appropriate and well-founded, but future changes in these assumptions could have a significant effect on the amount of the obligations and the Group's equity and net income. Sensitivity analyses are therefore presented in note 31.



**1.3.2.4 Impairment of goodwill and long-term assets**

Impairment tests on goodwill and long-term assets are sensitive to the macro-economic and segment assumptions used – particularly concerning energy price movements – and medium-term financial forecasts. The Group therefore revises the underlying estimates and assumptions based on regularly updated information.

These assumptions, which are specific to Group companies, are presented in note 13.

**1.3.2.5 Financial instruments**

In measuring the fair value of unlisted financial instruments (essentially energy contracts), the Group uses valuation models based on a certain number of assumptions subject to unforeseeable developments.

**1.3.2.6 Energy supplied but not yet measured and billed**

As explained in note 1.3.7, the quantities of energy supplied but not yet measured and billed are calculated at the reporting date based on consumption statistic models and selling price estimates. Determination of the unbilled portion of sales revenues at the year-end is sensitive to the assumptions used to prepare these statistics and estimates.

**1.3.2.7 Obligations concerning French public distribution concession assets to be replaced**

In view of the specific nature of French public electricity distribution concessions, the Group has opted to present its obligation to replace concession assets in the balance sheet at a value based on the amount of contractual commitments as calculated and disclosed to the grantors in the annual business reports (see note 1.3.13.2.1). An alternative approach would be to value the obligations based on the present value of future payments necessary to replace these assets at the end of their industrial useful life. The impacts this alternative approach would have had on the accounts are shown in note 1.3.23 for information. Whatever valuation method is used, measurement of the concession liability concerning assets to be replaced is notably subject to unforeseeable developments in terms of costs, useful life and disbursement dates.

**1.3.2.8 Deferred tax assets**

The use of estimates and assumptions over recovery horizons is particularly important in the recognition of deferred tax assets.

**1.3.2.9 Other judgements**

- For the application of IFRS 10 and IFRS 11, the Group uses judgement to assess control or classify the type of partnership arrangement represented by a jointly-controlled entity.

In particular, EDF has set up “reserved” investment funds for some of its funds set aside for secure financing of nuclear plant decommissioning expenses and long-term storage expenses for radioactive waste (see note 47.3). In view of the funds’ characteristics, the prerogatives exercised by their managers and the procedures for defining the management strategies applicable to them, the Group considers that it does not have control, as defined by IFRS 10, over these funds. They are consequently treated as available-for-sale financial assets, in application of IAS 39.

Furthermore, through its subsidiary Edison, since 2014 the Group has held a 30% investment in Edens, with F2i. However, the governance arrangements and contractual agreements introduced for Edens in connection with this transaction give Edison exclusive control over the Company. In application of IFRS 10, Edens is therefore fully consolidated (*via* Edison) in the Group’s consolidated financial statements.

- When there is no standard or interpretation applicable to a specific transaction, the Group exercises judgement to define and apply accounting methods that supply relevant and reliable information for preparation of its financial statements.

**1.3.3 Consolidation methods**

A list of the main subsidiaries, associates and joint ventures is presented in note 51.

**1.3.3.1 Controlled entities**

Subsidiaries are companies in which the Group exercises exclusive control and are fully consolidated. The Group controls an entity when the three following conditions are fulfilled:

- it holds power over the entity;
- it is exposed, or has rights, to variable returns from its involvement with the entity;
- it has the ability to use its power to affect the amount of the investor’s returns.

The Group considers all facts and circumstances when assessing control. All substantive potential voting rights exercisable, including by another party, are also taken into consideration.

**1.3.3.2 Investments in associates and joint ventures**

An associate is an entity in which the Group exercises significant influence on financial and operational policies without having exclusive or joint control. Significant influence is presumed to exist when the Group’s investment is at least 20%.

A joint venture is a partnership in which the parties (joint venturers) that exercise joint control over the entity have rights to the entity’s net assets. Joint control is the contractually agreed sharing of control of an entity operated jointly by a limited number of partners or shareholders, such that the financial and operational policies result from unanimous consent of the parties.

Investments in associates and joint ventures are accounted for by the equity method. They are carried in the balance sheet at historical cost, adjusted for the share in net assets generated after the acquisition, less any impairment. The share in the net income for the period is reported in “Share in net income of associates and joint ventures” in the income statement.

**1.3.3.3 Investments in joint operations**

A joint operation is a joint arrangement in which the parties (joint operators) that exercise joint control over the entity have direct rights to its assets, and obligations for its liabilities. The Group, as an operator in a joint operation, reports the assets and liabilities and income and expenses related to its investment line by line.

**1.3.4 Financial statement presentation rules**

Assets and liabilities contributing to working capital used in the entity’s normal operating cycle are classified as current in the consolidated balance sheet. Other assets and liabilities are classified as current if they mature within one year of the closing date, and non-current if they mature more than one year after the closing date.

The income statement presents items by nature. The heading “Other income and expenses” presented below the operating profit before depreciation and amortisation comprises items of an unusual nature or amount.

**1.3.5 Translation methods**

**1.3.5.1 Reporting currency**

The parent company’s functional currency is the Euro. The Group’s financial statements are presented in millions of euros.

**1.3.5.2 Functional currency**

An entity’s functional currency is the currency of the economic environment in which it primarily operates. In most cases, the local currency is the functional currency. But for some entities, a functional currency other than the local currency may be used when it reflects the currency used in the principal transactions.

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### Notes to the consolidated financial statements

#### 1.3.5.3 Translation of the financial statements of foreign companies whose functional currency is not the Euro

The financial statements of foreign companies whose functional currency is not the Euro are translated as follows:

- balance sheets are translated into Euros at the closing rate;
- income statements and cash flows are translated at the average rate for the period;
- resulting differences are recognised in equity under the heading "Translation adjustments".

Translation adjustments affecting a monetary item that is an integral part of the Group's net investment in a consolidated foreign company are included in consolidated equity until the disposal or liquidation of the net investment, at which date they are recognised as income or expenses in the income statement, in the same way as other exchange differences concerning the Company.

#### 1.3.5.4 Translation of transactions in foreign currencies

In application of IAS 21, transactions expressed in foreign currencies are initially translated and recorded in the functional currency of the entity concerned, using the rate in force at the transaction date.

At each reporting date, monetary assets and liabilities expressed in foreign currencies are translated at the closing rate. The resulting foreign exchange differences are taken to the income statement.

#### 1.3.6 Related parties

Related parties include the French State, companies in which the State holds majority ownership and certain of their subsidiaries, and companies in which the EDF group exercises joint control or significant influence. They also include members of the Group's management and governance bodies.

#### 1.3.7 Sales

Sales essentially comprise income from energy sales (to final customers and as part of trading activities), connections and other services, which mainly include energy transmission and distribution, and capacity and interconnection auctions.

The Group accounts for sales when:

- there is a proven contractual relationship;
- delivery has taken place (or the service has been completed);
- a quantifiable price has been established or can be determined;
- and the receivables are likely to be recovered.

Delivery takes place when the risks and benefits associated with ownership are transferred to the buyer.

Energy supplied but not yet measured and billed is calculated based on consumption statistics and selling price estimates.

Sales of goods and revenues on services not completed at the balance sheet date are valued by reference to the stage of completion at that date.

Energy trading operations are recognised net of purchases.

##### 1.3.7.1 Capacity mechanism

Capacity mechanisms have been set up in France and the UK to ensure secure power supplies during peak periods.

- **French system:** French law 2010-1488 of 7 December 2010 on the new organisation of the electricity market introduced an obligation in France to contribute to power supply security from January 2017.

Operators of electricity generation facilities and load-shedding operators must have their capacities certified by RTE, and commit to a forecast level of availability for a given year of delivery. In return, they are awarded capacity certificates. Meanwhile, electricity suppliers and purchasers of power to compensate for networks losses (obligated actors) must have capacity certificates equivalent to consumption by their customers in peak periods.

The system is completed by registers for trading of capacities between actors. Capacity auctions are held several times a year.

The Group is concerned by both aspects of this system, both as an operator of electricity installations (EDF SA, Dalkia, EDF Énergies Nouvelles) and as an electricity supplier (EDF SA, Électricité de Strasbourg) and a purchaser of power to compensate for networks losses (Enedis and Électricité de Strasbourg).

The operations are recorded as follows:

- sales of certificates are recognised in income when the auctions or over-the-counter sales take place;
- stocks of certificates are stated either at their certification value (*i.e.* cost of certification by RTE) or at their purchase value on the markets;
- decreases in the stock of certificates are valued at the weighted average unit cost. The timing of recognition depends on the actor:
  - operators of installations: when the auction sales take place,
  - obligated actors: spread on a straight-line basis over the 5-month peak period;
- for obligated actors, if there is a shortfall in the stocks of capacity certificates, a provision is recorded equivalent to the best estimate of the expense necessary to extinguish the obligation;
- at the closing date, if the realisable value of the stock of capacity certificates is lower than its net book value, impairment is recognised.

- **British system:** the British capacity mechanism is based on a system of auctions for operators, organised by the network operator 4 years prior to delivery. Capacity operators which have acquired certificates are remunerated in the year of delivery out of a fund consisting of contributions from electricity suppliers. This remuneration is recorded in sales revenues the same year.

The electricity suppliers' contribution to this mechanism is proportional to their sales to customers in the peak period. This contribution is recognised in expenses over the peak period.

#### 1.3.8 Income taxes

Income taxes include the current tax expense (income) and the deferred tax expense (income), calculated under the tax legislation in force in the countries where earnings are taxable.

In compliance with IAS 12, current and deferred taxes are generally recorded in the income statement or in equity symmetrically to the underlying operation.

Under IAS 32, income taxes on distributions to holders of equity instruments (notably dividends and the remuneration paid to holders of perpetual subordinated bonds) must be recognised in accordance with IAS 12. The Group considers that these distributions are paid out of previous years' accumulated profits and as a result the associated tax effects are included in the net income for the period.

The current tax expense (income) is the estimated amount of tax due on the taxable income for the period, calculated using the tax rates adopted at the year-end.

Deferred taxes result from temporary differences between the book value of assets and liabilities and their tax basis. No deferred taxes are recognised for temporary differences generated by:

- goodwill which is not tax deductible;
- the initial recognition of an asset or liability in a transaction which is not a business combination and does not affect the accounting profit or taxable profit (tax loss) at the transaction date;
- investments in subsidiaries and associates, investments in branches and interests in joint arrangements, when the Group controls the timing of reversal of the temporary differences, and it is probable that the temporary differences will not reverse in the foreseeable future.

Deferred tax assets and liabilities are valued at the expected tax rate for the period in which the asset will be realised or the liability extinguished, based on tax rates adopted at the year-end. If the tax rate changes, deferred taxes are adjusted to the new rate and the adjustment is recorded in the income statement, unless it relates to an underlying for which changes in value are recorded in equity, for example in accounting for actuarial gains and losses or fair value on hedging instruments and available-for-sale financial assets.

Deferred taxes are reviewed at each closing date, to take into account changes in tax legislation and the prospects for recovery of deductible temporary differences. Deferred tax assets are only recognised when it is probable that the Group will have sufficient taxable profit to utilise the benefit of the asset in the foreseeable future, or beyond that horizon, if there are deferred tax liabilities with the same maturity.

Deferred tax assets and liabilities are reported on a net basis, determined at the level of a tax entity or tax group.

### 1.3.9 Earnings per share and diluted earnings per share

Earnings per share is calculated by dividing the Group's share of net income by the weighted average number of shares outstanding over the period. This weighted average number of shares outstanding is the number of ordinary shares at the beginning of the year, adjusted by the number of shares redeemed or issued during the year.

This number, and the earnings per share, are adjusted whenever necessary to reflect the impact of translation or exercise of dilutive potential shares (stock options, stock warrants and convertible bonds issued, etc.).

In compliance with IAS 33, earnings per share and diluted earnings per share are based on the net income for the year after deduction of payments to bearers of perpetual subordinated bonds.

### 1.3.10 Business combinations

In application of IFRS 3 business combinations arising since 1 January 2010 are measured and recognised under the following principles.

At the date of acquisition, the identifiable assets acquired and liabilities assumed, measured at fair value, and any non-controlling interests in the company acquired (minority interests) are recorded separately from goodwill.

Non-controlling interests may be valued either at fair value (full goodwill method) or their share in the fair value of the net assets of the acquired company (partial goodwill method). The decision is made individually for each transaction.

Any acquisition or disposal of an investment in a subsidiary that does not affect control is considered as a transaction between shareholders and must be recorded directly in equity.

If additional interests are acquired in a joint venture, joint operation or associate without resulting in acquisition of control, the value of the previously-acquired assets and liabilities remains unchanged in the consolidated financial statements.

If control is acquired in stages, the cost of the business combination includes the fair value, at the date control is acquired, of the purchaser's previously-held interest in the acquired company.

Related costs directly attributable to an acquisition leading to control are treated as expenses for the periods in which they were incurred, except for issuance costs for debt securities or equity instruments, which must be recorded in compliance with IAS 32 and IAS 39.

IFRS 3 does not apply to common control business combinations, which are examined on a case-by-case basis to determine the appropriate accounting treatment.

Commitments given by the Group to purchase minority interests in Group-controlled companies are included in liabilities. For commitments of this kind given since 1 January 2010, the date of the Group's first application of IAS 27 (amended) and IFRS 3 (revised), the differential between the value of the non-controlling interests and the liability corresponding to the commitment is recorded in equity.

## 1.3.11 Goodwill and other intangible assets

### 1.3.11.1 Goodwill

#### 1.3.11.1.1 Determination of goodwill

In application of IFRS 3, "Business combinations", goodwill is the difference between:

- the sum of the following items:
  - the acquisition-date fair value of the price paid to acquire control,
  - the value of non-controlling interests in the entity acquired, and
  - for acquisitions achieved in stages, the acquisition-date fair value of the Group's share in the acquired entity before it acquired control, and;
- the net value of the assets acquired and liabilities assumed, measured at fair value at the acquisition date.

When this difference is negative it is immediately included in net income.

The fair values of assets and liabilities and the resulting goodwill are finalised within twelve months of the acquisition.

#### 1.3.11.1.2 Measurement and presentation of goodwill

Goodwill on acquisition of subsidiaries is disclosed separately in the balance sheet. Impairment on this goodwill is reported under the heading "Impairment" in the income statement. After initial recognition, goodwill is carried at cost less any impairment recognised.

Goodwill on acquisition of associates and joint ventures is included in the investment's net book value. Impairment on this goodwill is included under the heading "Share in income of associates and joint ventures".

Goodwill is not amortised, but impairment tests are carried out as soon as there is an indication of possible loss of value, and at least annually, as described in note 1.3.15.

### 1.3.11.2 Other intangible assets

#### 1.3.11.2.1 Research and development expenses

Research expenses are recognised as expenses in the financial period incurred.

Development costs that qualify for capitalisation under IAS 38 are included in intangible assets and amortised on a straight-line basis over their foreseeable useful life.

#### 1.3.11.2.2 Other self-produced or purchased intangible assets

Other intangible assets mainly comprise:

- software, which is amortised on a straight-line basis over its useful life;

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- purchased brands with an indefinite useful life, or amortised on a straight-line basis over their useful life;
- operating or usage rights for power plants, which are amortised on a straight-line basis over the useful life of the underlying asset;
- rights or licenses relating to hydrocarbon concessions, which are amortised under the Unit Of Production (UOP) method, and exploration expenses amortised over the year (see note 1.3.11.2.3);
- intangible assets related to environmental regulations (greenhouse gas emission rights and renewable energy certificates acquired for a consideration – see note 1.3.27);
- the positive value of energy purchase/sale contracts stated at fair value as part of a business combination governed by IFRS 3: this value is amortised as the contractual deliveries take place;
- assets related to concession contracts governed by IFRIC 12, under the “intangible model” (see note 1.3.13.2.4);
- technology related to activities as designer and supplier of nuclear steam supply systems and manufacturer of control rod clusters and nuclear fuel (Framatome) including codes and methods, EPR technology, patents and manufacturing processes, all amortised over their useful life;
- purchased customer contracts and relations, amortised over their useful life.

### 1.3.11.2.3 Hydrocarbon prospecting, exploration and generation

The Group applies IFRS 6, “Exploration for and Evaluation of Mineral Resources”.

Prospection and exploration costs and costs incurred in connection with geological surveys, exploration tests, geological and geophysical mapping and exploratory drilling are recognised as intangible assets and fully amortised in the year they are incurred.

Development costs related to commercially viable mineral wells and investments in facilities to extract and store hydrocarbons are recognised as “Property, plant and equipment used in generation and other tangible assets owned by the Group” or “Property, plant and equipment operated under concessions for other activities” as appropriate.

They are amortised under the Unit Of Production (UOP) method.

### 1.3.12 Concession assets, generation assets and other property, plant and equipment

The Group’s property, plant and equipment is reported under three balance sheet headings, as appropriate to the business and contractual circumstances of their use:

- property, plant and equipment operated under French public electricity distribution concessions;
- property, plant and equipment operated under concessions for other activities;
- property, plant and equipment used in generation and other tangible assets owned by the Group.

#### 1.3.12.1 Initial measurement

Property, plant and equipment is recorded at acquisition or production cost.

- The cost of facilities developed in-house includes all labour and materials costs, and all other production costs that can be included in the construction of the asset.
- Borrowing costs attributable to the financing of an asset incurred during the construction period are included in the value of the asset provided it is a qualifying asset as defined by IAS 23 “Borrowing costs”.
- The cost of property, plant and equipment also includes the initial estimate of decommissioning costs. These assets are associated with the provisions recorded to cover decommissioning obligations. At the date of commissioning, property, plant and equipment is measured and recorded in the same way as the corresponding provision (see note 1.3.21).

- Decommissioning costs for nuclear generation installations also include last core costs (see note 1.3.21).

When some of the decommissioning costs for a plant are to be borne by a partner, the expected reimbursement is recognised as accrued income in the assets. The difference between the provision and the accrued income is recorded in Property, plant and equipment, and subsequent payments by the partner are deducted from the accrued income.

The Group capitalises safety expenses incurred as a result of legal and regulatory obligations sanctioning non-compliance by an administrative ban from operation.

Strategic safety spare parts for generation facilities are treated as property, plant and equipment, and depreciated over the residual useful life of the installations.

The costs of major inspections that are necessary for continued operation by generation assets are capitalised and amortised over a period corresponding to the time elapsing between two inspections.

When a part of an asset has a different useful life from the overall asset’s useful life, it is identified as an asset component and depreciated over a specific period.

#### 1.3.12.2 Depreciation

Items of property, plant and equipment are depreciated on a straight-line basis over their useful life, defined as the period during which the Group expects to draw future economic benefits from their use.

Depending on each country’s specific regulations and contractual arrangements, the expected useful lives for the main facilities are as follows:

- hydroelectric dams 75 years
- electromechanical equipment used in hydropower plants 50 years
- fossil-fired power plants 25 to 45 years
- nuclear generation facilities:
  - in France 40 to 50 years
  - outside France 35 to 60 years
- transmission and distribution installations (lines, substations) 20 to 50 years
- wind farm and photovoltaic facilities 20 to 25 years

### 1.3.13 Concession agreements

#### 1.3.13.1 Accounting treatment

The accounting treatment of public and private agreements depends on the nature of the agreements and their specific contractual features.

For most of its concessions, other than concessions for heat generation and distribution, the Group considers that in substance the grantors do not have the characteristic features of control over infrastructures as defined in IFRIC 12.

#### 1.3.13.2 French concessions

In France, the Group is the operator for four types of public service concessions:

- public electricity distribution concessions in which the grantors are local authorities (municipalities or syndicated municipalities);
- hydropower concessions with the State as grantor;
- the public transmission network operated under concession from the State;
- concessions from public grantors for heat generation and distribution.

##### 1.3.13.2.1 Public electricity distribution concessions

###### General background

Since the enactment of the French Law of 8 April 1946, the EDF group has by law been the sole operator for the main public distribution concessions in France.

The accounting treatment of concessions is based on the concession agreements, with particular reference to their special clauses. It takes into consideration the possibility that the EDF group may one day lose its status as the sole authorised State concession operator.

These agreements generally cover terms of between 20 and 30 years, and use standard concession rules deriving from the 1992 Framework Contract (updated in 2007) negotiated with the National Federation of Licensing Authorities (*Fédération nationale des collectivités concédantes et régies* – FNCCR) and approved by the public authorities.

### Recognition of assets as property, plant and equipment operated under French public electricity distribution concessions

All assets used by the EDF group in public electricity distribution concessions in France, whether they are owned by the grantor or the operator, are reported together on a specific line in the balance sheet assets at acquisition cost, or their estimated value at the transfer date when supplied by the grantor.

#### 1.3.13.2.2 Hydropower concessions

Hydropower concessions follow standard rules approved by decree. Hydropower concession assets consist solely of hydropower generation equipment (dams, pipes, turbines, etc.) for initial concessions. In other concessions, they comprise hydropower generation equipment and switching facilities (alternators, etc).

Assets used in these concessions, whether operated under the concession agreement or owned by the EDF group, are recorded under "Property, plant and equipment operated under concessions for other activities" at acquisition cost.

#### 1.3.13.2.3 Public transmission concession

Under French law, assets assigned to the public transmission concession belong to RTE Réseau de Transport d'Électricité (RTE). Following the Group's loss of control over RTE from 31 December 2010, these assets are included in calculating the equity value of RTE in the consolidated balance sheet.

#### 1.3.13.2.4 Heat generation and distribution concessions

Heat generation and distribution concession agreements signed by Dalkia with public authorities confer the right to operate facilities remitted by or constructed at the request of those authorities for a limited period, under the grantor's supervision.

These agreements set the terms for remuneration and transfer of the facilities to the grantor or another operator succeeding the grantor at the end of the agreement.

The assets are recorded as intangible assets, in accordance with IFRIC 12 "Service concession agreements".

#### 1.3.13.3 Foreign concessions

Foreign concessions are governed by a range of contracts and national laws. Most assets operated under foreign concessions are recorded under "Property, plant and equipment operated under concessions for other activities". Foreign concessions essentially concern Edison in Italy, which operates hydrocarbon generation sites, gas storage sites, local gas distribution networks and hydropower generating plants under concessions. Edison owns all the assets except for some items of property, plant and equipment on the hydropower generation sites, which will be returned to the grantor for nil consideration or with an indemnity when the concession ends. In compliance with IFRIC 12, certain concession agreements are recorded as intangible assets.

Hydropower generation assets which will be returned for nil consideration at the end of the concession are depreciated over the duration of the concession. Hydrocarbon generation sites are recorded in compliance with the rules applicable to the sector (see note 1.3.11.2.3).

### 1.3.14 Leases

In the course of its business the Group uses assets made available to it, or makes assets available to lessees, under lease contracts. These contracts are analysed in the light of the situations described and indicators provided in IAS 17 in order to determine whether they are finance leases or operating leases.

#### 1.3.14.1 Finance leases

Contracts that effectively transfer substantially to the lessee all risks and benefits inherent to ownership of the leased item are classified as finance leases. The main criteria examined in determining whether substantially all the risks and benefits are transferred by an agreement are the following:

- the ratio of the duration of the lease to the leased asset's economic life;
- total discounted future payments as a ratio of the fair value of the financed asset;
- whether ownership is transferred at the end of the lease;
- whether the purchase option is attractive;
- the features specific to the leased asset.

Assets used under finance leases are derecognised from the lessor's balance sheet and included in the relevant category of property, plant and equipment in the lessee's accounts. Such assets are depreciated over their useful life, or the term of the lease contract when this is shorter.

A corresponding financial liability is booked by the lessee, and a financial asset by the lessor.

If the Group performs a sale and leaseback operation resulting in a finance lease agreement, this is recognised in accordance with the principles described above. If the transfer price is higher than the asset's book value, the surplus is deferred and recognised as income progressively over the term of the lease.

#### 1.3.14.2 Operating leases

Lease agreements that do not qualify as finance leases are classified and recognised as operating leases. Rental charges are spread over the duration of the lease agreement on a straight-line basis.

#### 1.3.14.3 Arrangements containing a lease

In compliance with IFRIC 4, the Group identifies arrangements that do not have the legal form of a lease contract but nonetheless convey the right to control the use of an asset or group of specific assets to the purchaser.

Such arrangements are treated as leases, and analysed with reference to IAS 17 for classification as either finance or operating leases.

### 1.3.15 Impairment of goodwill, intangible assets and property, plant and equipment

At the year-end and at each interim reporting date, in application of IAS 36, the Group assesses whether there is an indication that an asset could have been significantly impaired. An impairment test is also carried out at least once a year on cash-generating units (CGUs) or groups of CGUs including an intangible asset with an indefinite useful life, or to which goodwill has been partly or totally allocated.

Impairment tests are carried out as follows:

- the Group measures any long-term asset impairment by comparing the carrying value of these assets and goodwill, grouped into CGUs where necessary, and their recoverable amount;
- CGUs are groups of homogeneous assets that generate identifiable independent cash flows. They reflect the way activities are managed in the Group: they may be subgroups when the activity is optimised across the whole subgroup, or CGUs formed by parts of subgroups corresponding to different types of activity that are managed separately (fossil-fired generation, renewable energy production, services). Goodwill is allocated to the CGUs that benefit from synergies resulting from the acquisition;
- the recoverable value of these CGUs is the higher of fair value net of disposal costs, and value in use. When this recoverable value is lower than the carrying amount in the balance sheet, an amount equal to the difference is booked under the heading "Impairment". The loss is allocated first to goodwill, and any surplus to the other assets of the CGU concerned;

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- fair value is the asset's potential sale price in a normal transaction between economic actors;
- value in use is calculated based on projected future cash flows:
  - over a horizon that is coherent with the asset's useful life and/or operating life,
    - for certain intangible assets with an indefinite useful life (such as brands), beyond the horizon that can be observed or modelled, a terminal value is determined by discounting to infinity a normative cash flow,
  - excluding development projects other than those that have been decided at the valuation date,
  - and discounted at a rate that reflects the risk profile of the asset or CGU;
- the discount rates used are based on the weighted average cost of capital (WACC) for each asset or group of assets concerned, determined by geographical area and by business segment under the CAPM. WACC is calculated after taxes;
- future cash flows are calculated on the basis of the best available information at the valuation date:
  - for the first few years, the flows correspond to the Medium-Term Plan (MTP). Over the MTP horizon, energy and commodity prices are determined based on available forward prices, taking hedges into consideration;
  - beyond the MTP horizon, cash flows are estimated based on long-term assumptions prepared for each country and each energy, using a process that is updated annually. Medium and long-term electricity prices are constructed analytically by assembling blocks of assumptions, e.g. economic growth, commodity prices (oil, gas, coal) and CO<sub>2</sub>, demand for electricity, interconnections, and developments in the energy mix (rise of renewable energies, installed nuclear capacity, etc.) with fundamental models of supply-demand balance. The Group refers in particular to external analyses for each assumption object (for example, for commodities and CO<sub>2</sub>, which are primary factors in electricity prices, the Group compares its own scenarios with scenarios developed by organisations such as the AIE, IHS or Wood Mackenzie, bearing in mind that each of these analysts itself proposes a cone of scenarios corresponding to different macro-economic environments);
  - income from capacity market mechanisms is also taken into consideration in valuing generation assets, starting from the MTP horizon where relevant, provided the countries concerned have introduced or announced the future introduction of a capacity remuneration mechanism.

These calculations may be influenced by several variables:

- changes in discount rates;
- changes in market prices for energy and commodities and tariff regulations;
- changes in demand and the Group's market share, and the attrition rate on customer portfolios;
- the useful life of facilities, or the duration of concession agreements where relevant;
- the growth rates used beyond the medium-term plans and where relevant the terminal values taken into consideration.

Impairment recognised on goodwill is irreversible.

### 1.3.16 Financial assets and liabilities

Financial assets include available-for-sale assets (non-consolidated investments, investment securities and certain dedicated assets), loans and receivables at amortised cost, including trade receivables, and the positive fair value of derivatives.

Available-for-sale securities allocated to dedicated assets are presented in note 47.

Financial liabilities comprise loans and other financial liabilities, trade payables, bank credit and the negative fair value of financial derivatives.

Financial assets and liabilities are recorded in the balance sheet as current if they mature within one year and non-current if they mature after one year, apart from derivatives held for trading, which are all classified as current.

Operating debts and receivables, and cash and cash equivalents, are governed by IAS 39 and reported separately in the balance sheet.

#### 1.3.16.1 Valuation of financial assets and liabilities

Financial instruments are stated at fair value, which corresponds to the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction on the principal or most advantageous market at the measurement date.

The valuation methods for each level are generally as follows:

- level 1 (unadjusted quoted prices): prices accessible to the entity at the measurement date on active markets, for identical assets or liabilities;
- level 2 (observable data): data concerning the asset or liability, other than the market prices included in initial level 1 input, which are directly observable (such as a price) or indirectly observable (i.e. deducted from observable prices);
- level 3 (non-observable data): data that are not observable on a market, including observable data that have been significantly adjusted. In the EDF group this chiefly concerns certain non-consolidated investments.

##### 1.3.16.1.1 Financial assets and liabilities carried at fair value with changes in fair value included in income

Financial assets carried at fair value with changes in fair value included in the income statement are classified as such at the inception of the operation if:

- they were acquired from the outset with the intention of resale in the short term;
- they are derivatives not classified as hedges (derivatives held for trading);
- the Group has elected to include them in this category under the option allowed by IAS 39.

These assets are recorded at the transaction date at fair value, which is generally equal to the amount of cash paid out. Transaction costs directly attributable to the acquisition are recorded in the income statement. At each subsequent reporting date they are adjusted to fair value, based on quoted prices available from external sources for listed financial instruments, or using recognised valuation techniques such as the discounted cash flow method or reference to external sources for other financial instruments.

Changes in fair value other than those concerning commodity contracts are recorded in the income statement under the heading "Other financial income and expenses".

Dividends and interest received on assets carried at fair value are recorded in the income statement under "Other financial income".

Changes in the fair value of commodity trading contracts are recorded in the income statement under "Sales".

Changes in the fair value of non-trading commodity transactions are reported separately on a specific line of the income statement, "Net changes in fair value on Energy and Commodity derivatives, excluding trading activities" below the operating profit before depreciation and amortisation. These are transactions that come under the scope of IAS 39, which for accounting purposes are not eligible for hedge accounting or the IAS 39 "own use" exemption (see note 1.3.16.1.6).

Regarding the fair value option, the Group classifies an asset or liability "at fair value with changes in fair value included in income" in the three following circumstances:

- when using fair value eliminates or significantly reduces an inconsistency in the measurement of assets and liabilities;
- when the performance of a group of financial assets or financial liabilities is managed on a fair value basis, in accordance with documented strategies and the reporting to management;
- when a contract contains one or more embedded derivatives. In such cases the fair value option may be applied to the hybrid instrument, unless:
  - the embedded derivative does not substantially affect the cash flows of the contract,
  - analysis of the host contract and the embedded derivative does not lead to separation of this embedded derivative.

### 1.3.16.1.2 Held-to-maturity financial assets

This category covers fixed-term investments which the Group acquires with the intent and ability to hold to maturity. They are recorded at amortised cost at the transaction date. Interest is calculated at the effective interest rate and recorded in the income statement under the heading "Other financial income and expenses".

### 1.3.16.1.3 Loans and financial receivables

Loans and financial receivables are valued and recorded at the transaction date, at amortised cost less any impairment.

Interest is calculated at the effective interest rate and recorded in the income statement under the heading "Other financial income and expenses".

### 1.3.16.1.4 Available-for-sale financial assets

Available-for-sale financial assets comprise non-consolidated investments, investment securities, reserved funds and certain dedicated assets.

On initial recognition, available-for-sale financial assets are recorded at fair value plus transaction costs attributable to their acquisition. They are subsequently readjusted to fair value at each reporting date.

Fair value measurement is based on quoted prices available from external sources for financial instruments listed on an active market, and on the discounted cash flow method for other financial instruments. Shares not listed on an active market for which fair value cannot be reliably estimated are recorded at acquisition cost.

Unrealised gains or losses on these assets are recorded in equity, unless there is evidence of a realised loss, in which case impairment is recognised in the financial result (see note 1.3.16.2.2).

For available-for-sale financial assets represented by debt securities, interest income is calculated at the effective interest rate and credited to the income statement under the heading "Other financial income and expenses".

### 1.3.16.1.5 Loans and financial liabilities

When specific hedge accounting treatments are not applied (see note 1.3.16.1.6 (A)), loans and financial liabilities are recorded at amortised cost, with separation of embedded derivatives where applicable. Interest expenses are calculated at the effective interest rate and recorded in the income statement under the heading "Cost of gross financial indebtedness" over the duration of the loan or financial liability.

### 1.3.16.1.6 Derivatives

#### Scope

The scope of derivatives applied by the Group corresponds to the principles set out in IAS 39.

In particular, forward purchases and sales for physical delivery of energy or commodities are considered to fall outside the scope of application of IAS 39 when the contract concerned is considered to have been entered into as part of the Group's normal business activity ("own use"). This is demonstrated to be the case when all the following conditions are fulfilled:

- a physical delivery takes place under all such contracts;

- the volumes purchased or sold under the contracts correspond to the Group's operating requirements;
- the contracts cannot be considered as options as defined by the standard. In the specific case of electricity sale contracts, the contract is equivalent to a firm forward sale or can be considered as a capacity sale.

The Group considers that transactions negotiated with a view to balancing the volumes between electricity purchase and sale commitments are part of its business as an integrated electricity operator, and are outside the scope of IAS 39.

In compliance with IAS 39, the Group analyses all its contracts, of both financial and non-financial nature, to identify the existence of any "embedded" derivatives. Any component of a contract that affects the cash flows of that contract in the same way as a stand-alone derivative corresponds to the definition of an embedded derivative. If they meet the conditions set out by IAS 39, embedded derivatives are accounted for separately from the host contract at inception date.

#### Measurement and recognition

Derivatives are initially recorded at fair value, based on quoted prices and market data available from external sources. If no quoted prices are available, the Group may refer to recent comparable transactions or if no such transactions exist base its valuation on internal models that are recognised by market participants, giving priority to information directly derived from observable data, such as over-the-counter listings.

Changes in the fair value of these derivatives are recorded in the income statement, unless they are designated as hedges for a cash flow or net investment. Changes in the fair value of such hedging instruments are recorded directly in equity, excluding the ineffective portion of the hedge.

In the specific case of financial instruments entered into as part of the trading business, realised and unrealised gains and losses are reported net under the heading "Sales".

In application of IFRS 13, the fair value of derivatives incorporates the counterparty credit risk for derivative assets and the own credit risk for derivative liabilities. The probabilities of default used to calculate these credit risks are based on historical data.

#### Derivatives classified as hedges

The EDF group uses derivatives to hedge its foreign exchange and interest rate risks, as well as risks related to certain commodity contracts.

The Group applies the criteria defined by IAS 39 to classify operations for hedge accounting purposes:

- the instrument must hedge changes in fair value or cash flows attributable to the risk hedged, and the effectiveness of the hedge (*i.e.* the degree to which changes in the value of the hedging instrument offset changes in the value of the hedged item or future transaction) must be between 80% and 125%;
- in the case of cash flow hedges, the future transaction being hedged must be highly probable;
- reliable measurement of the effectiveness of the hedge must be possible;
- the hedge must be supported by appropriate documentation from its inception.

The hedging relationship ends when:

- a derivative ceases to be an effective hedging instrument;
- a derivative expires, or is sold, terminated or exercised;
- the hedged item expires, is sold or redeemed;
- a future transaction ceases to be considered as highly probable.

Only derivatives external to the Group, and internal derivatives that are matched with similar transactions external to the Group, qualify for hedge accounting.

The Group uses the following categories for hedges:

### (A) Fair value hedges

These instruments hedge the exposure to changes in the fair value of an asset or liability recorded in the balance sheet, or a firm commitment to purchase or sell an asset. Changes in the fair value of the hedged item attributable to the hedged component of that item are recorded in the income statement and offset by corresponding variations in the fair value of the hedging instrument. Only the ineffective portion of the hedge has an impact on income.

Loans and financial liabilities include bonds that are covered by a fair value hedge. In application of hedge accounting, their balance sheet value is adjusted for changes in fair value attributable to the hedged risks (foreign exchange and interest rate risks).

### (B) Cash flow hedges

These instruments hedge highly probable future transactions: the variability in cash flows generated by the hedged transaction is offset by changes in the value of the hedging instrument.

The effective portion of accumulated changes in the hedge's fair value is recorded in equity, and the ineffective portion (*i.e.* changes in the fair value of the hedging instrument in excess of changes in the fair value of the hedged item) is recorded in the income statement.

When the hedged cash flows materialise, the amounts previously recognised in equity are transferred to the income statement in the same way as for the hedged item.

### (C) Hedges of a net investment

These instruments hedge exposure to the foreign exchange risk related to a net investment in an entity which does not have the same functional currency as the Group. The effective portion of accumulated changes in the hedge's fair value is recorded in equity until the disposal or liquidation of the net investment, when it is included in the gain or loss on disposal. The ineffective portion (defined in the same way as for cash flow hedges) is recorded directly in the income statement.

The change in fair value resulting from the foreign exchange effect and interest rate effect of derivatives hedging a net investment in a foreign operation is recorded in equity.

### 1.3.16.2 Impairment of financial assets

At the year-end and at each interim reporting date, the Group assesses whether there is any objective evidence that an asset could have been significantly impaired. If so, the Group estimates the asset's recoverable value and records any necessary impairment as appropriate for the category of asset concerned.

#### 1.3.16.2.1 Impairment of financial assets recorded at amortised cost

Impairment is equal to the difference between the asset's net book value and the discounted value of expected future cash flows, using the original effective interest rate of the financial instrument. The impairment is included in the income statement under the heading "Other financial income and expenses". If the impairment loss decreases in a subsequent period, the amount of the decrease is reversed and transferred to the income statement.

#### 1.3.16.2.2 Impairment of available-for-sale financial assets

If there is a substantial, long-term decline in the fair value of available-for-sale assets, the unrealised loss is reclassified from equity to income. For debt instruments, impairment is only recorded in income when there is an indication of impairment associated with the counterparty. If the fair value of an available-for-sale financial asset rises in a subsequent period, the increase in value is included in equity when it concerns equity instruments, and leads to a reversal from previously-recorded impairment when it concerns debt instruments.

Different criteria for impairment apply to different types of available-for-sale financial assets.

For available-for-sale financial assets (other than dedicated assets) held by controlled companies, the Group generally uses the following criteria to assess impairment:

- 3 years as the threshold for assessment of long-term loss of value;
- a 50% decline from historical cost as indication of a significant loss of value.

For available-for-sale financial assets held as part of EDF's dedicated asset portfolio, the Group uses the following criteria to assess impairment:

- a 5-year period as the threshold for assessment of a long-term loss of value;
- a 40% decline from historical portfolio value as indication of a significant loss of value.

In assessing impairment of dedicated assets, the Group takes into consideration factors specific to their nature: legal and regulatory obligations associated with the funds concerned, the timing of the payments they are to finance, and long-term management of the funds.

### 1.3.16.3 Derecognition of financial assets and liabilities

The Group derecognises a financial asset when:

- the contractual rights to the cash flows generated by the asset expire; or
- the Group transfers the rights to receive contractual cash flows related to the financial asset through the transfer of substantially all of the risks and benefits associated with ownership of the asset.

Any interest created or retained by the Group in transferred financial assets is recorded as a separate asset or liability.

The Group derecognises a financial liability when its contractual obligations are extinguished, cancelled or expire. When a debt is renegotiated with a lender on substantially different terms, a new liability is recognised.

### 1.3.16.4 Assignment of receivables

When it can be demonstrated that the Group has transferred substantially all the risks and benefits related to assignment of receivables, particularly the credit risk, the items concerned are derecognised.

Otherwise, the operation is considered as a financing operation, and the receivables remain in the balance sheet assets, with recognition of a corresponding financial liability.

### 1.3.16.5 Offsetting financial assets and liabilities

The Group offsets financial assets and liabilities when:

- there is a legally enforceable right to set off the recognised amounts; and
- the intent is either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

In application of IFRS 7, disclosures are provided in the notes to the consolidated financial statements to indicate the actual or potential impact of the offsetting agreement.

### 1.3.17 Inventories

Inventories are recognised at the lower of acquisition cost or net realisable value, except for inventories held for trading activities, which are carried at market value. Inventories consumed are generally valued by the weighted average unit cost method.

Cost includes all direct material costs, labour costs, and a share of indirect production costs.

#### 1.3.17.1 Nuclear fuel and materials

Inventory accounts include:

- nuclear materials, whatever their form during the fuel production cycle;
- and fuel components in the warehouse or in the reactor.



The stated value of nuclear fuel and materials and work-in-progress is determined based on direct processing costs including materials, labour and subcontracted services (e.g. fluorination, enrichment, production, etc.).

In accordance with regulatory obligations specific to each country, inventories of fuel (new or not entirely consumed) may also comprise expenses for spent fuel management and long-term radioactive waste management, with corresponding provisions or debts in the liabilities, or full and final payments made when the fuel is loaded.

In compliance with IAS 23, interest expenses incurred in financing inventories of nuclear fuels are charged to expenses for the period provided these inventories are manufactured in large quantities on a repetitive basis.

Nuclear fuel consumption is determined as a proportion of the expected output when the fuel is loaded in the reactor. These quantities are valued at weighted average cost of inventories. Inventories are periodically corrected in view of forecast spent quantities based on neutronic measurements and physical inventories.

### 1.3.17.2 Other operating inventories

Other operating inventories comprise:

- fossil fuels required for operation of fossil-fired power plants;
- operating materials and equipment such as spare parts supplied under a maintenance programme (excluding capitalised strategic safety spare parts);
- certificates issued under the various environmental schemes (see note 1.3.27);
- certificates issued under capacity obligation mechanisms (capacity guarantees in France) (see note 4.3);
- goods and services in progress, particularly relating to the businesses of EDF Énergies Nouvelles, Dalkia and Framatome;
- gas stocks.

Other non-trading operating inventories are generally valued at weighted average cost including direct and indirect purchasing costs.

Impairment of spare parts principally depends on the turnover of these parts.

Inventories held for trading purposes are stated at market value.

### 1.3.18 Trade receivables

Trade receivables are initially recognised at the fair value of the consideration received or receivable. Impairment is recorded when, based on the probability of recovery assessed according to the type of receivable, their carrying amount falls below their book value. Depending on the nature of the receivable, the risk associated with doubtful receivables is assessed individually or by experience-based statistical methods.

Trade receivables also include the value of unbilled receivables for energy already supplied.

### 1.3.19 Cash and cash equivalents

Cash and cash equivalents comprise immediately available liquidities and very short-term investments that are readily convertible into a known amount of cash, usually maturing within three months or less of the acquisition date, and with negligible risk of fluctuation in value.

Securities held short-term and classified as "Cash equivalents" are recorded at fair value, with changes in fair value included in the heading "Other financial income and expenses".

## 1.3.20 Equity

### 1.3.20.1 Fair value adjustment of financial instruments

The fair value adjustment of financial instruments results from the restatement to fair value of available-for-sale financial assets and certain hedging instruments.

### 1.3.20.2 Share issue expenses

Share issue expenses correspond exclusively to external costs expressly related to the capital increase. They are charged against the issue premium at their net-of-tax value.

Other expenses are classified as expenses of the period.

### 1.3.20.3 Treasury shares

Treasury shares are shares issued by EDF and held either by that company or by other entities in the consolidated Group. They are valued at acquisition cost and deducted from equity until the date of disposal. Net gains or losses on disposals of treasury shares are directly included in equity and do not affect net income.

### 1.3.20.4 Perpetual subordinated bonds

In 2013 and 2014 EDF issued perpetual subordinated bonds comprising several tranches in euros, US dollars and pounds sterling (a "hybrid" bond issue). These bonds are redeemable at the initiative of EDF after a minimum period that depends on the specific terms of the issue, and subsequently at each coupon date or in the event of highly specific circumstances (such as a change in IFRS or tax regime). The annual yield is fixed and reviewable based on contractual clauses that vary according to the specific terms of the issue. There is no obligation for EDF to make any payment, due to the existence of contractual clauses that allow it to defer payment indefinitely. However, those clauses stipulate that deferred payments must be made if it is decided to pay dividend to EDF's shareholders. All these features give EDF an unconditional right to avoid paying out cash or another financial asset in redemption or interest on the principal. Consequently, in compliance with IAS 32, these bonds are recorded in equity and any payment made is treated as dividends.

## 1.3.21 Provisions other than employee benefit provisions

The Group recognises provisions when it has a present obligation (legal or constructive) arising from a past event, an outflow of resources will probably be required to settle the obligation, and the obligation amount can be estimated reliably.

If it is anticipated that all or part of the expenses covered by a provision will be reimbursed, the reimbursement is recognised under receivables if and only if the Group is virtually certain of receiving it.

Provisions are determined based on the Group's expectation of the cost necessary to settle the obligation. Estimates are based on management data from the information system, assumptions adopted by the Group, and if necessary experience of similar transactions, or in some cases based on independent expert reports or contractor quotes. The various assumptions are reviewed for each closing of the accounts.

The expected costs are estimated based on year-end economic conditions and spread over a forecast disbursement schedule. They are then adjusted to Euros of the year of payment through application of a forecast long-term inflation rate and discounted to present value using a nominal discount rate. The provisions are based on these discounted future cash flows.

The rate of inflation and the discount rate are based on the economic and regulatory parameters of the country where the economic entity is located, considering the long operating cycle of the Group's assets and the maturities of commitments.

# 6. FINANCIAL STATEMENTS

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The discount effect generated at each closing to reflect the passage of time is recorded under "Discount effect" in financial expenses.

In extremely rare situations, a provision cannot be booked due to lack of a reliable estimate. In such cases, the obligation is mentioned in the notes as a contingent liability, unless there is little likelihood of an outflow of resources.

### 1.3.21.1 Provisions related to nuclear generation

Provisions related to nuclear generation mainly cover the following:

- back-end nuclear cycle expenses: provisions for spent fuel management, for waste removal and conditioning and long-term radioactive waste management are established in accordance with the obligations and final contributions specific to each country;
- costs for decommissioning power plants and losses relating to fuel in the reactor when the reactor is shut down (provision for last cores).

Last core expenses correspond to the loss on fuel in the reactor that is not totally spent at the time of final reactor shutdown and cannot be reused due to technical and regulatory constraints, and the cost of fuel processing, and removal and storage of the resulting waste.

Changes in provisions resulting from a change in discount rates, a change in the disbursement schedule or a change in contractor quote are recorded:

- as an increase or decrease in the corresponding assets, up to the net book value, if the provision was initially covered by balance sheet assets (decommissioning of plants still in operation, long-term management of the radioactive waste resulting from such decommissioning, and last cores);
- in the income statement in all other cases.

Detailed information on the principles for determining provisions related to nuclear generation in France and the United Kingdom is given in note 29.

### 1.3.21.2 Other provisions

Other provisions primarily concern:

- contingencies related to subsidiaries and investments;
- tax liabilities;
- litigation;
- onerous contracts and losses on completion;
- environmental schemes.

Provisions for onerous contracts primarily relate to multi-year agreements for the purchase or sale of energy:

- losses on energy purchase agreements are measured by comparing the acquisition cost under the contractual terms with the forecast market price;
- losses on energy sale agreements are measured by comparing the estimated income under the contractual terms with the cost of the energy to be supplied.

The revenues and margin on Framatome's long-term contracts are recorded under the percentage-of-completion method. When the estimated result upon completion is negative, the loss is immediately recorded in profit and loss, after deducting the loss already recognised under the percentage-of-completion method, and a provision is booked.

Provisions for environmental schemes are established to cover the shortfall in greenhouse gas emission quotas and renewable energy certificates compared to the assigned targets (see note 1.3.27).

In extremely rare cases, description of a specific litigation covered by a provision may be omitted from the notes to the financial statements if such disclosure could cause serious prejudice to the Group.

### 1.3.22 Provisions for employee benefits

The Group grants its employees post-employment benefits (pension plans, retirement indemnities, etc.) and other long-term benefits (e.g. long-service awards) in compliance with the specific laws and measures in force in each country where it does business.

#### 1.3.22.1 Calculation and recognition of employee benefits

Obligations under defined-benefit plans are calculated by the projected unit credit method, which determines the present value of entitlements earned by employees at year-end under all types of plan, taking into consideration the prospects for wage increases and each country's specific economic conditions.

Post-employment benefit obligations are valued mainly using the following methods and assumptions:

- retirement age, determined on the basis of the applicable rules for each plan, and the requirements to qualify for a full pension;
- career-end salary levels, with reference to employee seniority, projected salary levels at the time of retirement based on the expected effects of career advancement, and estimated trends in pension levels;
- forecast numbers of pensioners, determined based on employee turnover rates and mortality data available in each country;
- reversion pensions where relevant, taking into account both the life expectancy of the employee and his/her spouse and the marriage rate;
- a discount rate that depends on the geographical zone and the duration of the obligations, determined at the year-end date by reference to the market yield on high-quality corporate bonds or the rate on government bonds whose duration is coherent with EDF group's commitments to employees.

The amount of the provision corresponds to the value of obligations less the fair value of the fund assets that cover those obligations.

The net expense booked during the year for employee benefit obligations includes:

- in the income statement:
  - the current service cost, corresponding to additional benefit entitlements earned during the year,
  - the net interest expense, corresponding to interest on obligations net of the return on fund assets, which is calculated using the same discount rate as for the obligations,
  - the past service cost, including the income or expense related to amendments or settlements of benefit plans or introduction of new plans,
  - the actuarial gains and losses relating to other long-term benefits;
- in other components of consolidated comprehensive income:
  - the actuarial gains and losses relating to post-employment benefits,
  - the effect of the limitation to the asset ceiling if any.

#### 1.3.22.2 Post-employment benefit obligations

When they retire, Group employees benefit from pensions determined under local rules. They may also be entitled to benefits directly paid by the companies, and additional benefits prescribed by the relevant regulations.

##### 1.3.22.2.1 French entities covered by the IEG system

Entities belonging to the specific IEG (electricity and gas) sector system, namely EDF, Enedis (formerly ERDF), RTE, Électricité de Strasbourg, EDF PEI, Dunkerque LNG and certain subsidiaries of the TIRU subgroup, are Group companies where almost all employees benefit from the IEG statutes, including the special pension system and other statutory benefits.

Since the financing reform for the IEG sector system took effect on 1 January 2005, the CNIIEG (Caisse nationale des IEG, the sector's specific pension body) has managed not only the special IEG pension system, but also the industrial accident, invalidity and death insurance system for the sector.

The CNIIEG is a social security body governed by private law, formed by the Law of 9 August 2004. It has legal entity status and reports to the French government, operating under the joint supervision of France's Ministers for the Budget, Social Security and Energy.

Under the funding arrangements introduced by the Law, IEG sector companies establish pension provisions to cover entitlements not funded by France's standard systems (CNAV, AGIRC and ARRCO), to which the IEG system is affiliated, or by the CTA (*contribution tarifaire d'acheminement*) levy on gas and electricity transmission and distribution services.

As a result of this funding mechanism, any change (whether favourable or unfavourable to employees) in the standard French pension system that is not passed on to the IEG pension system is likely to cause a variation in the amount of the provisions recorded by the Group to cover its obligations.

The obligations concerned by the pensions and for which a provision is recorded thus include:

- specific benefits of employees in the deregulated or competitive activities;
- specific benefits earned by employees from 1 January 2005 for the regulated activities (transmission and distribution) (benefits earned prior to that date are financed by the CTA levy).

In addition to pensions, other benefits are granted to IEG status former employees (not currently in active service), as detailed below:

- benefits in kind: Article 28 of the IEG national statutes entitles such employees and current employees to benefits in kind in the form of supplies of electricity or gas at preferential prices. The obligation for supplies of energy to employees of the EDF and Engie (formerly GDF-Suez) groups corresponds to the probable present value of kWh to be supplied to beneficiaries or their dependants during their retirement, valued on the basis of the unit cost. It also includes the payment made under the energy exchange agreement with Engie;
- retirement gratuities: these are paid upon retirement to employees due to receive the statutory old-age pension, or to their dependants if the employee dies before reaching retirement. These obligations are almost totally covered by an insurance policy;
- bereavement benefit: this is paid out upon the death of an inactive or disabled employee, in order to provide financial assistance for the expenses incurred at such a time (Article 26 -§ 5 of the National Statutes). It is paid to the deceased's principal dependants (statutory indemnity equal to three months' pension, subject to a ceiling) or to a third party that has paid funeral costs (discretionary indemnity equal to the costs incurred);
- bonus pre-retirement paid leave: all employees eligible to benefit immediately from the statutory old-age pension and aged at least 55 at their retirement date are entitled to 18 days of bonus paid leave during the last twelve months of their employment;
- other benefits include help with the cost of studies, time banking for pre-retirement leave, and pensions for personnel sent on secondment to subsidiaries not covered by the IEG system.

### 1.3.22.2.2 French and foreign subsidiaries not covered by the special IEG system

Pension obligations principally relate to the British companies and are mostly covered by defined-benefit plans.

In the United Kingdom, EDF Energy has three principal defined-benefit pension plans:

- the British Energy Generation Group (BEGG) plan affiliated to the Electricity Supply Pension Scheme (ESPS), of which the majority of members are employees in Nuclear Generation. The BEGG plan was closed to new members in August 2012;

- the EDF Energy Generation and Supply Group (EEGSG) plan, also affiliated to the ESPS, which was established in December 2010 for the employees remaining with EDF Energy following the transfer of the former Group plan to UK Power Networks as part of the sale of the Networks. The EEGSG plan has not accepted any new members since then;

- the EDF Energy Pension Scheme (EEPS). This scheme was established in March 2004 and membership remains open to new employees.

In 2016 EDF Energy introduced a new defined-benefit section of the EEPS pension plan named EEPS CARE (Career Average Revalued Earnings). Under EEPS CARE, pensions are based on a pensionable salary corresponding to the average salary over the beneficiary's entire career, adjusted for inflation. In December 2017 a CARE section was also introduced in the BEGG pension plan, open to new employees in Nuclear Generation on equivalent terms to the corresponding section of the EEPS pension plan. Pensions for the other sections continue to be based on the beneficiary's most recent pensionable salary.

Each pension plan is financially independent of the others. The BEGG and EEGSG plans are part of the industry-wide ESPS which is one of the largest private-sector pension schemes in the United Kingdom.

The plans are externally managed by separate trusts whose trustees are appointed by the firm and the plan participants to manage the funds in their exclusive interests. The trustees carry out an actuarial review of the plan every three years, defining the funding level, the necessary employer and employee contributions and the payment schedules. The trustees are responsible for defining the plans' investment strategy, in agreement with the firm.

### 1.3.22.3 Other long-term benefit obligations

These benefits concern employees currently in service, and are earned according to local regulations, particularly the statutory regulations for the electricity and gas sector for EDF and French subsidiaries covered by the IEG regime. They include:

- annuities following incapacity, invalidity, industrial accident or work-related illness; like their counterparts in the general national system, IEG employees are entitled to financial support in the event of industrial accident or work-related illness, and invalidity and incapacity annuities and benefits. The obligation is measured as the probable present value of future benefits payable to current beneficiaries, including any possible reversions;
- long-service awards;
- specific benefits for employees who have been in contact with asbestos.

### 1.3.23 Special concession liabilities

These liabilities represent the contractual obligations specific to the concession rules for public electricity distribution concessions in France, recognised in the liabilities as:

- rights in existing assets: these correspond to the grantor's right to recover all assets for nil consideration. This right comprises the value in kind of the facilities – the net book value of assets operated under concession – less any as yet unamortised financing provided by the operator;
- rights in assets to be replaced: these correspond to the operator's obligation to contribute to the financing of assets due for replacement. These non-financial liabilities comprise:
  - depreciation recorded on the portion of assets financed by the grantor,
  - the provision for renewal, exclusively for assets due for renewal before the end of the concession.

When assets are replaced, the provision and amortisation of the grantor's financing recorded in respect of the replaced item are eliminated and transferred to the rights in existing assets, since they are considered as the grantor's financing for the new asset. Any excess provision is taken to income.

During the concession, the grantor's rights in assets to be replaced are thus transferred upon the asset's renewal to become the grantor's rights in existing assets, with no outflow of cash to the benefit of the grantor.

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In general, the value of special concession liabilities is determined as follows:

- the grantor's rights in existing assets, representing the share deemed to be held by the grantor in the concession assets, are valued on the basis of the assets recorded in the balance sheet;
- the obligations relating to assets to be replaced are valued on the basis of the estimated value of the relevant assets, measured at each year-end taking into consideration wear and tear on the asset at that date:
  - based on the difference between the asset's replacement value as assessed at year-end and the historical cost for calculation of the provision for renewal. Annual allocations to the provision are based on this difference, less any existing provisions, with the net amount spread over the residual useful life of the assets. Consequently, the expenses recognised for a given item increase over time,
  - based on the share of the asset's historical cost financed by the grantor for amortisation of the grantor's financing.

The Group considers that the obligations related to assets to be replaced are to be valued on the basis of the special clauses contained in the concession agreements.

Under this approach, these obligations are stated at the value of the contractual obligations as calculated and reported annually in the reports to the grantors. This contractual value also reflects the possibility that the EDF group may one day lose its status as the concession operator.

If no such clauses existed, an alternative approach would be to state contractual obligations at the present value of future payments required for replacement of assets operated under concession at the end of their industrial useful life.

For information, the Group reports below the impacts of this alternative approach, *i.e.* the discounting of the future obligation to contribute to financing of assets to be replaced.

The principal assumptions used in preparing this simulation are as follows:

- the basis for calculation of the provision for renewal is the estimated replacement value at the end of the asset's useful life, applying a forecast annual inflation rate of 1.5%, less the asset's historical value. This amount is based on the wear and tear on the asset and discounted at a rate of 4.1%;
- amortisation of the grantor's financing is also discounted at the rate of 4.1%.

The following table shows the main impacts of this simulation for Enedis in 2017:

### IMPACTS ON THE INCOME STATEMENT

*(in millions of euros and before taxes)*

	2017
Operating profit	152
Financial result	(377)
Income before taxes of consolidated companies	(225)

### IMPACTS ON THE BALANCE SHEET – EQUITY

*(in millions of euros and before taxes)*

	2017
At opening date	1,977
At closing date	1,752

Valuation of concession liabilities under this method is subject to uncertainty over costs and disbursements, and is also sensitive to inflation and discount rates.

#### 1.3.24 Investment subsidies

Investment subsidies received by Group companies are included in liabilities under the heading "Other liabilities" and transferred to income as and when the economic benefits of the corresponding assets are utilised.

#### 1.3.25 Assets classified as held for sale and related liabilities, and discontinued operations

Assets that qualify as held for sale and related liabilities are disclosed separately from other assets and liabilities in the balance sheet.

When assets or groups of assets are classified as discontinued operations, income and expenses relating to these discontinued operations are disclosed in a single net amount after taxes in the income statement and net changes in cash and cash equivalents of discontinued operations are also reported separately in the cash flow statement.

Impairment is booked when the realisable value is lower than the net book value.

#### 1.3.26 Nature and extent of restrictions on the Group's ability to access and use assets or settle liabilities

The main restrictions that may limit the Group's ability to access or use its assets or settle its liabilities concern the following items:

- assets held to fund employee benefits (principally in France and the United Kingdom – see note 1.3.22) – and expenses related to nuclear liabilities (principally in France – see note 47 – and the United Kingdom – see note 29.2);
- tangible and intangible assets and the related liabilities associated with concession agreements, whether or not they are subject to regulatory mechanisms (obligations to supply energy or energy-related services, rules governing investments, an obligation to return concession facilities at the end of the contract, amounts payable at the end of the contract, tariff constraints, etc.). These restrictions mainly apply to assets of this type in France (EDF, Enedis and Dalkia), and to a lesser extent Italy (see notes 1.3.13 and 1.3.23);
- the sale of Group investments in certain subsidiaries requires authorisations from State bodies, particularly when they exercise a regulated activity or operate nuclear power plants (this is the case for EDF Nuclear Generation Ltd. in the United Kingdom, Taishan (TNPJVC) in China and CENG in the United States);
- prudential reserves established and measures taken as regards distribution capacity, so that the insurance subsidiaries will meet their prudential ratio requirements;
- the cash of certain entities that use financing arrangements stipulating that dividend distribution is subject to conditions concerning repayment of bank debt (or qualification for loans) and shareholders, or are subject to regulatory limitations in certain countries.

Certain shareholder agreements concerning companies controlled by the Group include clauses to protect minority shareholders, requiring approval from minority shareholders for certain particularly important decisions.

Finally, certain financing loans granted to Group entities contain early repayment clauses (see note 38.2.6), and certain items of cash and cash equivalents are subject to restrictions (see note 37).

### 1.3.27 Environment

#### 1.3.27.1 Greenhouse gas emission rights

The system currently in force is described in note 49.1.

The accounting treatment of emission rights depends on the holding intention. There are two economic models, both of which coexist in the EDF group.

Rights held under the "Trading" model are included in inventories at fair value. The change in fair value observed over the year is recorded in the income statement.

Rights held to comply with regulatory requirements on greenhouse gas emissions (the "Generation" model) are recorded in intangible assets:

- at acquisition cost when purchased on the market;
- at nil value when allocated free of charge (in countries that still have a free allocation system).

When the estimated emissions by a Group entity over a given period are higher than the rights allocated for no consideration for the period less any allocated rights sold on the spot or forward market, a provision is established to cover the excess emissions. This provision is equal to the shortfall in rights held (difference between actual emissions and allocated rights held at the closing date).

If no emission rights are allocated free of charge, a provision is systematically recorded equivalent to the actual emissions at the closing date.

In either case, the provision is measured on the basis of the acquisition cost up to the amount of rights acquired on the spot or forward markets, and on market prices for the balance. It is cancelled when the rights are surrendered to the State.

At the closing date, the portfolio of emission rights and the obligation to surrender rights for the emissions of the year are presented gross, without netting.

If the number of purchased emission rights recorded as intangible assets at the end of the year and not subject to forward sale is higher than the number of purchased rights that will be surrendered to the State for the year's emissions, an impairment test must be applied to the excess. If there is a significant negative differential on the purchased rights held, impairment is booked.

#### 1.3.27.2 Renewable energy certificates

The system currently in force is described in note 49.3.

The EDF group applies the following accounting treatments:

- for non-obligated electricity producers, certificates obtained based on generation output are recorded in "Other inventories" until they are sold on to suppliers;
- for obligated producers and an entity that both produces and supplies energy and is under an obligation to sell a specified quantity of renewable energy, the Group uses the following accounting treatments for certificates obtained based on generation output:

- up to the level of the obligation, these certificates are not recognised,
- certificates in excess of the obligation are recorded in "Other inventories",
- in the specific situation when an entity is not in a position to meet its obligation at the year-end, the Group applies the following accounting treatment:
  - certificates acquired for a consideration in order to meet the obligation are recorded in intangible assets at acquisition cost, and
  - a provision is established equivalent to the shortfall in certificates compared to the obligation at the year-end. The value of this provision is based on the acquisition price of certificates already purchased on the spot or forward market, and market prices or penalty prices for the balance. The provision is cancelled when the certificates are surrendered to the State.

Forward purchases/sales of certificates related to trading activities are recorded in accordance with IAS 39, stated at fair value in the balance sheet date. The change in fair value is recorded in the income statement.

#### 1.3.27.3 Energy savings certificates

The system currently in force is described in note 49.2.

The EDF group fulfils its obligations either by taking measures regarding its assets or actions with its final customers in order to receive energy savings certificates from the State, or by purchasing energy savings certificates directly.

Expenses incurred to meet the cumulative energy savings obligation are treated as:

- property, plant and equipment if the action taken by the entity concerns its own assets and the expenses qualify for recognition as an asset;
- expenses for the year incurred, if they do not meet the requirements for capitalisation or if the action taken is to encourage third parties to save energy.

Expenses incurred in excess of the accumulated obligation at year-end are included in inventories until they are used to cover the obligation. A provision is recognised if the energy savings achieved are lower than the cumulative energy savings obligation. The amount of the provision is equal to the cost of actions still to be taken to meet the obligations related to the energy sales made.

#### 1.3.27.4 Environmental expenses

Environmental expenses are identifiable expenses incurred to prevent, reduce or repair damage to the environment that has been or may be caused by the Group as a result of its activities. These expenses are treated as follows:

- they are capitalised if they are incurred to prevent or reduce future damage or protect resources;
- they are booked as environmental liabilities and increases to provisions for environmental risks if they correspond to an obligation that exists at the year-end and it is probable or certain at the reporting date that they will lead to an outflow of resources;
- they are recognised as expenses if they are operating expenses for the bodies in charge of environmental concerns, environmental supervision, environmental duties and taxes, processing of liquid and gas effluents and non-radioactive waste, or research unrelated to an investment.

### NOTE 2 COMPARABILITY

There were no accounting changes during 2017.

### NOTE 3 SIGNIFICANT EVENTS AND TRANSACTIONS

#### 3.1 CAPITAL INCREASE BY EDF SA

On 30 March 2017, EDF undertook a cash capital increase with preferential subscription rights for existing shareholders.

The total gross amount of the increase (including the issue premium) was €4,018 million, and 632,741,004 new shares were issued at the unit issue price of €6.35. This total amount comprises:

- a €316 million increase in the share capital;
- a €3,702 million gross increase in the issue premium.

Issue expenses (net of taxes) are charged to the issue premium.

In accordance with its commitment, the French State subscribed for an amount of €3 billion or approximately 75% of the capital increase, and after this operation held 83.10% of the Company's share capital. The dilution of the French State's shareholding results in a larger free float, as the proportion of shares in the Company held by the public (including employees) was raised from 14.25% to 16.81% as a result of the capital increase.

#### 3.2 ACQUISITION OF 75.5% OF FRAMATOME

Following approval of the operation by their respective Boards of Directors on 13 and 14 December 2017, AREVA SA and EDF signed definitive binding agreements on 22 December 2017 setting the terms for the sale to EDF on 31 December 2017 of an interest giving EDF exclusive control over a 100% subsidiary of AREVA NP ("New NP") that comprises the former AREVA group's activities relating to the design and manufacturing of nuclear reactors and equipment, fuel assemblies and services to the nuclear installed base.

Under the terms of these agreements, EDF's acquisition of 75.5% of New NP's capital was based on an adjusted valuation of €2.47 billion (for 100% of the capital), with no transfer of financial debt. This price was equivalent to a 2017 forecast EBITDA multiple of 8x<sup>(1)</sup>.

This amount may be adjusted upwards or downwards based on the accounts at the completion date (31 December 2017) once they have been finalised. Depending on achievement of certain performance targets measured after the completion date, it may also be subject to earn-out payment of up to €245 million. EDF also benefits from liability guarantee clauses.

The contracts for the EPR Olkiluoto 3 project and the resources required to complete the project, as well as certain contracts relating to components forged in Le Creusot plant, are not part of EDF's acquisition and remain with AREVA NP, part of AREVA SA.

The signing of these binding agreements of 22 December 2017 followed issuance of a positive opinion by the Board of the French Nuclear Safety Authority (Autorité de sûreté nucléaire - ASN) on 28 June 2017 regarding commissioning of the Flamanville 3 reactor vessel. EDF decided on 12 July 2017 to waive the condition precedent concerning the absence of anomalies on the primary circuit as it concerned the carbon segregation identified in parts of this reactor vessel.

These agreements also followed the completion and satisfactory conclusion of the quality audits undertaken at the Le Creusot, Saint-Marcel and Jeumont plants, regarding contracts transferred to New NP. For these contracts, EDF has a guarantee from AREVA SA for any residual risk related to the quality audits.

On 31 December 2017, the Group completed its acquisition of 75.5% of Framatome.

Simultaneously with completion of this transaction between EDF and AREVA SA, Mitsubishi Heavy Industries Ltd and Assystem took investments of 19.5% and 5% respectively in Framatome.

The immunisation mechanisms and guarantees set out in the final share purchase agreement signed with EDF on 22 December 2017 also apply to Mitsubishi Heavy Industries Ltd and Assystem.

Finally, the three new shareholders of New NP decided to change the name of New NP to Framatome from 4 January 2018.

On 3 February 2018, Teollisuuden Voima (TVO) brought an action before the European General Court seeking cancellation of the European Commission's decision of 29 May 2017 that authorised EDF's takeover of Framatome, on the grounds that it breaches the regulation on control of concentrations. The notice of the action, which should state the pleas in law and the main arguments put forward by TVO, has not yet been published in the Official Journal of the European Union and EDF is not currently informed of its content.

#### 3.2.1 History

EDF and AREVA SA signed a non-binding memorandum of understanding on 30 July 2015 that formalised the state of progress on discussions concerning their contemplated partnership. This memorandum had three sections:

- acquisition by EDF of exclusive control over AREVA NP. The plan was that EDF should hold majority control of AREVA NP, while AREVA SA would hold up to 25% in a strategic partnership that could potentially involve other minority partners;
- formation of a dedicated company (Edvance, created on 17 May 2017), owned 80% by EDF and 20% by AREVA NP (and now by Framatome), to optimise design and construction for nuclear islands and command-control systems for new projects in France and internationally;
- conclusion of a comprehensive strategic and industrial partnership agreement.

A further non-binding memorandum of understanding was signed by the same parties on 28 July 2016, formally acknowledging the EDF Board of Directors' approval of the final valuation of the activities to be acquired by EDF, and taking note of new developments since early 2016, *i.e.*:

- the negative outcome of discussions with TVO on the initial proposed arrangements to give EDF total protection against the risks of the Olkiluoto 3 (OL3) project, leading to the following new transaction structure: formation of a company, New NP, over which EDF would acquire exclusive control: this company would take over the contracts held by AREVA NP except for the OL3 contract and certain other contracts involving risks that EDF did not intend to bear (see the following point);
- the cases of non-quality observed at AREVA NP's Le Creusot plant, whether insufficient control of carbon content ("carbon segregation") or the presence of irregularities in the manufacturing records. The new memorandum of understanding laid down the principles for indemnification and protection of EDF against the consequences of these issues: non-transfer of terminated contracts to New NP, specific indemnities and a general guarantee, quality audit-related conditions precedent for completion of the acquisition;

(1) Normalised pro forma EBITDA for the activities acquired, excluding large projects.

- AREVA NP was to remain a fully-owned subsidiary of AREVA SA, and would retain all its existing contracts that were not transferred to New NP.

In accordance with the terms of this memorandum of understanding, a share sale contract was signed on 15 November 2016 between EDF SA, and AREVA SA/AREVA NP.

Completion of the transaction remained conditional on:

- favourable ASN conclusions regarding the outcome of the tests on the Flamanville 3 reactor's primary circuit;
- completion and satisfactory conclusion of the quality audits at the Le Creusot, Saint-Marcel and Jeumont plants;
- clearance by the relevant merger control authorities.

### 3.2.2 Framatome's activities

The new Framatome group's activities are principally the following:

- industrial design, production and installation of nuclear plant components for the existing nuclear fleet, and for management of major new reactor projects;
- service activities to improve the availability and competitiveness of nuclear installations, while reinforcing the safety of nuclear steam supply systems through production of instrumentation and control systems;
- production of nuclear fuel assemblies for electricity operators and certain research reactors.

These activities are exercised through six business units, mostly located in France, Germany and the United States:

- *Engineering and Design Authority*: development, design, certification and licensing of nuclear steam supply systems and related services;
- *Large projects*: management and execution of new nuclear reactor projects, from engineering to project completion;
- *Installed Base*: maintenance and engineering services for existing nuclear fleets and fleets under construction;
- *Fuel*: development, design, licensing and production of fuel assemblies and core components for Pressurised Water Reactors (PWR), Boiling Water Reactors (BWR) and research reactors; development of zirconium products;
- *Components*: design and production of heavy equipment and mobile equipment for nuclear power plants;
- *Instrumentation and Control (I&C)*: design and production of instrumentation and control systems for the safety for steam supply systems in operation and new builds.

EDF was a major customer of Framatome before the acquisition that was finalised on 31 December 2017, and will remain so after the operation (see note 48).

The EDF group uses Framatome for production of its fuel assemblies, plant maintenance operations and equipment purchases (supply and installation of steam supply systems, etc.).

Framatome is also the supplier of the steam supply system and instrumentation and control for EDF's new EPR reactors currently under construction (Flamanville 3 and Hinkley Point C), covering the whole process from initial design to commissioning.

### 3.2.3 Accounting treatment in the EDF consolidated financial statements

To form the Framatome group that was the target of this acquisition, AREVA SA undertook preliminary reorganisation operations involving the following principal steps:

- partial assets contribution by AREVA NP to New NP SAS, excluding certain contracts concerning the Le Creusot plant (partial assets contribution agreement of 29 September 2017, with deferred effect to 31 December 2017); the transfer took place at real values based on a fairness opinion issued by an independent assessor, expert reports on certain identified assets, and a report by two independent valuation auditors (*commissaires aux apports*);
- a sale of assets and liabilities (excluding assets attached to the Olkiluoto 3 project) by AREVA GmbH to New NP GmbH on 31 October 2017: this operation also took place at real values based on valuations by independent financial experts.

As a result of analysis of the governance arrangements and percentage ownership, Framatome is fully consolidated by the Group.

The acquisition of control over the activities of Framatome at 31 December 2017 led the Group to recognise Framatome's identifiable assets and liabilities at their fair value at the acquisition date in accordance with IFRS 3. The valuations are provisional and the Group has 12 months to finalise allocation of the purchase price.

The work done by EDF for the purchase price allocation was undertaken with the support of an independent financial valuation expert, and took into consideration the results of valuations performed as part of the preliminary reorganisations prior to the takeover of Framatome.

The acquisition on 31 December 2017 of 75.5% of Framatome is reflected in the Group's consolidated financial statements by recognition of provisional goodwill (measured under the partial goodwill method) of €1,257 million.

### 3.2.4 Items of Framatome's opening balance sheet in the EDF group's consolidated financial statements, and determination of goodwill

#### 3.2.4.1 Determination of the provisional opening balance sheet

The fair value of Framatome's identifiable assets and liabilities is the Group's current best estimate. It was determined based on Framatome's available business plan, applying standard valuation methods

After including the fair values of assets acquired and liabilities assumed, the provisional opening balance sheet for Framatome at 31 December 2017 (for 100% of the capital) is as follows.

# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

### ASSETS

(in millions of euros)

	<b>Provisional opening values</b>
Goodwill	-
Other intangible assets	1,236
Property, plant and equipment	1,100
Investments in associates and joint ventures	92
Financial assets	176
Deferred tax assets	131
Inventories	565
Trade receivables	4,427
Current tax assets	5
Other receivables	613
Cash and cash equivalents	-
<b>TOTAL ASSETS</b>	<b>8,345</b>

### EQUITY AND LIABILITIES

(in millions of euros)

	<b>Provisional opening values</b>
Capital	707
Consolidated reserves	103
<b>Equity – Group share</b>	<b>810</b>
Non-controlling interests	10
<b>TOTAL EQUITY</b>	<b>820</b>
Provisions	984
Financial liabilities	12
Deferred tax liabilities	141
Trade payables	460
Current tax liabilities	1
Other liabilities	5,927
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>8,345</b>

This balance sheet for the Framatome subgroup is presented before elimination of positions with Group entities, which mainly concern trade receivables and other liabilities.

The main restatements resulting from fair value adjustments of the assets acquired and liabilities assumed concern intangible assets and affect the following items:

- fair value adjustment of intangible assets in the amount of €554 million, comprising:
  - €132 million for the Framatome brand, valued by the royalty relief method. This brand is considered to have an indefinite useful life,
  - €156 million for customer relations, valued by the excess earnings method. When AREVA created the target Framatome group, some customer relations were stated at their real value of €246 million, leading to a total value of €402 million for customer relations. The useful life of these customer relations was determined for each business unit, giving an average of around 11 years,
  - €266 million for technology, valued by the royalty relief method: codes and methods, EPR technology, software, products, patents and trade secrets. When AREVA created the target Framatome subgroup, some of the technology was stated at its real value of €436 million, leading to a total value of €702 million for technology. The useful life of this technology was determined for each business unit, giving an average of 15 to 20 years;

- net deferred taxes, in the amount of €(131) million.

Revaluation of deferred taxes only concerned the tax effects associated with fair value adjustments applied for the purposes of determining the opening balance sheet (€554 million before tax).

The main assumptions to which these opening balance sheet assets and liabilities are sensitive are:

- the royalty rate used to value the Framatome brand and the technology;
- the margin rate;
- the discount rate applied to future cash flows;
- the attrition rate for customer contracts.



### 3.2.4.2 Determination of provisional goodwill

The provisional goodwill recorded on the operation, under the partial goodwill method and based on a 75.5% ownership percentage, is determined as follows.

(in millions of euros)

Purchase price for the investment	1,868
<b>Consideration transferred at 31 December 2017 (A)</b>	<b>1,868</b>
Fair value of the Framatome assets acquired	611
<b>Fair value of assets acquired and liabilities assumed (B)</b>	<b>611</b>
<b>PROVISIONAL GOODWILL (A)-(B)</b>	<b>1,257</b>

The acquisition price used to calculate provisional goodwill is the adjusted provisional price paid when the transaction was completed.

The provisional goodwill recognised mainly corresponds to:

- Framatome's pre-existing customer relations with the EDF group (see note 3.2.2);
- Framatome's future customer relations (with EDF and external customers) and technologies;
- Framatome's human capital.

### 3.2.4.3 Non-controlling interests

Framatome's non-controlling interests, amounting to €199 million at 31 December 2017, consist of the shareholders Mitsubishi Heavy Industries (19.5%) and Assystem (5%). These shareholders acquired their interests on 31 December 2017.

### 3.2.5 Impact of the operation on the Group's net income and net indebtedness

The acquisition of Framatome has no impact on the Group's net income in 2017, due to the acquisition date (31 December 2017).

The acquisition price paid, €1,868 million<sup>(1)</sup>, leads to an equivalent increase in the Group's net indebtedness at 31 December 2017. The operation took place on the basis that no financial net indebtedness would be transferred.

### 3.2.6 Impact of acquisition of control over Framatome on the Group's key indicators for 2017

The Framatome subgroup is a new subgroup established for the purpose and at the date of the operation (see note 3.2.3). The figures shown below are thus the best estimates for the activities taken over in the acquisition, taking into consideration operations with the EDF group.

On this basis, if the acquisition had taken place at 1 January 2017 instead of 31 December 2017, full consolidation of Framatome from 1 January 2017 (excluding the effects of purchase price allocation) would have led to an increase in Group sales and operating profit before depreciation and amortisation of approximately €1.7 billion and €0.2 billion respectively.

Framatome expects its operating profit before depreciation and amortisation to increase in 2018 due to growth in non-Group sales and better control of costs (particularly costs related to non-quality and corporate costs).

## 3.3 CLARIFICATIONS ON THE HINKLEY POINT C PROJECT

The HPC project cost and timetable review undertaken after EDF's final investment decision in September 2016 in conjunction with the project company (NNB) concluded that:

- the milestone of the first nuclear safety concrete for the building of Unit 1, scheduled for mid-2019, is confirmed provided that the final design, which is on a tight schedule, is settled by the end of 2018;
- project completion costs are now estimated at £19.6 billion (in 2015 sterling<sup>(2)</sup>), £1.5 billion (in 2015 sterling) more than previous estimates. This new estimate assumes successful completion of operational action plans, in partnership with suppliers. The estimated additional costs<sup>(3)</sup> result mainly from a better understanding of the design, which has been adjusted to meet the regulators' requirements, the volume and sequencing of work on site and the gradual implementation of supplier contracts. EDF's projected rate of return (IRR) is now estimated at about 8.5% compared to about 9% initially;
- the risk of deferral of the Commercial Operation Date (COD) is estimated at 15 months for Unit 1 and 9 months for Unit 2. This risk would entail an additional potential cost of around £0.7 billion (in 2015 sterling). In such a case, the IRR for EDF would be around 8.2%.

The project company NNB will examine and implement the recommendations of the review in compliance with its rules of governance.

The project management team is working hard to meet the initial delivery objective of the end of 2025 for Unit 1, and to identify and implement action plans to reduce costs and risks.

## 3.4 DISPOSAL PLAN

### 3.4.1 Finalisation of the sale of 49.9% of CTE

On 31 March 2017, EDF finalised the sale to Caisse des Dépôts and CNP Assurances of a 49.9% stake in the electricity transmission entity *Coentreprise de transport d'électricité* (CTE, formerly C25), which has held 100% of RTE since December 2016.

After completion, EDF, Caisse des Dépôts and CNP Assurances hold respective stakes of 50.1%, 29.9% and 20.0% in CTE.

The sale was based on a valuation of €8.2 billion for 100% of RTE.

The new shareholder agreement strengthens RTE's long-term investment strategy, which seeks to maximise transmission system infrastructure efficiency in support of the energy transition.

### Impacts on the consolidated financial statements

This operation has an impact of €1,462 million on other income and expenses (€1,289 million on consolidated net income), and contributed to a decrease of approximately €4 billion in the EDF group's net indebtedness.

(1) Based on a price of €2,475 million for 100% of the capital.

(2) Excluding interest during construction and forex effects versus the reference exchange rate for the project: £1 = €1.23.

(3) Net of action plans.

# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

Previously, the 49.9% share of CTE's balance sheet items due to be sold was classified as assets and liabilities held for sale at 31 December 2016.

Following this operation, EDF's 50.1% investment in CTE, stated at historic value, is accounted for under the equity method and entirely allocated to the dedicated asset portfolio.

### 3.4.2 Completion of the sale of EDF Polska's assets to PGE

On 13 November 2017, EDF finalised the disposal of EDF Polska's assets (heat and electricity cogeneration, and electricity generation)<sup>(1)</sup> to PGE Polska Grupa Energetyczna SA<sup>(2)</sup>.

This operation followed the issuance of all regulatory approvals and authorisations required under the sale agreement signed between EDF and PGE on 19 May 2017.

The transaction was based on a valuation of approximately 6.1 billion zlotys (€1.4 billion<sup>(3)</sup>)<sup>(4)</sup> for 100% of EDF Polska. It contributes to a €1.0 billion reduction in the EDF group's net indebtedness.

This transaction has no significant effect on the Group's income statement.

The EDF Polska business assets concerned were classified as assets and liabilities held for sale at 31 December 2016.

### 3.4.3 Sale of 100% of EDF Démász Zrt.

On 31 January 2017, EDF and ENK SZ finalised the sale of the total capital of EDF Démász, following approval of the operation by the Hungarian energy sector regulator and the French Ministry for the Economy.

The transaction valued EDF's 100% stake in EDF Démász at approximately €400 million, and had no significant effect on the Group's income statement.

### 3.4.4 EDF Trading and JERA: Sale of the coal trading business

Following the contractual agreements signed on 21 December 2016 with JERA Trading Singapore ("JERA TS"), in April 2017 EDF Trading acquired one third of the shares in the new trading company ("JERA Trading"), to which it sold several assets related to its coal business during the year 2017, with further sales due to take place in the near future.

This operation has no significant effect on the Group's income statement at 31 December 2017.

## 3.5 ¥137 BILLION SAMURAI BOND ISSUE

On 20 January 2017, EDF raised ¥137 billion, i.e. around €1.1 billion, through 4 senior bond issues on the Japanese market ("Samurai bonds") with maturities of 10 years and more:

- ¥107.9 billion bond, with a 10-year maturity and a fixed coupon of 1.088%;
- ¥19.6 billion green bond, with a 12-year maturity and a fixed coupon of 1.278%;
- ¥6.4 billion green bond, with a 15-year maturity and a fixed coupon of 1.569%;
- ¥3.1 billion bond, with a 20-year maturity and a fixed coupon of 1.870%.

With the issuance of two green tranches totalling ¥26 billion dedicated to financing its renewable investments, EDF opened the Samurai green bond market, continuing its active contribution to the development of green bonds as financing instruments for the energy transition.

## 3.6 UNCONSTITUTIONALITY OF THE 3% CONTRIBUTION ON DIVIDEND DISTRIBUTIONS

The contribution on dividend distributions introduced in France in 2012, amounting to 3% of the amounts distributed, is a tax on companies that make cash distributions.

After legal challenges, the Constitutional Council ruled on 6 October 2017 that this contribution was unconstitutional because it is contrary to the principle of equality before the law and public charges, since it created differences in tax treatment on the sole basis of the origin (and nature) of the profits distributed.

The EDF group filed claims for refunds of €220 million for the years 2013 to 2017, and in 2017 it recognised a tax receivable of €255 million for the companies concerned, including €35 million of interest on arrears. At 31 December 2017, the Group received a partial refund of these claims from the state, totalling €235 million.

## 3.7 SIGNIFICANT EVENTS AND TRANSACTIONS OF 2016

### 3.7.1 Extension to 50 years of the depreciation period of the 900MW PWR series in France<sup>(5)</sup>

In 2016, the Group considered that all the technical, economic and governance conditions necessary to bring the depreciation periods of its 900MW PWR power plants in France into line with its industrial strategy were fulfilled.

In view of studies and work completed, particularly concerning replacement of components and controlled equipment ageing, the Group had sufficient assurance of the plants' technical capacity to operate for at least 50 years. This was also confirmed by the international benchmark.

The Group also made progress with the Nuclear Safety Authority (Autorité de sûreté nucléaire (ASN)) on the question of the content of the fourth 10-year inspections of this series as part of the *Grand carénage* overhaul programme. Although some points remained to be finalised, the components of these inspections were in a convergence process with the ASN. This was demonstrated by the Re-examination Orientation File response sent by the ASN to EDF in April 2016, in which the ASN stated its agreement with the Company's chosen themes and commitments for these inspections. This was an important step in the process, giving EDF secure grounds for industrial preparations for the 10-year inspections.

Once its fourth 10-year inspections are completed, the 900MW PWR series will have reached a level of safety that is both as close as possible to EPR safety level and one of the highest worldwide.

(1) The transaction concerned the Rybnik generation plant, the coal cogeneration plants of Krakow, Czechnica, Gdansk, Gdynia, Torun and Wroclaw, and the gas fired cogeneration plants of Zawidawie and Zielona Gora. These power plants have a total installed capacity of 4.4GW<sub>th</sub> and 1.4GW<sub>he</sub>. The transaction also included the heat distribution networks of Czechnica, Torun, Zawidawie and Zielona Gora. The Wroclaw plant, the cogeneration plants and heat distribution networks of Czechnica, Zawidawie and Zielona Gora were held indirectly through a 50% + 1 share stake via Kogeneracja.

(2) PGE is owned 58% by the Polish state and is the country's largest electricity producer.

(3) As of 31 December 2016.

(4) Representing 4.9 billion zlotys (approximately €1.1 billion) after deduction of minority interests.

(5) Except for Fessenheim

Extending the nuclear reactors' operating lifetimes beyond 40 years also offered clearly positive returns that are higher than in a 40-years scenario, even in the event of long-term price depression.

Furthermore, the principle of operating lifetimes of more than 40 years is laid down in France's multi-year energy plan (*Programmation Pluriannuelle de l'Énergie* (PPE)) adopted by Decree 2016-1442 of 27 October 2016 as a necessity for secure power supplies. Extending the depreciation period of the 900MW series is consistent with the objectives of the PPE (particularly development of renewable energies, and control of greenhouse gas emissions).

The best estimate for the depreciation period of the 900MW series is now 50 years. This accounting estimate does not affect the ASN's decisions to authorise continued operation. Authorisations will be given individually for each unit after each 10-year inspection, which is currently the case as required by law.

The Group therefore undertook this change of accounting estimate at 1 January 2016 for all its power plants in the 900MW series in France, except for Fessenheim.

The impacts on the 2016 consolidated financial statements were the following:

- at 1 January 2016,
  - provisions relating to nuclear power generation were reduced by €2,044 million due to timing differences in the payment schedules, including €1,657 million concerning provisions covered by dedicated assets;
  - assets were reduced by the same amount, in accordance with IFRIC 1. This decrease was almost entirely taxable, generating a current tax liability of €679 million.
- the impacts on 2016 net income were estimated based on an unchanged depreciation period of 40 years:
  - a €965 million decrease in the depreciation charge due to the reduction in the value of assets and the extension of the depreciation period;
  - a €90 million decrease in the cost of unwinding the discount due to the reduction in provisions;
  - a €42 million decrease in income due to the lower level of partner advances made to EDF under the nuclear plant financing plans;
- these effects led to overall increases of €1,013 million in the income before taxes, and €664 million in consolidated net income.

### 3.7.2 Hinkley Point C: signature of the final agreements

On 21 October 2015, EDF and China General Nuclear Power Corporation (CGN) signed a Strategic Investment Agreement for joint investment in the construction of two EPRs at the Hinkley Point C site (HPC) in Somerset. The agreement also includes a UK partnership to develop the new nuclear power plants Sizewell (SZC) in Suffolk and Bradwell B (BRB) in Essex.

The final agreements concerning Hinkley Point C were signed on 29 September 2016 following the final investment decision authorized by EDF's Board of Directors on 28 July 2016.

Under the Strategic Investment Agreement, EDF holds 66.5% of the project entity HPC and CGN holds 33.5%.

As announced on 21 October 2015, the HPC project entity and the British government's Department of Energy and Climate Change (DECC) have finalised the terms for the Contract for Difference (CfD) that was approved in October 2014 by the European Commission as compliant with EU regulations on State aid.

This CfD was signed on 29 September 2016 and is designed to guarantee returns on the electricity produced and sold by HPC, through payments based on the differential between the contractual strike price defined below and the market price over a 35-year period beginning once the plant starts operation.

### Impacts on the 2016 consolidated financial statements

The agreements signed notably led to the partial sale by EDF to CGN of Hinkley Point C (33.5%) and Sizewell C (20%). As these are non-controlling interests, Hinkley Point C and Sizewell C remained fully consolidated and the operation had no impact on net income. This operation had an impact of €(548) million on EDF's share of equity and €1,510 million on the non-controlling interests' share of equity. These amounts comprise the reallocation to non-controlling interests of part of the goodwill of EDF Energy, which was essentially recognised when the Group took over British Energy in 2009.

The amount received in 2016 for these sales was €830 million. CGN also participated to the extent of its ownership interest in the capital increases undertaken by Hinkley Point C and Sizewell C after these operations, in the total amount of €469 million.

### 3.7.3 Senior bond issues

On 6 October 2016, EDF raised the equivalent of €5.4 billion through a series of senior bond issues in US dollars, Euros and Swiss Francs. Details are as follows:

- EDF undertook a €3 billion multi-currency senior bond issue in 4 tranches:
  - a €1,750 million Green Bond, with 10-year maturity and a fixed coupon of 1%,
  - a €750 million bond with 20-year maturity and a fixed coupon of 1.875%,
  - a CHF 400 million bond, with 8-year maturity and a fixed coupon of 0.3%,
  - a CHF 150 million bond, with 12-year maturity and a fixed coupon of 0.65%;
- on the same day, EDF raised US\$2.7 billion from some twenty investors through 2 senior Formosa bonds on the Taiwanese market:
  - a US\$491 million bond, with 30-year maturity and a fixed coupon of 4.65%,
  - a US\$2,164 million bond, with 40-year maturity and a fixed coupon of 4.99%.

These transactions enable the Group to further diversify its investor base and extend the average maturity of its gross debt.

### 3.7.4 Partial assignment of the CSPE receivable

On 22 December 2016 EDF assigned a portion (26.4%) of the CSPE (Contribution to the Public Electricity Service) receivable on the French state, corresponding to the accumulated shortfall at 31 December 2015 in compensation for public energy service costs.

This receivable was assigned to a pool of investors comprising a bank and a dedicated securitisation vehicle. This assignment generated income of €1,538 million.

Part of the assigned receivable was not allocated to dedicated assets, and consequently assignment of this portion led to a €644 million improvement in net indebtedness (as defined in note 38.3). The balance was allocated to dedicated assets and the corresponding amount has been reinvested in those assets.

### 3.7.5 Compensation arrangements for the closure of the Fessenheim plant

At a meeting held on 24 January 2017, EDF's Board of Directors examined the terms of the protocol negotiated between the Company and the French State concerning compensation for the prejudice to the Company resulting from closure of the Fessenheim nuclear power plant, in application of the Energy Transition Law of 17 August 2015.

This law caps the total authorised installed nuclear generation capacity in France at 63.2GW. This means that the Flamanville 3 EPR cannot be commissioned before the final shutdown of an equivalent generation capacity by the commissioning date.

The Board of Directors was informed of the unanimously negative opinion issued by EDF's Central Works Council on 10 January 2017.

The Board approved the terms of the protocol and authorised the CEO to sign it on behalf of EDF in due course.

The protocol provides for the following compensation for EDF:

- a fixed initial portion covering the anticipated costs to be borne after shutdown of the reactor and the end of operations (costs of staff retraining, decommissioning, the INB tax on basic nuclear facilities and "post-operation" costs). This fixed portion is currently estimated at approximately €490 million, 20% of which would be paid in 2019 and 80% in 2021;
- a further, variable portion that could give rise to subsequent payments reflecting the loss of income for EDF until 2041. This will be determined on the basis of market prices and the actual volumes generated by EDF's 900MW power plants other than Fessenheim over that period. EDF's partners in the Fessenheim plant (EnBW and CNP) will have certain conditional entitlements to a share of the compensation for loss of income, proportional to their contractual rights to the plant's generation capacity.

The closure of the Fessenheim plant requires a decree revoking its operating licence, to be issued at the request of the Company. In application of the Law, this decree will take effect at the same time as the commissioning of the Flamanville 3 EPR, scheduled for late 2018.

In the corporate interests of EDF, and in order to comply with the statutory ceiling of 63.2GW, the Board decided that submission of the request for revocation would be subject to the entry into force of the authorisations required to continue construction of the Flamanville 3 EPR and operation of Paluel 2, which is currently offline, and European Commission clearance of the protocol as regards State aid regulations.

## NOTE 4 REGULATORY CHANGES IN FRANCE

### 4.1 REGULATED ELECTRICITY SALES TARIFFS IN FRANCE

#### “Blue” tariffs

Since 8 December 2015, in accordance with the NOME Law on organisation of the French electricity market (articles L. 337-4 and L. 337-13 of the French Energy Code), the CRE has been responsible for sending the Ministers for the Economy and Energy its reasoned proposals for regulated sales tariffs for electricity. If no objections are made within three months, the proposals are deemed to have been approved.

The tariff change of summer 2017 followed this process; and by a decision of 27 July 2017 confirming the CRE's proposal of 6 July 2017, the “blue” regulated tariffs for residential and non-residential customers (excluding taxes) were raised by 1.7% from 1 August 2017.

In preparing its tariff revision in 2017, the CRE undertook an audit of the allocation of EDF's selling costs, to confirm proper application of the methodology ensuring that regulated sales tariffs do not bear development costs for market-price offers by EDF. This point was publicly confirmed in the CRE's decision of 6 July 2017 containing its tariff change proposal.

Appeals against the tariff changes of 2016 and 2017 have been brought before the Council of State by Anode and Engie.

### 4.2 “TURPE” NETWORK ACCESS TARIFFS

#### TURPE 5 Transmission and Distribution tariffs

On 17 November 2016, the CRE published its decisions for the TURPE 5 Transmission and TURPE 5 Distribution tariffs for the period 2017-2020. The new TURPE 5 tariff scale took effect on 1 August 2017.

- The TURPE 5 Transmission tariff includes a 6.76% tariff increase which took effect on 1 August 2017, with subsequent rises due on 1 August in the years 2018 to 2020, based on average inflation observed over the previous calendar year, adjusted by a correcting factor to balance the income and expenses adjustment account (CRCP)<sup>(1)</sup>. The TURPE 5 Transmission tariff sets the weighted average cost of capital (WACC) at 6.125% for the return on RTE's asset base versus 7.25% for TURPE 4.
- The TURPE 5 Distribution tariff includes a 2.71% tariff increase which took effect on 1 August 2017, with subsequent rises due on 1 August in the years 2018 to 2020, based on average inflation observed over the previous calendar year, adjusted by a correcting factor to balance the CRCP. The TURPE 5 continues to use the previous method for calculating cost of capital, setting the margin on assets at 2.6% and the return on regulated equity at 4.1%.

#### The CRCP income and expenses adjustment account

The income and expenses adjustment account (CRCP) is a non-accounting mechanism that has existed since the TURPE 2 tariffs to monitor differences between the actual figures for clearly-identified income and expense items and the forecasts on which tariffs are based, and to take account of financial incentives resulting from application of the regulatory incentive systems included in the tariff.

The CRCP is cleared at each tariff change on 1 August, leading to adjustment of the annual tariff movement (upward adjustment if there is a shortfall compared to the tariff, or downward adjustment if there is a surplus compared to the tariff).

#### Publications in the *Journal officiel* and appeals

By a decision of 12 January 2017 published in the *Journal officiel* of 17 January 2017; the French Minister for Energy, acting within the two-month response period, requested a new decision from the CRE as she considered that the

decision of 17 November 2016 had not taken national energy policy orientations into consideration.

In a new decision of 19 January 2017, the CRE reiterated its initial decision of 17 November 2016. Both decisions were published in the *Journal officiel* of 28 January 2017. On 2 February 2017, Enedis filed an application before the Council of State for cancellation of these two CRE decisions.

On 3 February 2017, EDF, in its capacity as the shareholder of Enedis, also filed an application before the Council of State for cancellation of the same CRE decisions.

#### Supplier commissioning

The CRE complemented its decision of 17 November 2016 with a decision of 26 October 2017 published in the *Journal officiel* of 14 December 2017 concerning the remuneration payable by Enedis to suppliers for customer management under a single contract (“supplier commissioning”). Noting the amendments to the French Energy Code resulting from Law 2017-1839 of 30 December 2017 “ending the search and operation of conventional and non-conventional hydrocarbons and introducing measures concerning energy and the environment”, particularly as regards the CRE's competence for supplier commissioning, the CRE issued a new decision on 18 January 2018, due to be published in the *Journal officiel* in the next few weeks, reiterating all of its decision of 26 October 2017.

The content of these decisions upholds the principle of identical commissions for all suppliers selling single-contract market-price offers. Only regulated tariffs will give rise to slightly lower commissions (around €2 per delivery point), and this difference will be progressively reduced to zero over a period of 5 years.

For remuneration of past customer management charges (prior to 1 January 2017), the CRE's decision sets an amount it considers as a cap that can be taken into consideration through the TURPE.

Law 2017-1839 of 30 December 2017 mentioned above introduces a measure intended to rule out the possibility of suppliers receiving remuneration from network managers for past customer management services.

On 23 December 2016, Engie brought action against Enedis before the Paris Commercial Court claiming such remuneration. These legal proceedings are ongoing.

#### Electricity Equalisation Fund

On 30 November 2017 the CRE published its consultation 2017-017 on the levels of contribution to be made to the Electricity Equalisation Fund for EDF SEI for the years 2018 to 2021. This consultation takes into consideration both the remuneration levels and the expected regulation framework for EDF SEI.

The associated decision is expected in early 2018.

### 4.3 COMPENSATION FOR PUBLIC ENERGY SERVICE CHARGES (CSPE)

#### Legal and regulatory framework

The compensation mechanism for public energy service charges (*compensation des Charges de Service Public de l'Énergie*) results from a reform introduced by France's amended finance law for 2015, published in the *Journal officiel* on 30 December 2015. Under the legislative and regulatory framework, the public energy service charges (electricity and gas) were to be compensated *via* two State budget items included in France's finance laws from 2016 onwards. The initial finance law for 2018 marks a continuation from 2017, defining the following charges for 2018:

- a special “Energy Transition” budget item of €7.2 billion, principally to compensate for the additional costs associated with all contracts obliging the operators to purchase renewable energies and biogas, the annual contribution to repayment of the accumulated shortfall in compensation due to EDF, and reimbursement of advances to industrial operators who benefited from ceilings for their CSPE tax prior to 2016;

(1) A mechanism to measure and offset differences between the actual figures and the forecasts on which tariffs are based.

# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

- a "Public Energy Service" item of €3 billion in the general budget to cover solidarity charges borne by gas and electricity suppliers, costs associated with purchase obligations excluding renewable energies (essentially cogeneration), and the cost of applying the standard national tariffs to zones that are not connected to France's mainland network. The interest on the accumulated shortfall to be repaid to EDF is also funded through the general budget.

From 2018, the "basic necessity" rates for electricity and the "special solidarity" rates for gas will gradually be phased out and replaced by an energy voucher system. The cost of this system will no longer be borne by EDF SA, although it has been budgeted by the State in the "Public Energy Service" programme. However, EDF will bear charges in 2018 due to the timing of invoicing for 2017 basic necessity rates.

In 2018, this mechanism is funded as follows:

- the costs linked to the energy transition, which correspond to the subsidy mechanisms for renewable energies, and the reimbursement of the past accumulated shortfall in compensation borne by EDF as measured at 31 December 2015, are registered in a special "energy transition" budget item created by the amended finance law for 2015. Law no. 2016-1917 of 29 December 2016 (the finance law for 2017) stipulated that the two sources of additional funding for this special budget item would be a portion of the domestic tax on coal, lignite and coke (TICC), and a portion of the domestic tax on energy products (TICPE). The finance law for 2018 replaces the percentages of the TICC and TICPE by a set amount, to avoid the uncertainties of forecast income from these taxes, and broadens the sources of funding for the "Energy transition" Budget item to include the proceeds of auctions of Guarantees of Origin as allowed by article L. 314-14-1 of the Energy Code;
- other public service charges – excluding costs associated with the subsidy mechanisms for renewable energies (fuel poverty, tariff equalisation in zones that are not connected to France's mainland network, cogeneration, the budget for the energy ombudsman, etc.) are registered directly in the general budget;
- income generated by the domestic tax on the final consumption of electricity, now renamed the Contribution to Public Electricity Service (*Contribution au Service Public de l'Electricité* – CSPE) goes directly into the general budget. The CSPE is collected directly from final consumers of electricity in the form of an additional levy on the electricity sale price (and collected from electricity suppliers), or directly from electricity producers that produce electricity for their own uses.

The level of the CSPE is set at the same level in 2018 as in 2017 with the full rate at €22.5/MWh, and seven reduced rates ranging from €7.5/MWh to €0.5/MWh depending on criteria of electro-intensiveness, business category and the risk of carbon leakage from installations (the risk of industries relocating to countries where greenhouse gas emissions are higher due to their electricity mix).

The costs associated with conclusion and management of purchase obligation contracts are eligible for compensation in 2018, as they were in 2017. This concerns an annual amount of around €45 million.

The amended French finance law for 2017 applied a downward adjustment to the amounts of compensation paid by the State for public service charges in 2017: these charges had decreased substantially due to a rise in electricity market prices between the July 2016 and July 2017 estimates for 2017, which automatically narrowed the differential between the purchase tariff and the market price for electricity.

### Public service charges borne by EDF

The amount of expenses (excluding the annual contribution to repayment and associated interest) to be compensated to EDF for 2017 is €6,558 million, up slightly from 2016 due to higher wind and solar power output.

The amounts received over 2017 (excluding the annual contribution to repayment and associated interest) totalled €7,065 million, higher than 2016, mainly as a result of the State's decision to defer the €414 million compensation payment to EDF out of the "Energy Transition" budget item. The effects of this deferral on funding *via*

the "Energy Transition" budget item for 2017 were adjusted through a budget carryover decision of 28 March 2017.

A repayment schedule for EDF's receivable corresponding to the accumulated shortfall in compensation, which amounted to €5,780 million at 31 December 2015, was set out in the ministerial decision of 13 May 2016, amended on 2 December 2016. Under this schedule the receivable will be fully repaid by 2020. On 22 December 2016 EDF securitised a portion of this receivable (€1.5 billion) through a State-approved "Daily law" assignment. Consequently, since 1 January 2017 EDF has received a 73.6% share of payments made by the State in reimbursement of the receivable as set out in the repayment schedule. The remainder is paid directly to the assignees.

At 31 December 2017, the State had paid €881 million of the €904 million due for 2017. The outstanding €23 million were paid on 2 January 2018.

Finally, in accordance with decree 2016-158 of 18 February 2016 concerning compensation for public energy service charges, on 13 July 2017 the CRE published a decision recording the public service charges for 2016 (€6,345 million) and providing a revised forecast of charges for 2017 (€6,698 million) and a forecast of charges for 2018 (€7,390 million).

## 4.4 FRENCH CAPACITY MECHANISM

On 13 November 2015, the European Commission opened an in-depth investigation into the proposed French capacity mechanism in order to decide whether it complied with EU state aid rules.

On 8 November 2016, the European Commission authorised France's proposals for its capacity mechanism. In the course of the investigation France had agreed to modify its mechanism in the following ways: introducing long-term (7-year) contracts for new capacities, admitting foreign capacities, and taking measures to prevent any market manipulation.

Two auctions of capacity for 2017 were held on the European Power Exchange EPEX SPOT, on 15 December 2016 and 27 April 2017. The volumes traded and the prices between obligated capacity purchasers and operators selling capacity amounted to 22.6GW in December 2016 for the price of €10/kW (the market reference price for 2017) and 0.5GW in April 2017 for the price of €10.42/kW.

The capacity price is passed on to customers through their contracts with EDF as supplier, or with other suppliers. This price is already included in bills for customers on market-price contracts. For customers on regulated sales tariffs, the cost of capacity was incorporated into the tariff change of 1 August 2017.

Auctions for 2018 capacities took place in November 2017 (10.96GW were traded at the price of €9.31 /kW) and December 2017 (10.25GW were traded at the price of €9.38/kW), determining the market reference price for 2018 as €9.34/kW.

The first capacity auction relating to 2019 was also held in December 2017, and concerned a volume of 1.22GW traded at the price of €13/kW.

In 2018, additional auctions will take place concerning capacity for 2017 and 2018 (rebalancing between actors) and later years (2019 to 2022).

## 4.5 REGULATED GAS SALES TARIFFS IN FRANCE

By a decision of 19 July 2017 the Council of State cancelled the decree of 16 May 2013 concerning regulated sales tariffs for natural gas, on the grounds that keeping tariffs at such levels is contrary to European Union law. These gas tariffs did not meet the requirements laid down by Directive 2009/73/EC, and in particular they did not pursue any objective in the general economic interest.

However, while this decision cancelled the disputed decree, it did not cancel the regulatory provisions of the Energy Code concerning regulated gas sales tariffs, which took effect on 1 January 2016.

Therefore, as things currently stand the regulated sales tariffs for gas remain in force until the Prime Minister takes steps to have those provisions repealed.

#### 4.6 ENERGY SAVINGS CERTIFICATES: FOURTH PERIOD (2018-2020)

Decree 2017-690 of 2 May 2017 issued by the French Ministry for the Environment, Energy and the Sea, published in the *Journal officiel* on 3 May 2017, sets the obligation levels for the fourth period of energy savings obligations to run from 1 January 2018 to 31 December 2020. The overall level of obligations for this three-year period is substantially increased by the decree: 1,200TWhc for the "standard" obligations and 400TWhc for the obligations that are to benefit households in situations of energy poverty, compared to 700TWhc and 150TWhc respectively for the previous period.

Energy sellers may fulfil their obligation in three ways: by supporting consumers in their energy efficiency operations, funding Ministry-approved energy savings certificate schemes, and purchasing certificates from eligible actors. Any surplus "stock" of certificates gained in the previous period also contributes to fulfilment of the obligation. If there is a shortfall at the end of the period, obligated actors must pay the Treasury the fine of €15 per MWhc of shortfall laid down in article L. 221-4

of the Energy Code, approximately three times the current cost of the standard obligation.

The EDF group will make every effort to gradually increase its number of certificates in order to meet the objectives set by the State. However, the significant increase in obligations combined with the current lack of depth in the energy savings certificates market, whose future liquidity is uncertain, expose the Group to the risk of a shortfall in certificates for the fourth period.

#### 4.7 ARENH

After the large number of ARENH applications in November/December 2016, confirmed in the May 2017 session, for a total delivery of some 82TWh in 2017, ARENH applications in November 2017 for 2018 deliveries totalled 94.6TWh. Applications due to network losses rose substantially (from 0.7TWh in 2017 to 9.2TWh in 2018) due to a recent change in the rules. The volume of 85.4TWh requested by alternative suppliers increased by around 4TWh over 2017.

This subscription volume results from the prices in force since the end of the third quarter of 2017 for 2018 deliveries, and is also attributable to the fact that ARENH includes delivery of a capacity guarantee.

## NOTE 5 CHANGES IN THE SCOPE OF CONSOLIDATION

The main changes in the scope of consolidation during 2017 are presented in note 3 (Framatome, partial sale of CTE and sales of EDF Polska, Démász Zrt and Jera) and in this note.

### 5.1 TAKEOVER OF FUTUREN

In June and July 2017, EDF Énergies Nouvelles acquired 87.5% of the capital (240,855,625 shares) and 87.2% of voting rights in Futuren, and 62.7% of OCEANE convertible bonds still outstanding (105,601 bonds). These acquisitions took place in accordance with the agreement of 10 May 2017 signed with Futuren's majority shareholders, after a simplified public tender offer of €1.15 per ordinary share and €9.37 per OCEANE convertible bond (ex coupon).

The Futuren group is specialised in onshore wind power. It operates in four countries, with 389MW gross capacity of wind power facilities in operation (France, Germany, Italy and Morocco), 21MW under construction (France); 212MW in development (France) and 357MW under management (Germany).

The Futuren group's consolidated financial statements at 30 June 2017 reported half-yearly EBITDA of €17 million and equity of €180 million.

The Futuren group has been fully consolidated since 30 June 2017.

### 5.2 DALKIA GROUP: SALE OF INVESTMENTS IN COGESTAR 1, 2 AND 3

Amundi Transition Énergétique (ATE), the asset management company jointly owned by EDF and Amundi, acquired an investment in Cogestar 3 on 22 December 2017, corresponding to 70% of its capital, for €15 million. Dalkia retains 30% and remains the sole service provider to Cogestar 3 for the entire lifetimes of the cogeneration assets it owns.

The analysis of the voting rights and governance of Cogestar 3 confirms that Dalkia still has exclusive control. The sale of shares to ATE, considered as a transaction between owners with no change in control, has no significant impact on Group equity.

This operation includes a bond issue by Cogestar 3 (consisting entirely of bonds convertible into shares) for the total amount of €48 million, to be subscribed by ATE. These convertible bonds are classified as equity instruments under IAS 32 (see note 27.4).

This operation is presented in cash flows from financing activities in the cash flow statement.

ATE had acquired a 70% stake in each of Cogestar 1 and Cogestar 2 in 2016 through its subsidiary Edulis Finance for an amount of €53 million, in an operation that also included an issue of bonds convertible into shares for the total amount of €86 million, subscribed by ATE.

### NOTE 6 SEGMENT REPORTING

#### 6.1 REPORTING BY OPERATING SEGMENT

Segment reporting presentation complies with IFRS 8, "Operating segments".

Segment reporting is determined before inter-segment eliminations. Inter-segment transactions take place at market prices.

In accordance with IFRS 8, the breakdown used by the EDF group corresponds to the operating segments as regularly reviewed by the Management Committee.

Following the acquisition of Framatome on 31 December 2017 (see note 3.2), the Group has created a new operating segment, "Reactors and Services (Framatome)".

The Group uses the following segments:

- "France – Generation and Supply";
- "France – Regulated activities": distribution, transmission, EDF's island activities and the activities of Electricité de Strasbourg;
- "Reactors and Services (Framatome)": this segment reports the balance sheet items of the Framatome subgroup following its acquisition at 31 December 2017;
- "United Kingdom": the entities of the EDF Energy subgroup;
- "Italy": Edison entities and TdE SpA;
- "Other international": EDF International and the other gas and electricity entities located in continental Europe, the US, Latin America and Asia;
- "Other activities": comprising in particular EDF Trading, EDF Énergies Nouvelles, Dalkia, and EDF Investissements Groupe.

No segments have been merged.

#### 6.1.1 At 31 December 2017

<i>(in millions of euros)</i>	France – Generation and Supply	France – Regulated activities	Reactors and Services (Framatome)	United Kingdom	Other Italy	Other international	Other activities	Inter-segment eliminations	Total
<b>Income statements:</b>									
External sales	34,533	5,732	-	8,681	9,918	4,649	6,119		69,632
Inter-segment sales	1,073	10,164	-	7	22	173	1,694	(13,133)	-
<b>TOTAL SALES</b>	<b>35,606</b>	<b>15,896</b>	<b>-</b>	<b>8,688</b>	<b>9,940</b>	<b>4,822</b>	<b>7,813</b>	<b>(13,133)</b>	<b>69,632</b>
<b>OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION</b>									
<b>OPERATING PROFIT</b>	<b>4,876</b>	<b>4,898</b>	<b>-</b>	<b>1,035</b>	<b>910</b>	<b>457</b>	<b>1,566</b>	<b>-</b>	<b>13,742</b>
<b>Balance sheet:</b>									
Goodwill	-	223	1,257	7,586	18	15	937	-	10,036
Intangible assets and property, plant and equipment	50,344	59,008	2,336	14,074	6,396	2,155	12,550	-	146,863
Investments in associates and joint ventures <sup>(1)</sup>	1,990	-	92	114	67	3,812	1,174	-	7,249
Other segment assets <sup>(2)</sup>	28,909	3,904	1,694	4,306	2,405	628	7,433	-	49,279
Assets classified as held for sale	-	-	-	-	-	-	-	-	-
Other non-allocated assets	-	-	-	-	-	-	-	-	67,325
<b>TOTAL ASSETS</b>	<b>81,243</b>	<b>63,135</b>	<b>5,379</b>	<b>26,080</b>	<b>8,886</b>	<b>6,610</b>	<b>22,094</b>	<b>-</b>	<b>280,752</b>
<b>Other information:</b>									
Net depreciation and amortisation	(3,128)	(2,797)	-	(1,097)	(603)	(246)	(666)	-	(8,537)
Impairment	(73)	-	-	(246)	(150)	(19)	(30)	-	(518)
Equity (non-controlling interests)	-	39	209	5,109	370	407	1,208	-	7,342
Investments in intangible assets and property, plant and equipment	5,831	4,003	-	2,408	457	325	1,723	-	14,747

(1) At 31 December 2017, investments in associates and joint ventures include 50.1% of the interests in CTE (the joint venture holding RTE's shares) which is now part of the France – Generation and Supply segment.

(2) Other segment assets include inventories, trade receivables and other receivables. By convention, the CSPE receivable is totally allocated to the France – Regulated Activities segment, in the amount of €1,147 million.



## 6.1.2 At 31 December 2016

<i>(in millions of euros)</i>	France – Generation and Supply	France – Regulated activities	United Kingdom	Italy international	Other	Other activities	Inter- segment eliminations	Total
<b>Income statements:</b>								
External sales	34,137	5,387	9,266	11,105	5,138	6,170	-	71,203
Inter-segment sales	1,054	10,341	1	20	148	1,564	(13,128)	-
<b>TOTAL SALES</b>	<b>35,191</b>	<b>15,728</b>	<b>9,267</b>	<b>11,125</b>	<b>5,286</b>	<b>7,734</b>	<b>(13,128)</b>	<b>71,203</b>
<b>OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION</b>								
	<b>6,156</b>	<b>5,102</b>	<b>1,713</b>	<b>641</b>	<b>711</b>	<b>2,091</b>	-	<b>16,414</b>
<b>OPERATING PROFIT</b>	<b>3,265</b>	<b>2,395</b>	<b>486</b>	<b>(255)</b>	<b>213</b>	<b>1,410</b>	-	<b>7,514</b>
<b>Balance sheet:</b>								
Goodwill	-	223	7,818	2	13	867	-	8,923
Intangible assets and property, plant and equipment	47,136	57,305	13,353	6,887	2,242	11,780	-	138,703
Investments in associates and joint ventures <sup>(1)</sup>	355	2,558	59	104	4,587	982	-	8,645
Other segment assets <sup>(2)</sup>	30,098	4,281	4,386	2,696	738	8,118	-	50,317
Assets classified as held for sale	-	2,623	-	-	2,115	482	-	5,220
Other non-allocated assets								69,833
<b>TOTAL ASSETS</b>	<b>77,589</b>	<b>66,990</b>	<b>25,616</b>	<b>9,689</b>	<b>9,695</b>	<b>22,229</b>	-	<b>281,641</b>
<b>Other information:</b>								
Net depreciation and amortisation	(2,681)	(2,674)	(1,069)	(558)	(378)	(606)	-	(7,966)
Impairment	(65)	-	(81)	(159)	(194)	(140)	-	(639)
Equity (non-controlling interests)	-	38	4,782	400	641	1,063	-	6,924
Investments in intangible assets and property, plant and equipment	5,752	3,779	1,911	436	497	2,022	-	14,397

(1) At 31 December 2016, investments in associates and joint ventures included figures for RTE in the France – Regulated activities segment.

(2) Other segment assets include inventories, trade receivables and other receivables. By convention, the CSPE receivable is totally allocated to the France – Regulated Activities segment, in the amount of €1,647 million.

# 6. FINANCIAL STATEMENTS

## Notes to the consolidated financial statements

### 6.2 SALES TO EXTERNAL CUSTOMERS, BY PRODUCT AND SERVICE GROUP

The Group's sales are broken down by product and service group as follows:

- **"Generation/Supply"**: energy generation and energy sales to industry, local authorities, small businesses and residential consumers. This segment also includes commodity trading activities;
- **"Distribution"**: management of the low and medium-voltage public electricity distribution networks;
- **"Other"**: energy services (district heating, thermal energy services, etc.) for industry and local authorities, and new businesses mainly aimed at boosting electricity generation through cogeneration and renewable energy sources (e.g. wind turbines, photovoltaic panels, etc.).

<i>(in millions of euros)</i>	<b>Generation - Supply</b>	<b>Distribution</b>	<b>Other</b>	<b>Total</b>
<b>2017:</b>				
External sales:				
■ France <sup>(1)</sup>	24,832	15,352	80	40,264
■ International and Other activities	24,201	-	5,167	29,368
<b>SALES</b>	<b>49,033</b>	<b>15,352</b>	<b>5,247</b>	<b>69,632</b>
<b>2016:</b>				
External sales:				
■ France <sup>(1)</sup>	24,247	15,202	75	39,524
■ International and Other activities	26,652	145	4,882	31,679
<b>SALES</b>	<b>50,899</b>	<b>15,347</b>	<b>4,957</b>	<b>71,203</b>

(1) "France" comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 6.1).

## INCOME STATEMENT

### NOTE 7 SALES

Sales are comprised of:

<i>(in millions of euros)</i>	2017	2016
Sales of energy and energy-related services	66,835	68,128
Other sales of goods and services	2,193	2,051
Trading	604	1,024
<b>SALES</b>	<b>69,632</b>	<b>71,203</b>

After elimination of changes in foreign exchange rates and the scope of consolidation, the downturn observed in 2017 (-1.0%) is principally attributable to lower sales in Italy, partly offset by higher sales in France.

In Italy, sales declined due to the lower volumes of electricity and gas sold, especially on the wholesale markets, although there was no significant impact on the margin.

In France, generation and supply activities registered a rise in sales in 2017 reflecting high ARENH subscriptions in 2017 (82.1TWh) whereas 2016 had no subscriptions. This rise is partly offset by the effects of retroactive adjustments to regulated sales tariffs for the period 1 August 2014 to 31 July 2015, recorded in 2016 in the amount of €1,030 million, which had no equivalent in 2017.

6.

### NOTE 8 FUEL AND ENERGY PURCHASES

Fuel and energy purchases comprise:

<i>(in millions of euros)</i>	2017	2016
Fuel purchases used – power generation	(12,473)	(12,639)
Energy purchases	(16,723)	(14,805)
Transmission and delivery expenses	(8,968)	(9,017)
Gain/loss on hedge accounting	80	(110)
(Increase)/decrease in provisions related to nuclear fuels and energy purchases	443	521
<b>FUEL AND ENERGY PURCHASES</b>	<b>(37,641)</b>	<b>(36,050)</b>

Fuel purchases used include costs relating to raw materials for energy generation (coal, biomass, oil, propane, fissile materials, nuclear fuels and gas), purchases of services related to the nuclear fuel cycle, and costs associated with environmental schemes (mainly greenhouse gas emission rights and renewable energy certificates).

Energy purchases include energy generated by third parties, incorporating energy derived from cogeneration intended for resale.

The increase in energy purchases is principally explained by the sourcing of ARENH subscriptions in France as nuclear power output was declining. This increase was partly counterbalanced by a decline in purchases in Italy, in line with the change in sales.

### NOTE 9 OTHER EXTERNAL EXPENSES

Other external expenses comprise:

<i>(in millions of euros)</i>	2017	2016
External services	(11,678)	(11,177)
Other purchases (excluding external services, fuel and energy)	(2,706)	(2,486)
Change in inventories and capitalised production	5,485	4,728
(Increase)/decrease in provisions on other external expenses	160	33
<b>OTHER EXTERNAL EXPENSES</b>	<b>(8,739)</b>	<b>(8,902)</b>

After elimination of changes in foreign exchange rates and the scope of consolidation, other external expenses declined by around -3.1% from 2016, mainly in the France – Generation and Supply segment.

## NOTE 10 PERSONNEL EXPENSES

### 10.1 PERSONNEL EXPENSES

Personnel expenses comprise:

<i>(in millions of euros)</i>	2017	2016
Wages and salaries	(7,790)	(7,860)
Social contributions	(1,844)	(1,885)
Employee profit sharing	(223)	(218)
Other contributions related to personnel	(383)	(366)
Other expenses linked to short-term benefits	(212)	(242)
<b>Short-term benefits</b>	<b>(10,452)</b>	<b>(10,571)</b>
Expenses under defined-contribution plans	(938)	(939)
Expenses under defined-benefit plans	(994)	(839)
<b>Post-employment benefits</b>	<b>(1,932)</b>	<b>(1,778)</b>
Other long-term expenses	(83)	(190)
Termination payments	11	(4)
<b>Other personnel expenses</b>	<b>(72)</b>	<b>(194)</b>
<b>PERSONNEL EXPENSES</b>	<b>(12,456)</b>	<b>(12,543)</b>

### 10.2 AVERAGE WORKFORCE

	2017	2016
IEG status	100,185	103,275
Other	50,888	51,533
<b>AVERAGE WORKFORCE</b>	<b>151,073</b>	<b>154,808</b>

The Group's average workforce presented in the above table does not include the effect of acquisition of Framatome, due to the date of the acquisition (31 December 2017).

Average workforce numbers for the controlled entities and joint operations are reported on a full-time equivalent basis.

A more detailed presentation of workforce categories can be found in the "Environmental and Societal Information – Human Resources" section of the Reference Document in section 3.7.3.3, "Social indicators".

## NOTE 11 TAXES OTHER THAN INCOME TAXES

Taxes other than income taxes break down as follows:

<i>(in millions of euros)</i>	2017	2016
Payroll taxes	(267)	(265)
Energy taxes	(1,518)	(1,566)
Other non-income taxes	(1,756)	(1,825)
<b>TAXES OTHER THAN INCOME TAXES</b>	<b>(3,541)</b>	<b>(3,656)</b>

Taxes other than income taxes mainly concern France and essentially comprise land tax and the French business taxes on land and value added.

## NOTE 12 OTHER OPERATING INCOME AND EXPENSES

Other operating income and expenses comprise:

<i>(in millions of euros)</i>	Notes	2017	2016
Operating subsidies	12.1	6,823	6,765
Net income on deconsolidation	12.2	214	290
Gains on disposal of fixed assets	12.2	57	108
Net increase in provisions on current assets		42	(17)
Net increase in provisions for operating contingencies and losses		137	41
Other items	12.3	(786)	(825)
<b>OTHER OPERATING INCOME AND EXPENSES</b>		<b>6,487</b>	<b>6,362</b>

### 12.1 OPERATING SUBSIDIES

This item mainly comprises the subsidy received or receivable by EDF in respect of the CSPE, reflected in the financial statements through recognition of income of €6,547 million for 2017 (€6,510 million for 2016).

### 12.2 NET INCOME ON DECONSOLIDATION AND GAINS ON DISPOSAL OF FIXED ASSETS

In 2017, net income on deconsolidation and gains on disposal of property, plant and equipment mainly includes:

- gains on sales of EDF Énergies Nouvelles' generation assets as part of the Development and Sale of Structured Assets (DSSA) activities, amounting to €180 million (€357 million for 2016);
- gains on sales of real estate assets in France and Italy, amounting to €307 million (€230 million in France for 2016).

### 12.3 OTHER ITEMS

Other items are stable compared to 2016, and notably include losses on non-recoverable operating receivables and costs associated with the Energy Savings Certificates used or consumed over the year.

## NOTE 13 IMPAIRMENT/REVERSALS

### 13.1 IMPAIRMENT BY CATEGORY OF ASSET

Details of impairment recognised and reversed are as follows:

<i>(in millions of euros)</i>	Notes	2017	2016
Impairment of goodwill	18	-	-
Impairment of other intangible assets	19	(16)	(159)
Impairment of tangible assets and discontinued operations	21-22-46	(502)	(480)
<b>IMPAIRMENT NET OF REVERSALS</b>		<b>(518)</b>	<b>(639)</b>

In 2016, the €(639) million of impairment recorded concerned:

- thermal assets: €(269) million (principally in Poland, but also in the United Kingdom and France);
- some of Edison's exploration and production fields and hydropower assets: €(160) million;
- various CGUs of EDF Énergies Nouvelles (particularly a biogas plant in the United States): €(127) million;
- other impairment on specific assets: €(83) million.

Impairment of €(481) million was also booked in respect of associates (see note 23).

In 2017, impairment amounts to €(518) million. Details are given below.

### 13.2 IMPAIRMENT TESTS ON GOODWILL, INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT

The following tables present the results of impairment tests carried out on the main goodwill, intangible assets with indefinite useful lives and other Group assets in 2017, and some of the key assumptions used.

As reported in note 3.2, the Group finalised the acquisition of 75.5% of the capital of Framatome on 31 December 2017. The assets acquired, mainly goodwill, intangible assets and property, plant and equipment, were recorded at fair value at 31 December 2017.

#### IMPAIRMENT OF GOODWILL AND INTANGIBLE ASSETS WITH INDEFINITE USEFUL LIVES

Operating segment	Cash-Generating Unit or asset	Net book value <i>(in millions of euros)</i>	WACC after tax	Growth rate to infinity	Impairment 2017 <i>(in millions of euros)</i>
United Kingdom	EDF Energy goodwill	7,586	6.3%	-	-
Italy	Edison brand	945	6.4% - 9.1%	2.0%	-
	Dalkia goodwill	536	4.6%	1.5%	-
Other activities	Dalkia brand	130	5.1%	1.5%	-
Other impairment of goodwill	Specific assets – France	-	-	-	(16)
<b>IMPAIRMENT OF GOODWILL AND INTANGIBLE ASSETS WITH INDEFINITE USEFUL LIVES</b>					<b>(16)</b>

#### IMPAIRMENT OF OTHER INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT

Operating segment	Cash-Generating Unit or asset	Impairment indicators	WACC after tax	Impairment 2017 <i>(in millions of euros)</i>
	Coal-fired plants	Fall in clean dark spreads and early shutdown decision		
	Gas storage			
United Kingdom	Real estate asset	Persistently low price volatility	6.0%-6.3%	(246)
Italy	Edison assets (Power and E&P)	Decline in the Euro-dollar exchange rate	4.8% - 10.3%	(150)
Other activities	EDF Énergies Nouvelles CGU		3.8% - 13.0%	(29)
France – Specific assets	Real estate assets			(57)
Other impairment	Hydropower projects			(20)
<b>IMPAIRMENT OF OTHER INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT</b>				<b>(502)</b>

## General assumptions

Note 1.3.15 explains the methodology used by the Group for impairment testing.

The WACC in the benchmark countries was lower overall than at 31 December 2016 (variable decline of around 10 to 70 base points, depending on the country). In core Euro zone countries (especially France and Belgium), the slight decrease in the WACC largely reflects the downward trend in risk-free rates in recent years. The sharper downturn in the WACC in other Euro zone countries (especially Italy) reflects the positive change in country risk. Test results are submitted to analyses of sensitivity to the discount rate, and the principal results of these analyses are detailed below.

The market environment remained weak and volatile in 2017 as the trends observed in 2015 continued. Low market prices for electricity and commodities, and for CO<sub>2</sub>, affected profitability on traditional generation assets (essentially thermal plants), and the recent introduction of capacity mechanisms with different modalities in each country cannot so far restore sufficient returns for these generation facilities.

On the market horizon, however, forward prices were slightly better than the price levels used in the previous medium-term plan.

Over the medium and long-term horizon, fundamentals show relative year-on-year stability. The fuel and electricity price trajectory used in impairment testing is slightly lower than last year, except for the United Kingdom where the price trajectories expressed in pounds sterling are slightly higher than those used last year.

As these assumptions are crucial in determining recoverable value and thus for the results of impairment tests, sensitivity analyses are applied to long-term price curves.

At 31 December 2017, the macro-economic context presented above does not introduce any major risk for the Group in addition to the risks already noted in previous years' financial statements; the impairment booked reflects risks specific to certain CGUs or specific assets.

## United Kingdom – EDF Energy

### Thermal assets and gas storage assets

In 2015, €(1,096) million of impairment was recorded on EDF Energy's thermal assets (mainly coal-fired plants and gas storage facilities, and to a lesser degree combined-cycle gas (CCGT) plants), reflecting the low spreads, volatility and additional revenues generated by the capacity mechanism. Additional risks were also identified in 2016, amounting to €(44) million.

At 31 December 2017, the persistently poor market for coal-fired plants (declining clean dark spreads and lower than expected results from capacity auctions) and for gas storage (continuously low volatility) led the Group to review the strategy relating to these assets, and decisions were made for early shutdown, sale or mothballing of plants. The operating lifetimes of the Cottam and West Burton A coal-fired plants were reassessed and reset to end in 2019 and 2021 respectively, in line with the results of the latest capacity auctions. As a result of updated assumptions regarding the Group's use of these facilities, their residual book value of €(188) million was fully written off at 31 December 2017.

The updated impairment test on the West Burton B CCGT plant showed a surplus recoverable value over the book value. As it is currently considered that the test result does not necessarily indicate a long-term improvement in the asset's profitability prospects, there was no partial reversal of the €(216) million impairment recorded in 2015 on this plant.

A 5% variation in clean spark spreads would have an impact of approximately 5% on the recoverable value of the West Burton B CCGT plant, with no effect on a positive difference between the recoverable value and the book value.

### Nuclear assets (plants in operation and the Hinkley Point C project)

The recoverable value of existing nuclear assets (7 power plants) is estimated by discounting future cash flows over the assets' useful life, assuming a 20-year extension for the Sizewell B PWR plant (other, Advanced Gas-cooled Reactor (AGR) plants have already had their useful life extended by the British Nuclear Authority, which announced the most recent decisions in February 2016). The recoverable value of EDF Energy's nuclear fleet has improved compared to 2016, in line with slightly more favourable long-term price trajectories, and is significantly higher than the assets' book values. Sensitivity analyses of the benchmark price curve do not call into question the existence of a positive difference between the recoverable value and the book value, identified by the impairment test.

EDF Energy's goodwill amounted to €7.6 billion (£6.7 billion) at 31 December 2017 and mainly resulted from the takeover of British Energy in 2009.

The recoverable value of EDF Energy is estimated by discounting future cash flows over the assets' expected useful life, taking into consideration the plan to construct two EPRs with a 60-year useful life at the Hinkley Point site, a project for which the final contracts were signed on 29 September 2016. Future cash flows relating to these plants are determined by reference to the Contract for Difference (CfD) between the Group and the UK government. The CfD sets stable, predictable prices for EDF Energy for a period of 35 years from the date the two EPRs are first commissioned: if market prices fall below the CfD exercise price, EDF Energy will receive an additional payment.

The impairment test incorporates the revised project costs (see press release of 3 July 2017) and thus includes total project completion costs (excluding borrowing costs and exchange rate effects compared to the project's benchmark rate of £1=€1.23) of £19.6 billion (in 2015 sterling), £1.5 billion more than previous estimates, still assuming delivery of Unit 1 by the end of 2025. This estimate also assumes successful completion of operational action plans in partnership with suppliers. The estimated additional costs (net of action plans) essentially result from a better understanding of the design, which has been adjusted to meet the regulator's requirements, the volume and sequencing of work on site, and the gradual implementation of supplier contracts. EDF's projected rate of return (IRR) is now estimated at 8.5% compared to about 9% initially. On these revised bases, the difference between the recoverable value and the book value of EDF Energy remains significant at 31 December 2017.

The project review also identified a risk of deferral of the Commercial Operation Date (COD), estimated at 15 months for Unit 1 and 9 months for Unit 2, entailing an additional potential cost of around £0.7 billion (in 2015 sterling) which would lead to an IRR for EDF of around 8.2%. This risk of deferral and the associated additional cost would reduce the margin resulting from the EDF Energy impairment test by approximately 20%.

Further sensitivity analyses were also conducted for information purposes, for example based on a 4-year deferral of commissioning and an associated additional cost of £4 billion over the new benchmark business plan. The results do not call into question the book value of EDF Energy.

Impairment of €58 million was recognised on other assets, including one real estate asset.

Although the Brexit decision has no immediate impact on EDF Energy's impairment tests since most cash flows (receipts, costs, investments) and assets are stated in pounds sterling, it is still difficult at this stage to anticipate the long-term consequences, given the uncertainties over the timing and terms of the UK's departure from the European Union. The Group will monitor movements in the rates of return demanded by investors and changes in fuel prices, CO<sub>2</sub> prices and macro-economic data such as GDP growth, which could affect price curves.

### Italy – Edison

As an intangible asset with an indefinite useful life, the Edison brand, first recognised at the value of €945 million when Edison was taken over in 2012, was subjected to an impairment test that did not identify any risk of impairment. This test used the royalty relief method.

In 2015, €(1,419) million of impairment was recorded on Edison's electricity generation assets (thermal and renewable energy plants) and exploration and production assets. Additional risks amounting to €(160) million were identified in 2016 in relation to exploration and production assets and hydropower assets.

At 31 December 2017, the recoverable value of most assets was stable or showing a small improvement in a slightly more favourable short-term market environment, and also thanks to controlled cost and investment trajectories. However, additional risks amounting to €(150) million were identified in 2017 concerning (i) certain exploration-production fields adversely affected by a deterioration in macro-economic parameters (the Euro-dollar exchange rate, the country risk premium). For information, a 1% variation in the Euro/dollar exchange rate would have an impact of approximately €10 million on the recoverable value, expressed in euros, of exploration and production assets that generate cash flows in dollars.

Sensitivity analyses conducted as part of the impairment tests produced the following information:

- for electricity generation assets, a 10% decrease in electricity prices or a 50 base point increase in the WACC would cause a maximum risk of around €(30) million, or less than 2% of the book value of these assets;
- for exploration and production assets, a 5% decrease in commodity prices would generate an additional risk of some €(30) million.

### Other activities

#### EDF Énergies Nouvelles

In 2017, impairment of €(29) million was recorded in respect of the various CGUs of EDF Énergies Nouvelles (this mainly concerned a US company specialising in batteries).

#### Dalkia

Dalkia's goodwill amounted to €536 million at 31 December 2017, and mainly resulted from acquisition of the Dalkia group in France under the agreement of 25 March 2014 with Veolia Environnement.

The recoverable value of the Dalkia group is based on future cash flows projected over a medium-term horizon, and a terminal value that represents cash flow projections to infinity. Using updated assumptions for 2017, the recoverable value remains higher than the book value. The key parameters of the test are the calculation method for the terminal value, and the discount rate: both were subjected to sensitivity analyses and the results did not affect the positive difference between the recoverable value and the book value.

The Dalkia brand, recognised as an asset when the Group took control of Dalkia in 2014 at the value of €130 million, is estimated by the royalties relief method. An updated test at 31 December 2017 showed that this book value is justified.

### France – Generation and supply

The integrated management and interdependence of the different generation facilities that make up the French fleet (nuclear, thermal and hydropower plants), independently of their maximum technical capacities, have led the Group to consider the entire fleet as a single CGU. This CGU does not include any goodwill.

Even when there is no indication of any loss of value, an impairment test is performed due to the highly significant value of this CGU in the Group's financial statements and its substantial exposure to market prices since discontinuation of the "yellow" and "green" regulated tariffs on 1 January 2016.

The recoverable value of the generation fleet is estimated by discounting future cash flows under the Group's usual methodology, described in note 1.3.15, over the assets' useful life, using an after-tax WACC of 5.2%. For nuclear assets, the Group's basic valuation assumes that the useful life will be extended to 50 years, in line with its industrial strategy. The nuclear capacity remains subject to a ceiling of 63.2GW under France's Energy Transition Law.

The assumption of stable returns on capacity of €10/kW (in 2016 prices) is adopted in keeping with the price set for the latest French capacity mechanism auction, which was held on the EPEX Spot market.

The impairment test led to recognition of a significant positive difference between the recoverable value and the book value of the generation fleet in France, supported by the slight rise in electricity prices on the market horizon and implementation of savings plans.

The key assumptions used in the test are the useful life of nuclear assets, the medium and long-term price scenario, the discount rate, developments in costs and investments, and the assumed capacity premium. Each of these assumptions has been subjected to a sensitivity analysis, which does not call into question the existence of a positive difference between the recoverable value and book value.

### France – Impairment of specific assets

The Group also recognised impairment of €(73) million on specific assets, notably relating to certain real estate assets and hydropower projects.

Finally, impairment of €(618) million was booked in respect of associates at 31 December 2017. Details are given in note 23.



## NOTE 14 OTHER INCOME AND EXPENSES

Other income and expenses amount to €1,363 million for 2017, mainly including a gain of €1,462 million on the sale of 49.9% of the Group's investment in CTE (see note 3.4.1).

Other income and expenses in 2016 mainly included income of €112 million resulting from the favourable outcome of a dispute with the Hungarian State. This

payment was ordered by the Hague Permanent Court of Arbitration following applications for compensation for loss of long-term power purchase agreements (PPAs) and reimbursement of stranded costs.

## NOTE 15 FINANCIAL RESULT

### 15.1 COST OF GROSS FINANCIAL INDEBTEDNESS

Details of the components of the cost of gross financial indebtedness are as follows:

<i>(in millions of euros)</i>	2017	2016
Interest expenses on financing operations	(1,869)	(1,907)
Change in the fair value of derivatives and hedges of liabilities	37	(11)
Transfer to income of changes in the fair value of cash flow hedges	31	122
Net foreign exchange gain on indebtedness	23	(31)
<b>COST OF GROSS FINANCIAL INDEBTEDNESS</b>	<b>(1,778)</b>	<b>(1,827)</b>

### 15.2 DISCOUNT EFFECT

The cost of unwinding the discount primarily concerns provisions for the back-end of the nuclear cycle, decommissioning and last cores, and long-term and post-employment employee benefits.

This cost decreased in 2016, in line with the lower real discount rate (see note 29.1.5.1).

Details of the final discount effect are as follows:

<i>(in millions of euros)</i>	2017	2016
Provisions for long-term and post-employment employee benefits	(884)	(1,048)
Provisions for the back-end of the nuclear cycle, decommissioning and last cores <sup>(1)</sup>	(1,968)	(2,278)
Other provisions and advances	(107)	(91)
<b>DISCOUNT EFFECT</b>	<b>(2,959)</b>	<b>(3,417)</b>

(1) Including the effect of discounting the receivable corresponding to amounts reimbursable by the NLF – see note 36.3.

### 15.3 OTHER FINANCIAL INCOME AND EXPENSES

Other financial income and expenses comprise:

<i>(in millions of euros)</i>	2017	2016
Financial income on cash and cash equivalents	21	20
Gains/(losses) on available-for-sale financial assets	1,395	775
Gains/(losses) on other financial assets	295	398
Changes in financial instruments carried at fair value with changes in fair value included in income	(102)	(46)
Other financial expenses	(52)	(263)
Foreign exchange gain/loss on financial items other than debts	(41)	43
Return on fund assets	470	547
Capitalised borrowing costs	515	437
<b>OTHER FINANCIAL INCOME AND EXPENSES</b>	<b>2,501</b>	<b>1,911</b>

Gains net of losses on available-for-sale financial assets include gains on disposals, interest income, and dividends.

In 2017, gains and losses on available-for-sale financial assets include net gains on sales of EDF's dedicated assets, amounting to €985 million (€428 million in 2016).

## NOTE 16 INCOME TAXES

### 16.1 BREAKDOWN OF TAX EXPENSE

Details are as follows:

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
Current tax expense	42	(1,886)
Deferred taxes	(189)	498
<b>TOTAL</b>	<b>(147)</b>	<b>(1,388)</b>

In 2017, €362 million of the current tax expense relates to EDF's tax consolidated group in France, and €(320) million relates to other subsidiaries (€(1,458) million and €(428) million respectively in 2016).

Following the announcement that the 3% contribution on dividend distributions is unconstitutional, the Group recorded a tax receivable of €255 million (see note 3.6).

In France, the first finance law for 2017 introduced two exceptional contributions in addition to income taxes, levied on 2017 taxable income only. These cumulative contributions respectively apply to large companies with sales revenues of over €1 billion and €3 billion. The EDF group is concerned by both, and this brings the income tax rate for 2017 to 44.43% (including the 3.3% social contribution). The increase in the income tax charge resulting from these contributions is approximately €69 million.

### 16.2 RECONCILIATION OF THE THEORETICAL AND EFFECTIVE TAX EXPENSE (TAX PROOF)

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
<b>Income of consolidated companies before tax</b>	<b>3,401</b>	<b>4,181</b>
Income tax rate applicable to the parent company	34.43%	34.43%
<b>Theoretical tax expense</b>	<b>(1,171)</b>	<b>(1,440)</b>
Differences in tax rate <sup>(1)</sup>	51	119
Permanent differences <sup>(2)</sup>	476	(163)
Taxes without basis <sup>(3)</sup>	478	286
Unrecognised deferred tax assets	20	(189)
Other	(1)	(1)
<b>ACTUAL TAX EXPENSE</b>	<b>(147)</b>	<b>(1,388)</b>
<b>EFFECTIVE TAX RATE</b>	<b>4.32%</b>	<b>33.20%</b>

The main factors explaining the difference between the theoretical tax rate and this effective rate are:

■ 2017:

<sup>(1)</sup> the positive impacts of income tax cuts in Belgium (from 33.99% to 25% in 2020) and the United States (from 40% to 27%), amounting to €38 million and €46 million respectively;

<sup>(2)</sup> the favourable impact of sales of investments (mainly the CTE/RTE operation (see note 3.4.1) and assets subject to a reduced tax rate, amounting to €389 million.

<sup>(3)</sup> the favourable impact of the appeal concerning the 3% contribution on dividend distributions, amounting to €255 million (and non-taxable) and the favourable impact of deduction of payments made to bearers of perpetual subordinated loans, amounting to €195 million.

■ 2016:

<sup>(1)</sup> the positive impacts of income tax cuts from 2020 in France (from 34.43% to 28.92%) and the United Kingdom (from 18% to 17%), amounting to €69 million and €68 million respectively;

<sup>(2)</sup> the favourable impact of deduction of payments made to bearers of perpetual subordinated loans, amounting to €200 million.

### 16.3 CHANGE IN DEFERRED TAX ASSETS AND LIABILITIES

<i>(in millions of euros)</i>	2017	2016
Deferred tax assets	1,641	2,713
Deferred tax liabilities	(2,272)	(4,122)
<b>Net deferred taxes at 1 January</b>	<b>(631)</b>	<b>(1,409)</b>
Change in net income	(189)	498
Change in equity	(437)	33
Translation adjustments	61	185
Changes in scope of consolidation	22	60
Other movements	32	2
<b>NET DEFERRED TAXES AT 31 DECEMBER</b>	<b>(1,142)</b>	<b>(631)</b>
Deferred tax assets	1,220	1,641
Deferred tax liabilities	(2,362)	(2,272)

€(349) million of the change in 2017 in deferred tax assets included in equity results from actuarial gains and losses on post-employment benefits (€(191) million in 2016), and €(294) million of this change concerns fair value movements on financial instruments and financial assets held for sale (€224 million in 2016).

### 16.4 BREAKDOWN OF DEFERRED TAX ASSETS AND LIABILITIES BY NATURE

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
<b>Deferred taxes:</b>		
Fixed assets	(5,419)	(5,344)
Provisions for employee benefits	5,203	6,051
Other provisions and impairment	378	377
Financial instruments	163	232
Tax loss carryforwards and unused tax credits	1,289	1,279
Other	132	48
<b>Total deferred tax assets and liabilities</b>	<b>1,746</b>	<b>2,643</b>
Unrecognised deferred tax assets	(2,888)	(3,274)
<b>NET DEFERRED TAXES</b>	<b>(1,142)</b>	<b>(631)</b>

At 31 December 2017, unrecognised deferred tax assets represent a potential tax saving of €2,888 million (€3,274 million at 31 December 2016), mainly relating to France and the United States.

In France, this potential tax saving, which amounts to €2,043 million at 31 December 2017 (€2,385 million at 31 December 2016), essentially concerns deferred tax assets on employee benefits. These deferred tax assets have no expiry date.

In the United States, this potential tax saving amounts to €499 million (€734 million in 2016) and mainly corresponds to losses carried forward, with expiry dates between 2029 and 2036.

Recognised deferred tax assets on tax loss carryforwards amount to €497 million (€438 million in 2016) and principally concern the United States (€199 million in 2017, €135 million in 2016), France (€51 million in 2017, €111 million in 2016), Canada and Italy. They have been recognised due to the existence of deferred tax liabilities on the same tax entities that will reverse over the same time horizon, or in view of prospects for taxable profits.

## NOTE 17 BASIC EARNINGS PER SHARE AND DILUTED EARNINGS PER SHARE

The diluted earnings per share is calculated by dividing the Group's share of net income, corrected for dilutive instruments and the payments made during the year to bearers of perpetual subordinated bonds, by the weighted average number of potential shares outstanding over the period after elimination of treasury shares.

The following table shows the reconciliation of the basic and diluted earnings used to calculate earnings per share (basic and diluted), and the variation in the weighted average number of shares used in calculating basic and diluted earnings per share:

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
Net income attributable to ordinary shares	3,173	2,851
Payments on perpetual subordinated bonds	(565)	(582)
Effect of dilutive instruments	-	-
<b>Net income used to calculate earnings per share</b>	<b>2,608</b>	<b>2,269</b>
<b>Average weighted number of ordinary shares outstanding during the year</b>	<b>2,660,243,412</b>	<b>1,980,632,028</b>
<b>Average weighted number of diluted shares outstanding during the year</b>	<b>2,660,243,412</b>	<b>1,980,632,028</b>
<b>Earnings per share (in euros):</b>		
<b>EARNINGS PER SHARE</b>	<b>0.98</b>	<b>1.15</b>
<b>DILUTED EARNINGS PER SHARE</b>	<b>0.98</b>	<b>1.15</b>

In 2017, the EDF capital increase, payment of the outstanding scrip dividend for 2016 and payment of the scrip interim dividend for 2017 led to an increase in

the share capital and an issue premium totalling €5,427 million, corresponding to the issuance of 818,302,121 shares.

## OPERATING ASSETS AND LIABILITIES, EQUITY

### NOTE 18 GOODWILL

#### 18.1 CHANGES IN GOODWILL

Goodwill on consolidated entities comprises the following:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
<b>Net book value at opening date</b>	<b>8,923</b>	<b>10,236</b>
Acquisitions (note 3.2)	1,396	36
Disposals	-	-
Impairment (note 13)	-	-
Translation adjustments	(282)	(1,298)
Other changes	(1)	(51)
<b>NET BOOK VALUE AT CLOSING DATE</b>	<b>10,036</b>	<b>8,923</b>
Gross value at closing date	10,802	9,709
Accumulated impairment at closing date	(766)	(786)

The changes in goodwill in 2017 primarily related to:

- the acquisition of Framatome for €1,257 million (see note 3.2);
- translation adjustments of €(282) million, largely reflecting the pound sterling's decline against the Euro.

The changes in goodwill in 2016 primarily related to the translation adjustments of €(1,298) million, largely reflecting the pound sterling's decline against the Euro.

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#### 18.2 GOODWILL BY OPERATING SEGMENT

The breakdown of goodwill between the new segments as presented in note 6.1 is as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
<b>France – Regulated activities</b>	<b>223</b>	<b>223</b>
<b>Reactors and services (Framatome) (note 3.2)</b>	<b>1,257</b>	<b>-</b>
<b>United Kingdom (EDF Energy)</b>	<b>7,586</b>	<b>7,818</b>
<b>Italy</b>	<b>18</b>	<b>2</b>
<b>Other international</b>	<b>15</b>	<b>13</b>
Dalkia	536	496
EDF Énergies Nouvelles	206	177
Other	195	194
<b>Other activities</b>	<b>937</b>	<b>867</b>
<b>GROUP TOTAL</b>	<b>10,036</b>	<b>8,923</b>

## NOTE 19 OTHER INTANGIBLE ASSETS

The net value of other intangible assets breaks down as follows:

### At 31 December 2017

<i>(in millions of euros)</i>	31/12/2016	Acquisitions	Disposals	Translation adjustments	Changes in scope	Other movements	31/12/2017
Software	3,624	638	(224)	(37)	23	10	4,034
Positive fair value of commodity contracts acquired in a business combination	810	-	-	-	-	-	810
Greenhouse gas emission rights – green certificates	428	1,123	(1,107)	(7)	1	2	440
Other intangible assets	5,975	410	(113)	(46)	1,322	(47)	7,501
Intangible assets in development <sup>(1)</sup>	995	128	(2)	(6)	96	-	1,211
<b>Gross value</b>	<b>11,832</b>	<b>2,299</b>	<b>(1,446)</b>	<b>(96)</b>	<b>1,442</b>	<b>(35)</b>	<b>13,996</b>
Accumulated amortisation and impairment	(4,382)	(976)	272	58	(71)	(1)	(5,100)
<b>NET VALUE</b>	<b>7,450</b>	<b>1,323</b>	<b>(1,174)</b>	<b>(38)</b>	<b>1,371</b>	<b>(36)</b>	<b>8,896</b>

(1) Increases in intangible assets in development are presented net of the effect of commissioning new assets.

The gross value of other intangible assets at 31 December 2017 includes:

- the Edison brand and intangible assets related to Edison's hydropower concessions, for amounts of €945 million and €729 million respectively;
- the Dalkia brand and intangible assets related to Dalkia's concession agreements in France, for respective amounts of €130 million and €962 million.

- The "Framatome" brand, Framatome's nuclear technology-related intangible assets and Framatome's customer contracts, for respective amounts of €132 million, €702 million and €402 million.

Impairment of €(16) million was recorded in respect of other intangible assets in 2017.

EDF's research and development expenses recorded in the income statement total €546 million for 2017.

### At 31 December 2016

<i>(in millions of euros)</i>	31/12/2015	Acquisitions	Disposals	Translation adjustments	Changes in scope	Other movements	31/12/2016
Software	3,577	617	(381)	(135)	(60)	6	3,624
Positive fair value of commodity contracts acquired in a business combination	810	-	-	-	-	-	810
Greenhouse gas emission rights – green certificates	690	935	(1,094)	(49)	(1)	(53)	428
Other intangible assets	5,936	341	(19)	(46)	(324)	87	5,975
Intangible assets in development <sup>(1)</sup>	1,976	87	-	(23)	(1)	(1,044)	995
<b>Gross value</b>	<b>12,989</b>	<b>1,980</b>	<b>(1,494)</b>	<b>(253)</b>	<b>(386)</b>	<b>(1,004)</b>	<b>11,832</b>
Accumulated amortisation and impairment	(4,100)	(992)	394	84	166	66	(4,382)
<b>NET VALUE</b>	<b>8,889</b>	<b>988</b>	<b>(1,100)</b>	<b>(169)</b>	<b>(220)</b>	<b>(938)</b>	<b>7,450</b>

(1) Other movements include the reclassification of certain costs relating to the Flamanville 3 EPR as property, plant and equipment in progress.

The gross value of other intangible assets at 31 December 2016 includes:

- the Edison brand and intangible assets related to Edison's hydropower concessions, for amounts of €945 million and €729 million respectively;
- the Dalkia brand and intangible assets related to Dalkia's concession agreements in France, for respective amounts of €130 million and €912 million.

Impairment of €(159) million was recorded in respect of other intangible assets in 2016.

EDF's research and development expenses recorded in the income statement total €572 million for 2016.

## NOTE 20 PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

### 20.1 NET VALUE OF PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

(in millions of euros)	31/12/2017	31/12/2016
Property, plant and equipment	53,034	51,489
Property, plant and equipment in progress	1,705	1,575
<b>PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS</b>	<b>54,739</b>	<b>53,064</b>

### 20.2 MOVEMENTS IN PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS (EXCLUDING ASSETS IN PROGRESS)

(in millions of euros)	Land and buildings	Networks	Other installations, plant, machinery, equipment & other	Total
<b>Gross value at 31/12/2016</b>	<b>2,601</b>	<b>86,959</b>	<b>3,909</b>	<b>93,469</b>
Increases <sup>(1)</sup>	164	3,762	389	4,315
Decreases	(19)	(766)	(167)	(952)
<b>GROSS VALUE AT 31/12/2017</b>	<b>2,746</b>	<b>89,955</b>	<b>4,131</b>	<b>96,832</b>
<b>Depreciation and impairment at 31/12/2016</b>	<b>(1,337)</b>	<b>(38,141)</b>	<b>(2,502)</b>	<b>(41,980)</b>
Net depreciation	(58)	(216)	(187)	(461)
Disposals	7	678	162	847
Other movements <sup>(2)</sup>	(9)	(2,099)	(96)	(2,204)
<b>DEPRECIATION AND IMPAIRMENT AT 31/12/2017</b>	<b>(1,397)</b>	<b>(39,778)</b>	<b>(2,623)</b>	<b>(43,798)</b>
<b>Net value at 31/12/2016</b>	<b>1,264</b>	<b>48,818</b>	<b>1,407</b>	<b>51,489</b>
<b>NET VALUE AT 31/12/2017</b>	<b>1,349</b>	<b>50,177</b>	<b>1,508</b>	<b>53,034</b>

(1) Increases also include facilities provided by the concession grantors.

(2) Other movements mainly concern depreciation of assets operated under concessions, booked against amortization recorded in the special concession liability accounts.

## NOTE 21 PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES

### 21.1 NET VALUE OF PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES

The net value of property, plant and equipment operated under concessions for other activities breaks down as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Property, plant and equipment	6,369	6,010
Property, plant and equipment in progress	1,238	1,606
<b>PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES</b>	<b>7,607</b>	<b>7,616</b>

### 21.2 MOVEMENTS IN PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES (EXCLUDING ASSETS IN PROGRESS)

<i>(in millions of euros)</i>	Land and buildings	Fossil-fired & hydropower plants	Networks	Other installations, plant, machinery, equipment & other	Total
<b>Gross value at 31/12/2016</b>	<b>1,452</b>	<b>11,795</b>	<b>41</b>	<b>546</b>	<b>13,834</b>
Increases	29	891	18	47	985
Decreases	(5)	(41)	(20)	(5)	(71)
Translation adjustments	-	(59)	(1)	(1)	(61)
Changes in the scope of consolidation	13	23	-	3	39
Other movements	-	(43)	1	(8)	(50)
<b>GROSS VALUE AT 31/12/2017</b>	<b>1,489</b>	<b>12,566</b>	<b>39</b>	<b>582</b>	<b>14,676</b>
<b>Depreciation and impairment at 31/12/2016</b>	<b>(873)</b>	<b>(6,570)</b>	<b>(18)</b>	<b>(363)</b>	<b>(7,824)</b>
Net depreciation	(29)	(361)	(4)	(35)	(429)
Impairment net of reversals	-	(150)	-	-	(150)
Disposals	4	27	-	6	37
Translation adjustments	-	38	-	-	38
Changes in the scope of consolidation	-	-	-	-	-
Other movements	3	17	-	1	21
<b>DEPRECIATION AND IMPAIRMENT AT 31/12/2017</b>	<b>(895)</b>	<b>(6,999)</b>	<b>(22)</b>	<b>(391)</b>	<b>(8,307)</b>
<b>Net value at 31/12/2016</b>	<b>579</b>	<b>5,225</b>	<b>23</b>	<b>183</b>	<b>6,010</b>
<b>NET VALUE AT 31/12/2017</b>	<b>594</b>	<b>5,567</b>	<b>17</b>	<b>191</b>	<b>6,369</b>

Property, plant and equipment operated under concessions for other activities comprise concession facilities mainly located in France (hydropower, excluding public electricity distribution) and Italy.

At 31 December 2017, impairment of property, plant and equipment in progress and other assets used in concessions for other activities amount to €(54) million and €(150) million respectively.



## NOTE 22 PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP

### 22.1 NET VALUE OF PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP

The net value of property, plant and equipment used in generation and other tangible assets owned by the Group breaks down as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Property, plant and equipment	48,972	46,350
Property, plant and equipment in progress	26,515	24,059
Finance-leased property, plant and equipment	135	164
<b>PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP</b>	<b>75,622</b>	<b>70,573</b>

At 31 December 2017, property, plant and equipment in progress owned by the Group mainly concern the EPR reactors at Flamanville 3 (€11,523 million including capitalised borrowing costs amounting to €2,287 million), and Hinkley Point C (€5,149 million including capitalised borrowing costs amounting to €59 million).

Property, plant and equipment concerning the Dunkirk methane terminal, which began commercial operations in early 2017, have been reclassified and transferred from property, plant and equipment in progress to property, plant and equipment used in generation at the value of €1,158 million.

The changes observed in generation assets in 2017 also include a foreign exchange effect of €(1,081) million, mainly caused by the decline of the pound sterling and US dollar against the Euro.

At 31 December 2017, impairment of tangible assets owned by the Group amounts to €(298) million.

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### 22.2 MOVEMENTS IN PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP (EXCLUDING ASSETS IN PROGRESS AND FINANCE-LEASED ASSETS)

<i>(in millions of euros)</i>	<b>Land and buildings</b>	<b>Nuclear power plants</b>	<b>Fossil-fired &amp; hydropower plants</b>	<b>Networks</b>	<b>Other installations, plant, machinery, equipment &amp; other</b>	<b>Total</b>
<b>Gross value at 31/12/2016</b>	<b>12,554</b>	<b>66,958</b>	<b>19,964</b>	<b>17</b>	<b>16,880</b>	<b>116,373</b>
Increases	654	2,938	1,767	-	2,200	7,559
Decreases	(503)	(1,020)	(493)	-	(429)	(2,445)
Translation adjustments	(43)	(378)	(179)	-	(737)	(1,337)
Changes in the scope of consolidation <sup>(1)</sup>	314	-	(271)	-	821	864
Other movements <sup>(2)</sup>	43	392	49	-	30	514
<b>GROSS VALUE AT 31/12/2017</b>	<b>13,019</b>	<b>68,890</b>	<b>20,837</b>	<b>17</b>	<b>18,765</b>	<b>121,528</b>
<b>Depreciation and impairment at 31/12/2016</b>	<b>(6,874)</b>	<b>(44,269)</b>	<b>(11,866)</b>	<b>(9)</b>	<b>(7,005)</b>	<b>(70,023)</b>
Net depreciation	(345)	(2,545)	(776)	(2)	(1,155)	(4,823)
Impairment net of reversals	(77)	13	(217)	-	(17)	(298)
Disposals	229	893	398	-	398	1,918
Translation adjustments	4	164	126	-	205	499
Changes in the scope of consolidation <sup>(1)</sup>	(9)	-	81	-	2	74
Other movements	(2)	65	24	(1)	11	97
<b>DEPRECIATION AND IMPAIRMENT AT 31/12/2017</b>	<b>(7,074)</b>	<b>(45,679)</b>	<b>(12,230)</b>	<b>(12)</b>	<b>(7,561)</b>	<b>(72,556)</b>
<b>Net value at 31/12/2016</b>	<b>5,680</b>	<b>22,689</b>	<b>8,098</b>	<b>8</b>	<b>9,875</b>	<b>46,350</b>
<b>NET VALUE AT 31/12/2017</b>	<b>5,945</b>	<b>23,211</b>	<b>8,607</b>	<b>5</b>	<b>11,204</b>	<b>48,972</b>

(1) Changes in the scope of consolidation mainly concern assets related to the first consolidation of Framatome.

(2) Other movements include the effect on assets associated with provisions and underlying assets of the €322 million change in the real discount rate used to calculate provisions related to EDF's nuclear generation (see note 29.1).

**22.3 FINANCE LEASE CONTRACTS**

	31/12/2017				31/12/2016
	Maturity				
<i>(in millions of euros)</i>	Total	< 1 year	1-5 years	> 5 years	Total
Future minimum lease payments receivable as lessor	33	10	20	3	46
Future minimum lease payments payable as lessee	367	51	150	166	482

The Group is the lessor in agreements classified as finance leases under IFRIC 4 and IAS 17.

The Group is bound as lessee by irrevocable finance lease contracts for premises, equipment and vehicles used in the course of its business. The corresponding payments are subject to renegotiation at intervals defined in the contracts.

## NOTE 23 INVESTMENTS IN ASSOCIATES AND JOINT VENTURES

Investments in associates and joint ventures are as follows:

(in millions of euros)	Principal activity <sup>(1)</sup>	31/12/2017			31/12/2016	
		Ownership%	Share of net equity	Share of net income	Share of net equity	Share of net income
<b>Principal investments in associates</b>						
CTE <sup>(2)</sup>	O	50.10	1,241	249	n/a	n/a
RTE	T	n/a	n/a	n/a	2,558	403
CENG	G	49.99	1,494	(316)	2,120	(485)
Taishan (TNPJVC) <sup>(3)</sup>	G	30.00	n.c.	n.c.	1,191	(12)
Alpiq <sup>(4)</sup>	G, D, O, T	25.04	602	25	606	-
<b>Other investments in associates and joint ventures</b>			<b>n.c.</b>	<b>n.c.</b>	<b>2,170</b>	<b>312</b>
<b>TOTAL</b>			<b>7,249</b>	<b>35</b>	<b>8,645</b>	<b>218</b>

n/a = not applicable.

n.c. = not communicated.

(1) G = generation, D = distribution, T = transmission, O = other.

(2) At 31 December 2017, this corresponds to a 50.1% interest in CTE (the joint venture holding RTE's shares) (see note 3.4.1). By convention, the share of net income presented comprises 100% of RTE's net income for the first quarter of 2017 and 50.1% of the CTE subgroup's net income for the rest of the year 2017.

(3) As CGN publishes its consolidated financial statements after the Group, the Group cannot report the financial data for Taishan at 31 December 2017.

(4) As Alpiq publishes its consolidated financial statements after the Group, the figures above include an estimate for net income at 31 December 2017 (including the final results published by Alpiq in August 2017).

Other investments in associates and joint ventures principally concern Nam Theun Power Company (NTPC) and certain companies owned by EDF Énergies Nouvelles, EDF SA and Edison.

In 2016, €(481) million of impairment of investments in associates and joint ventures was booked, mainly concerning the assets of CENG (see note 23.2.3).

In 2017, €(618) million of impairment of investments in associates and joint ventures was booked, mainly concerning the assets of CENG (see note 23.2.3).

### 23.1 COENTREPRISE DE TRANSPORT D'ÉLECTRICITÉ (CTE)

#### 23.1.1 CTE – financial indicators

The key financial indicators for CTE (on a 100% basis) are as follows:

(in millions of euros)	31/12/2017 <sup>(1)</sup>
Non-current assets	17,163
Current assets	2,793
<b>TOTAL ASSETS</b>	<b>19,956</b>
Equity	2,476
Non-current liabilities	12,870
Current liabilities	4,610
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>19,956</b>
Sales	3,143
Operating profit before depreciation and amortisation	1,285
Net income	337
Net indebtedness	11,633
Gains and losses recorded directly in equity	-
Dividends paid	159

(1) The figures for 31 December 2017 correspond to the CTE subgroup data, for the year 2017 (CTE is the company that holds RTE's shares – see note 3.4.1). The financial indicators published for RTE in 2016 are presented in note 23.1 to the consolidated financial statements at 31 December 2016.

# 6. FINANCIAL STATEMENTS

## Income Statement

### 23.1.2 Transactions between the EDF group and CTE

At 31 December 2017 the main transactions between the EDF group and CTE are as follows:

#### Sales

Enedis uses RTE's high-voltage and very high-voltage networks to convey energy from its point of generation to the distribution network. This service generated €3,507 million in sales revenues for RTE from Enedis over 2017.

In executing its responsibility to ensure balance in the electricity system, during 2017 RTE also undertook:

- energy purchases and sales with EDF and Enedis, amounting to €153 million and €165 million respectively;
- system service purchases from EDF amounting to €257 million.

## 23.2 CENG

### 23.2.1 CENG – financial indicators

The key financial indicators for CENG (on a 100% basis) are as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Non-current assets	7,370	10,164
Current assets	965	1,020
<b>TOTAL ASSETS</b>	<b>8,335</b>	<b>11,184</b>
Equity	2,989	4,240
Non-current liabilities	5,030	6,521
Current liabilities	316	423
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>8,335</b>	<b>11,184</b>
Sales	1,156	1,059
Operating profit before depreciation and amortisation	396	305
Net income	(633)	(971)
Gains and losses recorded directly in equity	107	169
Dividends paid	-	-

### 23.2.2 Transactions between the EDF group and CENG

At 31 December 2017 the main transactions between the EDF group and CENG concern the power purchase agreements between CENG and the Group (EDF Trading North America). These agreements provide for delivery to EDF Trading North America of 15% of the energy generated by CENG that is not sold to former owners of its power plants, in application of the pre-existing power purchase agreements that terminated in 2014. Since 1 January 2015, the Group has purchased 49.99% of the power output from CENG's two plants at market price.

These electricity sales by CENG to EDF Trading North America represented a volume of 16.3TWh in 2017.

### 23.2.3 Impairment

In 2016, impairment of €(462) million was recorded on the Group's investment in CENG as a result of lower forward prices and long-term electricity prices.

At 31 December 2017, the Group recognised additional impairment of €(491) million (of which €(341) million was already booked at 30 June 2017).

This impairment was evaluated by the Group's usual methodology. It results from:

- further downward revision of long-term price trajectories published by external analysts (ABB, IHS, Cera, EIA): the reports published in autumn 2017 were lower than the forecasts issued in spring 2017;
- a decline in short-term market prices caused by the steady decrease in gas prices throughout the year (average 4% decrease in electricity prices on the market horizon between the first and second half-year).

Calculation of the value in use takes into consideration the implementation of New York State's Zero Emission Credit (ZEC) programme of subsidies for nuclear power plants, which provides additional income for the Ginna and Nine Mile Point plants. However, the ZEC programme's long-term existence will depend on the outcome of current legal proceedings. In addition to the question of the ZEC programme's continuation, there are uncertainties relating to several key assumptions for the valuation of the investment in CENG (e.g. the market environment, legal framework, changes in energy policies, and the Group's lack of control over strategy-setting). The calculation of recoverable value for the CENG asset thus includes a specific risk premium.

## 23.3 TAISHAN

### 23.3.1 Taishan – financial indicators

The key financial indicators published for Taishan (on a 100% basis) are as follows:

<i>(in millions of euros)</i>	31/12/2016	31/12/2015
Non-current assets	10,936	10,369
Current assets	66	41
<b>TOTAL ASSETS</b>	<b>11,002</b>	<b>10,410</b>
Equity	3,594	3,597
Non-current liabilities	6,563	5,836
Current liabilities	845	977
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>11,002</b>	<b>10,410</b>
Sales	-	-
Net income	(39)	29
Dividends paid	-	-

### 23.3.2 Transactions between the EDF group and Taishan

EDF owns 30% of TNPJVC (Taishan Nuclear Power Joint Venture Company Limited), which was set up to build and operate two EPR nuclear reactors in Taishan, in the province of Guangdong in China. CGN holds a 51% stake and Yudean a 19% stake.

Taishan Unit 1 and Taishan Unit 2 are expected to begin commercial operation in 2018 and 2019 respectively.

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## 23.4 ALPIQ

As Alpiq publishes its consolidated financial statements after the Group, the figures presented here include an estimate for net income at 31 December 2017 (see note 3 to the table in note 23).

### 23.4.1 Published financial indicators

The main published indicators by the Alpiq group were as follows:

<i>(in millions of euros)</i>	31/12/2016	31/12/2015
Non-current assets	5,303	5,889
Current assets	3,765	3,239
Assets classified as held for sale	107	503
<b>TOTAL ASSETS</b>	<b>9,175</b>	<b>9,631</b>
Equity <sup>(1)</sup>	3,619	3,525
Non-current liabilities	3,222	4,148
Current liabilities	2,315	1,905
Liabilities related to assets classified as held for sale	19	53
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>9,175</b>	<b>9,631</b>
Sales	5,576	6,289
Operating profit before depreciation and amortisation	714	47
Net income	270	(777)
Gains and losses recorded directly in equity	(24)	(160)
Dividends paid to the Group	-	11

(1) Including €949 million of hybrid bonds.

On 25 April 2013, the main Swiss shareholders of Alpiq subscribed a hybrid loan of CHF 366.5 million. Following this first step, on 2 May 2013 Alpiq placed a public hybrid bond amounting to CHF 650 million, with 5% coupon and a redemption option after five and a half years at the earliest.

Due to their characteristics, in compliance with IAS 32, these hybrid loan and bond were recorded in equity in Alpiq's consolidated financial statements. Since the EDF group did not subscribe to the operation, there was no impact on the value of the investment in Alpiq reported in "Investments in associates and joint ventures".

The difference between the shares of equity as published by Alpiq and as reported in the Group's consolidated financial statements largely results from this hybrid loan.

The value of the EDF group's investment in Alpiq, valued on the basis of the stock market price at 31 December 2017, is €379 million. The Group considers that this stock market value does not correspond to the value of the Company, particularly as a result of the low level of floating stock.

### 23.4.2 Impairment

The Alpiq Group is operating in a difficult market environment with notably low wholesale prices. Also, Alpiq has no access to final customers on the non-liberalised Swiss market. This unfavourable context has affected the profitability of its generation capacities in Switzerland, where the proportion of baseload energy is high, and capacities have been penalised by the downward revision of long-term market prices. In March 2016, Alpiq therefore announced implementation of structural measures in traditional energy generation to reduce exposure to wholesale prices.

When it published its half-year 2017 financial statements on 28 August 2017, Alpiq once again stressed the two factors affecting the profitability of its traditional generation assets: stagnation of market prices at low levels, and asymmetrical regulation of the Swiss electricity market. However, since these risks had already been taken into account, no additional impairment was recognised by Alpiq during the first half-year 2017.

In legislative developments, a referendum in Switzerland on 21 May 2017 approved the energy law aiming to phase out nuclear power and increase clean energies.

The "Energy Strategy 2050" bill provides for progressive replacement of electricity produced by the country's five nuclear power plants by renewable energies. Switzerland has said it will not build any more new nuclear power plants, but that existing plants can remain in operation as long as they are guaranteed to be safe. This energy law had already been approved by the Swiss Parliament in September 2016. It is the end product of a long process, as Switzerland first announced its decision to abandon nuclear power and stop developing new nuclear plants in 2011.

Currently, since the publication of Alpiq's half-year results in August 2017, the Group is not aware of any factors indicating a risk of further impairment of its investment in Alpiq at 31 December 2017.

The Group will continue to closely monitor the effective implementation of Alpiq's action plans and changes in the market context and regulatory environment in Switzerland. Should the Alpiq group recognise impairment in its annual 2017 consolidated financial statements, due to be published on 26 March 2018, the EDF group would reflect that in its half-year 2018 financial statements.

## NOTE 24 INVENTORIES

The carrying value of inventories, broken down by nature, is as follows:

<i>(in millions of euros)</i>	31/12/2017			31/12/2016		
	Gross value	Provision	Net value	Gross value	Provision	Net value
Nuclear fuel	10,831	(15)	10,816	10,923	(19)	10,904
Other fuel	906	(7)	899	1,281	(5)	1,276
Other raw materials	1,526	(283)	1,243	1,413	(296)	1,117
Work-in-progress for production of goods and services	494	(48)	446	197	(46)	151
Other inventories	768	(34)	734	711	(58)	653
<b>TOTAL INVENTORIES</b>	<b>14,525</b>	<b>(387)</b>	<b>14,138</b>	<b>14,525</b>	<b>(424)</b>	<b>14,101</b>

The more-than-one-year portion mainly concerns nuclear fuel inventories amounting to €7,932 million at 31 December 2017 (€8,182 million at 31 December 2016).

The value of EDF Trading's inventories stated at market value is €179 million at 31 December 2017 (€492 million at 31 December 2016).

## NOTE 25 TRADE RECEIVABLES

Details of net trade receivables are as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Trade receivables, gross value – excluding EDF Trading	20,927	21,022
Trade receivables, gross value – EDF Trading	3,530	3,331
Impairment	(1,046)	(1,057)
<b>TRADE RECEIVABLES, NET VALUE</b>	<b>23,411</b>	<b>23,296</b>

Most trade receivables mature within one year.

### 25.1 TRADE RECEIVABLES DUE AND NOT YET DUE

<i>(in millions of euros)</i>	31/12/2017			31/12/2016		
	Gross value	Provision	Net value	Gross value	Provision	Net value
<b>TRADE RECEIVABLES</b>	<b>24,457</b>	<b>(1,046)</b>	<b>23,411</b>	<b>24,353</b>	<b>(1,057)</b>	<b>23,296</b>
overdue by up to 6 months	1,172	(260)	912	1,214	(186)	1,028
overdue by 6-12 months	435	(137)	298	491	(152)	339
overdue by more than 12 months	890	(532)	358	1,105	(595)	510
<b>Trade receivables due</b>	<b>2,497</b>	<b>(929)</b>	<b>1,568</b>	<b>2,810</b>	<b>(933)</b>	<b>1,877</b>
<b>Trade receivables not yet due</b>	<b>21,960</b>	<b>(117)</b>	<b>21,843</b>	<b>21,543</b>	<b>(124)</b>	<b>21,419</b>

### 25.2 ASSIGNMENT OF RECEIVABLES

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Trade receivables assigned and wholly retained in the balance sheet	-	-
Trade receivables assigned and partly retained in the balance sheet	41	33
Trade receivables assigned and wholly derecognised	903	1,304

The Group assigned trade receivables for a total of €903 million at 31 December 2017, including €406 million by the Edison group (€1,304 million at 31 December 2016, including €665 million by the Edison group).

As most assignment operations are carried out on a recurrent, without-recourse basis, the corresponding receivables are not carried in the Group's consolidated balance sheet.

## NOTE 26 OTHER RECEIVABLES

Details of other receivables are as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Prepaid expenses	1,592	1,567
Contribution to the Public Electricity Service (CSPE)	1,147	1,647
VAT receivables	3,026	2,862
Other tax receivables	1,727	1,754
Other operating receivables	4,237	5,090
<b>OTHER RECEIVABLES</b>	<b>11,729</b>	<b>12,920</b>
Non-current portion	2,168	2,268
Current portion	9,561	10,652
Gross value	11,804	13,135
Impairment	(75)	(215)

At 31 December 2017, other receivables include an amount of €1,147 million corresponding to the CSPE receivable (€1,647 million at 31 December 2016). The

rest of the CSPE receivable is reported in "Loans and financial receivables" (see note 36.3).

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## NOTE 27 EQUITY

### 27.1 SHARE CAPITAL

At 31 December 2017, EDF's share capital amounts to €1,463,719,402 comprising 2,927,438,804 fully subscribed and paid-up shares with nominal value of €0.50, owned 83.50% by the French State, 15.18% by the public (institutional and private investors) and 1.20% by current and retired Group employees, with 0.12% held by EDF as treasury shares.

In March 2017, the capital increase with preferential subscription rights led to a €316 million increase in the share capital and an issue premium of €3,689 million net of expenses, following the issuance of 632,741,004 new shares (see note 3.1).

In June 2017, payment of the interim dividend for 2016 in the form of a scrip dividend led to a €73 million increase in the share capital and an issue premium of €951 million following issuance of 145,476,587 new shares. The legal formalities for this operation were finalised in June 2017.

In December 2017, payment of part of the interim dividend for 2017 in the form of a scrip dividend led to a €20 million increase in the share capital and an issue premium of €378 million following the issuance of 40,084,530 new shares.

Under Article L. 111-67 of the French Energy Code, the French State must hold more than 70% of the capital of EDF at all times.

### 27.2 TREASURY SHARES

A share repurchase programme authorised by the General Shareholders' Meeting of 9 June 2006 was implemented by the Board of Directors, within the limit of 10% of the total number of shares making up the Company's capital. The initial duration of the programme was 18 months, renewed for 12 months then by tacit agreement every year.

A liquidity contract exists for this programme, as required by the French market regulator AMF (*Autorité des Marchés Financiers*).

At 31 December 2017, treasury shares deducted from consolidated equity represent 3,430,016 shares with total value of €40 million.

### 27.3 DIVIDENDS

The General Shareholders' Meeting of 18 May 2017 decided to distribute an ordinary dividend of €0.90 per share in respect of 2016, offering shareholders the choice of payment in cash or shares (scrip option).

In application of Article 24 of the Company's articles of association, shareholders who had held their shares continuously for at least 2 years at the year-end and still held them at the dividend distribution date benefit from a 10% bonus on their dividends. The number of shares carrying an entitlement to the bonus dividend cannot exceed 0.5% of the Company's capital per shareholder. The bonus dividend amounts to €0.99 per share.

As interim dividends of €0.50 per share had been paid in the form of new shares or cash on 31 October 2016, the balance payable for 2016 amounted to €0.40 per share benefiting from the ordinary dividend and €0.49 per share benefiting from the bonus dividend. The balance of the dividend was paid out on 30 June 2017.

The French government opted for the scrip dividend for the balance of 2016 dividends payable.

The amount of the cash dividend paid to shareholders who did not opt for the scrip dividend for 2016 amounts to €75 million.

On 7 November 2017, EDF's Board of Directors decided to distribute an interim dividend of €0.15 per share in respect of 2017. This interim dividend amounting to a total of €433 million was paid out in the form of new shares (scrip option) or cash on 11 December 2017.

The French government opted for the scrip interim dividend for the 2017 interim dividends payable.

The amount of the cash dividend paid to shareholders who did not opt for the scrip interim dividend for 2017 amounted to €35 million.

### 27.4 EQUITY INSTRUMENTS

At 31 December 2017, perpetual subordinated bonds are carried in equity at the amount of €10,095 million (net of transaction costs).

Interest paid by EDF to the bearers of perpetual subordinated bonds issued in January 2013 and January 2014 totalled €565 million in the year 2017 and €582 million in the year 2016. The resulting cash payout is reflected in a corresponding reduction in Group equity.

In January 2018, EDF paid interest of around €376 million to the bearers of perpetual subordinated bonds.

## Perpetual subordinated bonds in the accounts of EDF

(in millions of currencies)

Entity	Issue	Issue amount	Currency	Repayment option	Rate
EDF	01/2013	1,250	EUR	7 years	4.25%
EDF	01/2013	1,250	EUR	12 years	5.38%
EDF	01/2013	1,250	GBP	13 years	6.00%
EDF	01/2013	3,000	USD	10 years	5.25%
EDF	01/2014	1,500	USD	10 years	5.63%
EDF	01/2014	1,000	EUR	8 years	4.13%
EDF	01/2014	1,000	EUR	12 years	5.00%
EDF	01/2014	750	GBP	15 years	5.88%

### Other equity instruments

Other equity instruments are financial instruments issued by the Group that qualify as equity instruments under IAS 32.

In December 2017, the Dalkia group's Cogestar entities issued an instrument consisting of convertible bonds. At 31 December 2017, the total amount of the instrument recorded in equity is €124 million (€86 million at 31 December 2016) (see note 5.2).



## 27.5 NON-CONTROLLING INTERESTS (MINORITY INTERESTS)

### 27.5.1 Details of non-controlling interests

(in millions of euros)	31/12/2017			31/12/2016	
	Ownership%	Equity (non-controlling interests)	Net income attributable to non-controlling interests	Equity (non-controlling interests)	Net income attributable to non-controlling interests
<b>Principal non-controlling interests:</b>					
EDF Energy Nuclear Generation Ltd.	20.0%	2,687	23	2,773	111
NNB Holding Ltd.	33.5%	2,138	-	1,718	-
EDF Investissements Groupe SA	6.1%	516	11	516	13
EDF Luminus SA	31.4%	388	2	390	3
Framatome	24.5%	209	-	-	-
<b>Other non-controlling interests <sup>(1)</sup></b>		<b>1,403</b>	<b>80</b>	<b>1,527</b>	<b>33</b>
<b>TOTAL</b>		<b>7,341</b>	<b>116</b>	<b>6,924</b>	<b>160</b>

(1) Including Sizewell C Holding Co.

Non-controlling interests in EDF Energy Nuclear Generation Ltd. (formerly British Energy), which is owned 80% by the Group via EDF Energy, correspond to Centrica's share.

Non-controlling interests in NNB Holding Limited, the holding company for the Hinkley Point C project, which is owned 66.5% by the Group via EDF Energy, correspond to CGN's share (see note 3.7.2).

Non-controlling interests in Framatome, the Group acquired on 31 December 2017 (see note 3.2) and owned 75.5% by the Group via EDF SA, correspond to the 19.5% share held by Mitsubishi Heavy Industries and the 5% share held by Assystem.

Non-controlling interests in EDF Luminus correspond to the investments held by Belgian local.

Non-controlling interests in EDF Investissements Groupe correspond to the investment held by Natixis Belgique Investissements.

Other non-controlling interests principally correspond to the investments held by Total and Fluxys in Dunkerque LNG, and minority interests in subsidiaries of the Edison subgroup.

### 27.5.2 Non-controlling interests in EDF Energy

The key financial indicators (100% basis) for EDF Energy Nuclear Generation Ltd. are as follows:

(in millions of euros)	31/12/2017	31/12/2016
Non-current assets	21,149	21,877
Current assets	3,228	3,325
<b>TOTAL ASSETS</b>	<b>24,377</b>	<b>25,202</b>
Equity	13,433	13,870
Non-current liabilities	10,252	11,058
Current liabilities	692	274
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>24,377</b>	<b>25,202</b>
Sales	3,070	3,805
Net income	135	653
Gains and losses recorded directly in equity	(220)	(1,804)
Net cash flow from operating activities	867	1,296
Net cash flow from investing activities	(514)	(516)
Net cash flow from financing activities	(328)	(672)
<b>CASH AND CASH EQUIVALENTS – OPENING BALANCE</b>	<b>468</b>	<b>422</b>
Net increase/(decrease) in cash and cash equivalents	25	107
Effect of currency fluctuations	(10)	(62)
Other	-	-
<b>CASH AND CASH EQUIVALENTS – CLOSING BALANCE</b>	<b>483</b>	<b>468</b>
Dividends paid to shares of non-controlling interests	70	151

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## NOTE 28 PROVISIONS

The breakdown between current and non-current provisions is as follows:

<i>(in millions of euros)</i>	Notes	31/12/2017			31/12/2016		
		Current	Non-current	Total	Current	Non-current	Total
Provisions for the back-end of the nuclear cycle		1,479	21,378	22,857	1,463	20,823	22,286
Provisions for decommissioning and last cores		290	25,032	25,322	208	24,020	24,228
<b>Provisions related to nuclear generation</b>	<b>29</b>	<b>1,769</b>	<b>46,410</b>	<b>48,179</b>	<b>1,671</b>	<b>44,843</b>	<b>46,514</b>
<b>Other provisions for decommissioning</b>	<b>30</b>	<b>80</b>	<b>1,977</b>	<b>2,057</b>	<b>63</b>	<b>1,506</b>	<b>1,569</b>
<b>Provisions for employee benefits</b>	<b>31</b>	<b>1,106</b>	<b>20,630</b>	<b>21,736</b>	<b>1,100</b>	<b>21,234</b>	<b>22,334</b>
<b>Other provisions</b>	<b>32</b>	<b>2,529</b>	<b>2,356</b>	<b>4,885</b>	<b>2,394</b>	<b>2,155</b>	<b>4,549</b>
<b>TOTAL PROVISIONS</b>		<b>5,484</b>	<b>71,373</b>	<b>76,857</b>	<b>5,228</b>	<b>69,738</b>	<b>74,966</b>

## NOTE 29 PROVISIONS RELATED TO NUCLEAR GENERATION - BACK-END OF THE NUCLEAR CYCLE, PLANT DECOMMISSIONING AND LAST CORES

Provisions related to nuclear generation comprise provisions for back-end nuclear cycle expenses (management of spent fuel and radioactive waste), provisions for plant decommissioning and provisions for last cores.

Provisions are estimated under the principles presented in note 1.3.2.2.

Obligations can vary noticeably depending on each country's legislation and regulations, and the technologies and industrial practices used in each company.

The movement in provisions for the back-end of the nuclear cycle, provisions for decommissioning and provisions for last cores breaks down as follows:

<i>(in millions of euros)</i>	31/12/2016	Increases	Decreases	Discount effect	Translation adjustments	Other movements <sup>(1)</sup>	31/12/2017
Provisions for spent fuel management	12,429	454	(1,109)	648	(60)	(9)	12,353
Provisions for waste removal and conditioning	-	76	(15)	47	(4)	937	1,041
Provisions for long-term radioactive waste management	9,857	46	(221)	590	(28)	(781)	9,463
<b>Provisions for the back-end of the nuclear cycle</b>	<b>22,286</b>	<b>576</b>	<b>(1,345)</b>	<b>1,285</b>	<b>(92)</b>	<b>147</b>	<b>22,857</b>
Provisions for nuclear plant decommissioning	20,568	2	(146)	997	(220)	230	21,431
Provisions for last cores	3,660	-	-	162	(50)	119	3,891
<b>Provisions for decommissioning and last cores</b>	<b>24,228</b>	<b>2</b>	<b>(146)</b>	<b>1,159</b>	<b>(270)</b>	<b>349</b>	<b>25,322</b>
<b>PROVISIONS RELATED TO NUCLEAR GENERATION</b>	<b>46,514</b>	<b>578</b>	<b>(1,491)</b>	<b>2,444</b>	<b>(362)</b>	<b>496</b>	<b>48,179</b>

(1) Other movements mainly include the reclassification at 1 January 2017 of the provisions for waste removal and conditioning, which were previously included in the provisions for long-term radioactive waste management, in the amount of €882 million.

The breakdown of provisions by company is shown below:

<i>(in millions of euros)</i>	EDF Note 29.1	EDF Energy Note 29.2	Belgium	Total
Provisions for spent fuel management	10,786	1,567	-	12,353
Provisions for waste removal and conditioning	726	315	-	1,041
Provisions for long-term radioactive waste management	8,814	645	4	9,463
<b>PROVISIONS FOR THE BACK-END OF THE NUCLEAR CYCLE AT 31/12/2017</b>	<b>20,326</b>	<b>2,527</b>	<b>4</b>	<b>22,857</b>
<b>Provisions for the back-end of the nuclear cycle at 31/12/2016</b>	<b>19,624</b>	<b>2,659</b>	<b>3</b>	<b>22,286</b>
Provisions for nuclear plant decommissioning	14,920	6,233	278	21,431
Provisions for last cores	2,387	1,504	-	3,891
<b>PROVISIONS FOR DECOMMISSIONING AND LAST CORES AT 31/12/2017</b>	<b>17,307</b>	<b>7,737</b>	<b>278</b>	<b>25,322</b>
<b>Provisions for decommissioning and last cores at 31/12/2016</b>	<b>16,409</b>	<b>7,563</b>	<b>256</b>	<b>24,228</b>

### 29.1 NUCLEAR PROVISIONS IN FRANCE

In France, the provisions established by EDF SA for the nuclear generation fleet result from the Law of 28 June 2006 on long-term management of radioactive materials and waste, and the associated implementing provisions concerning secure financing of nuclear expenses.

In compliance with the accounting principles described in note 1.3.2.2.

- EDF books provisions to cover all obligations related to the nuclear facilities it operates;
- EDF holds dedicated assets for secure financing of long-term obligations (see note 47).

The calculation of provisions incorporates a level of risks and unknowns as appropriate to the operations concerned. The valuation of costs carries uncertainty factors such as:

- changes in legislation, particularly regarding safety, security and environmental protection, and financing of nuclear expenses;
- changes in the regulatory decommissioning process and the time necessary for issuance of administrative authorisation;
- future methods for storing long-lived radioactive waste and provision of storage facilities by the French agency for radioactive waste management ANDRA (Agence nationale pour la gestion des déchets radioactifs);
- changes in certain financial parameters such as discount rates, notably in view of the regulatory limits, inflation rates, or changes in the contractual terms of spent fuel management.

# 6. FINANCIAL STATEMENTS

## Income Statement

Details of changes in provisions for the back-end of the nuclear cycle, decommissioning and last cores are as follows:

<i>(in millions of euros)</i>	Notes	31/12/2016	Increases	Decreases	Discount effect <sup>(1)</sup>	Other movements <sup>(2)</sup>	31/12/2017
Provisions for spent fuel management	29.1.1	10,658	443	(851)	545	(9)	10,786
Provisions for waste removal and conditioning	29.1.2	0	74	(15)	31	636	726
Provisions for long-term radioactive waste management	29.1.2	8,966	44	(221)	556	(531)	8,814
<b>Provisions for the back-end of the nuclear cycle</b>		<b>19,624</b>	<b>561</b>	<b>(1,087)</b>	<b>1,132</b>	<b>96</b>	<b>20,326</b>
Provisions for nuclear plant decommissioning	29.1.3	14,122	2	(131)	658	269	14,920
Provisions for last cores	29.1.4	2,287	0	0	95	5	2,387
<b>Provisions for decommissioning and last cores</b>		<b>16,409</b>	<b>2</b>	<b>(131)</b>	<b>753</b>	<b>274</b>	<b>17,307</b>
<b>PROVISIONS RELATED TO NUCLEAR GENERATION</b>		<b>36,033</b>	<b>563</b>	<b>(1,218)</b>	<b>1,885</b>	<b>370</b>	<b>37,633</b>

(1) The discount effect comprises the €1,505 million cost of unwinding the discount, and the €380 million effect of the change in the real discount rate in 2017, which were recorded in the income statement for provisions with no related assets (cost of unwinding the discount).

(2) Other movements mainly include:

- the reclassification at 1 January 2017 of the provisions for waste removal and conditioning, which were previously included in the provisions for long-term radioactive waste management, in the amount of €581 million;
- the €347 million effect of the change in the real discount rate at 31 December 2017 for provisions with related assets.

### 29.1.1 Provisions for spent fuel management

EDF's currently adopted strategy with regards to the fuel cycle, in agreement with the French State, is to process spent fuel and to recycle the separated plutonium in the form of MOX fuel (Mixed OXide of plutonium and uranium).

The quantities processed by AREVA (now Orano) at the request of EDF, totalling approximately 1,100 tonnes per year, are determined based on the quantity of recyclable plutonium in the reactors that are authorised to load MOX fuel.

Consequently, provisions for spent fuel cover services associated with the following:

- removal of spent fuel from EDF's generation centres, as well as reception and interim storage;
- processing, including conditioning and storage of recyclable matter and waste resulting from this processing.

The processing expenses included in these provisions exclusively concern spent fuel that can be recycled in existing facilities, including the portion in reactors but not yet irradiated.

Expenses are measured based on forecast physical flows at the year-end, with reference to the contracts with AREVA (Orano) which define the terms for implementation of the framework agreement for the period 2008-2040. The most recent of these agreements, signed on 5 February 2016, covers the period 2016-2023.

These provisions also cover long-term storage of spent fuel that cannot currently be recycled in existing installations: plutonium fuel (MOX) or uranium fuel derived from enriched processing, and fuel from Creys-Malville and Brennilis until fourth-generation reactors become available.

### 29.1.2 Provision for waste removal and conditioning – Provision for long-term radioactive waste management

#### 29.1.2.1 Provisions for waste removal and conditioning

The provisions for waste removal and conditioning are reported separately from 1 January 2017.

They cover the following future expenses for radioactive waste resulting from operations or decommissioning (apart from spent fuel):

- characterisation and conditioning of waste;
- interim storage of waste.

#### 29.1.2.2 Provisions for long-term radioactive waste management

These provisions concern future expenses for:

- removal and storage of radioactive waste resulting from decommissioning of nuclear installations operated by EDF;
- removal and storage of radioactive waste packages resulting from spent fuel processing;
- direct storage, where relevant, of spent fuel that cannot be recycled in existing installations: specifically plutonium fuel (MOX) or uranium fuel derived from enriched processing, and fuel from Creys-Malville and Brennilis;
- EDF's share of the costs of studies, construction, operation and maintenance, shutdown and surveillance of existing and future storage centres.

The volumes of waste concerned by provisions include existing packages of waste and all waste to be conditioned, resulting from plant decommissioning or spent fuel processing at La Hague (comprising all fuel in reactors at 31 December, irradiated or otherwise). These volumes are regularly reviewed, in keeping with the data declared for the purposes of the national waste inventory undertaken by ANDRA.

The provisions for long-term radioactive waste management break down as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Very low-level and low and medium-level waste	1,161	1,066
Long-lived low-level waste	265	256
Long-lived medium and high-level waste <sup>(1)</sup>	7,388	7,644
<b>PROVISIONS FOR LONG-TERM RADIOACTIVE WASTE MANAGEMENT</b>	<b>8,814</b>	<b>8,966</b>

(1) At 31 December 2016, provisions for long-lived medium and high-level waste included €581 million of provisions for waste removal and conditioning, which are now reported separately.

**Very low-level and low and medium-level waste**

Very low-level waste mainly comes from nuclear plant decommissioning, and generally takes the form of rubble (concrete, scrap metal, insulating materials and piping). This type of waste is stored at surface level at the Morvilliers storage centre managed by ANDRA.

Low and medium-level waste comes from nuclear facilities (gloves, filters, resins). This type of waste is stored at surface level at the Soulaines storage centre managed by ANDRA.

The cost of removing and storing short-lived waste (very low-level and low and medium-level) is assessed on the basis of current contracts with transporters and contracts with ANDRA for operation of the existing storage centres.

**Long-lived low-level waste**

Long-lived low-level waste belonging to EDF essentially consists of graphite waste from the ongoing decommissioning of the former UNGG (natural uranium graphite gas-cooled) reactors.

As this waste has a long lifetime, but is lower-level than long-lived medium and high-level waste, specific subsurface storage requirements apply under the French Law of 28 June 2006.

Following the initial geological investigations, in July 2015 ANDRA remitted a report on the proposed storage centre for long-lived low-level waste on a site located in the Soulaines region (Aube) in France. This report was submitted to the ASN for its opinion. Uncertainties remain about the site’s capacity to accommodate all of the waste included in the baseline inventory of the long-lived low-level waste storage facility. Further studies are planned under the 2016-2018 National Plan for the Management of Radioactive Materials and Waste, concerning both the feasibility of this storage centre and the search for additional waste management solutions. A general industrial plan for management of all long-lived low-level radioactive waste is also to be remitted by the end of 2019.

**Long-lived medium and high-level waste**

Long-lived medium and high-level waste essentially comes from processing of spent fuel, and to a lesser extent waste resulting from nuclear plant decommissioning (metallic components that have been inside the reactor).

The French Law of 28 June 2006 requires reversible storage in deep geological layers for this type of waste.

The provision established for long-lived medium and high-level waste is the largest component of provisions for long-term radioactive waste management.

Until June 2015 the gross value and disbursement schedules for forecast expenses were based on a scenario of industrial geological waste storage, following conclusions presented in the first half of 2005 by a working group formed under supervision of the State involving representatives of the administrations concerned, ANDRA and the producers of waste (EDF, AREVA (now Orano), CEA). EDF applied a reasonable approach to information supplied by this working group, leading to a benchmark cost, for storage of waste from all producers, of €14.1 billion under the economic conditions of 2003 (€20.8 billion under 2011 economic conditions).

In 2012 ANDRA carried out preliminary conceptual studies for the Cigéo geological storage project, after discussing the technical optimisations proposed by the producers of waste.

On this basis, ANDRA drew up figures which, in compliance with the Law of 28 June 2006, were subjected to a consultation process with waste producers

started in late 2014 by the French Department for Energy and Climate (*Direction Générale de l’Énergie et du Climat* or DGEC). In April 2015 EDF and the other producers sent the DGEC their comments on ANDRA’s report and a joint estimation of the target Cigéo storage cost due to divergent approaches. All this information was included, together with the ASN’s opinion, in a report submitted to the Minister for Ecology, Sustainable Development and Energy.

On 15 January 2016 the Ministry of Ecology, Sustainable Development and Energy issued a ministerial order setting the target cost for the Cigéo storage project at €25 billion under 2011 economic conditions. The cost as defined constitutes an objective to be met by ANDRA, in compliance with safety standards set by the ASN, working in close liaison with the operators of nuclear installations.

Publication of this Order entailed an €820 million adjustment to the provision shown in the Group’s financial statements at 31 December 2015. The cost of the Cigéo project defined in the Order has replaced the estimated benchmark cost of €20.8 billion previously used by EDF for its consolidated financial statements.

In application of this ministerial order, the cost of the Cigéo project will be regularly updated, at least at each key milestone in the course of the project’s development (authorisation to create the facility, commissioning, end of the “pilot industrial phase”, safety reviews) in accordance with the opinion of the ASN.

Design studies for future facilities are currently in process with ANDRA and stakeholders. They include technical and economic optimisation and the responses to the safety option report sent by ANDRA to the ASN in April 2016. The law of 11 July 2016 also clarified the concept of reversibility. In 2017 ANDRA opted for a new configuration to provide the basis for the preliminary project.

Under the schedule prepared by ANDRA, the application to built Cigéo (classified as a basic nuclear facility) should be made during 2019 and permission is expected to be granted in 2022. After an industrial pilot phase starting in 2026, the first waste packages should be received in 2031.

On 15 January 2018, the ASN issued its opinion on the Cigéo safety option report (DOS Cigéo). It considers that the project has reached satisfactory overall technological maturity at this stage and requires examination of alternatives to the current proposals for storage of bituminous waste at Cigéo.

**29.1.3 Decommissioning provisions for nuclear power plants**

EDF bears full technical and financial responsibility for decommissioning of the nuclear plants it operates. The decommissioning process is governed by French Law of 13 June 2006, Decree 2007-1557 of 2 November 2007, and the French Environment Code (Articles L. 593-25 and following). It involves the following operations for each site:

- a shutdown declaration, to be made at least two years prior to the planned shutdown date;
- since the Energy Transition Law of 17 August 2015, the final shutdown, which takes place during the operating phase of the basic nuclear facility, is considered separately from dismantling, as a notable change of lesser importance (simply requiring a declaration by the operator to the Minister and the ASN);
- an application for decommissioning, which after examination by the authorities and a public inquiry, leads to a single decree authorising the decommissioning;

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- key progress reviews with the ASN, included in a formal safety procedure specific to dismantling operations;
- an internal authorisation procedure for the operator, independent of operational personnel and audited by the ASN, allowing some specific work to be started ahead of the authorised safety procedure;
- finally, once these operations are complete, declassification of the facility to remove it from the legal regime governing basic nuclear facilities.

The decommissioning scenario adopted by EDF complies with France's Environmental Code, which requires as short a period as possible to elapse between final shutdown and dismantling in economically acceptable conditions and in compliance with the principles laid down in Article L. 1333-1 of the Public Health Code (radioprotection) and section II of Article L. 110-1 of the Environmental Code (protection of the environment). The intended end-state is industrial use: the sites will be restored to their original condition and will be reusable for industrial facilities.

The ongoing operations concern plants that were constructed and operated before the current nuclear fleet ("first-generation" plants), and the Superphenix plant and Irradiated Materials Workshop at Chinon. These operations cover four different technologies: a heavy water reactor (Brennilis), a sodium-cooled fast-neutron

Details of changes in decommissioning provisions for nuclear power plants are as follows:

<i>(in millions of euros)</i>	31/12/2016	Increases	Decreases	Discount effect	Other movements	31/12/2017
Provisions for decommissioning nuclear plants in operation	10,899	2	(13)	461	267	11,616
Provisions for decommissioning permanently shut-down nuclear plants	3,223	-	(118)	197	2	3,304
<b>DECOMMISSIONING PROVISIONS FOR NUCLEAR POWER PLANTS</b>	<b>14,122</b>	<b>2</b>	<b>(131)</b>	<b>658</b>	<b>269</b>	<b>14,920</b>

#### For nuclear power plants currently in operation (PWR pressurized water reactor plants with 900MW, 1,300MW and N4 reactors)

Until 2013, provisions were estimated based on a 1991 study by the French Ministry of Trade and Industry, which set an estimated benchmark cost for decommissioning expressed in €/MW, confirming the assumptions defined in 1979 by the PEON commission. These estimates had been confirmed from 2009 by a detailed study of decommissioning costs conducted by EDF at the representative site of Dampierre (four 900MW units), and its results were corroborated by an intercomparison with the study carried out by consultants La Guardia, based mainly on the Maine Yankee reactor in the US.

In 2014 the Dampierre study was reviewed by EDF to make sure that the previous calculations were still valid in view of recent developments and experience, both internationally and internally. For this revision, the decommissioning provisions for plants in operation were based on costs resulting from the Dampierre study, in order to incorporate best estimates and feedback from inside and outside France. This change of estimate had no significant impact on the level of provisions at 31 December 2014.

Between June 2014 and July 2015, an audit of dismantling costs for EDF's nuclear fleet currently in operation was conducted by specialised consulting firms, at the request of the French Department for Energy and Climate (*Direction Générale de l'Énergie et du Climat* or DGEC). On 15 January 2016 the DGEC published a summary of the audit report. It stated that although estimating the cost of decommissioning nuclear reactors is a demanding exercise due to relatively limited past experience, the prospects of changes in techniques, and the distant timing of the expenditure, overall, the audit confirmed EDF's estimate of decommissioning costs for its nuclear fleet currently in operation. The DGEC also made a number of recommendations to EDF following this audit.

In 2016, EDF revised the decommissioning estimate, in order to incorporate the audit recommendations and past experience gained from dismantling operations for first-generation reactors (particularly Chooz A).

reactor (the Superphenix at Creys-Malville), natural uranium graphite gas-cooled (UNGG) reactors (at Chinon, Saint Laurent and Bugey) and a pressurised water reactor (PWR at Chooz). Each of them is a first for EDF, and apart from the PWR, they concern reactor technologies for which there is little or no international experience. They therefore require development of new methods and technologies that are riskier than technologies for which feedback already exists. Decommissioning of the Chooz PWR is benefiting from past experience (essentially in the US and limited), but the reactor has the specificity of being located in a cave, making this a unique operation, generating experience that is not immediately transposable and involves specific risks.

The experience gained from dismantling the Chooz PWR will make the studies and estimates of future decommissioning of the nuclear fleet currently in operation ("second-generation" plants) as robust as possible. But so far, neither EDF nor any other operator has begun a decommissioning programme on a scale comparable to the current PWR fleet, and as a result the estimates include both opportunities and risks, especially the risks associated with the scale effect.

The decommissioning provisions cover future decommissioning expenses as described above (excluding the cost of removing and storing waste, which is covered by the provisions for long-term waste management).

A detailed analytical approach was used to revise this estimate, identifying all costs for the engineering, construction work, operation and waste processing involved in future decommissioning of reactors currently in operation. This led to figures based on detailed timetables for plant decommissioning. The approach adopted made it possible to explore more thoroughly the assessment of costs specific to the initial units of each series, estimated for each series based on transposition coefficients applied to the baseline costs for the initial 900MW unit, and the series and mutualisation effects, as these costs and effects are inherent to the fleet's size and configuration.

The natures of the principal mutualisation and series effects used to arrive at the estimate are explained below.

There are several types of mutualisation effects:

- some of them relate to the fact that several reactors may share common buildings and facilities on the same site, and these buildings and facilities will not have to be decommissioned twice. Structurally, decommissioning a pair of reactors on the same site costs less than decommissioning two standalone reactors on two different sites. In France, unlike other countries, there are no single reactors but sites with two or four, and in one case six reactors;
- certain costs are no higher when 2 or 4 reactors are decommissioned on the same site. This is usually the case for surveillance costs and cost of maintaining safe operating conditions on the site;
- waste processing in centralised facilities (for example for dismantling major components) costs less than having several waste processing facilities at the decommissioning location.

Series effects are mainly of two types:

- first, in a fleet using the same technology, many of the studies do not need to be repeated each time;
- second, in a fleet using the same technology, robots and tooling can be largely reused from one site to another.

Such series effects are comparable in nature to the effects observed during construction of the fleet, in terms of studies or component manufacturing plants.

For example, for the 900MW fleet, a series effect of approximately 20% is expected between the first-of-kind reactor with 2 units and an average 2-units reactor.

Series and mutualisation effects in particular explain why it is not appropriate simply to compare the average decommissioning cost per reactor between the French fleet and other countries' nuclear fleets.

The figures only marginally reflect changes in productivity and the learning effect. The external audit of the decommissioning cost for the fleet currently in operation, ordered by the DGEC, considered that the learning effect incorporated into the estimate was conservative.

For reasons of prudence, the estimate also includes an assessment of risks, contingencies and uncertainties.

The Group considers that the work done to revise the estimate answers the recommendations issued after the audit. The approach adopted and its results have been presented to the administrative authority and are currently the subject of further questions and discussion.

EDF is also continuing to support its analyses through an international comparison, making it sure it takes into consideration a number of factors that could distort direct comparisons, for example differences in the scope concerned by costs estimate, or national and regulatory contexts.

The results of this detailed approach led to limited changes overall in the cost estimate and the associated provisions at 31 December 2016, apart from the consequences of the change in the depreciation period for 900MW series plants (excluding Fessenheim) at 1 January 2016, and the effect of changes in discount rates at 31 December 2016, *i.e.*:

- an increase of €321 million in the estimated decommissioning costs and an increase of €334 million in the estimated cost of long-term management of long-lived medium-level waste;
- a decrease of €(451) million in the provision for plant decommissioning, and an increase of €162 million in the provision for long-term management of long-lived medium-level waste, with corresponding changes in the underlying assets.

After its revision in 2016, it was decided that the estimate would be reviewed annually. The 2017 review led to non-significant adjustments.

### For permanently shut-down nuclear power plants

Unlike the PWR fleet currently in operation, the first-generation reactors now shut down used a range of different technologies: a PWR reactor at Chooz A, UNGG (natural uranium graphite gas-cooled) reactors at Bugey, St-Laurent and Chinon, a heavy water reactor at Brennilis, and a sodium-cooled fast neutron reactor at Creys-Malville.

The decommissioning costs are based on contractor quotes, which take account of accumulated industrial experience, unforeseen and regulatory developments, and the latest available figures.

In 2015 the industrial decommissioning strategy for UNGG plants was totally revised. The previously selected strategy was based on a scenario involving "underwater" dismantling of caissons (UNGG reactor buildings) for four of the reactors, with direct graphite storage in a centre currently under examination by ANDRA (see Long-lived low-level waste, note 29.1.2). Several new technical developments showed that the alternative "in-air" dismantling solution for the caissons would improve industrial control of operations and was apparently more favourable in terms of safety, radioprotection and environmental impact. The Company therefore selected a new "in-air" dismantling scenario as the benchmark strategy for all six caissons.

This scenario includes a consolidation phase, building on experience acquired from dismantling the first caisson before beginning work on the other five. The decommissioning phase will ultimately be longer than previously planned, leading to higher contractor quotes due to the induced operating costs.

The amended industrial scenario was presented to the ASN's commissioners on 29 March 2016.

At the request of the ASN, an independent expert review was ordered in the first quarter of 2017 to analyse EDF's chosen solutions for decommissioning of its 6 UNGG reactors. The conclusions did not challenge the main options chosen. A meeting took place with the ASN commissioners in June 2017 based on these conclusions and a justification file remitted by EDF in March.

This led to a further presentation in 2018 after EDF remitted another file presenting a detailed schedule for operations to be undertaken in the next 15 years, and the findings of a large number of studies concerning the stability of reactor buildings in the long term.

The strategy file and the safety option report concerning establishment of a secure configuration were sent to the ASN in late December 2017, together with the detailed timetable for operations over the period 2017-2032.

Updating the industrial decommissioning scenario for first-generation power plants, particularly UNGGs, led to a €590 million increase in the provision at 31 December 2015.

After the revision of the estimated cost in 2015, the decision was made that it should be reviewed annually.

The 2016 review led to non-significant adjustments, apart from one increase of €125 million for a specific installation (the Irradiated Materials Workshop at Chinon). The 2017 review led to non-significant adjustments.

### 29.1.4 Provisions for last cores

These provisions cover the future expenses resulting from scrapping fuel that will only be partially irradiated when the reactor is shut down. It is measured based on:

- the cost of the loss on fuel in the reactor that is not totally spent at the time of final reactor shutdown and cannot be reused due to technical and regulatory constraints;
- the cost of fuel processing, and waste removal and storage operations. These costs are valued in a similar way to provisions for spent fuel management and long-term radioactive waste management.

These unavoidable costs are components of the cost of nuclear reactor shutdown and decommissioning. As such, they are fully covered by provision from the commissioning date and an asset associated with the provision is recognised.

### 29.1.5 Discounting of provisions related to nuclear generation and sensitivity analyses

#### 29.1.5.1 Discount rate

##### Calculation of the discount rate

The discount rate is determined based on long-series data for a sample of bonds with maturities as close as possible to that of the liability. However, some expenses covered by these provisions will be disbursed over periods significantly longer than the duration of instruments generally traded on the financial markets.

The benchmark used to determine the discount rate is the sliding 10-year average of the return on French OAT 2055 treasury bonds which have a similar duration to the obligations, plus the spread of corporate bonds rated A to AA, which include EDF.

The methodology used to determine the discount rate, particularly the reference to sliding 10-year averages, is able to prioritise long-term trends in rates, in keeping with the long-term horizon for disbursements. The discount rate is therefore revised in response to structural developments in the economy leading to medium and long-term changes.

The assumed inflation rate is determined in line with the forecasts provided by consensus and expected inflation based on the returns on inflation-linked bonds.

The discount rate determined in this way is 4.1% at 31 December 2017, assuming inflation of 1.5% (4.2% and 1.5% respectively at 31 December 2016), giving a real discount rate of 2.6% at 31 December 2017 (2.7% at 31 December 2016).

**Regulatory discount rate limit**

The discount rate applied must also comply with two regulatory limits. Under the amended decree of 23 February 2007 and the ministerial order of 21 March 2007, itself modified by the order of 29 December 2017, the discount rate must be lower than:

- a regulatory maximum, set until 31 December 2026 as the weighted average of two terms, the first set at 4.3%, and the second corresponding to the arithmetic average over the 48 most recent months of the TEC 30-year rate plus 100 points. The weighting given to the first constant term of 4.3% reduces on a straight-line basis from 100% at 31 December 2016 to 0% at 31 December 2026;

- and the expected rate of return on assets covering the liability (dedicated assets).

The ceiling rate based on the TEC 30-year rate is 4.1% at 31 December 2017 (4.3% at 31 December 2016).

The discount rate used at 31 December 2017 is 4.1%

**29.1.5.2 Analyses of sensitivity to macro-economic assumptions**

Sensitivity to assumptions concerning costs, inflation rate, long-term discount rate, and disbursement schedules can be estimated through comparison of the gross amount estimated under year-end economic conditions with the present value of the amount.

	31/12/2017		31/12/2016	
	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
<i>(in millions of euros)</i>				
Spent fuel management	19,058	10,786	18,460	10,658
Waste removal and conditioning	1,203	726	-	-
Long-term radioactive waste management	29,396	8,814	29,631	8,966
<b>BACK-END NUCLEAR CYCLE EXPENSES</b>	<b>49,657</b>	<b>20,326</b>	<b>48,091</b>	<b>19,624</b>
Decommissioning provisions for nuclear plants in operation	20,563	11,616	20,185	10,889
Decommissioning provisions for shut-down nuclear plants	6,472	3,304	6,431	3,223
Provisions for last cores	4,332	2,387	4,344	2,287
<b>DECOMMISSIONING AND LAST CORE EXPENSES</b>	<b>31,367</b>	<b>17,307</b>	<b>30,960</b>	<b>16,409</b>

This approach can be complemented by estimating the impact of a change in the discount rate on the present value.

In application of Article 11 of the Decree of 23 February 2007, the following table reports these details for the main components of provisions for the back-end of the nuclear cycle, decommissioning of nuclear plants and last cores:

**AT 31 DECEMBER 2017:**

	Amounts in provisions at present value	Sensitivity to discount rate			
		Balance sheet provisions		Pre-tax net income	
		+0.20%	-0.20%	+0.20%	-0.20%
<i>(in millions of euros)</i>					
<b>Back-end nuclear cycle expenses:</b>					
■ Spent fuel management	10,786	(221)	238	190	(206)
■ Waste removal and conditioning	726	(22)	24	13	(14)
■ Long-term radioactive waste management	8,814	(497)	562	407	(464)
<b>Decommissioning and last core expenses:</b>					
■ Decommissioning of nuclear plants in operation	11,616	(477)	501	7	(7)
■ Decommissioning provisions for shut-down nuclear plants	3,304	(125)	135	125	(135)
■ Last cores	2,387	(85)	90	-	-
<b>TOTAL</b>	<b>37,633</b>	<b>(1,427)</b>	<b>1,550</b>	<b>742</b>	<b>(826)</b>

**AT 31 DECEMBER 2016:**

	Amounts in provisions at present value	Sensitivity to discount rate			
		Balance sheet provisions		Pre-tax net income	
		+0.20%	-0.20%	+0.20%	-0.20%
<i>(in millions of euros)</i>					
<b>Back-end nuclear cycle expenses:</b>					
■ Spent fuel management	10,658	(211)	227	182	(195)
■ Long-term radioactive waste management	8,966	(475)	534	381	(432)
<b>Decommissioning and last core expenses:</b>					
■ Decommissioning of nuclear power plants	14,122	(586)	619	127	(138)
■ Last cores	2,287	(85)	90	-	-
<b>TOTAL</b>	<b>36,033</b>	<b>(1,357)</b>	<b>1,470</b>	<b>690</b>	<b>(765)</b>



## 29.2 EDF ENERGY'S NUCLEAR PROVISIONS

The specific financing terms for long-term nuclear obligations related to EDF Energy are reflected as follows in the EDF group's financial statements:

- the obligations are reported in liabilities in the form of provisions amounting to €10,264 million at 31 December 2017;

- in the assets, EDF Energy reports receivables corresponding to the amounts payable under the restructuring agreements by the NLF, for non-contracted obligations or decommissioning obligations, and by the British Government for contracted obligations (or historical liabilities).

These receivables are discounted at the same real rate as the obligations they are intended to finance. They are included in "Financial assets" in the consolidated balance sheet (see note 36.3) at the amount of €8,650 million at 31 December 2017 (€8,743 million at 31 December 2016).

Details of changes in provisions for the back-end of the nuclear cycle and provisions for decommissioning and last cores are as follows:

<i>(in millions of euros)</i>	31/12/2016	Increases	Decreases	Discount effect	Translation adjustments	Other movements <sup>(1)</sup>	31/12/2017
Provisions for spent fuel management	1,771	10	(258)	103	(60)	1	1,567
Provisions for waste removal and conditioning	-	2	-	16	(4)	301	315
Provisions for long-term radioactive waste management	888	2	-	34	(28)	(251)	6,45
<b>Provisions for the back-end of the nuclear cycle</b>	<b>2,659</b>	<b>14</b>	<b>(258)</b>	<b>153</b>	<b>(92)</b>	<b>51</b>	<b>2,527</b>
Provisions for nuclear plant decommissioning	6,190	-	(15)	329	(220)	(51)	6,233
Provisions for last cores	1,373	-	-	67	(50)	114	1,504
<b>Provisions for decommissioning and last cores</b>	<b>7,563</b>	<b>-</b>	<b>(15)</b>	<b>396</b>	<b>(270)</b>	<b>63</b>	<b>7,737</b>
<b>PROVISIONS RELATED TO NUCLEAR GENERATION</b>	<b>10,222</b>	<b>14</b>	<b>(273)</b>	<b>549</b>	<b>(362)</b>	<b>114</b>	<b>10,264</b>

(1) Other movements mainly include the reclassification at 1 January 2017 of the provisions for waste removal and conditioning, which were previously included in the provisions for long-term radioactive waste management, in the amount of €301 million.

### 29.2.1 Regulatory and contractual framework

Amendments signed with the Nuclear Liabilities Fund (NLF – an independent trust set up by the UK Government as part of the restructuring of British Energy) following the EDF group's acquisition of British Energy have a limited impact on the contractual financing commitments made to British Energy by the UK Secretary of State and the NLF under the "Restructuring Agreements". These agreements were entered into by British Energy on 14 January 2005 as part of the restructuring led by the UK Government from 2005 in order to stabilise British Energy's financial position. British Energy Generation Limited changed its name to EDF Energy Nuclear Generation Limited on 1 July 2011 and replaced British Energy in these agreements and amendments.

Under the terms of the Restructuring Agreements:

- the NLF agreed to fund, to the extent of its assets: (i) qualifying contingent and/or latent nuclear liabilities (including liabilities for management of spent fuel from the Sizewell B power station); and (ii) qualifying decommissioning costs for EDF Energy's existing nuclear power stations;
- the Secretary of State agreed to fund: (i) qualifying contingent and/or latent nuclear liabilities (including liabilities for the management of spent fuel from the Sizewell B power station) and qualifying decommissioning costs related to EDF Energy's existing nuclear power stations, to the extent that they exceed the assets of the NLF; and (ii) subject to a cap of £2,185 million (in December 2002 monetary values, adjusted accordingly), qualifying known existing liabilities for EDF Energy's spent fuel (including liabilities for management of spent fuel from plants other than Sizewell B loaded in reactors prior to 15 January 2005);
- EDF Energy is responsible for funding certain excluded or disqualified liabilities (e.g. those defined as EDF Energy liabilities), and additional liabilities which could be created as a result of failure by EDF Energy to meet minimum performance standards under applicable law. The obligations of EDF Energy to the NLF and the Secretary of State are guaranteed by the assets of the principal members of EDF Energy.

EDF Energy has also undertaken commitments to pay:

- annual decommissioning contributions for a period limited to the useful life of the plants as at the date of the "restructuring agreements"; the corresponding provision amounts to €122 million at 31 December 2017;
- £150,000 (indexed to inflation) per tonne of uranium loaded in the Sizewell B reactor after the date of the "restructuring agreements".

Furthermore, EDF Energy has entered into a separate contract with the Nuclear Decommissioning Authority (NDA) for management of AGR spent fuel and associated radioactive waste resulting from operation of power plants other than Sizewell B after 15 January 2005, and bears no responsibility for this fuel and waste once it is transferred to the processing site at Sellafield. The corresponding costs of £150,000 (indexed to inflation) per tonne of loaded uranium – plus a rebate or surcharge dependent on market electricity price and electricity generated in the year – are included in inventories (see note 1.3.17.1).

### 29.2.2 Provisions for the back-end of the nuclear cycle

Spent fuel from the Sizewell B PWR (pressurised water reactor) plant is stored on site. Spent fuel from other plants is transferred to Sellafield for storage and reprocessing.

EDF Energy's provisions for the back-end of the nuclear cycle concern obligations for reprocessing and storage of spent fuel and long-term storage of radioactive waste, required by the existing regulations in the UK approved by the Nuclear Decommissioning Authority (NDA). Their amount is based on contractual agreements or if this is not possible, on the most recent technical estimates.

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	31/12/2017		31/12/2016	
	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
<i>(in millions of euros)</i>				
Spent fuel management	2,829	1,567	3,101	1,771
Waste removal and conditioning	1,827	315	-	-
Long-term radioactive waste management	3,589	645	5,326	888
<b>BACK-END NUCLEAR CYCLE EXPENSES</b>	<b>8,245</b>	<b>2,527</b>	<b>8,427</b>	<b>2,659</b>

### 29.2.3 Provisions for nuclear plant decommissioning

Provisions for decommissioning of nuclear plants result from management's best estimates. They cover the full cost of decommissioning and are measured on the

basis of existing techniques and methods that are most likely to be used for application of current regulations. The current costs are based on Baseline Decommissioning Plans produced in 2016 (3-year revision) and approved in 2013 and assume that plants will be decommissioned and the land will ultimately be reused.

	31/12/2017		31/12/2016	
	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
<i>(in millions of euros)</i>				
<b>PLANT DECOMMISSIONING EXPENSES</b>	<b>15,520</b>	<b>6,111</b>	<b>15,803</b>	<b>6,059</b>

The table above concerns decommissioning obligations excluding the present value of decommissioning contributions payable to the NLF, which is €122 million at 31 December 2017 (see note 29.2.1).

Corporate bonds rated A to AA, again over the longest-term duration. The implicit inflation rate used in determining a discount rate is based on a long-term forecast of adjusted retail prices (the UK's CPIH index).

### 29.2.4 Discounting of provisions related to nuclear generation

The discount rate has been calculated using an average series of data for a sample of UK Government gilts over the longest available durations plus the spread of UK

At 31 December 2017, EDF Energy applied a real discount rate of 2.7% to nuclear liabilities in the United Kingdom (2.7% at 31 December 2016).

## NOTE 30 OTHER PROVISIONS FOR DECOMMISSIONING

The breakdown by company is as follows:

<i>(in millions of euros)</i>	EDF	EDF Energy	Edison	Framatome <sup>(1)</sup>	Other entities <sup>(2)</sup>	Total
<b>OTHER PROVISIONS FOR DECOMMISSIONING AT 31/12/2017<sup>(2)</sup></b>	<b>626</b>	<b>130</b>	<b>692</b>	<b>347</b>	<b>262</b>	<b>2,057</b>
<b>Other provisions for decommissioning at 31/12/2016</b>	<b>617</b>	<b>90</b>	<b>667</b>	<b>-</b>	<b>195</b>	<b>1,569</b>

(1) Including €81 million of provisions concerning basic nuclear facilities in France.

(2) Including €43 million of provisions concerning SOCODEL's basic nuclear facilities in France.

Other provisions for decommissioning principally concern fossil-fired power plants, hydrocarbon production assets and installations for the production of nuclear fuel assemblies.

The costs of decommissioning fossil-fired power plants are calculated using regularly updated studies based on estimated future costs, measured by reference

to the charges recorded on past operations and the most recent estimates for plants still in operation.

The provision recorded at 31 December 2017 reflects the most recent known contractor quotes and commissioning of new generation assets.

## NOTE 31 PROVISIONS FOR EMPLOYEE BENEFITS

### 31.1 EDF GROUP

(in millions of euros)	31/12/2017	31/12/2016
Provisions for employee benefits – current portion	1,106	1,100
Provisions for employee benefits – non-current portion	20,630	21,234
<b>PROVISIONS FOR EMPLOYEE BENEFITS</b>	<b>21,736</b>	<b>22,334</b>

#### 31.1.1 Breakdown of the change in the net liability

(in millions of euros)	Obligations	Fund assets	Net Liability
<b>Balance at 31/12/2016 <sup>(1)</sup></b>	<b>42,683</b>	<b>(20,917)</b>	<b>21,766</b>
Net expense for 2017	1,961	(470)	1,491
Actuarial gains and losses	(400)	(721)	(1,121)
Employer's contributions to funds	-	(438)	(438)
Employees' contributions to funds	14	(14)	-
Benefits paid	(1,848)	811	(1,037)
Translation adjustment	(316)	333	17
Changes in scope of consolidation <sup>(2)</sup>	630	(479)	151
Other movements	(3)	-	(3)
<b>BALANCE AT 31/12/2017</b>	<b>42,721</b>	<b>(21,895)</b>	<b>20,826</b>
<b>Including:</b>			
Provisions for employee benefits			21,736
Non-current financial assets			(910)

(1) The net liability at 31 December 2016 comprised €22,334 million for the provisions for employee benefits and €(568) million of non-current financial assets, giving a net liability amount of €21,766 million.

(2) Changes in the scope of consolidation at 31 December 2017 principally comprise pension commitment and other long-term employee benefits related to the acquisition of Framatome, representing a net liability of €149 million.

Actuarial gains and losses on obligations amount to €(400) million for 2017, essentially comprising €194 million in the United Kingdom associated with changes in the discount and inflation rates and €(598) million in France, mainly attributable to experience adjustments.

Actuarial gains and losses on obligations amount to €2,041 million for 2016, essentially comprising €1,349 million in the United Kingdom associated with

changes in the discount and inflation rates (see note 31.3.6) and €643 million in France, mainly related to the effect of changes in financial assumptions:

- change in discount and inflation rate assumptions: €2,322 million;
- changes concerning the valuation of employee benefits in kind in the form of energy, particularly following the CSPE reform: €(1,742) million.

#### 31.1.2 Post-employment and other long-term employee benefit expenses

(in millions of euros)	2017	2016
Current service cost	(1,010)	(890)
Past service cost	-	38
Actuarial gains and losses – long-term benefits	(67)	(177)
<b>Net expenses recorded as operating expenses</b>	<b>(1,077)</b>	<b>(1,029)</b>
Interest expense (discount effect)	(884)	(1,048)
Return on fund assets	470	547
<b>Net interest expense included in financial result</b>	<b>(414)</b>	<b>(501)</b>
<b>EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT</b>	<b>(1,491)</b>	<b>(1,530)</b>
Actuarial gains and losses – post-employment benefits	400	(2,041)
Actuarial gains and losses on fund assets	721	2,602
<b>Actuarial gains and losses</b>	<b>1,121</b>	<b>561</b>
<b>Translation adjustments</b>	<b>(17)</b>	<b>(5)</b>
<b>GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY</b>	<b>1,104</b>	<b>556</b>

### 31.1.3 Net employee benefit liability by geographical area

<i>(in millions of euros)</i>	France <sup>(1)</sup>	United Kingdom	Other	Total
<b>Obligations at 31/12/2016</b>	<b>33,373</b>	<b>8,891</b>	<b>419</b>	<b>42,683</b>
Net expense for 2017	1,427	511	23	1,961
Actuarial gains and losses	(598)	194	4	(400)
Employees' contributions to funds	-	14	-	14
Benefits paid	(1,501)	(338)	(9)	(1,848)
Translation adjustment	-	(316)	-	(316)
Changes in scope of consolidation <sup>(2)</sup>	-	-	630	630
Other movements	-	-	(3)	(3)
<b>OBLIGATIONS AT 31/12/2017</b>	<b>32,701</b>	<b>8,956</b>	<b>1,064</b>	<b>42,721</b>
Fair value of fund assets	(11,621)	(9,684)	(588)	(21,895)
<b>NET EMPLOYEE BENEFIT LIABILITY AT 31/12/2017</b>	<b>21,080</b>	<b>(728)</b>	<b>474</b>	<b>20,826</b>
<b>Including:</b>				
Provisions for employee benefits	21,080	182	474	21,736
Non-current financial assets <sup>(3)</sup>	-	(910)	-	(910)

(1) France comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 31.2).

(2) At 31 December 2017, EDF Energy recognised surplus funding on its EEGSG and BEGG pension schemes (see note 31.3.1).

(3) Changes in the scope of consolidation at 31 December 2017 principally comprise pension commitment and other long-term employee benefits related to the acquisition of Framatome, amounting to €629 million.

<i>(in millions of euros)</i>	France <sup>(1)</sup>	United Kingdom	Other	Total
<b>Obligations au 31/12/2016</b>	<b>33,373</b>	<b>8,891</b>	<b>419</b>	<b>42,683</b>
Fair value of fund assets	(11,566)	(9,248)	(103)	(20,917)
<b>Provisions for employee benefits at 31/12/2016</b>	<b>21,807</b>	<b>(357)</b>	<b>316</b>	<b>21,766</b>
<b>Including:</b>				
Provisions for employee benefits	21,807	211	316	22,334
Non-current financial assets	-	(568)	-	(568)

(1) France comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 31.2).

## 31.2 FRANCE (REGULATED ACTIVITIES, AND GENERATION AND SUPPLY)

Given the strong similarities between their pension schemes, the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 6.1) are combined here into a single subtotal, "France", which primarily

includes EDF and Enedis. Almost all of these companies' employees have IEG status, including the special IEG pension and other IEG benefits.

These benefits are described in note 1.3.22.

### 31.2.1 Details of changes in the provisions

<i>(in millions of euros)</i>	Obligations	Fund assets	Provisions in the balance sheet
<b>Balances at 31/12/2016</b>	<b>33,373</b>	<b>(11,566)</b>	<b>21,807</b>
Net expense for 2017	1,427	(220)	1,207
Actuarial gains and losses	(598)	(161)	(759)
Contributions to funds	-	(145)	(145)
Benefits paid	(1,501)	471	(1,030)
<b>BALANCES AT 31/12/2017</b>	<b>32,701</b>	<b>(11,621)</b>	<b>21,080</b>

### 31.2.2 Post-employment and other long-term employee benefit expenses

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
Current service cost	(725)	(659)
Past service cost	-	-
Actuarial gains and losses – other long-term benefits	(68)	(177)
<b>Net expenses recorded as operating expenses</b>	<b>(793)</b>	<b>(836)</b>
Interest expense (discount effect)	(634)	(739)
Return on fund assets	220	252
<b>Net interest expense included in financial result</b>	<b>(414)</b>	<b>(487)</b>
<b>EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT</b>	<b>(1,207)</b>	<b>(1,323)</b>
Actuarial gains and losses – post-employment benefits	598	(643)
Actuarial gains and losses on fund assets	161	854
<b>Actuarial gains and losses</b>	<b>759</b>	<b>211</b>
<b>GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY</b>	<b>759</b>	<b>211</b>

Actuarial gains and losses on post-employment benefits break down as follows:

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
Experience adjustments	462	(165)
Changes in demographic assumptions	-	23
Changes in financial assumptions <sup>(1)</sup>	68	(678)
<b>ACTUARIAL GAINS AND LOSSES ON OBLIGATIONS</b>	<b>530</b>	<b>(820)</b>
<b>including:</b>		
Actuarial gains and losses on post-employment benefits	598	(643)
Actuarial gains and losses on other long-term benefits	(68)	(177)

(1) Financial assumptions mainly concern the discount rate, inflation rate and wage increase rate, and in 2016, assumptions regarding the value of benefits in kind (electricity/gas).

The actuarial gains and losses on obligations generated over 2017 amount to €530 million, and are mainly attributable to experience adjustments.

In 2016, actuarial gains and losses on obligations amounted to €(820) million, mainly related to the effect of revised financial assumptions (including the changes in assumptions for the discount rate and inflation).

### 31.2.3 Provisions for employee benefits by nature

AT 31 DECEMBER 2017

<i>(in millions of euros)</i>	<b>Obligations</b>	<b>Fund assets</b>	<b>Provisions in the balance sheet</b>
<b>Provisions for post-employment benefits at 31/12/2017</b>	<b>31,214</b>	<b>(11,621)</b>	<b>19,593</b>
<b>comprising:</b>			
Pensions	24,266	(10,859)	13,407
Benefits in kind (electricity/gas)	4,758	-	4,758
Retirement gratuities	873	(747)	126
Other	1,317	(15)	1,302
<b>Provisions for other long-term employee benefits at 31/12/2017</b>	<b>1,487</b>	<b>-</b>	<b>1,487</b>
<b>comprising:</b>			
Annuities following work-related accident and illness, and invalidity	1,250	-	1,250
Long service awards	208	-	208
Other	29	-	29
<b>PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2017</b>	<b>32,701</b>	<b>(11,621)</b>	<b>21,080</b>

### AT 31 DECEMBER 2016

<i>(in millions of euros)</i>	<b>Obligations</b>	<b>Fund assets</b>	<b>Provisions in the balance sheet</b>
<b>Provisions for post-employment benefits at 31/12/2016</b>	<b>31,876</b>	<b>(11,566)</b>	<b>20,310</b>
<b>comprising:</b>			
Pensions	24,976	(10,810)	14,166
Benefits in kind (electricity/gas)	4,695	-	4,695
Retirement gratuities	913	(741)	172
Other	1,292	(15)	1,277
<b>Provisions for other long-term employee benefits at 31/12/2016</b>	<b>1,497</b>	<b>-</b>	<b>1,497</b>
<b>comprising:</b>			
Annuities following work-related accident and illness, and invalidity	1,252	-	1,252
Long service awards	213	-	213
Other	32	-	32
<b>PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2016</b>	<b>33,373</b>	<b>(11,566)</b>	<b>21,807</b>

### 31.2.4 Breakdown of obligations by type of beneficiary

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Current employees	18,577	19,918
Retirees	14,124	13,455
<b>OBLIGATIONS</b>	<b>32,701</b>	<b>33,373</b>

### 31.2.5 Fund assets

For France, fund assets, managed under an asset/liability model, amount to €11,621 million at 31 December 2017 (€11,566 million at 31 December 2016) and concern the coverage of retirement gratuities (with target coverage of 100%) and the specific benefits of the special pension system.

Fund assets break down as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
<b>FUND ASSETS</b>	<b>11,621</b>	<b>11,566</b>
<b>Assets funding special pension benefits</b>	<b>10,859</b>	<b>10,810</b>
<b>comprising (%)</b>		
Listed equity instruments (shares)	31%	31%
Listed debt instruments (bonds)	69%	69%
<b>Assets funding retirement gratuities</b>	<b>747</b>	<b>741</b>
<b>comprising (%)</b>		
Listed equity instruments (shares)	32%	33%
Listed debt instruments (bonds)	68%	67%
Other fund assets	15	15

At 31 December 2017, the equities held as part of fund assets are distributed as follows:

- approximately 53% of the total are shares in North American companies;
- approximately 24% of the total are shares in European companies;
- approximately 23% of the total are shares in companies in the Asia-Pacific zone and emerging countries.

This distribution is relatively stable compared to the distribution at 31 December 2016.

They consist of insurance contracts with the following risk profile:

- 69% in a hedging pocket consisting of bonds, designed to replicate variations in the obligation caused by changes in interest rates;
- 31% in a growth asset pocket consisting of international equities.

At 31 December 2017, the bonds held as part of fund assets are distributed as follows:

- approximately 90% of the total are AAA and AA-rated bonds;
- approximately 10% of the total are bonds with A, BBB and other ratings.

Around 84% of bonds are sovereign bonds issued by Euro zone countries, and the balance mainly consists of bonds issued by financial and non-financial firms.

This distribution is relatively stable compared to the distribution at 31 December 2016.

The performance of pension fund assets in France is +3.1% in 2017.

### 31.2.6 Future Cash Flows

Cash flows related to future employee benefits are as follows:

<i>(in millions of euros)</i>	<b>Cash flow in year-end economic conditions</b>	<b>Amount covered by provisions (present value)</b>
Less than one year	1,480	1,467
One to five years	5,583	5,260
Five to ten years	5,383	4,621
More than ten years	40,829	21,353
<b>CASH FLOWS RELATED TO EMPLOYEE BENEFITS</b>	<b>53,275</b>	<b>32,701</b>

At 31 December 2017, the average duration of employee benefit commitments in France is 19.2 years.

### 31.2.7 Actuarial assumptions

<i>(in%)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Discount rate/rate of return on assets <sup>(1)</sup>	1.90%	1.90%
Inflation rate	1.50%	1.50%
Wage increase rate <sup>(2)</sup>	1.70%	1.70%

(1) The interest income generated by assets is calculated using the discount rate. The difference between this interest income and the return on assets is recorded in equity.

(2) Excluding inflation.

In France, the discount rate used for employee benefit obligations is determined by applying the yield rate on high-quality corporate bonds based on their duration to maturities corresponding to the future disbursements resulting from these obligations. For longer durations, the calculation also takes into consideration data from a wider selection of corporate bonds adjusted for comparability with the high-quality bonds, since 2017 saw a reduction in the number of such bonds with these durations.

Changes at 31 December 2017 in the economic and market parameters used have led the Group to set the discount rate at 1.90% at 31 December 2017 (identical to the rate at 31 December 2016).

The inflation rate used to calculate provisions for employee benefits is derived from an internally-determined inflation curve by maturity which is used in the Group as a benchmark for Euro zone countries. The inflation rate determined in this way at 31 December 2017 is an average 1.50% (identical to the rate at 31 December 2016).

### 31.2.8 Sensitivity analysis

Sensitivity analyses on the amount of the obligation are as follows:

<i>(in%)</i>	<b>31/12/2017</b>
Impact of a 25bp increase or decrease in the discount rate	-4.6% / +5.0%
Impact of a 25bp increase or decrease in the wage increase rate	+3.8% / -3.8%
Impact of a 25bp increase or decrease in the inflation rate	+4.7% / -4.4%

## 31.3 UNITED KINGDOM

The United Kingdom segment chiefly comprises EDF Energy, whose principal employee benefits are described in note 1.3.22.

### 31.3.1 Details of the change in the net liability

<i>(in millions of euros)</i>	<b>Obligations</b>	<b>Fund assets</b>	<b>Net liability</b>
<b>Balances at 31/12/2016</b>	<b>8,891</b>	<b>(9,248)</b>	<b>(357)</b>
Net expense for 2017	511	(249)	262
Actuarial gains and losses	194	(558)	(364)
Employer's contributions to funds	-	(286)	(286)
Employees' contributions to funds	14	(14)	-
Benefits paid	(338)	338	-
Translation adjustment	(316)	333	17
<b>BALANCES AT 31/12/2017</b>	<b>8,956</b>	<b>(9,684)</b>	<b>(728)</b>
<b>Including:</b>	<b>-</b>	<b>-</b>	<b>-</b>
Provisions for employee benefits	-	-	182
Non-current financial assets	-	-	(910)

## 6. FINANCIAL STATEMENTS

### Income Statement

At 31 December 2017, EDF Energy's EEGSG and BEGG pension schemes (see note 1.3.22.2.2) were overfunded to the extent of €910 million compared to €568 million at 31 December 2016.

This excess funding, which has increased due to the good performance by fund assets, is recognised in balance sheet assets as "non-current financial assets".

#### 31.3.2 Post-employment benefit and other long-term employee benefit expenses

<i>(in millions of euros)</i>	2017	2016
Current service cost	(267)	(224)
Past service cost	-	40
Actuarial gains and losses – other long-term benefits	-	-
<b>Net expenses recorded as operating expenses</b>	<b>(267)</b>	<b>(184)</b>
Interest expense (discount effect)	(244)	(302)
Return on fund assets	249	294
<b>Net interest expense included in financial result</b>	<b>5</b>	<b>(8)</b>
<b>EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT</b>	<b>(262)</b>	<b>(192)</b>
Actuarial gains and losses – post-employment benefits	(194)	(1,349)
Actuarial gains and losses on fund assets	558	1,717
<b>Actuarial gains and losses</b>	<b>364</b>	<b>368</b>
<b>Translation adjustments</b>	<b>(17)</b>	<b>(5)</b>
<b>GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY</b>	<b>347</b>	<b>363</b>

#### 31.3.3 Breakdown of obligations by type of beneficiary

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Current employees	5,412	5,195
Retirees	3,544	3,696
<b>OBLIGATIONS</b>	<b>8,956</b>	<b>8,891</b>

#### 31.3.4 Fund assets

Pension obligations in the United Kingdom are partly covered by external funds with a present value of €9,685 million at 31 December 2017 (€9,248 million at 31 December 2016).

The investment strategy applied in these funds is a liability driven investment strategy. The allocation between growth and back-to-back is regularly reviewed by

the trustees, at least after every actuarial valuation, to ensure that the funds' overall investment strategy remains coherent in order to achieve the target coverage level required.

These assets break down as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
BEGG pension fund	7,597	7,454
EEGSG pension fund	1,283	1,059
EEPS pension fund	804	735
<b>FUND ASSETS</b>	<b>9,684</b>	<b>9,248</b>
<b>comprising (%)</b>		
Listed equity instruments (shares)	27%	27%
Listed debt instruments (bonds)	50%	52%
Real estate properties	7%	6%
Cash and cash equivalents	1%	3%
Other	15%	12%

At 31 December 2017, the equities held as part of fund assets are distributed as follows:

- approximately 28% of the total are shares in North American companies;
- approximately 48% of the total are shares in European companies;
- approximately 24% of the total are shares in companies in the Asia-Pacific zone and emerging countries.

This distribution is relatively stable compared to the distribution at 31 December 2016.

At 31 December 2017, the bonds held as part of fund assets are distributed as follows:

- approximately 65% of the total are AAA and AA-rated bonds;
- approximately 35% of the total are bonds with A, BBB and other ratings.

Around 65% of all these bonds are sovereign bonds, mainly issued by the United Kingdom. The balance mainly consists of bonds issued by financial and non-financial firms.

The portion of sovereign bonds issued by the United Kingdom was 3% lower than at 31 December 2016.



### 31.3.5 Future cash flows

Cash flows related to future employee benefits are as follows:

<i>(in millions of euros)</i>	<b>Cash flow under year-end economic conditions</b>	<b>Amount covered by provisions (present value)</b>
Less than one year	256	255
One to five years	1,043	1,004
Five to ten years	1,480	1,292
More than ten years	13,443	6,405
<b>CASH FLOWS RELATED TO EMPLOYEE BENEFITS</b>	<b>16,222</b>	<b>8,956</b>

The contribution to funds for 2018 is estimated at approximately €293 million (€278 million contributed by the employer and €15 million by the employees).

The average weighted duration of funds in the United Kingdom is 21.0 years at 31 December 2017.

### 31.3.6 Actuarial assumptions

<i>(in%)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Discount rate/rate of return on assets <sup>(1)</sup>	2.56%	2.76%
Inflation rate	3.00%	3.05%
Wage increase rate	2.40%	2.45%

(1) The interest income generated by assets is calculated using the discount rate. The difference between this interest income and the return on assets is recorded in equity.

In the United Kingdom, the discount rate used for employee benefit obligations is determined by applying the yield rate on high-quality non-financial corporate bonds based on their duration to maturities corresponding to the future disbursements resulting from these obligations.

### 31.3.7 Sensitivity analyses

Sensitivity analyses on the amount of the obligations are as follows:

<i>(in%)</i>	<b>31/12/2017</b>
Impact of a 25bp increase or decrease in the discount rate	-4.8% / +5.3%
Impact of a 25bp increase or decrease in the wage increase rate	+0.5% / -0.5%
Impact of a 25bp increase or decrease in the inflation rate	+3.6% / -3.7%

## NOTE 32 OTHER PROVISIONS

Details of changes in other provisions are as follows:

(in millions of euros)	31/12/2016	Increases	Decreases		Changes in scope <sup>(3)</sup>	Other Changes	31/12/2017
			Utilisations	Reversals			
Provisions for contingencies related to subsidiaries and investments	1,037	-	(122)	(18)	6	10	913
Provisions for tax liabilities	518	90	(27)	(8)	1	(1)	573
Provisions for litigation	532	87	(23)	(13)	1	5	589
Provisions for onerous contracts and losses on completion	342	47	(94)	(93)	63	8	273
Provisions related to environmental schemes <sup>(1)</sup>	834	1,239	(1,172)	(3)	-	3	901
Other provisions for risks and liabilities <sup>(2)</sup>	1,286	451	(417)	(115)	430	1	1,636
<b>TOTAL</b>	<b>4,549</b>	<b>1,914</b>	<b>(1,855)</b>	<b>(250)</b>	<b>501</b>	<b>26</b>	<b>4,885</b>

(1) Provisions related to environmental schemes include provisions for greenhouse gas emission rights and renewable energy certificates (see note 49).

(2) These provisions cover various contingencies and expenses related to operations (employers' matching contributions to employee profit sharing, contractual maintenance obligations, etc.). None of these provisions is significant individually.

(3) Changes in scope mainly relate to the acquisition of Framatome (see note 3.2).

## NOTE 33 SPECIAL FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION LIABILITIES

The changes in special concession liabilities for existing assets and assets to be replaced are as follows:

(in millions of euros)	31/12/2017	31/12/2016
Value in kind of assets <sup>(1)</sup>	47,813	46,497
Unamortised financing by the operator	(24,172)	(23,160)
<b>Rights in existing assets – net value</b>	<b>23,641</b>	<b>23,337</b>
Amortisation of financing by the grantor	13,149	12,613
Provisions for renewal	9,533	9,742
<b>Rights in assets to be replaced</b>	<b>22,682</b>	<b>22,355</b>
<b>SPECIAL FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION LIABILITIES</b>	<b>46,323</b>	<b>45,692</b>

(1) Including contributions received to finance concession assets, amounting to €144 million (€143 million in 2016).

## NOTE 34 TRADE PAYABLES

(in millions of euros)	31/12/2017	31/12/2016
Trade payables – excluding EDF Trading	10,738	9,770
Trade payables – EDF Trading	3,256	3,261
<b>TRADE PAYABLES</b>	<b>13,994</b>	<b>13,031</b>

The Group has a reverse factoring programme allowing suppliers to transfer their receivables on EDF to a factoring company, at their own initiative.

For the Group, this programme does not cause any change in the substance and features of the receivables held by suppliers on EDF. In particular it does not affect the sequences of operating cash flows. The associated liabilities are therefore included in "trade payables" in the Group's financial statements.

## NOTE 35 OTHER LIABILITIES

Details of other liabilities are as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Advances and progress payments received	8,387	7,793
Liabilities related to property, plant and equipment	3,711	3,247
Tax liabilities	7,014	7,098
Social charges	4,171	4,010
Deferred income on long-term contracts	3,606	3,438
Other deferred income	499	729
Other <sup>(1)</sup>	2,436	2,909
<b>OTHER LIABILITIES</b>	<b>29,824</b>	<b>29,224</b>
Non-current portion	4,864	4,810
Current portion	24,960	24,414

(1) Other items include investment subsidies received, amounting to €348 million in 2017 (€417 million in 2016).

### 35.1 ADVANCES AND PROGRESS PAYMENTS RECEIVED

At 31 December 2017 advances and progress payments received include:

- monthly standing order payments by EDF's residential and business customers amounting to €6,568 million (€6,828 million at 31 December 2016);
- payments made by Framatome's customers amounting to €738 million.

### 35.2 TAX LIABILITIES

At 31 December 2017 tax liabilities mainly include an amount of €1,562 million for the CSPE to be collected by EDF on energy supplied but not yet billed (€1,633 million at 31 December 2016).

### 35.3 DEFERRED INCOME ON LONG-TERM CONTRACTS

EDF's deferred income on long-term contracts at 31 December 2017 comprises €1,711 million (€1,822 million at 31 December 2016) of partner advances made to EDF under the nuclear plant financing plans.

Deferred income on long-term contracts also includes an advance paid to the EDF group in 2010 under the agreement with the Exeltium consortium. This advance is transferred to the income statement progressively over the term of the contract.

## FINANCIAL ASSETS AND LIABILITIES

### NOTE 36 CURRENT AND NON-CURRENT FINANCIAL ASSETS

#### 36.1 BREAKDOWN BETWEEN CURRENT AND NON-CURRENT FINANCIAL ASSETS

Current and non-current financial assets break down as follows:

(in millions of euros)	31/12/2017			31/12/2016		
	Current	Non-current	Total	Current	Non-current	Total
Financial assets at fair value through profit or loss	2,614	-	2,614	3,813	-	3,813
Available-for-sale financial assets	19,312	21,612	40,924	22,402	17,888	40,290
Positive fair value of hedging derivatives	837	2,743	3,580	2,157	3,899	6,056
Loans and financial receivables	2,190	12,432	14,622	1,614	13,342	14,956
<b>CURRENT AND NON-CURRENT FINANCIAL ASSETS <sup>(1)</sup></b>	<b>24,953</b>	<b>36,787</b>	<b>61,740</b>	<b>29,986</b>	<b>35,129</b>	<b>65,115</b>

(1) Including impairment of €(547) million at 31 December 2017 (€(566) million at 31 December 2016).

#### 36.2 DETAILS OF FINANCIAL ASSETS

##### 36.2.1 Financial assets carried at fair value with changes in fair value included in income

(in millions of euros)	31/12/2017	31/12/2016
Positive fair value of trading derivatives	2,614	3,813
Fair value of financial assets held for trading	-	-
<b>FINANCIAL ASSETS CARRIED AT FAIR VALUE WITH CHANGES IN FAIR VALUE INCLUDED IN INCOME</b>	<b>2,614</b>	<b>3,813</b>

Financial assets carried at fair value with changes in fair value included in income mainly concern EDF Trading.

##### 36.2.2 Available-for-sale financial assets

	31/12/2017			31/12/2016		
	Equities <sup>(1)</sup>	Debt securities	Total	Equities <sup>(1)</sup>	Debt securities	Total
EDF dedicated assets	11,462	9,386	20,848	9,201	7,766	16,967
Liquid assets	3,145	15,818	18,963	4,507	17,759	22,266
Other securities	1,007	106	1,113	944	113	1,057
<b>AVAILABLE-FOR-SALE FINANCIAL ASSETS</b>	<b>15,614</b>	<b>25,310</b>	<b>40,924</b>	<b>14,652</b>	<b>25,638</b>	<b>40,290</b>

(1) Equities or Undertakings for Collective Investments in Transferable Securities (UCITS).

Changes in the fair value of available-for-sale financial assets were recorded in equity (EDF share) over the period as follows:

	2017		2016	
	Gross changes in fair value recorded in equity <sup>(1)</sup>	Gross changes in fair value transferred to income <sup>(2)</sup>	Gross changes in fair value recorded in equity <sup>(1)</sup>	Gross changes in fair value transferred to income <sup>(2)</sup>
EDF dedicated assets	807	673	760	488
Liquid assets	22	34	63	12
Other securities	(5)	10	(5)	-
<b>AVAILABLE-FOR-SALE FINANCIAL ASSETS <sup>(3)</sup></b>	<b>824</b>	<b>717</b>	<b>818</b>	<b>500</b>

(1) +/(-): increase/(decrease) in equity (EDF share).

(2) +/(-): increase/(decrease) in net income (EDF share).

(3) Excluding associates and joint ventures.

Gross changes in fair value included in equity (EDF share) in 2017 and 2016 principally concern EDF.

No significant impairment was recorded in 2017.

### 36.2.2.1 Dedicated assets

Diversified bond investments and equities included in EDF's dedicated assets are recorded as "available-for-sale financial assets". The general management policy for dedicated assets is presented in note 47.

### 36.2.2.2 Liquid assets

Liquid assets are financial assets consisting of funds or interest rate instruments with initial maturity of over three months that are readily convertible into cash, and are managed according to a liquidity-oriented policy.

EDF's monetary UCITS, included in liquid assets, amount to €2,646 million at 31 December 2017 (€3,955 million at 31 December 2016).

## 36.3 LOANS AND FINANCIAL RECEIVABLES

Loans and financial receivables are recorded at amortised cost.

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Loans and financial receivables – amounts receivable from the NLF	8,650	8,743
Loans and financial receivables – CSPE <sup>(1)</sup>	3,294	4,185
Loans and financial receivables – other	2,678	2,028
<b>LOANS AND FINANCIAL RECEIVABLES</b>	<b>14,622</b>	<b>14,956</b>

(1) Including €3,294 million allocated to dedicated assets at 31 December 2017 (€4,185 million at 31 December 2016).

Loans and financial receivables include:

- amounts representing reimbursements receivable from the NLF and the British government for coverage of long-term nuclear obligations, totalling €8,650 million at 31 December 2017 (€8,743 million at 31 December 2016), discounted at the same rate as the provisions they finance;

- the receivable corresponding to the accumulated shortfall in the Contribution to the Public Electricity Service (CSPE) at 31 December 2016 and the costs of bearing that shortfall. Reimbursements received during 2017 amounted to €954 million, in line with the schedule published in the ministerial orders of 13 May 2016 and 2 December 2016, made in application of Article R. 121-31 of the French Energy Code.

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## 36.4 CHANGE IN FINANCIAL ASSETS OTHER THAN DERIVATIVES

The variation in financial assets is as follows:

### 36.4.1 At 31 December 2017

<i>(in millions of euros)</i>	31/12/2016	Net increases	Changes in fair value	Discount effect	Changes in scope	Translation adjustments	Other	31/12/2017
Available-for-sale financial assets	40,290	344	588	-	144	(137)	(305)	40,924
Loans and financial receivables	14,956	(979)	-	442	174	(377)	406	14,622

"Net increases" in loans and financial receivables include the €(890) million change in the CSPE receivable.

Other changes in loans and financial receivables mainly correspond to the change in the financial asset reflecting the overfunding of EDF Energy's EEGSG and BEGG pension plans (€916 million at 31 December 2017, compared to €568 million at 31 December 2016).

### 36.4.2 At 31 December 2016

<i>(in millions of euros)</i>	31/12/2015	Net increases	Changes in fair value	Discount effect	Changes in scope	Translation adjustments	Other	31/12/2016
Available-for-sale financial assets	34,333	5,079	894	-	12	110	(138)	40,290
Loans and financial receivables	16,913	(2,908)	-	403	221	(1,387)	1,714	14,956

## NOTE 37 CASH AND CASH EQUIVALENTS

Cash and cash equivalents comprise cash in hand and at bank and investments in money market instruments. Cash and cash equivalents as stated in the cash flow statements include the following amounts recorded in the balance sheet:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Cash	3,328	2,651
Cash equivalents <sup>(1)</sup>	364	242
Financial current accounts	-	-
<b>CASH AND CASH EQUIVALENTS</b>	<b>3,692</b>	<b>2,893</b>

*(1) Items stated at fair value amount to €364 million at 31 December 2017 (€235 million at 31 December 2016).*

### Cash restrictions

Cash and cash equivalents include €298 million of cash subject to restrictions at 31 December 2017 (€243 million at 31 December 2016) (see note 1.3.26).

## NOTE 38 CURRENT AND NON-CURRENT FINANCIAL LIABILITIES

### 38.1 BREAKDOWN BETWEEN CURRENT AND NON-CURRENT FINANCIAL LIABILITIES

Current and non-current financial liabilities break down as follows:

<i>(in millions of euros)</i>	31/12/2017			31/12/2016		
	Non-current	Current	Total	Non-current	Current	Total
Loans and other financial liabilities	49,734	7,112	56,846	52,992	12,203	65,195
Negative fair value of derivatives held for trading	-	2,787	2,787	-	4,485	4,485
Negative fair value of hedging derivatives	1,631	1,243	2,874	1,284	1,601	2,885
<b>FINANCIAL LIABILITIES</b>	<b>51,365</b>	<b>11,142</b>	<b>62,507</b>	<b>54,276</b>	<b>18,289</b>	<b>72,565</b>

### 38.2 LOANS AND OTHER FINANCIAL LIABILITIES

#### 38.2.1 Changes in loans and other financial liabilities

<i>(in millions of euros)</i>	Bonds	Loans from financial institutions	Other financial liabilities	Loans related to finance-leased assets	Accrued Interest	Total
<b>Balances at 31/12/2016</b>	<b>51,864</b>	<b>4,180</b>	<b>7,380</b>	<b>420</b>	<b>1,351</b>	<b>65,195</b>
Increases	1,509	365	1,027	-	121	3,022
Decreases	(3,033)	(301)	(3,219)	(57)	(129)	(6,739)
Translation adjustments	(625)	(94)	(127)	-	(3)	(849)
Changes in scope of consolidation	4	(1,187)	49	-	(2)	(1,136)
Changes in fair value	(2,396)	-	(251)	4	-	(2,643)
Other changes	2	131	(134)	1	(4)	(4)
<b>BALANCES AT 31/12/2017</b>	<b>47,325</b>	<b>3,094</b>	<b>4,725</b>	<b>368</b>	<b>1,334</b>	<b>56,846</b>

Increases and decreases in loans and other financial liabilities (excluding accrued interest) shown in the above table do not include monetary variations (included in the Cash flow statement) of €306 million on settlement of hedging instruments.

Loans and other financial liabilities of the Group's main entities are as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
EDF and other related subsidiaries <sup>(1)</sup>	44,367	52,811
EDF Energy <sup>(2)</sup>	6,118	5,268
EDF Énergies Nouvelles	5,276	4,642
Edison <sup>(3)</sup>	241	1,214
Other	844	1,260
<b>LOANS AND OTHER FINANCIAL LIABILITIES</b>	<b>56,846</b>	<b>65,195</b>

<sup>(1)</sup> Enedis, EDF PEI, EDF International, EDF Holding SAS, C3, C25 and EDF Investissements Groupe.

<sup>(2)</sup> Including holding companies.

<sup>(3)</sup> Edison excluding TdE SpA.

At 31 December 2017, none of these entities had defaulted on any borrowing.

## 6. FINANCIAL STATEMENTS

### Financial assets and liabilities

The Group's principal borrowings at 31 December 2017 are as follows:

Type of borrowing (in millions of currencies)	Entity	Issue <sup>(1)</sup>	Maturity	Issue amount	Currency	Rate
Euro MTN	EDF	02/2008	02/2018	1,500	EUR	5.00%
Bond	EDF	01/2009	01/2019	2,000	USD	6.50%
Bond	EDF	01/2014	01/2019	1,250	USD	2.15%
Bond	EDF	01/2010	01/2020	1,400	USD	4.60%
Euro MTN	EDF	05/2008	05/2020	1,200	EUR	5.38%
Bond	EDF	10/2015	10/2020	1,500	USD	2.35%
Euro MTN	EDF	01/2009	01/2021	2,000	EUR	6.25%
Euro MTN (green bond)	EDF	11/2013	04/2021	1,400	EUR	2.25%
Euro MTN	EDF	01/2012	01/2022	2,000	EUR	3.88%
Euro MTN	EDF	09/2012	03/2023	2,000	EUR	2.75%
Euro MTN	EDF	09/2009	09/2024	2,500	EUR	4.63%
Bond (green bond)	EDF	10/2015	10/2025	1,250	USD	3.63%
Euro MTN	EDF	11/2010	11/2025	750	EUR	4.00%
Euro MTN (green bond)	EDF	10/2016	10/2026	1,750	EUR	1.00%
Bond	EDF	01/2017	01/2027	107,900	JPY	1.09%
Euro MTN	EDF	03/2012	03/2027	1,000	EUR	4.13%
Euro MTN	EDF	04/2010	04/2030	1,500	EUR	4.63%
Euro MTN	EDF	07/2001	07/2031	650	GBP	5.88%
Euro MTN	EDF	02/2003	02/2033	850	EUR	5.63%
Euro MTN	EDF	06/2009	06/2034	1,500	GBP	6.13%
Euro MTN	EDF	10/2016	10/2036	750	EUR	1.88%
Bond	EDF	01/2009	01/2039	1,750	USD	6.95%
Euro MTN	EDF	11/2010	11/2040	750	EUR	4.50%
Euro MTN	EDF	10/2011	10/2041	1,250	GBP	5.50%
Bond	EDF	01/2014	01/2044	1,000	USD	4.88%
Bond	EDF	10/2015	10/2045	1,500	USD	4.75%
Bond	EDF	10/2015	10/2045	1,150	USD	4.95%
Euro MTN	EDF	09/2010	09/2050	1,000	GBP	5.13%
Euro MTN	EDF	10/2016	10/2056	2,164	USD	4.99%
Bond	EDF	01/2014	01/2114	1,350	GBP	6.00%

(1) Date funds were received.

On 20 January 2017, EDF raised ¥137 billion, i.e. around €1.1 billion, through four senior bond issues on the Japanese market ("Samurai bonds") (see note 3.5).

At 31 December 2017, the total ceiling on EDF's EMTN (Euro Medium Term Notes) programme, allowing issuance of borrowings under the programme, is €45 billion.



### 38.2.2 Maturity of loans and other financial liabilities

#### AT 31 DECEMBER 2017

<i>(in millions of euros)</i>	Bonds	Loans from financial institutions	Other financial liabilities	Loans related to finance-leased assets	Accrued Interest	Total
Less than one year	1,557	549	3,881	52	1,073	7,112
From one to five years	13,021	653	50	147	71	13,942
More than five years	32,747	1,892	794	169	190	35,792
<b>LOANS AND OTHER FINANCIAL LIABILITIES AT 31/12/2017</b>	<b>47,325</b>	<b>3,094</b>	<b>4,725</b>	<b>368</b>	<b>1,334</b>	<b>56,846</b>

#### AT 31 DECEMBER 2016

<i>(in millions of euros)</i>	Bonds	Loans from financial institutions	Other financial liabilities	Loans related to finance-leased assets	Accrued Interest	Total
Less than one year	2,913	1,780	6,332	51	1,127	12,203
From one to five years	12,386	526	109	168	52	13,241
More than five years	36,565	1,874	939	201	172	39,751
<b>LOANS AND OTHER FINANCIAL LIABILITIES AT 31/12/2016</b>	<b>51,864</b>	<b>4,180</b>	<b>7,380</b>	<b>420</b>	<b>1,351</b>	<b>65,195</b>

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### 38.2.3 Breakdown of loans and other financial liabilities by currency

<i>(in millions of euros)</i>	31/12/2017			31/12/2016		
	Initial debt structure	Impact of hedging instruments <sup>(1)</sup>	Debt structure after hedging	Initial debt structure	Impact of hedging instruments <sup>(1)</sup>	Debt structure after hedging
Euro (EUR)	27,609	18,454	46,063	31,204	20,220	51,424
American dollar (USD)	17,224	(14,752)	2,472	22,239	(19,314)	2,925
Pound sterling (GBP)	9,495	(2,331)	7,164	9,824	(827)	8,997
Other	2,518	(1,371)	1,147	1,928	(79)	1,849
<b>LOANS AND OTHER FINANCIAL LIABILITIES</b>	<b>56,846</b>	<b>-</b>	<b>56,846</b>	<b>65,195</b>	<b>-</b>	<b>65,195</b>

(1) Hedges of liabilities and net assets of foreign subsidiaries.

### 38.2.4 Breakdown of loans and other financial liabilities by type of interest rate

<i>(in millions of euros)</i>	31/12/2017			31/12/2016		
	Initial debt structure	Impact of derivatives	Final debt structure	Initial debt structure	Impact of derivatives	Final debt structure
Fixed rates	52,900	(21,469)	31,431	58,650	(23,710)	34,940
Floating rates	3,946	21,469	25,415	6,545	23,710	30,255
<b>LOANS AND OTHER FINANCIAL LIABILITIES</b>	<b>56,846</b>	<b>-</b>	<b>56,846</b>	<b>65,195</b>	<b>-</b>	<b>65,195</b>

The breakdown of loans and financial liabilities by interest rate includes the impact of all derivatives classified as hedges in accordance with IAS 39.

A large portion of the EDF group's fixed-rate loans is swapped to variable rates.

## 6. FINANCIAL STATEMENTS

### Financial assets and liabilities

#### 38.2.5 Credit lines

At 31 December 2017, the Group has unused credit lines with various banks totalling €11,943 million (€11,709 million at 31 December 2016).

	31/12/2017				31/12/2016
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
<b>CONFIRMED CREDIT LINES</b>	<b>11,943</b>	<b>2,149</b>	<b>9,759</b>	<b>35</b>	<b>11,709</b>

#### 38.2.6 Early repayment clauses

Project financing loans to EDF Énergies Nouvelles from non-Group parties generally include early repayment clauses, mainly applicable when the borrower fails to maintain a minimum Debt Service Coverage Ratio (DSCR). In general, early repayment clauses are activated when this ratio falls below 1.

In other Group entities, certain clauses contained in contracts for financing or other commitments may make reference to Group ratings, but are not classified as covenants.

Two borrowings with a combined total of €725 million contain a review clause stipulating that if the borrower's rating falls below a certain level, the borrower and the lender must review and possibly renegotiate the terms of the loan, and the borrower may voluntarily proceed to early repayment.

No early repayment took place in 2017 as a result of any Group entity's failure to comply with contractual clauses concerning loans.

#### 38.3 NET INDEBTEDNESS

Net indebtedness is not defined in the accounting standards and is not directly presented in the consolidated balance sheet. It comprises total loans and financial liabilities, less cash and cash equivalents and liquid assets. Liquid assets are financial assets consisting of funds or interest rate instruments with initial maturity of over three months that are readily convertible into cash and are managed according to a liquidity-oriented policy.

(in millions of euros)	Notes	31/12/2017	31/12/2016
Loans and other financial liabilities	38.2.1	56,846	65,195
Derivatives used to hedge liabilities	41	(1,176)	(3,965)
Cash and cash equivalents	37	(3,692)	(2,893)
Available-for-sale financial assets – liquid assets	36.2.2	(18,963)	(22,266)
Net indebtedness of assets held for sale		-	1,354
<b>NET INDEBTEDNESS</b>		<b>33,015</b>	<b>37,425</b>

## NOTE 39 OTHER INFORMATION ON FINANCIAL ASSETS AND LIABILITIES

### 39.1 FAIR VALUE OF FINANCIAL INSTRUMENTS

The following tables show the breakdown of financial assets and liabilities in the balance sheet, by level.

#### 39.1.1 At 31 December 2017

<i>(in millions of euros)</i>	Balance sheet value	Fair value	Level 1 Unadjusted quoted prices	Level 2 Observable data	Level 3 Non-observable data
Financial assets carried at fair value with changes in fair value included in income <sup>(1)</sup>	2,614	2,614	233	2,252	129
Available-for-sale financial assets	40,924	40,924	2,499	37,792	633
Positive fair value of hedging derivatives	3,580	3,580	21	3,559	-
Cash equivalents carried at fair value	364	364	198	166	-
<b>FINANCIAL ASSETS CARRIED AT FAIR VALUE IN THE BALANCE SHEET</b>	<b>47,482</b>	<b>47,482</b>	<b>2,951</b>	<b>43,769</b>	<b>762</b>
Loans and financial receivables – assets receivable from the NLF	8,650	8,650	-	8,650	-
Loans and financial receivables – CSPE	3,294	3,349	-	3,349	-
Other loans and financial receivables	2,678	2,678	-	2,678	-
<b>FINANCIAL ASSETS RECORDED AT AMORTISED COST</b>	<b>14,622</b>	<b>14,677</b>	<b>-</b>	<b>14,677</b>	<b>-</b>
Negative fair value of hedging derivatives	2,874	2,874	75	2,799	-
Negative fair value of trading derivatives	2,787	2,787	200	2,467	120
<b>FINANCIAL LIABILITIES CARRIED AT FAIR VALUE IN THE BALANCE SHEET</b>	<b>5,661</b>	<b>5,661</b>	<b>275</b>	<b>5,266</b>	<b>120</b>
Loans and other financial liabilities <sup>(2)</sup>	56,846	63,334	-	63,334	-
<b>FINANCIAL LIABILITIES RECORDED AT AMORTISED COST</b>	<b>56,846</b>	<b>63,334</b>	<b>-</b>	<b>63,334</b>	<b>-</b>

(1) Including €2,614 million for the positive fair value of trading derivatives.

(2) Loans and other financial liabilities are carried in the balance sheet at amortised cost, adjusted for changes in the fair value of risks covered by a fair value hedge.

Level 3 available-for-sale financial assets are principally non-consolidated investments carried at historical value.

Cash equivalents, which principally take the form of negotiable debt instruments and short-term investments, are generally valued using yield curves, and therefore observable market data.

#### 39.1.2 At 31 December 2016

<i>(in millions of euros)</i>	Balance sheet value	Fair value	Level 1 Unadjusted quoted prices	Level 2 Observable data	Level 3 Non-observable data
Financial assets carried at fair value with changes in fair value included in income <sup>(1)</sup>	3,813	3,813	220	3,337	256
Available-for-sale financial assets	40,290	40,290	1,799	37,895	596
Positive fair value of hedging derivatives	6,056	6,056	7	6,049	-
Cash equivalents carried at fair value	235	235	141	94	-
<b>FINANCIAL ASSETS CARRIED AT FAIR VALUE IN THE BALANCE SHEET</b>	<b>50,394</b>	<b>50,394</b>	<b>2,167</b>	<b>47,375</b>	<b>852</b>
Loans and financial receivables – Assets receivable from the NLF	8,743	8,743	-	8,743	-
Loans and financial receivables – CSPE	4,185	4,288	-	4,288	-
Other loans and financial receivables	2,028	2,028	-	2,028	-
<b>FINANCIAL ASSETS RECORDED AT AMORTISED COST</b>	<b>14,956</b>	<b>15,059</b>	<b>-</b>	<b>15,059</b>	<b>-</b>
Negative fair value of hedging derivatives	2,885	2,885	105	2,775	5
Negative fair value of trading derivatives	4,485	4,485	216	4,046	223
<b>FINANCIAL LIABILITIES CARRIED AT FAIR VALUE IN THE BALANCE SHEET</b>	<b>7,370</b>	<b>7,370</b>	<b>321</b>	<b>6,821</b>	<b>228</b>
Loans and other financial liabilities <sup>(2)</sup>	65,195	70,682	-	70,682	-
<b>FINANCIAL LIABILITIES RECORDED AT AMORTISED COST</b>	<b>65,195</b>	<b>70,682</b>	<b>-</b>	<b>70,682</b>	<b>-</b>

(1) Including €3,813 million for the positive fair value of trading derivatives.

(2) Loans and other financial liabilities are carried in the balance sheet at amortised cost, adjusted for changes in the fair value of risks covered by a fair value hedge.

# 6. FINANCIAL STATEMENTS

## Financial assets and liabilities

### 39.2 OFFSETTING OF FINANCIAL ASSETS AND LIABILITIES

#### 39.2.1 At 31 December 2017

<i>(in millions of euros)</i>	As reported in balance sheet	Balance with offsetting under IAS 32			Amounts covered by a general offsetting agreement but not offset under IAS 32			
		Balance without offsetting	Gross amount recognised (before offsetting)	Gross amount offset under IAS 32	Net amount recognised after offsetting under IAS 32	Financial instruments	Fair value of financial collateral	Net amount
Fair value of derivatives – assets	6,194	234	11,067	(5,107)	5,960	(1,652)	(1,073)	3,235
Fair value of derivatives – liabilities	(5,661)	(844)	(9,924)	5,107	(4,817)	1,652	768	(2,397)

#### 39.2.2 At 31 December 2016

<i>(in millions of euros)</i>	As reported in balance sheet	Balance with offsetting under IAS 32			Amounts covered by a general offsetting agreement but not offset under IAS 32			
		Balance without offsetting	Gross amount recognised (before offsetting)	Gross amount offset under IAS 32	Net amount recognised after offsetting under IAS 32	Financial instruments	Fair value of financial collateral	Net amount
Fair value of derivatives – assets	9,869	5,043	10,741	(5,915)	4,826	(1,689)	(2,303)	834
Fair value of derivatives – liabilities	(7,370)	(5,240)	(8,045)	5,915	(2,130)	1,689	56	(385)

## **NOTE 40 MANAGEMENT OF MARKET AND COUNTERPARTY RISKS**

As an operator in the energy sector worldwide, the EDF group is exposed to financial market risks, energy market risks and counterparty risks. All these risks could generate volatility in the financial statements.

### ■ **Financial market risks**

The main financial market risks to which the Group is exposed are the liquidity risk, the foreign exchange risk, the interest rate risk and the equity risk.

The objective of the Group's liquidity risk management is to seek resources at optimum cost and ensure their constant accessibility.

The foreign exchange risk relates to the diversification of the Group's businesses and geographical locations, and results from exposure to the risk of exchange rate fluctuations. These fluctuations can affect the Group's translation differences, balance sheet items, financial expenses, equity and net income.

The interest rate risk results from exposure to the risk of fluctuations in interest rates that can affect the value of assets invested by the Group, the value of the liabilities covered by provision, or its financial expenses.

The Group is exposed to equity risks, particularly through its dedicated asset portfolio held for secure financing of long-term nuclear commitments, through external pension funds, and to a lesser extent through its cash assets and directly-held investments.

A more detailed description of these risks can be found in section 5.1.6.1 of the Reference Document, "Financial Information – Management and control of financial risks".

### ■ **Energy market risks**

With the opening of the final customer market, development of the wholesale markets and international business expansion, the EDF group operates on deregulated energy markets, mainly in Europe, through its generation and supply activities. This exposes the Group to price variations on the wholesale markets for energy (electricity, gas, coal, oil products) and the CO<sub>2</sub> emissions quota market, with a potentially significant impact on the financial statements.

A more detailed description of these risks can be found in section 5.1.6.2 of the Reference Document, "Financial Information – Management and control of energy market risks".

### ■ **Counterparty risks**

Counterparty risk is defined as the total loss that the EDF group would sustain on its business and market transactions if a counterparty defaulted and failed to perform its contractual obligations.

A more detailed description of these risks can be found in section 5.1.6.1.7 of the Reference Document, "Financial Information – Management and control of counterparty/credit risks".

Regarding the customer risk, which is another component of the counterparty risk, a statement of receivables not yet due and overdue is shown in note 25.

The sensitivity analyses required by IFRS 7 are presented in section 5.1.6.1 of the Reference Document, "Financial Information – Management and control of financial risks":

- foreign exchange risks: section 5.1.6.1.3,
- interest rate risks: section 5.1.6.1.4,
- equity risk on financial assets: sections 5.1.6.1.5 and 5.1.6.1.6.

The principal information on financial assets and liabilities is described by theme in the following notes and sections:

- liquidity risks:
  - maturity of loans and other financial liabilities: note 38.2.2 to the consolidated financial statements,
  - credit lines: note 38.2.5 to the consolidated financial statements,
  - early repayment clauses for borrowings: note 38.2.6 to the consolidated financial statements,
  - off-balance sheet commitments: note 44 to the consolidated financial statements;
- foreign exchange risks:
  - breakdown of loans by currency and type of interest rate: notes 38.2.3 and 38.2.4 to the consolidated financial statements;
- equity risks (sections 5.1.6.1.5 and 5.1.6.1.6 of the Reference Document, "Financial Information Management of equity risks/Management of financial risk on EDF's dedicated asset portfolio"):
  - coverage of nuclear obligations: notes 47 and 29.1.5 to the consolidated financial statements,
  - coverage of social obligations: notes 31.2.5 and 31.3.4 to the consolidated financial statements,
  - long-term cash management,
  - direct investments;
- interest rate risks:
  - discount rate for nuclear provisions: calculation method and sensitivity: note 29.1.5.2 to the consolidated financial statements,
  - discount rate used for employee benefits: notes 31.2.7 and 31.3.6 to the consolidated financial statements,
  - breakdown of loans by currency and interest rate: notes 38.2.3 and 38.2.4 to the consolidated financial statements;
- balance sheet treatment of financial and market risks:
  - derivatives and hedge accounting: note 41 to the consolidated financial statements, and the statement of changes in equity,
  - derivatives not classified as hedges: note 42 to the consolidated financial statements.

## NOTE 41 DERIVATIVES AND HEDGE ACCOUNTING

Hedge accounting is applied in compliance with IAS 39, and concerns interest rate derivatives used to hedge long-term indebtedness, currency derivatives used to hedge net foreign investments and debts in foreign currencies, and currency and commodity derivatives used to hedge future cash flows.

The fair value of hedging derivatives reported in the balance sheet breaks down as follows:

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
Positive fair value of hedging derivatives	36.1	3,580	6,056
Negative fair value of hedging derivatives	38.1	(2,874)	(2,885)
<b>FAIR VALUE OF HEDGING DERIVATIVES</b>		<b>706</b>	<b>3,171</b>
Interest rate hedging derivatives	41.4.1	1,689	2,023
Exchange rate hedging derivatives	41.4.2	(606)	2,122
Commodity-related cash flow hedges	41.4.3	(411)	(995)
Commodity-related fair value hedges	41.5	34	21

An alternative breakdown of hedging derivatives is shown below:

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
Fair value of derivatives hedging liabilities	38.3	1,176	3,965
Fair value of derivatives hedging net foreign investments		90	14
Fair value of other hedging derivatives (commodities)		(560)	(808)
<b>FAIR VALUE OF HEDGING DERIVATIVES</b>		<b>706</b>	<b>3,171</b>

### 41.1 FAIR VALUE HEDGES

The EDF group hedges the exposure to changes in the fair value of fixed-rate debts. The derivatives used for this hedging are fixed/floating interest rate swaps and cross currency swaps, with changes in fair value recorded in the income statement. Fair value hedges also include currency hedging instruments on certain firm purchase commitments.

In 2017, the ineffective portion of fair value hedges represents a gain of €37 million (loss of €(11) million in 2016), included in the financial result.

### 41.2 CASH FLOW HEDGES

The EDF group uses cash flow hedging principally for the following purposes:

- to hedge its floating-rate debt, using interest-rate swaps (floating/fixed rate);
- to hedge the exchange rate risk related to debts contracted in foreign currencies, using cross currency swaps;
- to hedge future cash flows related to expected sales and purchases of electricity, gas, and coal, using futures, forwards and swaps.

The EDF group also hedges the currency risk associated with fuel and commodity purchases.

The ineffective portion of cash flow hedges recorded in 2017 is nil (also nil in 2016).

### 41.3 HEDGES OF NET INVESTMENTS IN FOREIGN ENTITIES

Hedging of net foreign investments is used for protection against exposure to the exchange rate risk related to net investments in the Group's foreign entities.

This risk is hedged at Group level either by contracting debts for investments in the same currency, or through the markets, in which case the Group uses currency swaps and forward exchange contracts.

## 41.4 IMPACT OF HEDGING DERIVATIVES ON EQUITY

Changes during the period in the fair value of hedging instruments included in equity (EDF share) are detailed below:

(in millions of euros)	2017			2016		
	Gross changes in fair value recorded in equity <sup>(1)</sup>	Gross changes in fair value transferred to income - Recycling <sup>(2)</sup>	Gross changes in fair value transferred to income -Ineffectiveness	Gross changes in fair value recorded in equity <sup>(1)</sup>	Gross changes in fair value transferred to income - Recycling <sup>(2)</sup>	Gross changes in fair value transferred to income -Ineffectiveness
Interest rate hedging	31	-	-	6	-	1
Exchange rate hedging	(1,588)	(1,331)	(3)	70	288	(4)
Net foreign investment hedging	518	(120)	-	1,352	-	-
Commodity hedging	(613)	(1,714)	5	(489)	361	31
<b>HEDGING DERIVATIVES <sup>(3)</sup></b>	<b>(1,652)</b>	<b>(3,165)</b>	<b>2</b>	<b>939</b>	<b>649</b>	<b>28</b>

(1) +/( ): increase/(decrease) in equity (EDF share).

(2) +/( ): increase/(decrease) in net income (EDF share).

(3) Excluding associates and joint ventures.

### 41.4.1 Interest rate hedging derivatives

Interest rate hedging derivatives break down as follows:

(in millions of euros)	Notional at 31/12/2017				Notional at 31/12/2016	Fair value	
	< 1 year	1-5 years	> 5 years	Total	Total	31/12/2017	31/12/2016
Fixed rate payer/floating rate receiver	106	711	331	1,148	1,342	(75)	(62)
Floating rate payer/fixed rate receiver	-	4,769	17,971	22,740	24,906	1,928	2,299
Floating rate/floating rate	-	-	1,252	1,252	2,022	(9)	4
Fixed rate/fixed rate	528	5,269	4,265	10,062	10,327	(155)	(218)
Interest rate swaps	634	10,749	23,819	35,202	38,597	1,689	2,023
<b>INTEREST RATE HEDGING DERIVATIVES</b>	<b>634</b>	<b>10,749</b>	<b>23,819</b>	<b>35,202</b>	<b>38,597</b>	<b>1,689</b>	<b>2,023</b>

The fair value of interest rate/exchange rate cross-currency swaps comprises the interest rate effect only.

A large portion of the EDF group's fixed-rate loans is swapped to variable rates.

The notional value of cross-currency swaps is included both in this note and the note on Exchange rate hedging derivatives (41.4.2).

### 41.4.2 Exchange rate hedging derivatives

Exchange rate hedging derivatives break down as follows:

#### AT 31 DECEMBER 2017

(in millions of euros)	Notional amount to be received at 31/12/2017				Notional amount to be given at 31/12/2017				Fair value
	< 1 year	1-5 years	> 5 years	Total	< 1 year	1-5 years	> 5 years	Total	31/12/2017
Forward exchange transactions	2,478	518	-	2,996	2,475	514	-	2,989	-
Swaps	12,469	10,614	12,724	35,807	12,592	10,384	13,155	36,131	(606)
<b>EXCHANGE RATE HEDGING DERIVATIVES</b>	<b>14,947</b>	<b>11,132</b>	<b>12,724</b>	<b>38,803</b>	<b>15,067</b>	<b>10,898</b>	<b>13,155</b>	<b>39,120</b>	<b>(606)</b>

#### AT 31 DECEMBER 2016

(in millions of euros)	Notional amount to be received at 31/12/2016				Notional amount to be given at 31/12/2016				Fair value
	< 1 year	1-5 years	> 5 years	Total	< 1 year	1-5 years	> 5 years	Total	31/12/2016
Forward exchange transactions	1,600	730	-	2,330	1,589	718	-	2,307	26
Swaps	15,030	11,027	13,703	39,760	14,304	10,107	12,782	37,193	2,096
<b>EXCHANGE RATE HEDGING DERIVATIVES</b>	<b>16,630</b>	<b>11,757</b>	<b>13,703</b>	<b>42,090</b>	<b>15,893</b>	<b>10,825</b>	<b>12,782</b>	<b>39,500</b>	<b>2,122</b>

The notional value of cross-currency swaps shown in this note is also included in the note on interest rate hedging derivatives (note 41.4.1).

## 6. FINANCIAL STATEMENTS

### Financial assets and liabilities

#### 41.4.3 Commodity-related cash flow hedges

For commodities, changes in fair value are mainly explained by:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Electricity hedging contracts	(916)	(2,610)
Gas hedging contracts	69	(316)
Coal hedging contracts	36	9
Oil product hedging contracts	149	2,007
CO <sub>2</sub> emission rights hedging contracts	49	421
<b>CHANGES IN FAIR VALUE BEFORE TAXES</b>	<b>(613)</b>	<b>(489)</b>

The main components of the amount transferred to income in respect of commodity hedges terminated during the year are:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Electricity hedging contracts	(1,744)	1,276
Gas hedging contracts	50	(943)
Coal hedging contracts	31	(72)
Oil product hedging contracts	(66)	86
CO <sub>2</sub> emission rights hedging contracts	15	14
<b>CHANGES IN FAIR VALUE BEFORE TAXES</b>	<b>(1,714)</b>	<b>361</b>

Details of commodity-related cash flow hedges are as follows:

<i>(in millions of euros)</i>	Units of measure	31/12/2017				31/12/2016	
		< 1 year	1-5 years	> 5 years	Total	Net notional	Fair value
Swaps		2	-	-	2	58	(3)
Forwards/futures		(2)	(70)	-	(72)	(688)	(1,174)
<b>Electricity</b>	<b>TWh</b>	<b>-</b>	<b>(70)</b>	<b>-</b>	<b>(70)</b>	<b>(630)</b>	<b>(1,177)</b>
Swaps		(193)	(40)	-	(233)	(16)	(4)
Forwards/futures		1,052	399	-	1,451	65	109
<b>Gas</b>	<b>Millions of therms</b>	<b>859</b>	<b>359</b>	<b>-</b>	<b>1,218</b>	<b>49</b>	<b>105</b>
Swaps		8,528	5,647	-	14,175	109	69
Options		379	-	-	379	2	-
<b>Oil products</b>	<b>Thousands of barrels</b>	<b>8,907</b>	<b>5,647</b>	<b>-</b>	<b>14,554</b>	<b>111</b>	<b>69</b>
Swaps		-	-	-	-	40	-
<b>Coal</b>	<b>Millions of tonnes</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>40</b>	<b>-</b>
Swaps		-	-	-	-	-	-
Forwards/futures		5,821	13,755	-	19,576	19	8
<b>CO<sub>2</sub></b>	<b>Thousands of tonnes</b>	<b>5,821</b>	<b>13,755</b>	<b>-</b>	<b>19,576</b>	<b>19</b>	<b>8</b>
<b>COMMODITY-RELATED CASH FLOW HEDGES</b>						<b>(411)</b>	<b>(995)</b>

#### 41.5 COMMODITY-RELATED FAIR VALUE HEDGES

Details of commodity-related fair value hedges are as follows:

<i>(in millions of euros)</i>	Units of measure	31/12/2017		31/12/2016	
		Net notional	Fair value	Net notional	Fair value
Coal and freight	Millions of tonnes	4	3	4	3
Gas	Millions of therms	(583)	31	(307)	18
<b>COMMODITY-RELATED FAIR VALUE HEDGES</b>			<b>34</b>		<b>21</b>



## NOTE 42 NON-HEDGING DERIVATIVES

Details of the fair value of trading derivatives reported in the balance sheet are as follows:

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
Positive fair value of trading derivatives	36.2.1	2,614	3,813
Negative fair value of trading derivatives	38.1	(2,787)	(4,485)
<b>FAIR VALUE OF TRADING DERIVATIVES</b>		<b>(173)</b>	<b>(672)</b>
Interest rate derivatives held for trading	42.1	(33)	(55)
Currency derivatives held for trading	42.2	73	(179)
Non-hedging commodity derivatives	42.3	(213)	(438)

### 42.1 INTEREST RATE DERIVATIVES HELD FOR TRADING

Interest rate derivatives held for trading break down as follows:

<i>(in millions of euros)</i>	Notional at 31/12/2017				Notional at 31/12/2016	Fair value	
	< 1 year	1-5 years	> 5 years	Total	Total	31/12/2017	31/12/2016
Purchases of options	-	-	519	519	517	15	22
<b>Interest rate operations</b>	-	-	<b>519</b>	<b>519</b>	<b>517</b>	<b>15</b>	<b>22</b>
Fixed rate payer/floating rate receiver	1,366	1,280	332	2,978	742	(42)	(77)
Floating rate payer/fixed rate receiver	-	330	86	416	406	(8)	(2)
Floating rate/floating rate	-	351	-	351	910	1	1
Fixed rate/fixed rate	194	70	74	338	418	1	1
<b>Interest rate swaps</b>	<b>1,560</b>	<b>2,031</b>	<b>492</b>	<b>4,083</b>	<b>2,476</b>	<b>(48)</b>	<b>(77)</b>
<b>INTEREST RATE DERIVATIVES HELD FOR TRADING</b>	<b>1,560</b>	<b>2,031</b>	<b>1,011</b>	<b>4,602</b>	<b>2,993</b>	<b>(33)</b>	<b>(55)</b>

### 42.2 CURRENCY DERIVATIVES HELD FOR TRADING

Currency derivatives held for trading break down as follows:

AT 31 DECEMBER 2017:

<i>(in millions of euros)</i>	Notional amount to be received at 31/12/2017				Notional amount to be given at 31/12/2017				Fair value
	< 1 year	1-5 years	> 5 years	Total	< 1 year	1-5 years	> 5 years	Total	31/12/2017
Forward transactions	2,438	1,079	8	3,525	2,443	1,089	9	3,541	(23)
Swaps	11,986	4,823	74	16,883	11,960	4,764	73	16,797	96
<b>CURRENCY DERIVATIVES HELD FOR TRADING</b>	<b>14,424</b>	<b>5,902</b>	<b>82</b>	<b>20,408</b>	<b>14,403</b>	<b>5,853</b>	<b>82</b>	<b>20,338</b>	<b>73</b>

AT 31 DECEMBER 2016:

<i>(in millions of euros)</i>	Notional amount to be received at 31/12/2016				Notional amount to be given at 31/12/2016				Fair value
	< 1 year	1-5 years	> 5 years	Total	< 1 year	1-5 years	> 5 years	Total	31/12/2016
Forward transactions	2,230	603	-	2,833	2,138	629	-	2,767	3
Swaps	11,279	5,094	-	16,373	11,264	5,368	-	16,632	(182)
<b>CURRENCY DERIVATIVES HELD FOR TRADING</b>	<b>13,509</b>	<b>5,697</b>	<b>-</b>	<b>19,206</b>	<b>13,402</b>	<b>5,997</b>	<b>-</b>	<b>19,399</b>	<b>(179)</b>

### 42.3 NON-HEDGING COMMODITY DERIVATIVES

Details of commodity derivatives not classified as hedges are as follows:

<i>(in millions of euros)</i>	Unit of measure	31/12/2017		31/12/2016	
		Net notional	Fair value	Net notional	Fair value
Swaps		(5)	479	(18)	52
Options		4	106	4	118
Forwards/futures		(54)	(403)	(45)	(406)
<b>Electricity</b>	<b>TWh</b>	<b>(55)</b>	<b>182</b>	<b>(59)</b>	<b>(236)</b>
Swaps		894	(132)	8,253	114
Options		(68)	171	338	38
Forwards/futures		19,784	57	(4,169)	(205)
<b>Gas</b>	<b>Millions of therms</b>	<b>20,610</b>	<b>96</b>	<b>4,422</b>	<b>(53)</b>
Swaps		3,400	94	11,159	27
Options		1,920	3	(247)	(14)
Forwards/futures		108	(3)	(10)	(2)
<b>Oil products</b>	<b>Thousands of barrels</b>	<b>5,428</b>	<b>94</b>	<b>10,902</b>	<b>11</b>
Swaps		(1)	(151)	-	(205)
Options		3	(1)	-	-
Forwards/futures		4	9	45	105
Freight		(4)	17	7	31
<b>Coal and freight</b>	<b>Millions of tonnes</b>	<b>2</b>	<b>(126)</b>	<b>52</b>	<b>(69)</b>
Swaps		43	-	113	-
Options		-	-	-	-
Forwards/futures		35,583	(57)	2,906	(42)
<b>CO<sub>2</sub></b>	<b>Thousands of tonnes</b>	<b>35,626</b>	<b>(57)</b>	<b>3,019</b>	<b>(42)</b>
Swaps/options			(56)		258
Forwards/futures			(346)		(308)
<b>Other commodities</b>			<b>(402)</b>		<b>(50)</b>
<b>Embedded commodity derivatives</b>			-		<b>1</b>
<b>NON-HEDGING COMMODITY DERIVATIVES</b>			<b>(213)</b>		<b>(438)</b>

These mainly include contracts included in EDF Trading's portfolio.

## CASH FLOWS AND OTHER INFORMATION

### NOTE 43 CASH FLOWS

#### 43.1 CHANGE IN WORKING CAPITAL

<i>(in millions of euros)</i>	2017	2016
Change in inventories	543	6
Change in the receivable for Contribution to the Public Electricity Service (CSPE)	499	(9)
Change in trade receivables	636	(1,487)
Change in trade payables	550	91
Change in other receivables and payables (excluding CSPE)	(752)	(536)
<b>CHANGE IN WORKING CAPITAL</b>	<b>1,476</b>	<b>(1,935)</b>

#### 43.2 INVESTMENTS IN INTANGIBLE AND TANGIBLE ASSETS

<i>(in millions of euros)</i>	2017	2016
Acquisitions of intangible assets	(1,165)	(1,038)
Acquisitions of tangible assets	(14,329)	(13,217)
Change in payables to suppliers of fixed assets	747	(142)
<b>INVESTMENTS IN INTANGIBLE AND TANGIBLE ASSETS</b>	<b>(14,747)</b>	<b>(14,397)</b>

## NOTE 44 OFF-BALANCE SHEET COMMITMENTS

This note presents off-balance sheet commitments given and received by the Group at 31 December 2017. The amounts of commitments correspond to non-discounted contractual values.

### 44.1 COMMITMENTS GIVEN

The table below shows off-balance sheet commitments given by the Group that have been valued. Other commitments are described separately in the detailed notes.

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
Operating commitments given	44.1.1	44,705	46,560
Investment commitments given	44.1.2	17,222	18,605
Financing commitments given	44.1.3	5,123	5,535
<b>TOTAL COMMITMENTS GIVEN</b>		<b>67,050</b>	<b>70,700</b>

In almost all cases, these are reciprocal commitments, and the third parties concerned are under a contractual obligation to supply the Group with assets or services related to operating, investment and financing activities.

#### 44.1.1 Operating commitments given

Operating commitments given by the Group at 31 December 2017 are as follows:

<i>(in millions of euros)</i>	31/12/2017	31/12/2016
Fuel and energy purchase commitments <sup>(1)</sup>	26,728	32,669
Operating contract performance commitments given	13,739	10,260
Operating lease commitments as lessee	4,238	3,631
<b>TOTAL OPERATING COMMITMENTS GIVEN</b>	<b>44,705</b>	<b>46,560</b>

<sup>(1)</sup> Excluding gas purchases and related services.

##### 44.1.1.1 Fuel and energy purchase commitments

In the course of its ordinary generation and supply activities, the Group has entered into long-term contracts for purchases of electricity, gas, other energies and commodities and nuclear fuel, for periods of up to 20 years.

The Group has also entered into long-term purchase contracts with a certain number of electricity producers, by contributing to the financing of power plants.

At 31 December 2017, fuel and energy purchase commitments mature as follows:

<i>(in millions of euros)</i>	Total	Maturity				Total
		< 1 year	1-5 years	5-10 years	> 10 years	
Electricity purchases and related services <sup>(1)</sup>	9,767	1,601	3,310	2,274	2,582	9,267
Other energy and commodity purchases <sup>(2)</sup>	391	83	213	95	-	662
Nuclear fuel purchases	16,570	1,414	6,151	5,285	3,720	22,740
<b>FUEL AND ENERGY PURCHASE COMMITMENTS</b>	<b>26,728</b>	<b>3,098</b>	<b>9,674</b>	<b>7,654</b>	<b>6,302</b>	<b>32,669</b>

<sup>(1)</sup> Including commitments given by controlled entities to joint ventures, amounting to €606 million at 31 December 2017 (€643 million at 31 December 2016).

<sup>(2)</sup> Excluding gas purchases and related services – see note 44.1.1.1.4.

The decrease in fuel and energy purchases mainly relates to the portion of intragroup commitments following the acquisition of Framatome, and the decline in EDF's nuclear fuel purchase commitments.

##### 44.1.1.1.1 Electricity purchases and related services

Electricity purchase commitments mainly concern EDF and EDF Energy. In the case of EDF many of these commitments are borne by the Island Energy Systems (SEI), which have made commitments to purchase the electricity generated using bagasse and coal.

In addition to the obligations reported above and under Article 10 of the Law of 10 February 2000, in mainland France EDF is obliged, at the producer's request and subject to compliance with certain technical features, to purchase the power

produced by co-generation plants and renewable energy generation units (wind turbines, small hydro-electric plants, photovoltaic power, etc.). The additional costs generated by this obligation are offset, after validation by the CRE, by the CSPE. These purchase obligations total 47TWh for 2017 (43TWh for 2016), including 6TWh for co-generation (6TWh for 2016), 23TWh for wind power (20TWh for 2016), 9TWh for photovoltaic power (8TWh for 2016) and 3TWh for hydropower (3TWh for 2016).

##### 44.1.1.1.2 Other energy and commodity purchases

Purchase commitments for other energies and commodities mainly concern coal and oil used to operate the fossil-fired plants, and purchases of biomass fuel used by Dalkia in the course of its business.

#### 44.1.1.1.3 Nuclear fuel purchases

Commitments for purchases of nuclear fuel arise from supply contracts for the nuclear plants intended to cover the EDF group's needs for uranium and fluorination, enrichment and fuel assembly production services.

The decrease in these commitments in 2017 is mainly explained by the acquisition of Framatome (see note 3.2) and elimination of intragroup commitments, as EDF is a significant customer of Framatome.

#### 44.1.1.1.4 Gas purchases and related services

Gas purchase commitments are principally undertaken by Edison and EDF. The volumes concerned for both entities at 31 December 2017 are as follows:

	31/12/2017				31/12/2016
	Total	Maturity			Total
< 1 year		1-5 years	> 5 years		
<i>(in billions of m<sup>3</sup>)</i>					
Edison	154	14	43	97	167
EDF	24	1	7	16	26

Edison has entered into agreements to import natural gas from Russia, Libya, Algeria and Qatar, for a total maximum volume of 14.4 billion m<sup>3</sup> per year. The terms of these contracts vary between 3 and 18 years.

Under the contract with Terminale GNL Adriatico, Edison also benefits from approximately 80% of the terminal's regasification capacities until 2034, for an annual premium of approximately €100 million.

#### 44.1.1.2 Operating contract performance commitments given

At 31 December 2017, these commitments mature as follows:

	31/12/2017				31/12/2016
	Total	Maturity			Total
< 1 year		1-5 years	> 5 years		
<i>(in millions of euros)</i>					
Operating guarantees given	7,074	3,215	2,294	1,565	5,883
Operating purchase commitments <sup>(1)</sup>	6,460	3,655	2,117	688	4,212
Other operating commitments	205	84	102	19	165
<b>OPERATING CONTRACT PERFORMANCE COMMITMENTS GIVEN <sup>(2)</sup></b>	<b>13,739</b>	<b>6,954</b>	<b>4,513</b>	<b>2,272</b>	<b>10,260</b>

(1) Excluding fuel and energy.

(2) Including commitments given by controlled entities to joint ventures, amounting to €835 million at 31 December 2017 (€1,121 million at 31 December 2016).

The increase in operating contract performance commitments given relates to consolidation of the activities of Framatome (see note 3.2).

##### 44.1.1.2.1 Operating guarantees given

Operating guarantees given are as follows:

	31/12/2017	31/12/2016
<i>(in millions of euros)</i>		
EDF	2,270	1,612
EDF Énergies Nouvelles	1,363	1,617
Edison	1,215	1,432
EDF Energy	732	630
Framatome	714	-
Other entities	780	592
<b>TOTAL</b>	<b>7,074</b>	<b>5,883</b>

The change since 31 December 2016 in operating guarantees given is mainly explained by the transfer of guarantees in the acquisition of Framatome.

##### 44.1.1.2.2 Operating purchase commitments

Operating purchase commitments are as follows:

	31/12/2017	31/12/2016
<i>(in millions of euros)</i>		
EDF	2,480	2,434
Framatome	1,878	-
EDF Energy	627	608
Enedis	601	598
Other entities	874	572
<b>TOTAL</b>	<b>6,460</b>	<b>4,212</b>

The increase in operating purchase commitments relates to the acquisition of Framatome.

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#### 44.1.1.3 Operating lease commitments as lessee

At 31 December 2017, operating lease commitments as lessee break down as follows:

	31/12/2017				31/12/2016
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
<b>OPERATING LEASE COMMITMENTS AS LESSEE</b>	<b>4,238</b>	<b>748</b>	<b>1,923</b>	<b>1,567</b>	<b>3,631</b>

The Group is bound as lessee by irrevocable operating lease contracts, principally for premises, equipment, land and vehicles used in the course of its business and maritime freight contracts for trading activities. The corresponding rents are subject

to renegotiation at intervals defined in the contracts. Operating leases mainly concern EDF, EDF Énergies Nouvelles and Enedis.

#### 44.1.2 Investment commitments given

At 31 December 2017, details of investment commitments are as follows:

	31/12/2017				31/12/2016
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
Commitments related to acquisition of tangible and intangible assets	15,827	6,798	8,224	805	17,351
Commitments related to acquisition of financial assets	569	390	173	6	406
Other commitments related to investments	826	411	415	-	848
<b>TOTAL INVESTMENT COMMITMENTS GIVEN <sup>(1)</sup></b>	<b>17,222</b>	<b>7,599</b>	<b>8,812</b>	<b>811</b>	<b>18,605</b>

(1) Including commitments given by controlled entities to joint ventures, amounting to €428 million at 31 December 2017 (€548 million at 31 December 2016).

##### 44.1.2.1 Commitments related to acquisition of tangible and intangible fixed assets

The commitments related to acquisition of tangible and intangible fixed assets are as follows:

(in millions of euros)	31/12/2017	31/12/2016
EDF	4,689	7,556
EDF Energy	6,428	5,837
Enedis	2,383	2,621
EDF Énergies Nouvelles	1,242	977
Framatome	562	-
Other entities	523	360
<b>TOTAL</b>	<b>15,827</b>	<b>17,351</b>

The decrease in commitments given by EDF for acquisition of tangible and intangible assets mainly reflects the elimination of what are now intragroup transactions due to the acquisition of Framatome, and progress on the Flamanville 3 EPR project. The increase in commitments given by EDF Energy concerns the signature of new contracts for construction of the Hinkley Point C reactor.

##### 44.1.2.2 Commitments related to acquisition of financial assets

The increase in commitments related to acquisition of financial assets at 31 December 2017 principally results from the acquisition of Gas Natural Vendita Italia (GNVI).

On 13 October 2017 Edison and Gas Natural Fenosa signed a binding agreement for the acquisition by Edison of GNVI and the Shah Deniz II gas contract.

Edison will acquire 100% of the capital of GNVI, a subsidiary of Gas Natural Fenosa which supplies natural gas and electricity across Italy. The purchase price is set at €193 million corresponding to an Enterprise Value of €263 million after debt repayment and provisions.

The acquisition of Gas Natural Vendita Italia is subject to European Competition authority clearance, which was obtained on 6 February 2018, and the transaction should be finalised during the first half-year of 2018.

As part of the agreement and subject to completion of the acquisition of Gas Natural Vendita Italia, Edison will also acquire a 11TWh long-term gas supply contract from the Shah Deniz II field. Gas imports from Shah Deniz II are expected to start at the end of 2020 once the Trans Adriatic Pipeline (TAP) is completed.

The main share purchase commitments that cannot be valued concern EDF Luminus.

EDF Luminus signed an amendment to the shareholder pact on 26 October 2015 defining a liquidity clause for the investments held by its minority shareholders, which could, in certain conditions under the control of EDF, result in sale of their shares through an IPO, or purchase of their shares by the Group at market value. This liquidity clause is valid at all times from 1 July 2018 to 31 December 2025.

Regarding the investment in EDF Investissements Groupe (EIG), C3 (a fully-owned EDF subsidiary) and NBI (Natixis Belgique Investissement, a subsidiary of the Natixis group) amended the agreements for their investment in EIG on 12 February 2014.

C3 now has a call option to buy EIG shares held by NBI at a fixed price, exercisable at any time until May 2021. Meanwhile, NBI has a put option to sell EDF all of its EIG shares for a fixed amount of cash, exercisable subject to certain conditions between February 2019 and May 2020.

Due to their features, in compliance with IAS 32, NBI's put option and C3's call option are considered as derivatives and their net value is included in the positive or negative fair value of trading derivatives. At 31 December 2017, the fair value of these trading derivatives is not significant.

### 44.1.2.3 Other commitments related to investments

Other commitments given related to investments at 31 December 2017 mainly comprise guarantees given by EDF Norte Fluminense in connection with its 51%

investment in CES, the Company in charge of constructing and operating a hydroelectric dam on the Teles Pires river in Brazil, and a parent company guarantee given as part of a real estate investment project.

### 44.1.3 Financing commitments given

Financing commitments given by the Group at 31 December 2017 comprise the following:

	31/12/2017				31/12/2016
	Total	Maturity			Total
< 1 year		1-5 years	> 5 years		
<i>(in millions of euros)</i>					
Security interests in real property	4,250	76	731	3,443	4,637
Guarantees related to borrowings	613	349	144	120	644
Other financing commitments	260	245	15	-	254
<b>TOTAL FINANCING COMMITMENTS GIVEN <sup>(1)</sup></b>	<b>5,123</b>	<b>670</b>	<b>890</b>	<b>3,563</b>	<b>5,535</b>

(1) Including commitments given by controlled entities to joint ventures, amounting to €692 million at 31 December 2017 (€673 million at 31 December 2016). These financing commitments to joint ventures mainly concern EDF Énergies Nouvelles.

Security interests and assets provided as guarantees mainly concern pledges or mortgages of tangible assets and shares representing investments in consolidated

subsidiaries which own property, plant and equipment, for EDF Énergies Nouvelles.

## 44.2 COMMITMENTS RECEIVED

The table below shows off-balance sheet commitments received by the Group that have been valued. Other commitments received are described separately in the detailed notes.

	Notes	31/12/2017	31/12/2016
<i>(in millions of euros)</i>			
Operating commitments received <sup>(1)</sup>	44.2.1	3,635	3,430
Investment commitments received	44.2.2	214	3,663
Financing commitments received	44.2.3	72	24
<b>TOTAL COMMITMENTS RECEIVED <sup>(2)</sup></b>		<b>3,921</b>	<b>7,117</b>

(1) Excluding commitments related to supplies of energy and related services (see notes 44.2.1.4 and 44.2.1.5).

(2) Excluding commitments related to credit lines, which are described in note 38.2.5.

### 44.2.1 Operating commitments received

Operating commitments received by the Group at 31 December 2017 comprise the following:

	31/12/2017				31/12/2016
	Total	Maturity			Total
	< 1 year	1-5 years	> 5 years		
<i>(in millions of euros)</i>					
Operating lease commitments as lessor	780	121	430	229	911
Operating sale commitments	1,326	181	750	395	829
Operating guarantees received	1,483	1,042	253	188	1,637
Other operating commitments received	46	16	22	8	53
<b>OPERATING COMMITMENTS RECEIVED</b>	<b>3,635</b>	<b>1,360</b>	<b>1,455</b>	<b>820</b>	<b>3,430</b>

#### 44.2.1.1 Operating lease commitments as lessor

The Group benefits from commitments as lessor in operating leases amounting to €780 million.

Most of these commitments derive from contracts classified as operating leases under IFRIC 4, "Determining whether an arrangement contains a lease". They mainly concern the Asian Independent Power Projects (IPPs) and real estate leases.

#### 44.2.1.2 Operating sale commitments

Operating sale commitments received principally concern EDF Énergies Nouvelles and relate to agreements for operation services, maintenance services, and development and sale of structured assets.

#### 44.2.1.3 Operating guarantees received

Operating guarantees received primarily concern EDF and relate to guarantees received from suppliers, particularly in connection with deliveries under the ARENH system.

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#### 44.2.1.4 Electricity supply commitments

In the course of its business, the EDF group has signed long-term contracts to supply electricity as follows:

- long-term contracts with a number of European electricity operators, for a specific plant or for a defined group of plants in the French nuclear generation fleet, corresponding to installed power capacity of 3.5GW;
- in execution of France's NOME Law on organisation of the French electricity market, EDF has a commitment to sell some of the energy generated by its existing nuclear power plants to other suppliers. This covers volumes of up to 100TWh each year until 31 December 2025.

#### 44.2.1.5 Sale commitments for regasification capacities and related services

The Dunkirk methane terminal began commercial operations in early 2017. It has an annual regasification capacity of some 13 billion cubic metres.

The Total group has subscribed a liquefied natural gas (LNG) regasification capacity from Dunkerque LNG, covering a total fixed volume of 40 billion cubic metres over a 20-year period. 8.5 billion cubic metres of this volume could, subject to certain restrictive conditions, be transferred to EDF.

#### 44.2.2 Investment commitments received

	31/12/2017				31/12/2016
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
<b>INVESTMENT COMMITMENTS RECEIVED</b>	<b>214</b>	<b>20</b>	<b>72</b>	<b>122</b>	<b>3,663</b>

The decrease in investment commitments over the first half of 2017 reflects the completion of operations initiated before 31 December 2016 as part of the asset disposal plan (see note 3.4).

At 31 December 2016, investment commitments received mainly included a commitment of €2,566 million relating to the future sale of 49.9% of its subsidiary RTE via the company CTE. Other notable investment commitments received

concerned the future sale of EDF Démász Zrt and EDF Trading's coal trading and freight businesses.

Under the terms of the agreement signed with Exelon on 29 July 2013 and finalised on 1 April 2014, EDF has an option to sell its share in CENG to Exelon at fair value, which can be exercised between January 2016 and June 2022. Due to its features, this commitment has nil value at 31 December 2017.

#### 44.2.3 Financing commitments received

	31/12/2017				31/12/2016
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
<b>FINANCING COMMITMENTS RECEIVED</b>	<b>72</b>	<b>51</b>	<b>1</b>	<b>20</b>	<b>24</b>



## NOTE 45 CONTINGENT LIABILITIES

In addition to the matters reported in note 4.2, the principal contingent liabilities at 31 December 2017 are the following.

### 45.1 TAX INSPECTIONS

#### EDF

Following inspections of previous years' accounts, the French tax authorities disputed the tax-deductibility of the provision for annuities following work-related accidents and illness paid by the Company. As this issue related to the special gas and electricity (IEG) statutes, it also concerned RTE, Enedis and Électricité de Strasbourg as well as other entities. In two rulings of 22 November 2017, the Council of State definitively validated the Company's position and recognised the tax-deductible nature of these provisions, putting an end to all the related litigations.

For the period 2008 to 2015, EDF was notified of proposed tax adjustments, notably concerning the tax-deductibility of certain long-term liabilities. This recurrent reassessment, which is applied for each year, represents a cumulative financial risk of some €536 million in income taxes at 31 December 2017. In September 2017 the Montreuil Administrative Court issued two rulings that recognised the tax-deductibility of these liabilities and validated the position taken by the Company.

For the years 2012 and 2015, the French tax authorities notified the Company of certain recurrent tax reassessments concerning the *Contribution sur la Valeur ajoutée des Entreprises* (tax on corporate value added), and questioned the deductibility of long-term provisions.

#### EDF International

Following the tax inspections of EDF International for the years 2009 to 2014, the French tax authorities questioned the valuation of the bond convertible into shares issued to refinance the acquisition of British Energy. The total amount concerned is approximately €310 million. EDF International has contested this reassessment, and considers it has good chances of winning the dispute.

### 45.2 LABOUR LITIGATION

EDF is party to a number of labour lawsuits, primarily regarding working hours. EDF estimates that none of these lawsuits, individually, is likely to have a significant impact on its financial results or financial position. However, because they relate to situations that could concern a large number of EDF's employees in France, any increase in such litigations could have a potentially negative impact on the Group's financial position (although the risk has been mitigated by the signature of the agreement on fixed numbers of working days in 2016).

### 45.3 ENEDIS – LITIGATION WITH PHOTOVOLTAIC PRODUCERS

The French authorities' announcement in autumn 2010 of a forthcoming downward revision to photovoltaic electricity purchase prices triggered an upsurge in connection applications (since at the time the applicable tariff depended on the date at which a complete connection application was filed). Several successive ministerial orders were issued reducing purchase prices.

As these price decreases were not sufficient to stem the flow of connection applications, by a decree of 9 December 2010 the Government suspended the conclusion of new contracts for a three-month period, and stated that if the financial and technical proposal for a request had not been approved by 2 December 2010, a new connection/contract application would have to be submitted at the end of this three-month period.

A certain number of producers who, as a result of these circumstances, lost their entitlement to the pre-moratorium purchase obligation price brought legal proceedings against EDF as operator of the distribution network in the non-interconnected zones, and against Enedis as network operator for mainland France, claiming that the electricity network operator did not issue the technical and financial connection proposals in time for them to benefit from more advantageous electricity purchase terms.

Certain first instance rulings rejected all the plaintiffs' claims, while others awarded compensation.

EDF and Enedis sought to apply their Civil Liability insurance policy, but the insurers refused their claims. The Court of Cassation ruling of 9 June 2015 for the Green Yellow case found that Enedis was liable and that the insurance payment was due. However, the insurers continued to refuse to make any payouts on the other pending cases.

In an order of 15 March 2017, the CJEU confirmed that the decisions of 10 July 2006 and 12 January 2010 setting the purchase tariffs for photovoltaic energy constitute "intervention by the State or using State resources", one of the four criteria that characterise State aid. The Court stated that such a support measure, implemented without prior notification to the Commission, is illegal. It is now up to the national courts to act accordingly, particularly by banning application of these illegal decisions.

France's commercial courts and Appeal Courts will issue their decisions in the coming months.

EDF and Enedis dispute their liability, and:

- have decided to take action to group insurance for all claims to their insurers relating to the same damaging event with the same technical cause (connection/contract applications issued between 24 and 31 August 2010), known as "serial losses"; or
- are filing appeals for the most unfavourable first-instance judgements issued against them;
- are using the CJEU order as grounds to argue that the producers' prejudices stem from illegal decisions and thus are not legally repairable.

#### 45.3.1 SUN'R

On 21 June 2012, SUN'R filed a complaint against EDF and Enedis, along with an application for interim measures, with France's Competition Authority, the ADLC. SUN'R accused Enedis of delays in the procedure for connecting its photovoltaic facilities and EDF of delays in the establishment of the purchase obligation contracts and payment of the related invoices. SUN'R also claimed that EDF ENR had benefited from special treatment from Enedis for the connection of its facilities and from EDF for the payment of its invoices.

In a decision of 14 February 2013, the ADLC rejected all the applications made by SUN'R for interim measures but decided to continue the investigation on the merits of the case

On 12 January 2018 the ADLC's investigation departments sent the parties a proposal to dismiss the matter due to the absence of anticompetitive practices by EDF, Enedis and RTE. This proposal is not an indication of the ADLC's future final decision.

Concurrently with its complaint to the ADLC in 2012, on 29 August 2012 SUN'R filed a petition at an urgent applications hearing for expert assessment and provision for costs before the Paris Administrative Court, including a claim for provisional compensation of €1 million from EDF and €2.5 million from Enedis. By order of 27 November 2012, the urgent applications judge (*juge des référés*) at the Administrative Court of Paris dismissed this petition.

On 30 April 2015, SUN'R issued proceedings against Enedis and EDF SA before the Paris Commercial Court, seeking compensation for the loss allegedly caused to it by the delays in the procedure for the connecting its solar energy plant projects to the electricity distribution network. It asked the Court to suspend proceedings pending the ADLC's decision on the merits of the case, and claimed a provisional amount of €10 million to be applied against future compensation for its loss. In a ruling of 7 November 2016 the Paris Commercial Court dismissed SUN'R's claim for provisional compensation and suspended proceedings until the ADLC issues a decision on the merits of the case.

On 24 November 2015, Sun West, Azimut 56 and JB Solar issued proceedings against Enedis and EDF SA before the Paris Commercial Court on the same grounds. They are currently claiming almost €4 million for the alleged prejudice, but asked the Court to suspend proceedings pending the ADLC's decision on the merits of the case. In a ruling of 4 December 2017, the Paris Commercial Court rejected claims for provisional compensation made by Sun West, Azimut 56 and JB Solar and suspended proceedings until the ADLC issues a decision on the merits of the case.

## NOTE 46 ASSETS HELD FOR SALE AND RELATED LIABILITIES

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Assets held for sale	-	5,220
<b>LIABILITIES RELATED TO ASSETS HELD FOR SALE</b>	<b>-</b>	<b>2,109</b>

The decrease in assets held for sale and related liabilities since 31 December 2016 results from the following operations under the disposal plan:

- sale to Caisse des Dépôts and CNP Assurances of 49.9% of the balance sheet items of CTE (principally comprising RTE shares and a bond) (see note 3.4.1);

- sale of EDF Polska's assets (see note 3.4.2);
- sale of EDF Démász's assets (see note 3.4.3);
- sale of EDF Trading's coal trading and freight business (see note 3.4.4).

## NOTE 47 EDF'S DEDICATED ASSETS

### 47.1 REGULATIONS

Article L. 594 of France's Environment Code and its implementing regulations require assets (dedicated assets) to be set aside for secure financing of nuclear plant decommissioning expenses and long-term storage expenses for radioactive waste. The regulations govern the way dedicated assets are built up, and the management and governance of the funds themselves. These assets are clearly identified and managed separately from the Company's other financial assets and investments. They are also subject to specific monitoring and control by the Board of Directors and the administrative authorities.

The law requires the realisable value of these dedicated assets to be higher than the value of the provisions corresponding to the present value of the long-term nuclear expenses defined above.

The Decree of 29 December 2010 made RTE shares eligible for inclusion in dedicated assets subject to certain conditions and administrative authorisation. The Decree of 24 July 2013 revised the list of eligible assets by reference to the Insurance Code, and unlisted securities are also now eligible subject to certain conditions.

The Decree of 24 March 2015 contains two measures concerning dedicated assets:

- the annual allocation to dedicated assets, net of any increases to provisions, must be positive or zero as long as their realisable value is below 110% of the amount of the provisions concerned;
- subject to certain conditions, real estate property owned by the operators of nuclear facilities may be allocated to coverage of these provisions.

Subject to certain conditions, the Decree of 19 December 2016 allows allocation of the shares of CTE, which holds 100% of the capital of RTE, to the portfolio of dedicated assets at 31 December 2017 (see note 47.2.2 below).

### 47.2 PORTFOLIO CONTENTS AND MEASUREMENT

Given the applicable regulations, these dedicated assets are a highly specific category of assets.

Dedicated assets are structured and managed according to a strategic allocation defined by the Board of Directors and reported to the administrative authorities. The strategic allocation is designed to meet the overall objective of long-term coverage of obligations, and determines the structure and management of the portfolio as a whole. It takes into account regulatory constraints concerning the nature and liquidity of the dedicated assets, the financial outlook for the equity and bond markets, and the diversifying contribution of unlisted assets.

As part of the strategic allocation review process and in order to pursue the diversification into unlisted assets begun in 2010 with the shares in RTE, in 2013 the Board of Directors approved the introduction of an unlisted asset portfolio alongside the diversified equity and bond investments. This portfolio is managed by the EDF Invest Division, which was formed following the Decree of 24 July 2013 on

securing the funding for nuclear expenses. EDF Invest has three target asset classes: principally infrastructures, and also real estate and private equity funds.

Following the French government's authorisation issued on 8 February 2013, and the approval of the Nuclear Commitments Monitoring Committee and the Board of Directors' decision of 13 February 2013, EDF allocated the entire receivable recognised by the French State, representing the accumulated shortfall in CSPE financing at 31 December 2012, to its dedicated assets.

This financial receivable was increased in the financial statements at 31 December 2015 by an additional amount estimated at €644 million that was not allocated to dedicated assets, corresponding to the shortfalls in compensation that arose between the beginning of 2013 and the end of 2015, as acknowledged by the State in a ministerial letter of 26 January 2016. In accordance with this letter, the total financial receivable bears interest at 1.72% and will be repaid under a revised schedule ending in late 2020. This schedule was laid down in a ministerial order of 2 December 2016, based on the CRE's confirmation of the shortfall for 2015.

On 22 December 2016, EDF assigned a 26.4% portion of this financial receivable, including the additional receivable corresponding to the shortfalls in compensation between 2013 and 2015, to a pool of investors.

Consequently, the realisable value of the non-assigned portion of the receivable, which is totally allocated to dedicated assets, is calculated based on the assignment value at that date.

The amount received for assignment of the portion of the CSPE receivable that was allocated to dedicated assets (€894 million) has been reinvested in dedicated assets, in the same way as the reimbursements received (see note 3.7.4).

#### 47.2.1 Diversified equity and bond investments

Certain dedicated assets take the form of bonds held directly by EDF. The rest comprise specialised collective investment funds on leading international markets, managed by independent asset management companies. They take the form of open-end funds and "reserved" funds established solely for the use of the Group (which does not participate in the fund management).

These investments are structured and managed in line with the strategic allocation, which takes into consideration international stock market cycles, for which the statistical inversion generally observed between equity market cycles and bond market cycles – as well as between geographical areas – has led the Group to define an overall composite benchmark indicator that guarantees continuation of the long-term investment policy.

As a result, for accounting purposes the portfolio is evaluated as a whole, all funds combined, treating the cash flows generated as a group of financial assets. This ensures consistency with the specificities of the dedicated asset portfolio, in particular the legal matching with the liability and the distant timing of significant payments, as disbursements are spread over a period extending beyond 2150.

At the year-end, dedicated assets are presented in available-for-sale financial assets in the balance sheet, at their liquidation value. In view of the specific financial characteristics of the dedicated asset portfolio, the Group exercises judgement in determining whether indicators of impairment appropriate to the structure of the portfolio should be taken into consideration.

The Group thus takes a 5-year period as the basis for assessment of prolonged decline compared to historical value. This period is at the low end of the range of statistical estimates concerning stock markets. Also, based on statistical observations of the asset/liability management model used for this portfolio, the Group considers impairment of dedicated assets to be significant when the value is 40% or more below the portfolio's historical value.

In parallel to these general criteria for impairment, in the course of operational asset monitoring the Group exercises judgement through long-term, specific management rules defined and supervised by its governance bodies (maximum investment ratios, volatility analyses and assessment of individual fund manager quality).

#### 47.2.2 Unlisted assets (EDF Invest)

The assets managed by EDF Invest consist of unlisted securities related to investments in infrastructures, real estate, and private equity funds.

At 31 December 2017, the assets managed by EDF Invest represent a realisable value of €5,408 million, particularly including:

- 50.1% of the Group's shares in CTE, the joint venture that owns RTE, in compliance with Decree 2016-1781 of 19 December 2016 amending the Decree of 23 February 2007. These shares amount to €2,705 million at 31 December 2017 (€3,905 million for 75.93% of the shares in CTE, at 31 December 2016) (see note 3.4.1);
- the Group's investment in TIGF, Porterbrook, Autostrade and Q-Park presented in available-for-sale financial assets in the consolidated balance sheet;
- the Group's investments in Madrileña Red de Gas (MRG), Géosel, Thyssengas, Aéroports de la Côte d'Azur and Central Sicaf presented in investments in associates in the consolidated balance sheet.

### 47.3 VALUATION OF EDF'S DEDICATED ASSETS

The following table shows a breakdown of dedicated assets by nature:

<i>(in millions of euros)</i>	<b>Consolidated balance sheet presentation</b>	<b>31/12/2017</b>		<b>31/12/2016</b>	
		<b>Book value</b>	<b>Realisable value</b>	<b>Book value</b>	<b>Realisable value</b>
Equities		9,942	9,942	8,010	8,010
Debt instruments		9,282	9,282	6,866	6,866
Cash portfolio		104	104	900	900
<b>Dedicated assets – equities and debt instruments</b>	<b>Available-for-sale financial assets</b>	<b>19,328</b>	<b>19,328</b>	<b>15,776</b>	<b>15,776</b>
Derivatives	Fair value of derivatives	30	30	(18)	(18)
Other	Available-for-sale financial assets	-	-	-	-
<b>Diversified equity and bond investments</b>		<b>19,358</b>	<b>19,358</b>	<b>15,758</b>	<b>15,758</b>
CSPE receivable <sup>(1)</sup>	Loans and financial receivables	3,294	3,349	4,185	4,288
Derivatives	Fair value of derivatives	-	-	(2)	(2)
<b>CSPE receivable after derivatives</b>		<b>3,294</b>	<b>3,349</b>	<b>4,183</b>	<b>4,286</b>
CTE <sup>(2)</sup>	Investments in associates <sup>(3)</sup>	1,241	2,705	1,852	3,905
Other associates	Investments in associates <sup>(3)</sup>	893	944	487	537
Other assets <sup>(5)</sup>	Available-for-sale financial assets and other net assets <sup>(5)</sup>	1,716	1,759	1,191	1,191
<b>Unlisted assets (EDF Invest)</b>		<b>3,850</b>	<b>5,408</b>	<b>3,530</b>	<b>5,633</b>
<b>TOTAL DEDICATED ASSETS<sup>(4)</sup></b>		<b>26,502</b>	<b>28,115</b>	<b>23,471</b>	<b>25,677</b>

(1) The receivable consisting of accumulated shortfalls in compensation at 31 December 2015, less the portion assigned on 22 December 2016 and reimbursements received in 2017, in line with the repayment schedule. The realisable value of the CSPE receivable is estimated based on market rates.

(2) In 2017, the Group's investment of 50.1% of CTE (formerly C25), the company that holds 100% of the shares in RTE. In 2016, 75.93% of the Group's investment in CTE.

The CTE shares are included at their equity value in the consolidated financial statements (book value in the table). The realisable value shown in this table is based on the sale transaction price of 31 March 2017 (see note 3.4.1).

(3) Including the value of the share in equity of the controlled companies owning these investments.

(4) Limiting the value of certain investments in compliance with Article 16 of Decree 2007-243 concerning calculation of the regulatory realisable value of dedicated assets, has no effect at 31 December 2017. By limiting the value of certain investments in compliance with Article 16 of Decree 2007-243 concerning calculation of the amount of the regulatory realisable value of dedicated assets, the regulatory realisable value was reduced to €24,312 million at 31 December 2016.

(5) Including the value of the share in equity of other controlled companies.

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#### Structured entities – Investment funds

The investment funds held by the Group (see note 1.3.2.9) reported in the table under “Available-for-sale financial assets” are located in France and owned by EDF. The Group has not given these funds any financial support.

The value of the assets of these investment funds amounts to €3,294 million at 31 December 2017 (€1,548 million at 31 December 2016). The funds mainly consist of 12 listed funds with total value of €2,906 million (at 31 December 2016, 9 listed funds with total value of €1,297 million).

#### 47.4 CHANGES IN DEDICATED ASSETS IN 2017

At 31 December 2017, the degree of coverage of provisions by dedicated assets was 108.5% applying the regulatory calculations.

The regulatory limit on the realisable value of certain investments (decree 2007-243) has no effect at 31 December 2017.

At 31 December 2016, provisions were 99.8% covered by dedicated assets applying the regulatory calculations. Without application of the regulatory limits set by Decree 2007-243, the provision coverage rate was 105.4%.

Withdrawals from dedicated assets totalled €378 million, equivalent to the payments made in respect of the long-term nuclear obligations to be covered in 2017 (€377 million in 2016).

The regulatory allocation to dedicated assets (required by Article 2-IV of decree 2007-243, amended) for 2016, amounting to €1,095 million, was made during the first half of 2017 in compliance with the ministerial letter of 10 February 2017 (no allocations were made in 2016). The regulatory allocation to dedicated assets for 2017 amounts to €386 million and will be made during 2018.

2017 was a remarkable year for the equity markets, which were boosted by simultaneous worldwide economic growth and monetary policies that remained generous, and the financial portfolio achieved excellent results, outperforming its strategic benchmark index. This good performance was primarily driven by prudent positioning in terms of sensitivity and exposure to government bonds in core Euro zone countries, as long rates on government bonds rose slightly. The credit portfolio also outperformed its benchmark, particularly thanks to subordinated bank notes. The very slight overexposure on equities maintained over the year was beneficial, and so were the active management approaches selected.

On 31 March 2017, EDF finalised the sale of a 49.9% stake in CTE, the company which has held 100% of the shares of RTE since December 2016. Since completion, EDF's entire investment in CTE, i.e. 50.1%, has been allocated to dedicated assets (see note 3.4.1).

For the unlisted asset portfolio, EDF Invest continued over 2017 to build up a portfolio of infrastructures, real estate property and investment funds.

On 26 July 2017 EDF Invest completed the acquisition by the consortium consisting of Allianz (60%), EDF Invest (20%) and the investment fund DIF (20%), of 6.94% of the capital of Autostrade per l'Italia, one of Europe's largest motorway concession operators.

In June and September 2017, EDF Invest, together with Beni Stabili, the Italian subsidiary of Foncière des Régions, and Predica, acquired a non-controlling interest in Central SicaF, which manages a portfolio of offices and technical premises that are all leased to Telecom Italia and were previously owned 100% by Beni Stabili.

In October 2017, EDF Invest, together with KKR Infrastructure, finalised the acquisition of a minority interest in the Dutch carpark operator Q-Park NV, one of Europe's largest carpark operators.

In December 2017, EDF Invest acquired 50% of the Ecowest real estate development in Levallois-Perret, which is leased principally to L'Oreal's Luxury division.

These investments are allocated to EDF Invest's Infrastructures pocket, alongside other investments including TIGF, Porterbrook, MRG, Géosel, CTE (the company that owns RTE) Aéroports de la Côte d'Azur and Thyssengas.

A total of €985 million in net gains on disposals from the financial portfolio was recorded in the financial result in 2017 (€428 million in 2016).

The difference between the fair value and acquisition cost of diversified bond and equity investments included in equity was a positive €2,118 million before taxes at 31 December 2017 (€1,984 million at 31 December 2016).

The Group's assessment of the value of the dedicated asset portfolio did not lead to recognition of any impairment in 2017.

#### 47.5 PRESENT COST OF LONG-TERM NUCLEAR OBLIGATIONS

The Group's long-term nuclear obligations in France concerned by the regulations for dedicated assets related to nuclear generation are included in the EDF group's consolidated financial statements at the following values:

(in millions of euros)	31/12/2017	31/12/2016
Provisions for spent fuel management – portion unrelated to the operating cycle as defined in the regulations	983	820
Provisions for long-term radioactive waste management <sup>(1)</sup>	8,814	8,966
Provisions for waste removal and conditioning	726	-
Provisions for nuclear plant decommissioning	14,920	14,122
Provisions for last cores – portion for future long-term radioactive waste management	467	450
<b>PRESENT COST OF LONG-TERM NUCLEAR OBLIGATIONS</b>	<b>25,910</b>	<b>24,358</b>

(1) At 31 December 2016, provisions for long-term radioactive waste management included the provision for waste removal and conditioning which amounted to €581 million.

#### 47.6 DEDICATED ASSETS OF FRAMATOME AND SOCODEI

The dedicated assets of Framatome and SOCODEI relating to Basic nuclear facilities (INB) in France have realisable values of €84 million and €49 million respectively and the degree of coverage of provisions according to the regulations is 103.9% for

Framatome and 114.7% for SOCODEI (calculated using EDF group discount and inflation rates for nuclear provisions in France – see note 30).

These two entities' long-term nuclear obligations in France concerned by the regulations for dedicated assets are included in the EDF group's consolidated financial statements at the amounts of €81 million for Framatome and €43 million for SOCODEI (see note 30).

## NOTE 48 RELATED PARTIES

Details of transactions with related parties are as follows:

(in millions of euros)	Associates and joint ventures		Joint operations		French State or State-owned entities <sup>(1) (2)</sup>			Group Total	
	31/12/2017	31/12/2016	31/12/2017	31/12/2016	31/12/2017	31/12/2016	31/12/2017	31/12/2016	
Sales	580	547	-	-	1,549	1,328	2,129	1,875	
Energy purchases	3,817	3,651	4	4	2,313	2,418	6,134	6,073	
External purchases	9	4	4	4	1,163	1,065	1,176	1,073	
Financial assets	238	106	-	-	-	-	238	106	
Other assets	729	575	-	-	596	754	1,325	1,329	
Financial liabilities	-	-	-	-	-	-	-	-	
Other liabilities	1,282	1,106	1	-	552	880	1,835	1,986	

(1) Excluding tax and social liabilities and the CSPE receivable.

(2) As a result of the Group's acquisition of Framatome on 31 December 2017 (see note 3.2), income and expense items between the Group and Framatome are still partly reported in Related Parties for 2017, whereas assets and liabilities are eliminated at the year-end.

### 48.1 TRANSACTIONS WITH ENTITIES INCLUDED IN THE SCOPE OF CONSOLIDATION

Transactions with the principal associates (CTE, (the company that owns RTE), CENG, Taishan and Alpiq) are presented in note 23.

Transactions with other associates, joint ventures, and partner entities in joint arrangements with the Group mainly consist of sales and purchases of energy.

### 48.2 RELATIONS WITH THE FRENCH STATE AND STATE-OWNED ENTITIES

#### 48.2.1 Relations with the French State

The French State holds 83.50% of the capital of EDF at 31 December 2017, and is thus entitled in the same way as any majority shareholder to control decisions that require approval by the shareholders.

In accordance with the legislation applicable to all companies having the French State as their majority shareholder, the EDF group is subject to certain inspection procedures, in particular economic and financial inspections by the State, audits by the French Court of Auditors (*Cour des comptes*) or Parliament, and verifications by the French General Finance Inspectorate (*Inspection générale des finances*).

The public service contract between the French State and EDF was signed on 24 October 2005. This contract is intended to form the framework for public service missions assigned to EDF by the lawmaker for an unlimited period. The Law of 9 August 2004 does not stipulate the duration of the contract.

EDF, like other electricity producers, also participates in the multi-annual energy program established in the Decree of 27 October 2016, which defines objectives for generation and load shedding.

Finally, the French State intervenes through the regulation of electricity and gas markets, particularly for authorisation to build and operate generation facilities, establishment of sales tariffs for customers that have stayed on the regulated tariffs, transmission and distribution tariffs, and also determination of the ARENH price in accordance with France's Energy Code, and the level of the Contribution to the Public Electricity Service.

#### 48.2.2 Relations with Engie

The common service function shared by EDF and Engie, respectively the electricity distribution and gas distribution subsidiaries Enedis and GRDF, is defined by Article L. 111-71 of the French Energy Code. Its missions in the electricity and gas distribution sector are building structures, site project management, network operation and maintenance, and metering operations. This service is not a legal entity in its own right.

#### 48.2.3 Relations with public sector entities

The EDF group's relations with public sector entities mainly concern the two entities belonging to the former AREVA group (Orano and Framatome). The EDF group took over Framatome (see note 3.2) at 31 December 2017, and relations with that company continued up to that date.

Transactions with Orano concern:

- the front-end of the nuclear fuel cycle (uranium supplies, conversion and enrichment services);
- the back-end of the nuclear fuel cycle (transportation, storage, processing and recycling services for spent fuel).

Transactions with Framatome are described in note 3.2.

#### Front-end of the cycle

Several important agreements were negotiated between EDF and Orano:

- for supplies of natural uranium: AREVA Mines (now Orano Mining) contracts covering the period 2021-2030;
- for fluorination: a contract covering the period 2019-2030;
- for enrichment of natural uranium into uranium 235: an AREVA NC (now Orano Cycle) contract for the period 2019-2030.

As part of the plan to construct two EPRs in the United Kingdom at the Hinkley Point site, on 29 September 2016 EDF and AREVA (Orano) signed a uranium contract with AREVA Mines (Orano Mining), and a conversion contract and enrichment contract with AREVA NC (Orano Cycle).

#### Back-end of the cycle

Relations between EDF and AREVA (Orano) concerning transportation, processing and recycling of spent fuels are described in note 29.1.1.

#### Relations with Framatome

In December 2014, EDF and Framatome signed a contract for supplies of enriched-uranium fuel assemblies over the period 2015-2021.

Another agreement with Framatome was signed for the supply of initial core assemblies for the Flamanville 3 EPR.

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A contract for the supply of control rod clusters was also signed with Framatome for the period 2018-2020.

As part of the plan to construct two EPRs in the United Kingdom at the Hinkley Point site, EDF signed a fabrication contract with Framatome.

EDF and Framatome have signed the following main contracts for the 900MW, 1300MW and N4 nuclear power plants:

- in 2011, a contract for supply of 32 steam generators and a contract for renewal of the instrumentation and control systems;
- in August 2012, a contract for services related to replacement operations for the first steam generators;
- in mid-2017, a framework contract concerning EDF's rights to use AREVA intellectual property. This contract will be applied through specific agreements such as the one signed in December 2017 for the nuclear fleet;
- in late 2017, a framework agreement with no financial commitment, for the provision of engineering, design and production services relating to the steam supply system.

In 2013, EDF and Framatome signed two amendments to the initial 2007 contract for the Flamanville EPR steam supply system, covering the period from development studies to industrial commissioning.

### 48.3 MANAGEMENT COMPENSATION

The Company's key management and governance personnel are the Chairman and CEO, the members of the COMEX (Executive Committee) throughout 2017 or since their date of appointment if they joined the COMEX during the year, and the Directors. Directors representing the employees receive no remuneration for their services.

The total compensation paid by EDF and controlled companies to the Group's key management and governance personnel amounted to €12.2 million in 2017 (€12.1 million in 2016). This amount covered short-term benefits (basic salaries, performance-related salary, profit share and benefits in kind), special IEG post-employment benefits where relevant, and the corresponding employer contributions, plus director's fees.

Apart from EDF's Chairman and CEO who could benefit from a termination indemnity if his term of office were ended, the directors benefit from no other special pension system, starting bonus or severance payment entitlement except by contractual negotiation.

## NOTE 49 ENVIRONMENT

### 49.1 GREENHOUSE GAS EMISSION RIGHTS

In ratifying the Kyoto Protocol Europe made a commitment to reduce its greenhouse gas emissions. EU Directive 2003/87/EC set up a greenhouse gas emission quota system for the European Union which has been in operation since 1 January 2005.

This system is adapted into national laws. Among other things it requires obligated actors, which is the case of EDF, to surrender to the State a number of greenhouse gas emission credits each year, corresponding to their emissions for the year.

This Directive came into effect in 2005 for an initial three-year period, followed by a second period from 2008 to 2012, with progressive reduction of the emission rights allocated.

One of the main features of the third phase, running from 2013 to 2020, is the discontinuation of free allocation of emission rights in certain countries, including France and United Kingdom.

In the EDF group, the entities subject to this Directive are EDF, EDF Energy, Edison, Dalkia, and EDF Luminus.

In 2017, the Group surrendered 38 million tonnes in respect of emissions generated in 2016. In 2016, the Group surrendered 46 million tonnes in respect of emissions generated in 2015.

The Group's total emission rights allocation for 2017 recorded in the national registers is 3 million tonnes (5 million tonnes for 2016).

The volume of emissions at 31 December 2017 stood at 40 million tonnes (38 million tonnes for 2016). The provision resulting from over-quota emissions amounts to €120 million at 31 December 2017 (€90 million at 31 December 2016).

### 49.2 ENERGY SAVINGS CERTIFICATES

In all its subsidiaries, the Group is engaged in a process to control energy consumption through various measures developed by national legislations, in application of European Union Directives.

In France, the Law of 13 July 2005 introduced a system of energy savings certificates. Suppliers of energy (electricity, gas, heat, cold, domestic fuel oil and fuel for vehicles) with sales above a certain level are subject to energy savings obligations for a defined period. They fulfil these obligations by making direct or indirect energy savings rewarded by certificates, or by purchasing energy savings certificates. At the end of the set period, the entities concerned must provide evidence of compliance with obligations by surrendering the certificates, or pay a fine to the Treasury.

The French system was renewed by Decree 2014-1557 of 24 December 2014 for a third period running from 1 January 2015 to 31 December 2017. The energy savings objectives for this period are more ambitious, and the system has been simplified. The volumes of energy savings certificates obtained during the second period will count towards achievement of the objectives for the third period.

In application of Article 30 of the Law of 17 August 2015 on the energy transition for green growth, a new additional energy savings obligation for 2016-2017 applies from 1 January 2016, for the benefit of households in situation of energy poverty. This new obligation is added to the energy savings obligations for the third period. The annual volume of the obligation is proportional to the annual energy savings obligation.

A fourth three-year period of energy savings obligations will begin on 1 January 2018 (see note 4.6).

### 49.3 RENEWABLE ENERGY CERTIFICATES

In application of EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources, every EU member state has set national targets for consumption of electricity from renewable sources.

There are two ways for States to meet these targets:

- incorporating the costs of generating such electricity into the sale price for electricity (this is the approach taken in France);
- introducing a renewable energy certificate system (as is the case in the United Kingdom and Belgium).

The renewable energy certificates system may apply to:

- non-obligated electricity producers when the obligation applies to energy sales (EDF Énergies Nouvelles);
- obligated electricity producers when the obligation applies to generation;
- producers who are also sellers of electricity when the obligation applies to energy sales (EDF Energy, EDF Luminus).

Through the renewable energy certificates scheme, the EDF group has an obligation to surrender renewable energy certificates, particularly in the United Kingdom and Belgium.

At 31 December 2017, a provision of €781 million was booked, essentially by EDF Energy (United Kingdom) and EDF Luminus (Belgium) to cover the shortfall in renewable energy certificates compared to the assigned obligations.

## NOTE 50 SUBSEQUENT EVENTS

Developments since the year-end that are not presented in other notes are reported below.

### **50.1 CONFIRMATION OF THE EUROPEAN COMMISSION DECISION ON THE TAX TREATMENT OF PROVISIONS ESTABLISHED BETWEEN 1987 AND 1996 FOR RENEWAL OF GENERAL NETWORK FACILITIES**

On 16 January 2018, the General Court of the European Union rejected EDF's appeal against the European Commission's decision of 22 July 2015 classifying the tax treatment of provisions established between 1987 and 1996 for renewal of General Network facilities as state aid, and ordering that it be recovered by the French State.

Following this decision by the Commission, on 13 October 2015, EDF repaid €1.383 billion, corresponding to the amount of state aid including interest. ENEDIS and RTE contributed their respective shares.

In its ruling, the General Court upheld the European Commission's decision of 22 July 2015 classifying the tax treatment of provisions established for renewal of

General Network as state aid. As EDF had already repaid €1.383 billion on 13 October 2015, the execution of this ruling will not entail any additional payment.

The Commission had previously issued a similar decision on 16 December 2003. That decision was cancelled by the Court of Justice of the European Union in a ruling on 5 June 2012, confirming a ruling by the General Court of the European Union dated 15 December 2009. Following that ruling, the Commission reopened an inquiry into state aid, at the end of which it issued the decision of 22 July 2015 which was challenged by EDF.

EDF acknowledges this decision and will consider the advisability of submitting an appeal to the Court of Justice of the European Union.



## NOTE 51 SCOPE OF CONSOLIDATION AT 31 DECEMBER 2017

The Group's activities are defined as follows:

- **"Generation/Supply" (G):** energy generation and energy sales to industry, local authorities, small businesses and residential consumers. This segment also includes commodity trading activities;
- **"Distribution" (D):** management of the low and medium-voltage public electricity distribution networks;
- **"Transmission" (T):** operation, maintenance and development of the high-voltage and very-high-voltage electricity transmission networks;

- **"Reactors and Services (Framatome)" (R):** services and production of equipment and fuel for nuclear reactors;
- **"Other" (O):** energy services (district heating, thermal energy services, etc.) for industry and local authorities, and new businesses mainly aimed at boosting electricity generation through cogeneration and renewable energy sources (e.g. wind turbines, photovoltaic panels, etc.). This activity also includes EDF Invest's holding companies and entities that are classified as dedicated assets.

### 51.1 FULLY CONSOLIDATED COMPANIES

		Percentage of ownership at 31/12/2017	Percentage of ownership at 31/12/2016	Business sector
<b>FRANCE – GENERATION AND SUPPLY</b>				
Electricité de France – Parent Company		100.00	100.00	G, D, O
Group Support Services (G2S)		100.00	100.00	O
Edvance		95.10	-	O
Immo C47 <sup>(1)</sup>		100.00	100.00	O
Other holding companies (EDF Invest)		100.00	100.00	O
<b>FRANCE – REGULATED ACTIVITIES</b>				
Enedis		100.00	100.00	D
Électricité de Strasbourg		88.64	88.64	G, D
EDF Production Électrique Insulaire (EDF PEI)		100.00	100.00	G
<b>REACTORS AND SERVICES (FRAMATOME)</b>				
Framatome <sup>(2)</sup>	France	75.50	-	R
<b>UNITED KINGDOM</b>				
EDF Energy Holdings Limited (EDF Energy)		100.00	100.00	G, O
EDF Energy UK Ltd.		100.00	100.00	O
EDF Development Company Ltd.		100.00	100.00	O
<b>ITALY</b>				
Edison SpA (Edison)		97.45	97.45	G, O
Transalpina di Energia SpA (TdE SpA)		100.00	100.00	O
<b>OTHER INTERNATIONAL</b>				
EDF International SAS	France	100.00	100.00	O
EDF Belgium SA	Belgium	100.00	100.00	G
EDF Luminus SA	Belgium	68.63	68.63	G, O
EDF Norte Fluminense SA	Brazil	100.00	100.00	G
Ute Paracambi SA	Brazil	100.00	100.00	G
French Investment Guangxi Laibin Electric Power Co, Ltd. (Figlec)	China	100.00	100.00	G
EDF (China) Holding Ltd.	China	100.00	100.00	O
EDF Inc.	USA	100.00	100.00	O
Unistar Nuclear Energy LLC	USA	100.00	100.00	G
EDF Démász Zrt.	Hungary	-	100.00	G, D, O
EDF Paliwa Sp. z o.o. (Energokrak)	Poland	-	99.51	O
EDF Polska SA	Poland	-	99.51	G
Zec Kogeneracja SA (Kogeneracja)	Poland	-	49.91	G, O
Elektrociepłownia Zielona Góra SA (Zielona Góra)	Poland	-	49.11	G, O
EDF Alpes Investissements SARL	Switzerland	100.00	100.00	O
Mekong Energy Company Ltd. (MECO)	Vietnam	56.25	56.25	G
EDF Chile Spa	Chile	100.00	100.00	G

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other

(1) Immo C47 was accounted for under the equity method at 31 December 2016.

(2) Acquisition of Framatome on 31 December 2017 (see note 3.2).

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		Percentage of ownership at 31/12/2017	Percentage of ownership at 31/12/2016	Business sector
<b>OTHER ACTIVITIES</b>				
EDF Développement Environnement SA	France	100.00	100.00	O
Société pour le Conditionnement des Déchets et Effluents Industriels (SOCODEI)	France	100.00	100.00	O
Société Française d'Ingénierie Electronucléaire et d'Assistance (SOFINEL)	France	88.98	55.00	O
Dunkerque LNG	France	65.01	65.01	O
EDF Énergies Nouvelles	France	100.00	100.00	G, O
EDF IMMO and real estate subsidiaries	France	100.00	100.00	O
Société C2	France	100.00	100.00	O
Société C3	France	100.00	100.00	O
EDF Holding SAS	France	100.00	100.00	O
CHAM SAS	France	100.00	100.00	O
Dalkia	France	99.94	99.94	O
Citelum	France	100.00	100.00	O
EDF Trading Ltd.	UK	100.00	100.00	O
EDF DIN UK Ltd.	UK	100.00	100.00	O
Wagram Insurance Company Ltd.	Ireland	100.00	100.00	O
EDF Investissements Groupe SA	Belgium	93.89	93.89	O
Océane Re	Luxembourg	99.98	99.98	O
EDF Gas Deutschland GmbH	Germany	100.00	100.00	O

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

### 51.2 COMPANY HELD IN THE FORM OF JOINT OPERATIONS

		Percentage of ownership at 31/12/2017	Percentage of ownership at 31/12/2016	Business sector
<b>OTHER ACTIVITIES</b>				
Friedeburger Speicherbetriebsgesellschaft GmbH (Crystal)	Germany	50.00	50.00	O

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

### 51.3 COMPANIES ACCOUNTED FOR BY THE EQUITY METHOD

		Percentage of ownership at 31/12/2017	Percentage of ownership at 31/12/2016	Business sector
<b>FRANCE –GENERATION AND SUPPLY</b>				
CTE (formerly C25) <sup>(1)</sup>	France	50.10	100.00	O
Elisandra IV (Madrileña Red de Gas Holding) (EDF Invest)	Spain	20.00	20.00	O
Alba Real Estate SCS (EDF Invest)	Luxembourg	46.50	46.50	O
Géosel Manosque (EDF Invest)	France	38.35	25.00	O
Transport Stockage Hydrocarbures (TSH) (EDF Invest)	France	50.00	50.00	O
Central Sicaf (EDF Invest)	Italy	20.00	-	O
Thyssengaz (EDF Invest)	Germany	50.00	-	O
Aéroports Côte d'Azur (EDF Invest)	France	19.40	-	O
<b>FRANCE –REGULATED ACTIVITIES</b>				
RTE Réseau de Transport d'Électricité (RTE) <sup>(2)</sup>	France	n.a.	100.00	T
<b>OTHER INTERNATIONAL</b>				
Compagnie Énergétique de Sinop (CES)	Brazil	51.00	51.00	G
Constellation Energy Nuclear Group LLC (CENG)	USA	49.99	49.99	G
SLOE Centrale Holding BV	Netherlands	50.00	50.00	G
Shandong Zhonghua Power Company, Ltd.	China	19.60	19.60	G
Datang Sanmenxia Power Generation Co., Ltd.	China	35.00	35.00	G
Taishan Nuclear Power Joint Venture Company Ltd. (TNPJVC)	China	30.00	30.00	G
Jiangxi Datang International Fuzhou Power Generation Company Ltd.	China	49.00	49.00	G
Nam Theun 2 Power Company (NTPC)	Laos	40.00	40.00	G
Alpiq	Switzerland	25.04	25.04	G, D, T,O
<b>OTHER ACTIVITIES</b>				
Domofinance SA	France	45.00	45.00	O

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.  
n.a: not applicable.

(1) Coentreprise de Transport d'Electricité or CTE (formerly C25), the company holding 100% of RTE. This joint venture was fully consolidated at 31 December 2016.  
(2) At 31 December 2017 is now consolidated as part of the CTE subgroup, in the France – Generation and supply segment.

### 51.4 COMPANIES IN WHICH THE EDF GROUP'S VOTING RIGHTS DIFFER FROM ITS PERCENTAGE OWNERSHIP

The percentage of voting rights, which is decisive for assessing control, differs from the Group's percentage ownership for the following entities:

	Percentage of ownership at 31/12/2017	Percentage of voting rights at 31/12/2017
Edison SpA	97.45	99.48
EDF Investissements Groupe SA	93.89	50.00

## NOTE 52 STATUTORY AUDITORS' FEES

The following table sets forth the fees paid for work done by the Statutory Auditors and their network during 2017:

	Deloitte network		KPMG network	
	Amount (excluding taxes)	%	Amount (excluding taxes)	%
<i>(In thousands of euros)</i>				
<b>Audit</b>				
Statutory audit, certification, review of company and consolidated accounts				
EDF	3,103	22.1	3,012	19.7
Controlled entities <sup>(1)</sup>	5,133	36.4	10,024	65.6
<b>SUB-TOTAL</b>	<b>8,236</b>	<b>58.5</b>	<b>13,036</b>	<b>85.3</b>
<b>Non-audit services <sup>(2)</sup></b>				
EDF	906	6.4	778	5.1
Controlled entities <sup>(1)</sup>	4,944	35.1	1,473	9.6
<b>SUB-TOTAL</b>	<b>5,850</b>	<b>41.5</b>	<b>2,251</b>	<b>14.7</b>
<b>TOTAL</b>	<b>14,086</b>	<b>100</b>	<b>15,287</b>	<b>100</b>

(1) Fully consolidated subsidiaries and jointly controlled entities whose auditors' fees are included in the consolidated income statement.

(2) Services required by laws and regulations, and services supplied at the request of the Group. Non-audit services mainly correspond to (i) due diligence work for the capital increase of March 2017, (ii) certifications of financial and accounting information or Independent Reports on social, environmental and societal information required under article L. 225-102-1 of the French Commercial Code, (iii) services relating to disposals of entities, (iv) tax services authorised by local legislation, and (v) operating process reviews and information system consulting services that are unrelated to the production of accounting and financial information.

### Statutory Auditors' fees for 2016

The following table sets forth the fees paid for work done by the Statutory Auditors and their network during 2016:

	Deloitte network		KPMG network	
	Amount (excluding taxes)	%	Amount (excluding taxes)	%
<i>(In thousands of euros)</i>				
<b>Audit</b>				
Statutory audit, certification, review of company and consolidated accounts				
EDF	3,701	21.8	3,535	26.0
Controlled entities	6,787	40.0	8,639	63.7
<b>SUB-TOTAL</b>	<b>10,488</b>	<b>61.8</b>	<b>12,174</b>	<b>89.7</b>
<b>Non-audit services</b>				
EDF	1,973	11.6	448	3.3
Controlled entities	4,507	26.6	951	7.0
<b>SUB-TOTAL</b>	<b>6,480</b>	<b>38.2</b>	<b>1,399</b>	<b>10.3</b>
<b>TOTAL</b>	<b>16,968</b>	<b>100</b>	<b>13,573</b>	<b>100</b>

## 6.2 STATUTORY AUDITORS' REPORT ON THE CONSOLIDATED FINANCIAL STATEMENTS

### For the year ended December 31, 2017

*This is a translation into English of the Statutory Auditors' report on the consolidated financial statements of the Company issued in French and it is provided solely for the convenience of English speaking users.*

*This Statutory Auditors' report includes information required by European regulation and French law, such as information about the appointment of the Statutory Auditors or verification of the information concerning the Group presented in the management report. This report should be read in conjunction with, and construed in accordance with, French law and professional auditing standards applicable in France.*

To the Shareholders,

#### Opinion

In compliance with the engagement entrusted to us by your General Meeting, we have audited the accompanying consolidated financial statements of Électricité de France S.A. (« EDF », the « Company » or the « Group ») for the year ended December 31, 2017.

In our opinion, the consolidated financial statements give a true and fair view of the assets and liabilities and of the financial position of the Group as at December 31, 2017 and of the results of its operations for the year then ended in accordance with International Financial Reporting Standards as adopted by the European Union.

The audit opinion expressed above is consistent with our report to the Audit Committee.

#### Basis for Opinion

##### Audit Framework

We conducted our audit in accordance with professional standards applicable in France. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our responsibilities under those standards are further described herein in the *Statutory Auditors' Responsibilities for the Audit of the Consolidated Financial Statements* section of our report.

#### Independence

We conducted our audit engagement in compliance with independence rules applicable to us, for the period from January 1, 2017 to the date of our report and specifically we did not provide any prohibited non-audit services referred to in Article 5(1) of Regulation (EU) No 537/2014 or in the French Code of ethics (*Code de Déontologie*) for Statutory Auditors.

#### Justification of Assessments – Key Audit Matters

In accordance with the requirements of Articles L. 823-9 and R. 823-7 of the French Commercial Code (*Code de Commerce*) relating to the justification of our assessments, we inform you of the key audit matters relating to risks of material misstatement that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current period, as well as how we addressed those risks.

These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on specific items of the consolidated financial statements.

### VALUATION OF PROVISIONS RELATED TO NUCLEAR GENERATION IN FRANCE – BACK-END OF THE NUCLEAR CYCLE, PLANT DECOMMISSIONING AND LAST CORES – AND DEDICATED ASSETS

*Notes 1.3.2.1, 1.3.16.2.2, 1.3.21.1, 29 and 47 to the consolidated financial statements*

#### Key Audit Matter

As at December 31, 2017, the provisions recorded to cover obligations relating to nuclear power plants for which EDF is the operator in France total €37,633 million, including €20,326 million with respect to the back-end of the nuclear cycle (management of spent fuel and radioactive waste) and €17,307 million with respect to the decommissioning of nuclear power plants and last cores.

The valuation of these provisions is described in Notes 1.3.2.2, 1.3.21.1 and 29.1. It requires defining technical and financial assumptions and using complex calculation models and falls within the scope of the regulatory context described in Note 29.1.

They are updated and the assumptions taken into consideration in the models are reviewed at least once a year. These assumptions reflect management's best estimate at the reporting date of the impacts of the applicable regulation, the implementation of decommissioning and storage processes or changes in the main financial parameters.

Furthermore, the Company is required to allocate so-called "dedicated" assets to secure financing of certain categories of nuclear provisions in France. The realisable value of these assets should allow the Company's commitments relating to the decommissioning of nuclear power plants and long-term storage of radioactive waste in France to be covered (Notes 1.3.16.2.2. and 47). The realisable value of these dedicated assets, for an amount of €28,115 million (or a net carrying amount of €26,502 million) as of December 31, 2017, was determined based on the fair value of diversified equity and bonds investments, and the fair value or the equity value of non-listed assets managed by EDF Invest.

#### Responses

We have analysed the measures for recognising provisions related to nuclear generation in France and gained an understanding of the industrial scenarios for decommissioning nuclear power plants and the solutions adopted in terms of management of spent fuel and radioactive waste. We have assessed the compliance of the provisions with regard to applicable accounting, legal and regulatory measures.

We have verified the calculation models used by the Company and assessed the sensitivity of the valuations to the assumptions adopted in terms of cost, forecast cash outflows and financial parameters (discount and inflation rates).

Our work also consisted in verifying the type of costs used to determine provisions, assessing the consistency of industrial scenarios adopted by the Company and verifying the reconciliation of forecast costs and forecast cash outflows with these scenarios as well as the available studies and quotes.

We have also assessed the reasonableness of:

- margins for uncertainties and risks included in the provisions, to take into account the degree of control over decommissioning techniques and the management of spent fuel and radioactive waste.
- the series and mutualisation effects adopted in the quotes for decommissioning nuclear power plants in operation, for which the nominal cost represents €20,563 million to economic conditions at the end of the period, for a provision of €11,616 million in discounted value (Notes 29.1.3 and 29.1.5.2).

### VALUATION OF PROVISIONS RELATED TO NUCLEAR GENERATION IN FRANCE – BACK-END OF THE NUCLEAR CYCLE, PLANT DECOMMISSIONING AND LAST CORES – AND DEDICATED ASSETS

Notes 1.3.2.1, 1.3.16.2.2, 1.3.21.1, 29 and 47 to the consolidated financial statements

Key Audit Matter	Responses
<p>We considered the valuation of nuclear provisions and dedicated assets to be a key audit matter due to:</p> <ul style="list-style-type: none"> <li>the sensitivity of the assumptions on which the valuation of these provisions is based, notably in terms of cost, inflation and long-term discount rates, as well as the depreciation periods of nuclear power plants in operation, and forecast cash outflows; the modification of these parameters can lead to a material revision in the provisioned amounts;</li> <li>the negative impacts on the financial position of the Company (cash earmarked to increase the amount of dedicated assets) in the event of an increase in nuclear provisions in France, a change in the realisable values of dedicated assets or changes in the coverage rate of nuclear provisions for dedicated assets,</li> </ul> <p>it being specified that the valuation of provisions covers and includes uncertainties related to the fact that certain scenarios and technical solutions have never been implemented.</p>	<p>Concerning the inflation and discount rates adopted by management, we have verified their compliance with applicable accounting standards and regulatory measures, notably the ministerial order of March 21, 2007, as amended. We have reconciled the data used for this purpose with market data and available historical information.</p> <p>Concerning the securing of financing for certain of these provisions through dedicated assets, we have verified, by sampling, the portfolio movements and reconciled the realisable value of the dedicated assets in the portfolio at the reporting date with the available certificate of depository statements and available external valuations. We have also assessed the accounting treatment and their valuation, in particular, the compliance with the accounting standard of the impairment criteria described in Note 1.3.16.2.2.</p> <p>Finally, we have verified the appropriateness of the disclosures given for the provisions related to nuclear generation in France and the dedicated assets in the notes to the consolidated financial statements, notably regarding the sensitivity of the valuation of provisions to changes in macro-economic assumptions (Note 29.1.5.2).</p>

### VALUATION OF GOODWILL, INTANGIBLE ASSETS WITH INDEFINITE USEFUL LIFE, PROPERTY, PLANTS AND EQUIPMENTS, AND INVESTMENTS IN ASSOCIATES AND JOINT VENTURES

Notes 1.3.2.4, 1.3.15, 13 and 23 to the consolidated financial statements

Key Audit Matter	Responses
<p>As at December 31, 2017, the goodwill, intangible assets with indefinite useful life and investments in associates and joint ventures represent 45% of the Group's equity. They are mainly related to non-regulated activities in which the EDF group operates.</p> <p>Notes 1.3.2.4, 1.3.15 and 13 describe the methodologies adopted and applied to determine if indicators exist showing that an asset may be subject to an impairment loss. These notes also describe the methods for performing impairment tests. The tests and the determination of recoverable amounts are carried out annually at the cash-generating unit (CGU) level for those holding intangible assets with indefinite lives or goodwill. The recoverable amount corresponds, for the majority of these CGU, to the value in use determined based on the discounted value of future cash flows.</p> <p>We considered the valuation of non-regulated assets in France, the United Kingdom, in Italy and associates in the United States, to be a key audit matter, due to the sensitivity of valuations to macro-economic, industry and financial assumptions to determine recoverable amounts and the estimates and judgments that they require from management.</p> <p>In particular, an unfavorable and volatile market with low electricity market prices and persistent electricity generation over-capacity, added to a stagnation of the demand for energy in the main markets where EDF operates, significantly decreases the recoverable amount of certain goodwill, intangible assets, property, plant and equipment or investments in associates and joint ventures allocated to non-regulated activities and may lead to significant impairment losses.</p>	<p>As part of our work, we analysed the existence of indicators of impairment losses at the CGU level. We have also gained an understanding of the process for formulating estimates and assumptions made by management as part of impairment testing and we have also assessed the appropriateness of the valuation model.</p> <p>We have verified, for the CGU tested, that the discounted future cash flow projections correspond to those generated by the assets included in these CGU and that they were consistent with (i) the budget data, medium-term plans (MTP) and, beyond, with the Group's long-term assumptions, (ii) past performances, (iii), market outlook and (iv) the expected operating life of the assets.</p> <p>We have assessed, by conducting interviews with management, the different underlying assumptions (economic growth, price of raw material and CO<sub>2</sub>, electricity demands, production capacities and interconnections and changes in energetic mix) on which the medium and long-term price assumptions are based, by substantiating them with external studies carried out by international organisms or experts in energy.</p> <p>We have verified the determination methods and the consistency of the discount rate assumptions, based on the weighted average cost of capital (WACC) by geographic area and by activity and, in particular, analysed, with the assistance of our internal experts, the consistency of risk-free rates and the risk premiums adopted by management with the underlying market assumptions.</p> <p>If necessary, we have assessed the highly probable aspect of the disposals decided by the Group and the items considered to evaluate the recoverable amount.</p> <p>Finally, we have assessed if Notes 1.3.15 and 13 of the consolidated financial statements provide appropriate disclosure in particular in terms of assumptions adopted to perform impairment tests and sensitivity analyses.</p>

### Verification of the Information Pertaining to the Group Presented in the Management Report

As required by law, we have also verified in accordance with professional standards applicable in France the information pertaining to the Group presented in the management report of the Board of Directors.

We have no matters to report as to its fair presentation and its consistency with the consolidated financial statements.

### Report on Other Legal and Regulatory Requirements

#### Appointment of the Statutory Auditors

We were appointed as Statutory Auditors of Electricité de France S.A. by the General Meeting of June 6, 2005 for KPMG Audit and the by decision of the Board of Directors of April 25, 2002 for Deloitte & Associés.

As at December 31, 2017, KPMG Audit was in the 13<sup>th</sup> year of total uninterrupted engagement and Deloitte & Associés was in the 16<sup>th</sup> year of total uninterrupted engagement, which for both 13 years since securities of the Company were admitted to trading on a regulated market.

### Responsibilities of Management and Those Charged with Governance for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with International Financial Reporting Standards as adopted by the European Union, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless it is expected to liquidate the Company or to cease operations.

The Audit Committee is responsible for monitoring the financial reporting process and the effectiveness of internal control and risks management systems and where applicable, its internal audit, regarding the accounting and financial reporting procedures.

The consolidated financial statements were approved by the Board of Directors.

### Statutory Auditors' Responsibilities for the Audit of the Consolidated Financial Statements

#### Objectives and audit approach

Our role is to issue a report on the consolidated financial statements. Our objective is to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in

accordance with professional standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As specified in Article L. 823-10-1 of the French Commercial Code (*Code de Commerce*), our statutory audit does not include assurance on the viability of the Company or the quality of management of the affairs of the Company.

As part of an audit conducted in accordance with professional standards applicable in France, the Statutory Auditor exercises professional judgment throughout the audit and furthermore:

- identifies and assesses the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, designs and performs audit procedures responsive to those risks, and obtains audit evidence considered to be sufficient and appropriate to provide a basis for his opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtains an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the internal control;
- evaluates the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management in the consolidated financial statements;
- assesses the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. This assessment is based on the audit evidence obtained up to the date of his audit report. However, future events or conditions may cause the Company to cease to continue as a going concern. If the Statutory Auditor concludes that a material uncertainty exists, there is a requirement to draw attention in the audit report to the related disclosures in the consolidated financial statements or, if such disclosures are not provided or inadequate, to modify the opinion expressed therein;
- evaluates the overall presentation of the consolidated financial statements and assesses whether these statements represent the underlying transactions and events in a manner that achieves fair presentation;
- obtains sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. The Statutory Auditor is responsible for the direction, supervision and performance of the audit of the consolidated financial statements and for the opinion expressed on these consolidated financial statements.

## 6. FINANCIAL STATEMENTS

### Statutory Auditors' report on the consolidated financial statements

#### Report to the Audit Committee

We submit a report to the Audit Committee which includes in particular a description of the scope of the audit and the audit program implemented, as well as the results of our audit. We also report, if any, significant deficiencies in internal control regarding the accounting and financial reporting procedures that we have identified.

Our report to the Audit Committee includes the risks of material misstatement that, in our professional judgment, were of most significance in the audit of the

consolidated financial statements of the current period and which are therefore the key audit matters, that we are required to describe in this report.

We also provide the Audit Committee with the declaration provided for in Article 6 of Regulation (EU) N° 537/2014, confirming our independence within the meaning of the rules applicable in France such as they are set in particular by Articles L.822-10 to L.822-14 of the French Commercial Code (*Code de Commerce*) and in the French Code of Ethics (*Code de Déontologie*) for Statutory Auditors. Where appropriate, we discuss with the Audit Committee the risks that may reasonably be thought to bear on our independence, and the related safeguards.

Paris La Défense and Neuilly-sur-Seine, February 15, 2018

#### The Statutory Auditors

##### KPMG Audit

*Department of KPMG S.A.*

Jay Nirsimloo

Michel Piette

##### Deloitte & Associés

Damien Leurent

Anthony Maarek



## 6.3 FINANCIAL STATEMENTS

NB: Most figures in the tables are reported in millions of Euros. The resulting approximation can lead to slight differences in totals or movements and changes.

### INCOME STATEMENT

<i>(in millions of euros)</i>	Notes	2017	2016
<b>SALES <sup>(1)</sup></b>	<b>4</b>	<b>42,371</b>	<b>40,857</b>
Change in inventories and capitalised production		1,138	1,127
Operating subsidies	5	6,558	6,532
Reversals of provisions and depreciation	6	3,231	3,808
Other operating income and transfers of charges	7	823	784
<b>I TOTAL OPERATING INCOME</b>		<b>54,121</b>	<b>53,108</b>
<b>Purchases and other external expenses</b>	<b>8</b>	<b>36,723</b>	<b>33,408</b>
Fuel purchases used		3,186	2,894
Energy purchases		15,870	12,427
Services and other purchases used		17,667	18,087
<b>Taxes other than Income taxes</b>	<b>9</b>	<b>2,567</b>	<b>2,616</b>
<b>Personnel expenses</b>	<b>10</b>	<b>6,754</b>	<b>6,874</b>
<b>Depreciation, amortisation and provisions</b>	<b>11</b>	<b>5,441</b>	<b>5,550</b>
Depreciation and amortisation	11.1	3,366	2,904
Provision and impairment	11.2	2,075	2,646
<b>Other operating expenses</b>	<b>12</b>	<b>1,644</b>	<b>1,482</b>
<b>II TOTAL OPERATING EXPENSES</b>		<b>53,129</b>	<b>49,930</b>
<b>OPERATING PROFIT (I - II)</b>		<b>992</b>	<b>3,178</b>
<b>III JOINT OPERATIONS</b>		<b>1</b>	<b>6</b>
<b>IV FINANCIAL RESULT</b>	<b>13</b>	<b>(988)</b>	<b>(1,264)</b>
<b>PROFIT OR LOSS BEFORE INCOME TAXES AND EXCEPTIONAL ITEMS (I - II + III + IV)</b>		<b>5</b>	<b>1,920</b>
<b>V EXCEPTIONAL RESULT</b>	<b>14</b>	<b>1,232</b>	<b>4,277</b>
<b>VI INCOMES TAXES</b>	<b>15</b>	<b>687</b>	<b>(680)</b>
<b>PROFIT OR LOSS (I - II + III + IV + V + VI)</b>		<b>1,924</b>	<b>5,517</b>

(1) Production of goods for export in 2017: €8,022 million; production of services for export in 2017: €537 million.

## BALANCE SHEET

### ASSETS

	Notes	31/12/2017			31/12/2016
		Gross values	Amortisation, depreciation and impairment	Net values	Net values
<i>(in millions of euros)</i>					
Intangible assets	16 -17	1,833	900	933	868
Property, plant and equipment owned by EDF	16 -17	82,533	56,467	26,066	25,022
Property, plant and equipment operated under concessions	16 -17	14,415	8,544	5,871	5,782
Tangible and intangible assets in progress	16 -17	19,843	188	19,655	17,600
Investments and related receivables		58,649	204	58,445	55,546
Investment securities		18,144	52	18,092	16,775
Loans and other financial assets		12,389	3	12,386	13,868
<b>Financial assets</b>	<b>18</b>	<b>89,182</b>	<b>259</b>	<b>88,923</b>	<b>86,189</b>
<b>Total I FIXED ASSETS</b>		<b>207,806</b>	<b>66,358</b>	<b>141,448</b>	<b>135,461</b>
Inventories and work-in-progress	19	10,163	194	9,969	10,126
Advances on orders	20	786	1	785	968
Trade and other receivables	20	21,245	454	20,791	21,921
Marketable securities	21	14,538	11	14,527	17,194
Cash instruments	20	2,096	-	2,096	4,610
Cash and cash equivalents	22	5,110	-	5,110	5,457
Prepaid expenses	20	1,358	-	1,358	1,334
<b>Total II CURRENT ASSETS</b>		<b>55,296</b>	<b>660</b>	<b>54,636</b>	<b>61,610</b>
Deferred charges (III)		265	-	265	285
Bond redemption premiums (IV)		681	228	453	490
Unrealised foreign exchange losses (V)	23	572	-	572	1,083
<b>TOTAL ASSETS (I + II + III + IV + V)</b>		<b>264,620</b>	<b>67,246</b>	<b>197,374</b>	<b>198,929</b>

## EQUITY AND LIABILITIES

<i>(in millions of euros)</i>	Notes	31/12/2017	31/12/2016
<b>Capital</b>		1,464	1,055
<b>Capital-related premiums</b>		14,866	9,847
<b>Revaluation surplus</b>		680	679
<b>Reserves</b>			
Legal reserves		105	101
Other reserves		3,000	3,000
<b>Retained earnings</b>		6,809	3,317
<b>Profit or loss for the financial year</b>		1,924	5,517
<b>Interim dividend</b>		(433)	(1,006)
<b>Investment subsidies</b>		163	169
<b>Tax-regulated provisions</b>		6,098	6,132
<b>EQUITY</b>	24	34,676	28,812
<b>Additional equity</b>	25	10,449	11,038
<b>Special concession accounts</b>	26	2,159	2,120
<b>TOTAL I EQUITY AND CONCESSION ACCOUNTS</b>		47,284	41,970
<b>Provisions for risks</b>	27	1,384	2,189
Provisions related to nuclear generation (Back-end of the nuclear cycle, plant decommissioning and last cores)	28	37,633	36,033
Provisions for decommissioning of non-nuclear facilities	29	626	617
Provisions for employee benefits	30	11,055	10,846
Provisions for other expenses	31	938	879
<b>Provisions for expenses</b>		50,252	48,375
<b>TOTAL II PROVISIONS</b>		51,636	50,564
<b>Financial liabilities</b>	33	51,441	56,861
<b>Advances and progress payments received</b>	32	6,861	7,068
<b>Operating, investment and other liabilities</b>	32	31,911	33,172
<b>Cash instruments</b>	32	4,471	5,283
<b>Deferred income</b>	32	3,285	3,627
<b>TOTAL III LIABILITIES</b>	32	97,969	106,011
<b>Unrealised foreign exchange gains (IV)</b>	34	485	384
<b>TOTAL EQUITY AND LIABILITIES (I + II + III + IV)</b>		197,374	198,929

## CASH FLOW STATEMENT

<i>(in millions of euros)</i>	Notes	2017	2016
<b>Operating activities:</b>			
Profit/(loss) before income tax		1,237	6,198
Amortisation, depreciation and provisions		4,010	3,082
Capital (gains)/losses <sup>(1)</sup>		(859)	(3,873)
Financial income and expenses		(827)	(405)
Changes in working capital		2,530	2,335
<b>NET CASH FLOW FROM OPERATIONS</b>		<b>6,091</b>	<b>7,337</b>
Net financial expenses, including dividends received		620	1,749
Income taxes paid		(677)	(621)
<b>NET CASH FLOW FROM OPERATING ACTIVITIES (A)</b>		<b>6,034</b>	<b>8,465</b>
<b>Investing activities:</b>			
Investments in property, plant and equipment and intangible assets		(5,984)	(6,001)
Proceeds from sale of property, plant and equipment and intangible assets		17	16
Changes in financial assets <sup>(2)</sup>		1,022	(1,676)
<b>NET CASH FLOW USED IN INVESTING ACTIVITIES (B)</b>		<b>(4,945)</b>	<b>(7,661)</b>
<b>Financing activities:</b>			
Issuance of borrowings and underwriting agreements		1,282	6,130
Repayment of borrowings and underwriting agreements		(5,204)	(8,645)
Dividends paid	24	(110)	(165)
Capital increase	24	4,005	-
Issuance of perpetual subordinated bonds		-	-
Funding contributions received for assets operated under concessions		8	7
Investment subsidies		4	8
<b>NET CASH FLOW FROM FINANCING ACTIVITIES (C)</b>		<b>(15)</b>	<b>(2,665)</b>
<b>NET INCREASE/(DECREASE) IN CASH AND CASH EQUIVALENTS (A)+(B)+(C)</b>		<b>1,074</b>	<b>(1,861)</b>
<b>CASH AND CASH EQUIVALENTS - OPENING BALANCE</b>	<b>22</b>	<b>(3,981)</b>	<b>(2,427)</b>
Effect of currency fluctuations		(23)	250
Financial income on cash and cash equivalents		55	57
<b>CASH AND CASH EQUIVALENTS - CLOSING BALANCE <sup>(3)</sup></b>	<b>22</b>	<b>(2,875)</b>	<b>(3,981)</b>

(1) Including the gain on the sale of all the shares of RTE to the new company CTE (formerly C25): €388 million in 2017 and €3,780 million in 2016 (see note 2.4).

(2) In 2017, "Changes in financial assets" include the acquisition of Framatome for €1,894 million (see note 2.2). In 2016 this item included an amount of €1,538 million received upon assignment of a portion (26.4%) of the CSPE receivable. The receivable assigned comprised a €644 million component that was not allocated to dedicated assets. In 2016 this item also included a cash consideration of €2,667 million received for the RTE shares transferred to CTE (formerly C25).

(3) "Cash and cash equivalents – opening balance" and "Cash and cash equivalents – closing balance" do not include investment funds, nor negotiable debt instruments maturing in more than three months. However, they do include cash management agreements with subsidiaries and cash pooling agreements with C2, C3 and EDF Holding SAS. Details of the variation in cash and cash equivalents are presented in note 22.

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Électricité de France SA (EDF), the parent company of the EDF group, is a French société anonyme operating in electricity generation and electricity and gas supply. EDF also covers all the business activities of Island Energy Systems (SEI) for Corsica and France's overseas departments.

## **NOTE 1 ACCOUNTING PRINCIPLES AND METHODS**

### **1.1 ACCOUNTING STANDARDS**

EDF's financial statements are prepared in accordance with the accounting principles and methods defined by the French national chart of accounts (*Plan Comptable Général*), as presented by regulation 2014-03 of 5 June 2014 concerning the chart of accounts issued by the ANC (*Autorité des normes comptables*, France's Accounting Standards Authority).

Regulation 2015-05 of 2 July 2015 concerning forward financial instruments and hedging operations became mandatory from 1 January 2017.

The first application of this regulation constitutes a change of accounting method. The after-tax effect, calculated retrospectively for operations existing at 1 January 2017 only, amounts to €84 million and has been charged to retained earnings (see footnote (1) to note 24).

Implementation of this regulation has led to the following changes:

- discontinuation of recognition of unrealised gains on the foreign exchange optimisation portfolio, which were previously included in the financial result and are now recognised in the balance sheet in the revaluation surplus (while unrealised losses remain in the financial result). The impact on equity is not significant;
- application of hedge accounting to currency derivatives that were previously treated as speculative derivatives but are now considered as management hedging instruments (and included in the financial result). In general, the unrealised gain or loss on currency derivatives classified as hedging instruments is recorded in the balance sheet in the revaluation surplus accounts created by the new regulation. These accounts are netted with the translation adjustment booked in respect of the hedged items. The after-tax impact on equity amounts to €87 million;
- the unrealised gain or loss on derivatives held to hedge commodity purchases is recorded in a similar way to the hedged items. The after-tax impact on equity amounts to €(3) million;
- foreign exchange gains and losses on trade receivables and payables are recorded in operating income and expenses and no longer in the financial result.

At 31 December 2017, application of the new regulation to operations concerning the 2017 financial year resulted in:

- a €51 million decrease in the financial result due to mandatory application of hedge accounting when a management operation is identified as a hedging relationship;
- reclassification of gains and losses on trade receivables and payables amounting to €21 million from financial result to operating income.

The other accounting and valuation methods are identical to those used in the financial statements for the year ended 31 December 2016.

### **1.2 MANAGEMENT JUDGMENTS AND ESTIMATES**

The preparation of the financial statements requires the use of judgments, best estimates and assumptions in determining the value of assets and liabilities, income and expenses recorded for the period, considering positive and negative contingencies existing at year-end. The figures in EDF's future financial statements could differ significantly from current estimates due to changes in these assumptions or economic conditions.

In a context characterised by financial market volatility, the parameters used to prepare estimates are based on macro-economic assumptions appropriate to the very long-term cycle of EDF's assets.

The principal operations for which EDF uses estimates and judgments are the following:

#### **1.2.1 Depreciation period of nuclear power plants**

In the specific case of the depreciation period of its nuclear power plants, EDF's industrial strategy is to continue operation beyond 40 years, in optimum conditions as regards safety and efficiency.

During 2016, all the technical, economic and governance conditions for extending the depreciation period of 900MW series power plants were fulfilled. EDF therefore extended this period as of 1 January 2016 for all 900MW power plants, with the exception of Fessenheim (see note 2.1 to the 2016 financial statements: Extension to 50 years of the depreciation period of the 900MW PWR series).

The depreciation period of other series (1300MW and 1450MW), which are more recent, is currently unchanged at 40 years, as the conditions for extension are not yet fulfilled.

These depreciation periods take into account the date of recoupling with the network after the most recent 10-year inspection.

#### **1.2.2 Nuclear provisions**

The measurement of provisions for the back-end of the nuclear cycle, decommissioning and last cores is sensitive to assumptions concerning technical processes, costs, inflation rates, long-term discount rates, the depreciation period of plants currently in operation and disbursement schedules.

These parameters are therefore re-estimated at each closing date to ensure that the amounts accrued correspond to the best estimate of the costs eventually to be borne by EDF.

EDF considers that the assumptions used at 31 December 2017 are appropriate and justified. However, any future change in assumptions could have a significant impact on EDF's balance sheet and income statement.

The main assumptions and sensitivity analyses relating to nuclear provisions are presented in note 28.5.

The calculation of provisions incorporates a level of risks and unknowns as appropriate to the operations concerned. The valuation of costs carries uncertainty factors such as:

- changes in the regulations, particularly on safety, security and environmental protection, and financing of nuclear expenses;
- changes in the regulatory decommissioning process and the time necessary for issuance of administrative authorisation;
- future methods for storing long-lived radioactive waste and provision of storage facilities by the French agency for radioactive waste management ANDRA (*Agence nationale pour la gestion des déchets radioactifs*);
- changes in certain financial parameters such as discount rates, notably in relation to the regulatory limit, inflation rates, or changes in the contractual terms of spent fuel management.

#### **1.2.3 Pensions and other long-term and post-employment benefit obligations**

The value of pensions and other long-term and post-employment benefit obligations is based on actuarial valuations that are sensitive to all the actuarial assumptions used, particularly concerning discount rates, inflation rates and wage increase rates.

The principal actuarial assumptions used to calculate these post-employment and long-term benefits at 31 December 2017 are presented in note 30.4. These assumptions are updated annually. EDF considers the actuarial assumptions used at 31 December 2017 appropriate and well-founded, but future changes in these assumptions could have a significant effect on the amount of the obligations and EDF's net income.

### 1.2.4 Energy supplied but not yet measured and billed

As explained in note 1.3, the quantities of energy supplied but not yet measured and billed are calculated at the reporting date based on consumption statistic models and selling price estimates. Determination of the unbilled portion of sales revenues at the year-end is sensitive to the assumptions used to prepare these statistics and estimates.

## 1.3 SALES

Sales essentially comprise income from energy sales (to final customers and as part of trading activities), and sales of services. EDF's energy sales revenues include delivery services through the energy distribution network purchased from the subsidiary Enedis and invoiced to end-customers.

Sales are recognised when delivery of goods has taken place or the service has been completed.

The quantities of energy delivered to EDF customers but not yet measured and billed at the end of the period are calculated based on the quantities used by the sites of the EDF balance-responsible entity less the quantities billed, after losses measured by a statistical method presented to the *Commission de régulation de l'énergie* (CRE), the French Energy Regulation Commission. These quantities are valued using an average price determined by reference to energy invoiced in the previous month.

Sales of goods and services not completed at the balance sheet date are valued by reference to the stage of completion at that date.

Sales of energy to EDF Trading, the Group's trading company, are recorded at their contractually stipulated amount.

### 1.3.1 Capacity mechanism

A capacity mechanism had been set up in France to ensure secure power supplies during peak periods.

French law 2010-1488 of 7 December 2010 on the new organisation of the electricity market introduced an obligation in France to contribute to power supply security from January 2017.

Operators of electricity generation facilities and load-shedding operators must have their capacities certified by RTE, and commit to a forecast level of availability for a given year of delivery. In return, they are awarded capacity certificates. Meanwhile, electricity suppliers and purchasers of power to compensate for network losses (obligated actors) must have capacity certificates equivalent to consumption by their customers in peak periods.

The system is completed by registers for trading of capacities between actors. Capacity auctions are held several times a year.

EDF is concerned by both aspects of this system, both as an operator of electricity installations and as an electricity supplier.

The operations are recorded as follows:

- sales of certificates are recognised in income when the auctions or over-the-counter sales take place;
- stocks of certificates are stated either at their certification value (*i.e.* cost of certification by RTE) or at their purchase value on the markets;
- decreases in the stock of certificates are valued at the weighted average unit cost. The timing of recognition depends on the actor:
  - operators of installations: when the auction sales take place,
  - obligated actors: spread on a straight-line basis over the 5-month peak period;

- for obligated actors, if there is a shortfall in the stocks of capacity certificates, a provision is recorded equivalent to the best estimate of the expense necessary to extinguish the obligation;
- at the closing date, if the realisable value of the stock of capacity certificates is lower than its net book value, impairment is recognised.

## 1.4 INTANGIBLE ASSETS

### 1.4.1 Research and development expenses

Research expenses are recognised as expenses in the financial period incurred.

Development costs that meet the requirements for capitalisation laid down in Article 211-5 of the French national chart of accounts are included in intangible assets and amortised on a straight-line basis over their foreseeable useful life.

### 1.4.2 Other intangible assets

Other intangible assets mainly consist of software and storage capacity reservation costs.

They are amortised on a straight-line basis over their useful lives regardless of whether they are generated in-house or purchased.

## 1.5 PROPERTY, PLANT AND EQUIPMENT

EDF's property, plant and equipment is reported under two balance sheet headings, as appropriate to the business and contractual circumstances of the assets' use:

- property, plant and equipment owned by EDF, essentially nuclear generation facilities;
- property, plant and equipment operated under concessions.

### 1.5.1 Initial measurement

Property, plant and equipment is recorded at acquisition or production cost.

- The cost of facilities developed in-house includes all labour and materials costs, and all other production costs attributable to the construction of the asset.
- The cost of property, plant and equipment also includes the initial estimate of decommissioning costs. These assets are associated with the provisions recorded to cover decommissioning obligations. At the date of commissioning, property, plant and equipment is measured and recorded in the same way as the corresponding provision (see note 1.15).
- Decommissioning costs for nuclear generation installations also include last core costs (see note 1.15).

When some of the decommissioning costs for a plant are to be borne by a partner, the expected reimbursement is recognised as accrued income in the assets. The difference between the provision and the accrued income is recorded in Property, plant and equipment, and subsequent payments by the partner are deducted from the accrued income.

EDF capitalises safety expenses incurred as a result of legal and regulatory obligations sanctioning non-compliance by an administrative ban from operation.

Strategic safety spare parts for generation facilities are treated as property, plant and equipment, and depreciated over the residual useful life of the installations.

The costs of major inspections that are necessary for continued operation by generation assets are capitalised and amortised over a period corresponding to the time elapsing between two inspections.

When a part of an asset has a different useful life from the overall asset's useful life, it is identified as an asset component and depreciated over a specific period.

Borrowing costs attributable to the financing of an asset incurred during the construction period are recognised as expenses.



## 1.5.2 Depreciation

Items of property, plant and equipment are depreciated on a straight-line basis over their useful life, defined as the period during which the Company expects to draw future economic benefits from their use.

The expected useful lives for the main facilities are as follows:

- hydroelectric dams 75 years;
- electromechanical equipment used in hydropower plants 50 years;
- fossil-fired power plants 25 to 45 years;
- nuclear generation facilities 40 to 50 years;
- distribution installations (lines, substations) 20 to 45 years.

## 1.5.3 Concession agreements

EDF is the operator for two types of public service concessions:

- public electricity distribution concessions in which the grantors are local authorities (municipalities or syndicated municipalities);
- hydropower concessions with the French State as grantor.

The accounting treatment of concessions is based on the 1975 accounting guide for concession operator firms, as there are no specific instructions in the national chart of accounts.

### 1.5.3.1 Public electricity distribution concessions

EDF is the concession operator for the island networks located in Corsica and France's overseas departments, generally under concession agreements using standard concession rules deriving from the 1992 Framework Contract (updated in 2007) negotiated with the National Federation of Licensing Authorities (*Fédération nationale des collectivités concédantes et régies* - FNCCR) and approved by the public authorities.

Assets used under concessions are reported in the balance sheet assets as property, plant and equipment operated under concessions, regardless of their initial financing, at acquisition cost or their estimated value at the transfer date when supplied by the grantor. An offsetting liability is recognised for any assets supplied for nil consideration by concession grantors.

### 1.5.3.2 Hydropower concessions

Hydropower concessions follow standard rules approved by Decree.

Hydropower concession assets consist solely of hydropower generation equipment (dams, pipes, turbines, etc) for initial concessions. In other concessions, they comprise hydropower generation equipment and switching facilities (alternators, etc).

Assets used in these concessions are recorded under "Property, plant and equipment operated under concessions" at acquisition cost.

Depreciation is calculated over their useful life, which is generally identical to the term of the concession.

Additional depreciation is booked in the balance sheet liabilities for assets operated under concessions (see 1.14.2).

## 1.6 LONG-TERM ASSET IMPAIRMENT

At each reporting date, EDF assesses whether there is an indication that an asset could have significantly lost value. If so, an impairment test is carried out as follows:

- EDF measures any long-term asset impairment by comparing the carrying value of these assets, combined into groups where necessary, and their recoverable amount, usually determined using the discounted future net cash flow method. When this recoverable amount is lower than the value in the balance sheet, an amount equivalent to the difference is written off under "Depreciation and impairment";
- the discount rates used for these purposes are based on the weighted average cost of capital (WACC) for each asset or group of assets concerned;

- future cash flows are based on Medium-Term Plans (MTPs) and assumptions validated by the management.

## 1.7 FINANCIAL ASSETS

### 1.7.1 Investments

Investments are carried at acquisition cost.

Gains and losses on sales of investments are valued using the FIFO (first in first out) method.

In accordance with Article 213–8 of the national chart of accounts, transfer duties, fees and commissions and legal fees related to acquisitions of investments are included in the cost of acquisition of the asset.

Expenses of this type relating to other shares are included in expenses. Tax-regulated amortisation of acquisition costs is recorded in an excess depreciation account.

When the book value of investments is higher than their value in use, impairment is recorded equivalent to the difference.

The value in use of listed securities in non-consolidated entities is based on stock market price.

For unlisted and listed securities in companies included in the EDF group consolidation, the value in use is determined by reference to the transaction value, equity value or net adjusted consolidated assets, taking into account expert valuation information and information that has become known since the previous year-end when necessary.

### 1.7.2 Investment securities

EDF has set up two investment portfolios:

- the first comprises dedicated financial assets intended to finance the end of nuclear fuel cycle operations, for which provisions have been accrued. These assets are managed separately from other financial assets and investments in view of their specific objective, and comprise bonds, equities, collective investment funds and "reserved" funds built up by EDF solely for its own use;
- the second comprises securities acquired to generate a satisfactory return on investment in the medium to long term, without participating in the management of the companies concerned.

Investment securities also include treasury shares that cover obligations relating to debt instruments providing access to the Company's capital, acquired under a liquidity contract with an investment services company or through an external operation or capital reduction.

Shares are recorded at acquisition cost. In compliance with Article 213–8 of ANC regulation 2014-03 on the national chart of accounts, transfer duties, professional fees, commissions, legal expenses and purchasing costs are all charged to expenses, applying the option used for other investments.

Investment securities (shares and bonds) are recorded at acquisition cost. If the year-end inventory value of a security is lower than the acquisition cost, the unrealised capital loss is fully covered by a provision without being netted against potential gains on other securities. The inventory value of listed securities is assessed individually, taking the stock market price into account. For unlisted securities, the inventory value is also assessed individually, mainly by reference to the growth prospects of the companies concerned and their share prices.

### 1.7.3 Other financial assets

As part of Group activities, EDF grants short-term loans in foreign currencies to its subsidiaries.

# 6. FINANCIAL STATEMENTS

## Notes to the financial statements

In order to reduce exposure to foreign exchange risks, the Group mainly finances these loans by short-term commercial paper issues in foreign currencies and in euros, together with the use of currency hedging derivatives. Capitalised receivables are stated at nominal value. Impairment is recognised when the market value falls below the book value.

### 1.8 INVENTORIES AND WORK-IN-PROGRESS

The initial cost of inventories includes all direct material costs (including the effect of hedging), labour costs and a share of indirect production costs.

Inventory consumption is generally valued under the weighted average unit cost method. Consumption of greenhouse gas emission rights and Energy Savings Certificates is valued under the FIFO (first in first out) method.

Inventories are carried at the lower of historical cost or net realisable value.

#### 1.8.1 Nuclear fuel and materials

Inventory accounts include:

- nuclear materials, whatever their form during the fuel production cycle;
- fuel components in the warehouse or in the reactor.

The stated value of nuclear fuel and materials and work-in-progress is determined based on direct processing costs including materials, labour and subcontracted services (e.g. fluorination, enrichment, production, etc).

In accordance with the concept of "loaded fuel" as defined in the order of 21 March 2007, the cost of inventories for fuel loaded in the reactors but not yet irradiated includes expenses for spent fuel management and long-term radioactive waste management. The corresponding amounts are taken into account in the relevant provisions.

Nuclear fuel consumption is determined by component (natural uranium, fluorination, enrichment, fuel assembly production) as a proportion of the expected output when the fuel is loaded in the reactor. These quantities are valued at weighted average cost of inventories, applied to each component. Inventories are periodically corrected in view of forecast spent quantities, based on neutronic measurements and physical inventories.

#### 1.8.2 Other operating inventories

Other operating inventories include:

- fossil fuels required for operation of fossil-fired power plants;
- operating materials and equipment such as spare parts supplied under a maintenance programme (excluding capitalised strategic safety spare parts);
- greenhouse gas emission rights and Energy Savings Certificates acquired for the generation cycle (see notes 1.19.1 and 1.19.2);
- gas stocks, valued at weighted average cost, including direct and indirect purchase costs, especially transport costs;
- capacities held under the capacity mechanisms (capacity guarantees in France) (see note 3.3).

Impairment of spare parts depends mainly on the turnover of these parts.

### 1.9 ACCOUNTS RECEIVABLE AND MARKETABLE SECURITIES

#### 1.9.1 Trade receivables

Trade receivables are initially stated at nominal value.

They also include the value of unbilled receivables for energy already supplied.

A write-down is recorded when, based on the probability of recovery assessed according to the type of receivable, the recoverable amount of receivables falls below their book value. Depending on the nature of the receivable, the risk associated with doubtful receivables is assessed individually or by experience-based statistical methods. EDF does not bear the risks of non-payment for the delivery portion of these receivables, which is borne by Enedis.

#### 1.9.2 Marketable securities

Marketable securities are initially recorded as assets at acquisition cost, and restated at the lower of historical cost or present value at year-end.

For listed securities, the present value is equal to the year-end stock market price. For unlisted securities, the market value is the probable trading value taking the Company's growth prospects into consideration.

Impairment is recorded to fully cover any unrealised losses, without netting against unrecorded unrealised gains.

Gains and losses on sales of marketable securities are valued using the FIFO (first in first out) method.

### 1.10 BOND ISSUANCE EXPENSES AND REDEMPTION PREMIUMS

Bond redemption premiums are amortised in equal portions prorated to the duration of the bond (straight-line method), regardless of the redemption pattern, applying the option allowed by Article 212-10 of the national chart of accounts.

Commissions and external costs paid by EDF upon issuance of borrowings and included in "Deferred charges" are spread on a straight-line basis over the term of the related instruments.

### 1.11 UNREALISED FOREIGN EXCHANGE GAINS AND LOSSES

Foreign currency receivables and payables are translated into Euros at the year-end exchange rates. The resulting translation differences are recorded in the balance sheet under "Unrealised foreign exchange gains" and "Unrealised foreign exchange losses". Provisions are recorded to cover all unrealised exchange losses on foreign currency borrowings not hedged for exchange risks. Unrealised gains are not recognised in the income statement.

Unrealised gains and losses on currency derivatives classified as hedging instruments are recorded in the balance sheet in the revaluation surplus accounts, and netted with the translation adjustment booked in respect of the hedged items, in application of regulation 2015-05 of 2 July 2015 on forward financial instruments and hedging operations (see note 1.1).

### 1.12 TAX-REGULATED PROVISIONS

This item mainly includes excess depreciation recorded for tax purposes and relates to:

- ordinary depreciation of generation and distribution facilities;
- exceptional depreciation of software developed in-house by the Company;
- amortisation of acquisition expenses for new investments by the Company.

### 1.13 ADDITIONAL EQUITY

Perpetual subordinated bonds issued by EDF in euros and other currencies are recorded in compliance with the French Chartered accountants' body *Ordre des experts comptables* opinion 28 of July 1994, taking their specific characteristics into consideration.

As a result, they are classified as additional equity, since redemption is exclusively controlled by EDF.

Issuance expenses and premiums are amortised through the income statement, on a pro rata basis.

Interest paid on these bonds is recorded in the financial result.

## 1.14 SPECIAL CONCESSION LIABILITIES

These liabilities relate mostly to public electricity distribution concessions for the Island Energy Systems (SEI), and hydropower concessions.

### 1.14.1 Special public electricity distribution concession liabilities – SEI

These liabilities represent the contractual obligations specific to the concession rules for public electricity distribution concessions, recognised in the liabilities as:

- rights in existing assets: these correspond to the grantor's right to recover all assets for nil consideration. This right comprises the value in kind of the facilities - the net book value of assets operated under concession - less any as yet unamortised financing provided by the operator;
- rights in assets to be replaced: these correspond to the operator's obligation to contribute to the financing of assets due for replacement. These non-financial liabilities comprise:
  - depreciation recorded on the portion of assets financed by the grantor,
  - the provision for renewal, exclusively for assets due for renewal before the end of the concession. This provision is included in provisions for expenses.

When assets are replaced, the provision and amortisation of the grantor's financing recorded in respect of the replaced item are eliminated and transferred to the rights in existing assets, since they are considered as the grantor's financing for the new asset. Any excess provision is taken to income.

During the concession, the grantor's rights in assets to be replaced are thus transferred upon the asset's renewal to become the grantor's rights in existing assets, with no outflow of cash to the benefit of the grantor.

### 1.14.2 Special hydropower concession liabilities

These liabilities comprise:

- the value of assets remitted for nil consideration and contributions received;
- differences arising from revaluations in accordance with French legislation for fixed assets commissioned before 1 January 1959 and before 1 January 1977;
- additional depreciation to industrial depreciation for facilities that are to be returned for nil consideration at the end of the concession but whose useful life extends beyond the concession term.

Following the changes made to the accounting treatment of hydropower concessions at 1 January 2009, the 1959 revaluation reserve is transferred to equity when the assets concerned are retired.

The net revaluation reserve generated by the 1976 revaluation is taken to income over the residual useful life of the assets concerned.

The value of assets remitted for nil consideration and contributions received are transferred to the income statement over their useful lives.

## 1.15 PROVISIONS OTHER THAN EMPLOYEE BENEFIT PROVISIONS

EDF recognises provisions when it has a present obligation (legal or constructive) arising from a past event, an outflow of resources will probably be required to settle the obligation, and the obligation amount can be estimated reliably.

If it is anticipated that all or part of the expenses covered by a provision will be reimbursed, the reimbursement is recognised under receivables if and only if EDF is virtually certain of receiving it.

Provisions are determined based on the Company's expectation of the cost necessary to settle the obligation. Estimates are based on management data from

the information system, assumptions adopted by the Company, and if necessary experience of similar transactions, or in some cases based on independent expert reports or contractor quotes. The various assumptions are reviewed for each closing of the accounts.

The expected costs are estimated based on year-end economic conditions and spread over a forecast disbursement schedule. They are then adjusted to Euros of the year of payment through application of a forecast long-term inflation rate and discounted to present value using a nominal discount rate. The provisions are based on these discounted future cash flows.

The rate of inflation and the discount rate are based on the economic and regulatory parameters of France, considering the long operating cycle of EDF's assets and the maturities of commitments.

The discount effect generated at each closing to reflect the passage of time is recorded in financial expenses.

In extremely rare situations, a provision cannot be booked due to lack of a reliable estimate. In such cases, the obligation is mentioned in the notes as a contingent liability, unless there is little likelihood of an outflow of resources.

### 1.15.1 Provisions related to nuclear generation

These provisions mainly cover the following:

- back-end nuclear cycle expenses: provisions for spent fuel management, for waste removal and conditioning and long-term radioactive waste management;
- costs for decommissioning power plants and losses relating to fuel in the reactor when the reactor is shut down (provision for last cores).

Last core expenses correspond to the loss on fuel in the reactor that is not totally spent at the time of final reactor shutdown and cannot be reused due to technical and regulatory constraints, and the cost of fuel processing, and removal and storage of the resulting waste.

Changes in provisions resulting from a change in discount rates, a change in the disbursement schedule or a change in contractor quote are recorded:

- as an increase or decrease in the corresponding assets, up to the net book value, if the provision was initially covered by balance sheet assets (decommissioning of plants still in operation, long-term management of the radioactive waste resulting from such decommissioning, and last cores);
- in the income statement in all other cases.

Detailed information on the principles for determining provisions related to nuclear generation is given in note 28.

### 1.15.2 Other provisions

These provisions mainly cover:

- losses relating to multi-year agreements for the purchase and sale of energy:
  - losses on energy purchase agreements are measured by comparing the acquisition cost under the contractual terms with the forecast market price,
  - losses on energy sale agreements are measured by comparing the estimated income under the contractual terms with the cost of the energy to be supplied;
- unrealised foreign exchange losses;
- risks relating to subsidiaries and affiliates;
- tax risks;
- litigation;
- costs of decommissioning of fossil-fired and hydropower plants;

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## Notes to the financial statements

- costs of renewal of facilities operated under public electricity distribution concessions;
- provisions related to environmental schemes (see note 1.19).

In extremely rare cases, description of a specific litigation covered by a provision may be omitted from the notes to the financial statements if such disclosure could cause serious prejudice to the Company.

### 1.16 EMPLOYEE BENEFITS

In accordance with the statutory regulations for companies in the electricity and gas sector (IEG), EDF's employees are entitled to post-employment benefits (pension plans, retirement indemnities, etc) and other long-term benefits (e.g. long-service awards).

#### 1.16.1 Calculation and recognition of employee benefits

In application of the CNC Emergency Committee opinion 2000-A issued on 6 July 2000, incorporated into Article 324-1 of ANC regulation 2014-03 on the national chart of accounts, EDF opted for recognition of post-employment benefits granted to personnel as of 1 January 2005.

Obligations under defined-benefit plans are calculated by the projected unit credit method, which determines the present value of entitlements earned by employees at year-end to post-employment benefits and long-term benefits, taking into consideration the prospects for wage increases and the country's specific economic conditions.

Post-employment benefit obligations are valued mainly using the following methods and assumptions, in compliance with Article 324-1 of ANC regulation 2014-03:

- retirement age, determined on the basis of the applicable rules, and the requirements to qualify for a full pension;
- career-end salary levels, with reference to employee seniority, projected salary levels at the time of retirement based on the expected effects of career advancement, and estimated trends in pension levels;
- forecast numbers of pensioners, determined based on employee turnover rates and mortality data;
- reversion pensions where relevant, taking into account both the life expectancy of the employee and his/her spouse and the marriage rate for IEG sector employees;
- a discount rate that depends on the duration of the obligations, determined at the year-end date by reference to the market yield on high quality corporate bonds or the rate on government bonds whose duration is coherent with EDF's commitments to employees.

The amount of the provision takes into account the present value of the fund assets that cover these benefits, which is deducted from the value of the benefit obligation.

Any actuarial gain or loss on post-employment benefit obligations in excess of 10% (the "corridor") of the obligations or fund assets, whichever is the highest, are recognised in the income statement progressively over the average residual working life of the Company's employees.

For other long-term benefits, actuarial gains and losses and the full past service cost are directly included in the provision, without application of the "corridor" rule.

The net expense booked during the year for employee benefit obligations includes:

- the current service cost, corresponding to additional benefit entitlements earned during the year;
- the net interest expense, corresponding to interest on obligations net of the return on fund assets;

- the income or expense corresponding to the actuarial gains and losses on long-term benefits and amortisation of actuarial gains or losses on post-employment benefits;
- the past service cost, including the income or expense related to amendments or settlements of benefit plans or introduction of new plans.

#### 1.16.2 Post-employment benefit obligations

Since the financing reform for the IEG sector system took effect on 1 January 2005, the CNIIEG (*Caisse nationale des IEG*, the sector's specific pension body) has managed not only the special IEG pension system, but also the industrial accident, invalidity and death insurance system for the sector.

The CNIIEG is a social security body governed by private law, formed by the Law of 9 August 2004. It has legal entity status and reports to the French government, operating under the joint supervision of France's ministers for the Budget, Social Security and Energy.

Under the funding arrangements introduced by the Law, EDF establishes pension provisions to cover entitlements not funded by France's standard systems (CNAV, AGIRC and ARRCO), to which the IEG system is affiliated, or by the CTA (*Contribution tarifaire d'acheminement*) levy on gas and electricity transmission and distribution services.

As a result of this funding mechanism, any change (whether favourable or unfavourable to employees) in the standard French pension system that is not passed on to the IEG pension system is likely to cause a variation in the amount of the provisions recorded by EDF to cover its obligations.

The benefits covered by pension provisions include:

- specific benefits of employees in the deregulated or competitive activities;
- specific benefits earned by employees from 1 January 2005 for the regulated activities (island public electricity distribution) (benefits earned before that date are financed by the CTA levy).

CNIIEG management expenses payable by EDF for the administration and payment of retired employees' pensions are also included.

In addition to pensions, other benefits are granted to IEG status former employees (not currently in active service), as detailed below:

- benefits in kind (energy): Article 28 of the IEG national statutes entitles such employees and current employees to benefits in kind in the form of supplies of electricity or gas at preferential prices. The obligation for supplies of energy to employees of EDF and Engie corresponds to the probable present value of kWh to be supplied to beneficiaries or their dependants during their retirement, valued on the basis of the unit cost. It also includes the payment made under the energy exchange agreement with Engie;
- retirement gratuities: these are paid upon retirement to employees due to receive the statutory old-age pension, or to their dependants if the employee dies before reaching retirement. These obligations are almost totally covered by an insurance policy;
- bereavement benefit: this is paid out upon the death of an inactive or disabled employee, in order to provide financial assistance for the expenses incurred at such a time (Article 26-§5 of the National Statutes). It is paid to the deceased's principal dependants (statutory indemnity equal to three months' pension, subject to a ceiling) or to a third party that has paid funeral costs (discretionary indemnity equal to the costs incurred);
- bonus pre-retirement paid leave: all employees eligible to benefit immediately from the statutory old-age pension and aged at least 55 at their retirement date are entitled to 18 days of bonus paid leave during the last twelve months of their employment;

- other benefits include help with the cost of studies, time banking for pre-retirement leave, and pensions for personnel sent on secondment to companies not covered by the IEG system.

### 1.16.3 Other long-term benefit obligations

These benefits concern employees currently in service, and include:

- annuities following incapacity, invalidity, industrial accident or work-related illness; like their counterparts in the general national system, IEG employees are entitled to financial support in the event of industrial accident or work-related illness, and invalidity and incapacity annuities and benefits. The obligation is measured as the probable present value of future benefits payable to current beneficiaries, including any possible reversions;
- long-service awards;
- specific benefits for employees who have been in contact with asbestos.

## 1.17 DERIVATIVES

EDF uses derivatives in order to minimise the impact of foreign exchange risks and interest rate risks.

These short-term and long-term derivatives comprise interest rate and currency derivatives.

Hedging derivatives correct the foreign exchange result and interest income or expense of the corresponding asset or liability. If the foreign exchange risk is fully hedged, no provision is recorded. If it is only partly hedged, a provision is recorded for the entire unhedged portion of the unrealised foreign exchange loss.

For other instruments, when there is no hedging relationship, a provision is recorded for unrealised losses and unrealised gains are not recognised.

Instruments in the portfolio at the year-end are included in off-balance sheet commitments at the nominal value of the contracts.

## 1.18 COMMODITY CONTRACTS

Forward financial instruments on commodities are traded for hedging purposes. Gains and losses on these operations are included in sales or in the cost of energy purchases, depending on the nature of the hedged item.

Instruments in the portfolio at the year-end are included in off balance sheet commitments at the quantities to be delivered or to be received under the contracts.

## 1.19 ENVIRONMENT

### 1.19.1 Greenhouse gas emission rights

The system currently in force is described in note 40.1.

EDF applies the accounting methods for greenhouse gas emission rights in accordance with France's Accounting Standards Authority (ANC) regulation 2012-04 of 4 October 2012, incorporated into Articles 615-1 to 615-22 of ANC regulation 2014-03.

The accounting treatment of emission rights depends on the holding intention. There are two economic models, both of which coexist at EDF.

Emission rights held under the "Trading" model are included in inventories at acquisition cost. A write-down is recorded when the present value of emission rights is lower than the book value.

Emission rights held to comply with regulatory requirements on greenhouse gas emissions (the "Generation" model) are included in inventories at acquisition cost, and the FIFO (first in first out) method is applied. A write-down is recorded when the generation cost of the electricity that includes the cost of the rights is higher than the present value of that electricity. At year-end, a "net presentation" principle is applied as follows:

- an asset is recognised (in inventories) if the quantities of greenhouse gas emissions are lower than the number of emission rights held in the portfolio. This corresponds to the rights available to cover future greenhouse gas emissions;
- a liability (provision) is recorded in the opposite situation equivalent to the rights still needed to cover emissions already produced, valued at contractualised acquisition price for forward purchases deliverable before surrender, and at market value for the balance.

The net reporting principle assumes that the emission rights held in the portfolio will be the rights used to offset emissions produced. However, there is a limit to the fungibility of rights at EDF, as there are no transfers of rights between the island and mainland activities. This can lead to concurrent recognition of an asset and a liability.

### 1.19.2 Energy savings certificates

The system currently in force is described in note 40.2.

EDF accounts for Energy Savings Certificates in compliance with ANC regulation 2012-04 of 4 October 2012, incorporated into Articles 616-1 to 616-25 of ANC regulation 2014-03.

EDF holds Energy Savings Certificates in order to meet the requirements of the regulations on energy savings. Consequently, EDF applies the "Energy Savings" model defined by the ANC regulation.

Certificates obtained or receivable are recorded in inventories at production or acquisition cost, and are valued under the FIFO (first in first out) method.

At the year-end, only the net position is presented in the financial statements:

- an asset is recognised (in inventories) if the energy savings achieved are greater than the energy savings obligations. This inventory corresponds to the certificates purchased, obtained or receivable that cover future energy savings obligations. It is consumed as and when energy sales are completed that generate energy savings obligations; or
- a liability (provision) is recognised if the energy savings achieved are lower than the energy savings obligations. The liability corresponds to the cost of action yet to be taken to cover the obligations associated with energy sales completed. It is subsequently extinguished by making energy savings expenditures that enable the Company to obtain certificates, or by purchasing certificates.

## NOTE 2 SIGNIFICANT EVENTS AND TRANSACTIONS

### 2.1 CAPITAL INCREASE BY EDF SA

On 30 March 2017, EDF undertook a cash capital increase with preferential subscription rights for existing shareholders.

The total gross amount of the increase (including the issue premium) was €4,018 million, and 632,741,004 new shares were issued at the unit issue price of €6.35. This total amount comprises:

- a €316 million increase in the share capital;
- a €3,702 million gross increase in the issue premium.

Issue expenses (net of taxes) are charged to the issue premium.

In accordance with its commitment, the French State subscribed for an amount of €3 billion or approximately 75% of the capital increase, and after this operation held 83.10% of the Company's share capital.

The dilution of the French State's shareholding results in a larger free float, as the proportion of shares in the Company held by the public (including employees) was raised from 14.25% to 16.81% as a result of the capital increase.

### 2.2 ACQUISITION OF 75.5% OF FRAMATOME

Following approval of the operation by their respective Boards of Directors on 13 and 14 December 2017, AREVA SA and EDF signed definitive binding agreements on 22 December 2017 setting the terms for the sale to EDF on 31 December 2017 of an interest giving EDF control over a 100% subsidiary of AREVA NP ("New NP") that comprises the former AREVA Group's activities relating to the design and manufacturing of nuclear reactors and equipment, fuel assemblies and services to the nuclear installed base.

Under the terms of these agreements, EDF's acquisition of 75.5% of New NP's capital was based on an adjusted valuation of €2.47 billions (for 100% of the capital), with no transfer of financial debt. This price was equivalent to a 2017 forecast EBITDA multiple of 8x<sup>(1)</sup>.

This amount may be adjusted upwards or downwards based on the accounts at the completion date (31 December 2017) once they have been finalised. Depending on achievement of certain performance targets measured after the completion date, it may also be subject to earn-out payment of up to €245 million. EDF also benefits from liability guarantee clauses.

The contracts for the EPR Olkiluoto 3 project and the resources required to complete the project, as well as certain contracts relating to components forged in Le Creusot plant, are not part of EDF's acquisition and remain with AREVA NP, part of AREVA SA.

The signing of these binding agreements of 22 December 2017 followed issuance of a positive opinion by the Board of the French Nuclear Safety Authority (*Autorité de sûreté nucléaire* - ASN) on 28 June 2017 regarding commissioning of the Flamanville 3 reactor vessel. EDF decided on 12 July 2017 to waive the condition precedent concerning the absence of anomalies on the primary circuit as it concerned the carbon segregation identified in parts of this reactor vessel.

These agreements also followed the completion and satisfactory conclusion of the quality audits undertaken at the Le Creusot, Saint-Marcel and Jeumont plants, regarding contracts transferred to New NP. For these contracts, EDF has a guarantee from AREVA SA for any residual risk related to the quality audits.

On 31 December 2017, EDF completed its acquisition of 75.5% of Framatome.

Simultaneously with completion of this transaction between EDF and AREVA SA, Mitsubishi Heavy Industries Ltd and Assystem took investments of 19.5% and 5% respectively in Framatome.

The immunisation mechanisms and guarantees set out in the final share purchase agreement signed with EDF on 22 December 2017 also apply to Mitsubishi Heavy Industries Ltd and Assystem.

Finally, the three new shareholders of New NP decided to change the name of New NP to Framatome from 4 January 2018.

On 3 February 2018, Teollisuuden Voima (TVO) brought an action before the European General Court seeking cancellation of the European Commission's decision of 29 May 2017 that authorised EDF's takeover of Framatome, on the grounds that it breaches the regulation on control of concentrations. The notice of the action, which should state the pleas in law and the main arguments put forward by TVO, has not yet been published in the Official Journal of the European Union and EDF is not currently informed of its content.

#### 2.2.1 History

EDF and AREVA SA signed a non-binding memorandum of understanding on 30 July 2015 that formalised the state of progress on discussions concerning their contemplated partnership. This memorandum had three sections:

- acquisition by EDF of exclusive control over AREVA NP. The plan was that EDF should hold majority control of AREVA NP, while AREVA SA would hold up to 25% in a strategic partnership that could potentially involve other minority partners;
- formation of a dedicated company (Edvance, created on 17 May 2017), owned 80% by EDF and 20% by AREVA NP (and now by Framatome), to optimise design and construction for nuclear islands and command-control systems for new projects in France and internationally;
- conclusion of a comprehensive strategic and industrial partnership agreement.

A further non-binding memorandum of understanding was signed by the same parties on 28 July 2016, formally acknowledging the EDF Board of Directors' approval of the final valuation of the activities to be acquired by EDF, and taking note of new developments since early 2016, *i.e.*:

- the negative outcome of discussions with TVO on the initial proposed arrangements to give EDF total protection against the risks of the Olkiluoto 3 (OL3) project, leading to the following new transaction structure: formation of a company, New NP, over which EDF would acquire exclusive control: this company would take over the contracts held by AREVA NP except for the OL3 contract and certain other contracts involving risks that EDF did not intend to bear (see the following point);
- the cases of non-quality observed at AREVA NP's Le Creusot plant, whether insufficient control of carbon content ("carbon segregation") or the presence of irregularities in the manufacturing records. The new memorandum of understanding laid down the principles for indemnification and protection of EDF against the consequences of these issues: non-transfer of terminated contracts to New NP, specific indemnities and a general guarantee, quality audit-related conditions precedent for completion of the acquisition;
- AREVA NP was to remain a fully-owned subsidiary of AREVA SA, and would retain all its existing contracts that were not transferred to New NP.

In accordance with the terms of this memorandum of understanding, a share sale contract was signed on 15 November 2016 between EDF SA, and AREVA SA/AREVA NP.

Completion of the transaction remained principally conditional on:

- favourable ASN conclusions regarding the outcome of the tests on the Flamanville 3 reactor's primary circuit;
- completion and satisfactory conclusion of the quality audits at the Le Creusot, Saint-Marcel and Jeumont plants;
- clearance by the relevant merger control authorities.

(1) Normalised pro forma EBITDA for the activities acquired, excluding large projects.

## 2.2.2 Framatome's activities

The new Framatome group's activities are principally the following:

- industrial design, production and installation of nuclear plant components for the existing nuclear fleet, and for management of major new reactor projects;
- service activities to improve the availability and competitiveness of nuclear installations, while reinforcing the safety of nuclear steam supply systems through production of instrumentation and control systems;
- production of nuclear fuel assemblies for electricity operators and certain research reactors.

These activities are exercised through six business units, mostly located in France, Germany and the United States:

- *Engineering and Design Authority*: development, design, certification and licensing of nuclear steam supply systems and related services;
- *Large projects*: management and execution of new nuclear reactor projects, from engineering to project completion;
- *Installed Base*: maintenance and engineering services for existing nuclear fleets and fleets under construction;
- *Fuel*: development, design, licensing and production of fuel assemblies and core components for Pressurised Water Reactors (PWR), Boiling Water Reactors (BWR) and research reactors; development of zirconium products;
- *Components*: design and production of heavy equipment and mobile equipment for nuclear power plants;
- *Instrumentation and Control (I&C)*: design and production of instrumentation and control systems for the safety for steam supply systems in operation and new builds.

EDF was a major customer of Framatome before the acquisition that was finalised on 31 December 2017, and will remain so after the operation (see note 39 on related parties).

EDF uses Framatome for production of its fuel assemblies, plant maintenance operations and equipment purchases (supply and installation of steam supply systems, etc).

Framatome is also the supplier of the steam supply system and instrumentation and control for EDF's new EPR reactors currently in construction (Flamanville 3 and Hinkley Point C), covering the whole process from initial design to commissioning.

## 2.2.3 Accounting treatment in EDF's financial statements

EDF acquired its investment in Framatome on 31 December 2017.

The takeover of Framatome involved the acquisition of 98,805,807 shares representing 75.5% of the Company's capital, for the price of €1,894 million including purchasing expenses. These shares are classified as investments in the balance sheet (see note 18). The acquisition also had impacts on balance sheet commitments (see note 36).

## 2.3 CLARIFICATIONS ON THE HINKLEY POINT C PROJECT

The HPC project cost and timetable review undertaken after EDF's final investment decision in September 2016 in conjunction with the project company (NNB) concluded that:

- the milestone of the first nuclear safety concrete for the building of Unit 1, scheduled for mid-2019, is confirmed provided that the final design, which is on a tight schedule, is settled by the end of 2018.
- project completion costs are now estimated at £19.6 billion (in 2015 sterling<sup>(1)</sup>), £1.5 billion (in 2015 sterling) more than previous estimates. This new estimate assumes successful completion of operational action plans, in partnership with suppliers. The estimated additional costs<sup>(2)</sup> result mainly from a better understanding of the design, which has been adjusted to meet the regulators' requirements, the volume and sequencing of work on site and the gradual implementation of supplier contracts. EDF's projected rate of return (IRR) is now estimated at about 8.5% compared to about 9% initially.
- the risk of deferral of the Commercial Operation Date (COD) is estimated at 15 months for Unit 1 and 9 months for Unit 2. This risk would entail an additional potential cost of around £0.7 billion (in 2015 sterling). In such a case, the IRR for EDF would be around 8.2%.

The project company NNB will examine and implement the recommendations of the review in compliance with its rules of governance.

The project management team is working hard to meet the initial delivery objective of the end of 2025 for Unit 1, and to identify and implement action plans to reduce costs and risks.

## 2.4 FINALISATION OF THE SALE OF 49.9% OF CTE

On 14 December 2016, EDF entered into a binding agreement with Caisse des Dépôts and CNP Assurances for the acquisition by Caisse des Dépôts and CNP Assurances of 49.9% of the capital of Réseau de Transport d'Electricité (RTE)<sup>(3)</sup>, and the modalities of a long-term partnership to promote the development of RTE.

The final agreed value was set at €8,200 million for 100% of RTE's equity.

Under the chosen structure for the sale, on 23 December 2016 EDF transferred all the shares in RTE to a new company, which at the time was named C25, in exchange for shares in C25 to the value of €5,143 million and a cash payment of €2,667 million.

At 31 December 2016, this operation was reflected in EDF's financial statements through a €3,780 million gain on sale recorded in the exceptional result (see note 2.5 to EDF's 2016 financial statements). Regarding the recognition of EDF's investment in C25 in the balance sheet, the portion to be retained by EDF after the operation (50.1%) was classified as an investment, and the portion to be sold in 2017 to Caisse des Dépôts and CNP Assurances (49.9%) was classified as investment securities.

On 31 March 2017, EDF finalised the sale to Caisse des Dépôts and CNP Assurances of the 49.9% stake in the electricity transmission entity Coentreprise de transport d'électricité (CTE, the former C25), which had held 100% of RTE since December 2016.

After completion, EDF, Caisse des Dépôts and CNP Assurances were the co-owners of CTE, respectively holding stakes of 50.1%, 29.9% and 20.0%.

Finalisation of the operation generated a €388 million gain, recorded in the exceptional result at 31 December 2017 (see note 14).

At 31 December 2017, EDF's 50.1% stake in CTE is classified as an investment in the balance sheet, at the value of €2,705 million.

In accordance with decree 2016-1781 of 19 December 2016, EDF's remaining investment in C25 (50.1%) is entirely allocated to dedicated assets (see note 38.2.3).

(1) Excluding interest during construction and forex effects versus the reference exchange rate for the project: £1 = €1.23.

(2) Net of action plans.

(3) 29.9% for Caisse des Dépôts and 20% for CNP Assurances.

## 2.5 ¥137 BILLION SAMURAI BOND ISSUE

On 20 January 2017, EDF raised ¥137 billion, *i.e.* around €1.1 billion, through four senior bond issues on the Japanese market ("Samurai bonds") with maturities of 10 years and more:

- ¥107.9 billion bond, with a 10-year maturity and a fixed coupon of 1.088%;
- ¥19.6 billion green bond, with a 12-year maturity and a fixed coupon of 1.278%;
- ¥6.4 billion green bond, with a 15-year maturity and a fixed coupon of 1.569%;
- ¥3.1 billion bond, with a 20-year maturity and a fixed coupon of 1.870%.

With the issuance of two green tranches totalling ¥26 billion dedicated to financing its renewable investments, EDF opened the Samurai green bond market, continuing its active contribution to the development of green bonds as financing instruments for the energy transition.

## 2.6 UNCONSTITUTIONALITY OF THE 3% CONTRIBUTION ON DIVIDEND DISTRIBUTIONS

The contribution on dividend distributions introduced in France in 2012, amounting to 3% of the amounts distributed, is a tax on companies that make cash distributions.

After legal challenges, the Constitutional Council ruled on 6 October 2017 that this contribution was unconstitutional because it is contrary to the principle of equality before the law and public charges, since it created differences in tax treatment on the sole basis of the origin (and nature) of the profits distributed.

EDF filed claims for refunds of €213 million for the years 2013 to 2017, and in 2017 it recognised a tax receivable of €247 million, including €34 million of interest on arrears. At 31 December 2017, EDF had received a partial refund of these claims from the state, totalling €235 million.



## NOTE 3 REGULATORY CHANGES IN 2017

### 3.1 REGULATED ELECTRICITY SALES TARIFFS IN FRANCE

#### “Blue” tariffs

Since 8 December 2015, in accordance with the NOME Law on organisation of the French electricity market (Articles L. 337-4 and L. 337-13 of the French Energy Code), the CRE has been responsible for sending the ministers for the economy and energy its reasoned proposals for regulated sales tariffs for electricity. If no objections are made within three months, the proposals are deemed to have been approved.

The tariff change of summer 2017 followed this process, and by a decision of 27 July 2017 confirming the CRE’s proposal of 6 July 2017, the “Blue” regulated tariffs for residential and non-residential customers were raised by 1.7% from 1 August 2017.

In preparing its tariff revision in 2017, the CRE undertook an audit of the allocation of EDF’s selling costs, to confirm proper application of the methodology ensuring that regulated sales tariffs did not bear development costs for market-price offers by EDF. This point was publicly confirmed in the CRE’s decision of 6 July 2017 containing its tariff change proposal.

Appeals against the tariff changes of 2016 and 2017 have been brought before the Council of State by Anode and Engie.

### 3.2 COMPENSATION FOR PUBLIC ENERGY SERVICE CHARGES (CSPE)

#### Legal and regulatory framework

The compensation mechanism for public energy service charges (*compensation des Charges de Service Public de l’Energie*) results from a reform introduced by France’s amended finance law for 2015, published in the *Journal officiel* on 30 December 2015. Under the new legislative and regulatory framework, the public energy service charges (electricity and gas) were to be compensated via two State budget items included in France’s finance laws from 2016 onwards. The initial finance law for 2018 marks a continuation from 2017, defining the following charges for 2018:

- a special “Energy Transition” budget item of €7.2 billion, principally to compensate for the additional costs associated with all contracts obliging the operators to purchase renewable energies and biogas, the annual contribution to repayment of the accumulated shortfall in compensation due to EDF, and reimbursement of advances to industrial operators who benefited from ceilings for their CSPE tax prior to 2016;
- a “Public Energy Service” item of €3 billion in the general budget to cover solidarity charges borne by gas and electricity suppliers, costs associated with purchase obligations excluding renewable energies (essentially cogeneration), and the cost of applying the standard national tariffs to zones that are not connected to France’s mainland network. The interest on the accumulated shortfall to be repaid to EDF is also funded through the general budget;
- from 2018, the “basic necessity” rates for electricity and the “special solidarity” rates for gas will gradually be phased out and replaced by an energy voucher system. The cost of this system will no longer be borne by EDF SA, although it has been budgeted by the State in the “Public Energy Service” programme. However, EDF will bear charges in 2018 due to the timing of invoicing for 2017 basic necessity rates.

In 2018, this mechanism is funded as follows:

- the costs linked to the energy transition, which correspond to the subsidy mechanisms for renewable energies, and the reimbursement of the past accumulated shortfall in compensation borne by EDF as measured at 31 December 2015, are registered in a special “energy transition” budget item created by the amended finance law for 2015. Law no. 2016-1917 of

29 December 2016 (the finance law for 2017) stipulated that the two sources of additional funding for this special budget item would be a portion of the domestic tax on coal, lignite and coke (TICC), and a portion of the domestic tax on energy products (TICPE). The finance law for 2018 replaces the percentages of the TICC and TICPE by a set amount, to avoid the uncertainties of forecast income from these taxes, and broadens the sources of funding for the “Energy transition” Budget item to include the proceeds of auctions of Guarantees of Origin as allowed by Article L. 314-14-1 of the Energy Code;

- other public service charges – excluding costs associated with the subsidy mechanisms for renewable energies – (fuel poverty, tariff equalisation in zones that are not connected to France’s mainland network, cogeneration, the budget for the energy ombudsman, etc.) are registered directly in the general budget;
- income generated by the domestic tax on the final consumption of electricity, now renamed the Contribution to Public Electricity Service (*Contribution au Service Public de l’Electricité* - CSPE) goes directly into the general budget. The CSPE is collected directly from final consumers of electricity in the form of an additional levy on the electricity sale price (and collected from electricity suppliers), or directly from electricity producers that produce electricity for their own uses.

The level of the CSPE is set at the same level in 2018 as in 2017 with the full rate at €22.5/MWh, and seven reduced rates ranging from €7.5/MWh to €0.5/MWh depending on criteria of electro-intensiveness, business category and the risk of carbon leakage of installations (the risk of industries relocating to countries where greenhouse gas emissions are higher due to their electricity mix).

The costs associated with conclusion and management of purchase obligation contracts are eligible for compensation in 2018, as they were in 2017. This concerns an annual amount of around €45 million.

The amended French finance law for 2017 applied a downward adjustment to the amounts of compensation paid by the State for public service charges in 2017: these charges had decreased substantially due to a rise in electricity market prices between the July 2016 and July 2017 estimates for 2017, which automatically narrowed the differential between the purchase tariff and the market price for electricity.

#### Public service charges borne by EDF

The amount of expenses (excluding the annual contribution to repayment and associated interest) to be compensated to EDF for 2017 is €6,558 million, up slightly from 2016 due to higher wind and solar power output.

The amounts received over 2017 (excluding the annual contribution to repayment and associated interest) totalled €7,065 million, higher than 2016, mainly as a result of the State’s decision to defer the €414 million compensation payment to EDF out of the “Energy Transition” budget item. The effects of this deferral on funding via the “Energy Transition” budget item for 2017 were adjusted through a budget carryover decision of 28 March 2017.

A repayment schedule for EDF’s receivable corresponding to the accumulated shortfall in compensation, which amounted to €5,780 million at 31 December 2015, was set out in the ministerial decision of 13 May 2016, amended on 2 December 2016. Under this schedule the receivable will be fully repaid by 2020. On 22 December 2016 EDF securitised a portion of this receivable (€1.5 billion) through a State-approved “Daily law” assignment to two groups of assignees. Consequently, since 1 January 2017 EDF has received a 73.6% share of payments made by the State in reimbursement of the receivable as set out in the repayment schedule. The remainder is paid directly to the assignees.

At 31 December 2017, the State had paid €881 million of the €904 million due for 2017. The outstanding €23 million were paid on 2 January 2018.

Finally, in accordance with decree 2016-158 of 18 February 2016 concerning compensation for public energy service charges, on 13 July 2017 the CRE published a decision recording the public service charges for 2016 (€6,345 million) and providing a revised forecast of charges for 2017 (€6,698 million) and a forecast of charges for 2018 (€7,390 million).

### 3.3 FRENCH CAPACITY MECHANISM

On 13 November 2015, the European Commission opened an in-depth investigation into the proposed French capacity mechanism in order to decide whether it complied with EU state aid rules.

On 8 November 2016, the European Commission authorised France's proposals for its capacity mechanism. In the course of the investigation France had agreed to modify its mechanism in the following ways: introducing long-term (7-year) contracts for new capacities, admitting foreign capacities, and taking measures to prevent any market manipulation.

Two auctions of capacity for 2017 were held on the European Power Exchange EPEX SPOT, on 15 December 2016 and 27 April 2017. The volumes traded and the prices between obligated capacity purchasers and operators selling capacity amounted to 22.6GW in December 2016 for the price of €10/kW (the market reference price for 2017) and 0.5GW in April 2017 for the price of €10.42/kW.

The capacity price is passed on customers through their contracts with EDF as supplier, or with other suppliers. This price is already included in bills for customers on market-price contracts. For customers on regulated sales tariffs, the cost of capacity was incorporated into the tariff change of August 2017.

Auctions for 2018 capacities took place in November 2017 (10.96GW were traded at the price of € 9.31/kW) and December 2017 (10.25GW were traded at the price of € 9.38/kW), determining the market reference price for 2018 as € 9.34/kW.

The first capacity auction relating to 2019 was also held in December 2017, and concerned a volume of 1.22GW traded at the price of € 13/kW.

In 2018, additional auctions will take place concerning capacity for 2017 and 2018 (rebalancing between actors) and later years (2019 to 2022).

### 3.4 REGULATED GAS SALES TARIFFS IN FRANCE

By a decision of 19 July 2017 the Council of State cancelled the Decree of 16 May 2013 concerning regulated sales tariffs for natural gas, on the grounds that keeping tariffs at such levels is contrary to European Union law. These gas tariffs did not meet the requirements laid down by Directive 2009/73/EC, and in particular they did not pursue any objective in the general economic interest.

However, while this decision cancelled the disputed Decree, it did not cancel the regulatory provisions of the Energy Code concerning regulated gas sales tariffs, which took effect on 1 January 2016.

Therefore, as things currently stand the regulated sales tariffs for gas remain in force until the Prime Minister takes steps to have those provisions repealed.

### 3.5 ENERGY SAVINGS CERTIFICATES: FOURTH PERIOD (2018-2020)

Decree 2017-690 of 2 May 2017 issued by the French Ministry for the Environment, Energy and the Sea, published in the *Journal officiel* on 3 May 2017, sets the obligation levels for the fourth period of energy savings obligations to run from 1 January 2018 to 31 December 2020. The overall level of obligations for this three-year period is substantially increased by the decree: 1,200TWhc for the "standard" obligations and 400TWhc for the obligations that are to benefit households in situations of energy poverty, compared to 700TWhc and 150TWhc respectively for the previous period.

Energy sellers may fulfil their obligation in three ways: by supporting consumers in their energy efficiency operations, funding Ministry-approved energy savings certificate schemes, and purchasing certificates from eligible actors. Any surplus "stock" of certificates gained in the previous period also contributes to fulfilment of the obligation. If there is a shortfall at the end of the period, obligated actors must pay the Treasury the fine of €15 per MWhc of shortfall laid down in Article L. 221-4 of the Energy Code, approximately three times the current cost of the standard obligation.

EDF will make every effort to gradually increase its number of certificates in order to meet the objectives set by the State. However, the significant increase in obligations combined with the current lack of depth in the energy savings certificates market, whose future liquidity is uncertain, expose EDF to the risk of a shortfall in certificates for the fourth period.

### 3.6 ARENH

After the large number of ARENH applications in November/December 2016, confirmed in the May 2017 session, for a total delivery of some 82TWh in 2017, ARENH applications in November 2017 for 2018 deliveries totalled 94.6TWh. Applications due to network losses rose substantially (from 0.7TWh in 2017 to 9.2TWh in 2018) due to a recent change in the rules. The volume requested by alternative suppliers amounted to 85.4TWh, an increase of around 4TWh over 2017.

This subscription volume results from the prices in force since the end of the third quarter of 2017 for 2018 deliveries, and is also attributable to the fact that ARENH includes delivery of a capacity guarantee.

## INCOME STATEMENT

### NOTE 4 SALES

Sales are comprised of:

<i>(in millions of euros)</i>	2017	2016
Sales of energy <sup>(1)</sup>	40,131	38,836
Sales of goods and services	2,240	2,021
<b>SALES</b>	<b>42,371</b>	<b>40,857</b>

(1) Including a share of delivery costs for sales of electricity and gas.

EDF's sales rose during 2017, reflecting high ARENH subscriptions in 2017 (82.1TWh) whereas 2016 had no subscriptions. This rise is partly offset by the effects of the retroactive adjustment of €1,018 million to regulated sales tariffs for

the period 1 August 2014 to 31 July 2015, recorded in 2016, which had no equivalent in 2017.

### NOTE 5 OPERATING SUBSIDIES

<i>(in millions of euros)</i>	2017	2016
<b>OPERATING SUBSIDIES</b>	<b>6,558</b>	<b>6,532</b>

Operating subsidies mainly comprise the subsidy received or receivable by EDF in respect of the Compensation for Public Energy Service Charges (CSPE). In the financial statements, this compensation is reflected in income of €6,547 million

for 2017 (€6,510 million for 2016). The increase is mainly explained by the higher subsidy for purchase obligations, due to a rise in purchase volumes for photovoltaic and wind power, counterbalanced by higher market prices for electricity.

### NOTE 6 REVERSALS OF PROVISIONS AND IMPAIRMENT

<i>(in millions of euros)</i>	2017	2016
<b>Reversals of provisions for risks</b>	<b>382</b>	<b>261</b>
Pensions and similar obligations	998	1,219
Spent fuel management	851	817
Long-term radioactive waste management <sup>(1)</sup>	236	698
Decommissioning of nuclear power plants	131	159
Decommissioning of fossil-fired and hydropower plants	49	51
Other provisions for expenses	122	225
<b>Reversals of provisions for expenses</b>	<b>2,387</b>	<b>3,169</b>
<b>Reversals of depreciation</b>	<b>462</b>	<b>378</b>
<b>TOTAL REVERSALS OF PROVISIONS AND IMPAIRMENT</b>	<b>3,231</b>	<b>3,808</b>

(1) In 2016 this item included a reclassification of €465 million from provisions for long-term radioactive waste management to provisions for spent fuel management.

### NOTE 7 OTHER OPERATING INCOME AND TRANSFERS OF CHARGES

<i>(in millions of euros)</i>	2017	2016
Other operating income	740	665
Transfers of charges	83	119
<b>TOTAL</b>	<b>823</b>	<b>784</b>

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## NOTE 8 PURCHASES AND OTHER EXTERNAL EXPENSES

<i>(in millions of euros)</i>	2017	2016
Fuel purchases used <sup>(1)</sup>	3,186	2,894
Energy purchases <sup>(2)</sup>	15,870	12,427
Services and other purchases used <sup>(3)</sup>	17,667	18,087
<b>PURCHASES AND OTHER EXTERNAL EXPENSES</b>	<b>36,723</b>	<b>33,408</b>

(1) Fuel purchases used include costs relating to raw materials for energy generation (nuclear fuel, fissile materials, coal, oil, and gas), and purchases of services related to the nuclear fuel cycle. This item also includes greenhouse gas emission rights consumed (see note 1.19.1).

(2) Energy purchases include purchase obligations. The increase of energy purchases is principally explained by higher levels of purchases on the markets, particularly for sourcing of ARENH subscriptions as nuclear power output was declining due to reactor outages for additional tests begun in 2016.

(3) Service purchases include distribution network access fees invoiced by the subsidiary Enedis. Excluding delivery, service purchases decreased by €357 million in 2017.

## NOTE 9 TAXES OTHER THAN INCOME TAXES

Details of taxes other than income taxes are as follows:

<i>(in millions of euros)</i>	2017	2016
Taxes on salaries and wages	174	176
Energy-related taxes	1,249	1,236
Local Economic Contribution	417	482
Property taxes	413	408
Other taxes	314	314
<b>TOTAL TAXES OTHER THAN INCOME TAXES</b>	<b>2,567</b>	<b>2,616</b>

## NOTE 10 PERSONNEL EXPENSES

<i>(in millions of euros)</i>	2017	2016
Salaries and wages	3,831	4,001
Social contributions	2,923	2,873
<b>PERSONNEL EXPENSES</b>	<b>6,754</b>	<b>6,874</b>

The decrease in personnel expenses mainly reflects the lower workforce numbers.

	2017			2016 Total
	Executives	Non executives	Total	
IEG status	27,817	34,676	62,493	65,256
Other	1,818	2,266	4,084	4,238
<b>AVERAGE WORKFORCE</b>	<b>29,635</b>	<b>36,942</b>	<b>66,577</b>	<b>69,494</b>

Average workforce numbers are reported on a full-time equivalent basis.

## NOTE 11 OPERATING DEPRECIATION, AMORTISATION AND PROVISIONS

### 11.1 DEPRECIATION AND AMORTISATION

<i>(in millions of euros)</i>	2017	2016
Amortisation of intangible assets	216	181
Depreciation on property, plant and equipment:		
■ owned by EDF <sup>(1)</sup>	2,864	2,451
■ operated under concessions <sup>(2)</sup>	260	246
<b>Total depreciation and amortisation on fixed assets</b>	<b>3,340</b>	<b>2,878</b>
<b>Other depreciation and amortisation and deferred expenses</b>	<b>26</b>	<b>26</b>
<b>TOTAL DEPRECIATION AND AMORTISATION</b>	<b>3,366</b>	<b>2,904</b>

(1) Including €115 million of accelerated depreciation in 2017 due to the closure of oil-fired plants.

(2) This depreciation concerns the Island Energy Systems public electricity distribution concessions and hydropower concessions.

### 11.2 PROVISIONS AND IMPAIRMENT

<i>(in millions of euros)</i>	2017	2016
<b>Provisions for risks <sup>(1)</sup></b>	<b>78</b>	<b>372</b>
Pensions and similar obligations	889	891
Management of spent nuclear fuel	443	389
Long-term management of radioactive waste	118	173
Decommissioning of nuclear power plants and last cores <sup>(2)</sup>	2	156
Decommissioning of thermal and hydropower plants	19	22
Other provisions for expenses	160	137
<b>Provisions for expenses</b>	<b>1,631</b>	<b>1,768</b>
<b>Impairment <sup>(3)</sup></b>	<b>366</b>	<b>506</b>
<b>TOTAL PROVISIONS AND IMPAIRMENT</b>	<b>2,075</b>	<b>2,646</b>

(1) Mostly concerning supply and sale contracts.

(2) Including a €125 million increase in 2016 for the Chinon Irradiated Materials Workshop.

(3) Including a €29 million increase in 2016 following the decision to close unit 1 at the Porcheville thermal power plant in early 2017.

## NOTE 12 OTHER OPERATING EXPENSES

Other operating expenses amount to €1,644 million in 2017 (€1,482 million in 2016) and notably include losses on non-recoverable receivables, royalties on software, the change in the stock of energy savings certificates and the net book value of assets demolished or scrapped.

## NOTE 13 FINANCIAL RESULT

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
Income from investments <sup>(1)</sup>	1,828	2,240
Income from other securities and receivables related to fixed assets <sup>(2)</sup>	496	555
Interest and similar income and expenses <sup>(3)</sup>	(1,325)	(2,856)
Reversal of provisions and impairment and transfers of charges <sup>(4)</sup>	948	1,535
<b>Foreign exchange result</b>	<b>(172)</b>	<b>466</b>
■ Gains	2,256	3,061
■ Losses	(2,428)	(2,595)
<b>Result on sales of marketable securities</b>	<b>(140)</b>	<b>(35)</b>
■ Net income	18	9
■ Net charges	(158)	(44)
<b>Financial amortisation, provisions and impairment <sup>(5)</sup>, including:</b>	<b>(2,623)</b>	<b>(3,169)</b>
■ Discount expense on employee benefits	(585)	(688)
■ Discount expense on nuclear provisions	(1,881)	(2,178)
<b>FINANCIAL RESULT</b>	<b>(988)</b>	<b>(1,264)</b>

(1) The change in dividends received principally concerns:

- Enedis (€659 million in 2017 and €551 million in 2016);
- C3 (the holding company which carries EDF Investissements Groupe) (€334 million in 2017 and €345 million in 2016);
- EDF International (€200 million in 2017 and €500 million in 2016);
- EDF Holding (€517 million in 2016, no equivalent in 2017);
- PEI (€101 million in 2017 and €55 million in 2016);
- EDF Immo (€234 million in 2017 and €61 million in 2016);
- RTE (€129 million in 2017, no equivalent in 2016);
- CTE (€60 million in 2017, no equivalent in 2016);
- EDEV (€123 million in 2017, no equivalent in 2016).

(2) In 2017, this item includes income of €64 million (€100 million in 2016) for the cost of bearing the CSPE financial receivable.

(3) The decrease essentially results from changes in the unrealised foreign exchange gain or loss on currency instruments (€1,401 million).

(4) This change mainly reflects the recovery of a provision for unrealised foreign exchange losses on perpetual bonds, amounting to €524 million (see note 27).

(5) The change mainly reflects the effect of discounting provisions for the back-end of the nuclear cycle, decommissioning and last cores, amounting to €297 million, and effects associated with changes in provisions for long-term and post-employment benefits amounting to €103 million.

In 2017, the discount expense on nuclear provisions decreased, because the real discount rate showed a smaller decrease from 2016 than for the comparative period 2016/2015 (the rate was 2.6% at 31 December 2017, 2.7% at 31 December 2016 and 2.9% at 31 December 2015).

## NOTE 14 EXCEPTIONAL RESULT

At 31 December 2017, exceptional items resulted in net income of €1,232 million. The main items are the following:

- a net gain of €388 million on the sale of the CTE investment securities upon completion of the RTE operation (see note 2.4);
- net gains of €872 million on sales of investment securities included in dedicated assets, undertaken as part of operational portfolio management;
- net reversals of €62 million from excess tax depreciation.

At 31 December 2016, exceptional items resulted in net income of €4,277 million. The main items are the following:

- a net gain of €3,780 million on the transfer of all the shares in RTE to the new company C25 (see note 2.4);
- net gains of €367 million on sales of investment securities included in dedicated assets, undertaken as part of operational portfolio management;
- net reversals of €126 million from excess tax depreciation.

## NOTE 15 INCOME TAXES

### 15.1 TAX GROUP

Since 1 January 1988, EDF and certain subsidiaries have formed a group subject to the tax consolidation system existing under French tax legislation (Articles 223A to 223U of the French Tax Code). The tax consolidation group comprises 234 subsidiaries in 2017, including Enedis, EDF International, EDF Energies Nouvelles and Dalkia. As of 1 January 2017, RTE and its subsidiaries are no longer part of the tax group.

### 15.2 INCOME TAX PAYABLE

Under Article 223A of the French Tax Code, EDF, as the head of the tax consolidated group, is the sole entity responsible for payment of income taxes and additional related contributions.

The tax consolidation agreement between the members of the tax group stipulates that the arrangement must be neutral in effect. In application of this principle, each subsidiary pays the consolidating company a contribution to group income tax equivalent to the tax it would have paid had it been taxed separately.

The tax consolidation agreement between EDF and the subsidiaries included in the tax group requires EDF to reimburse loss-making subsidiaries for the tax saving generated by their losses, as and when the entities concerned make taxable profits, in compliance with the standard rules for use of taxable losses.

Following the announcement that the 3% contribution on dividend distributions is unconstitutional, EDF recorded a tax receivable of €247 million (see note 2.6).

In France, the first finance law for 2017 introduced two exceptional contributions in addition to income taxes, levied on 2017 taxable income only. These cumulative contributions respectively apply to large companies with sales revenues of over €1 billion and €3 billion. EDF is concerned by both, and this brings the income tax rate for 2017 to 44.43% (including the 3.3% social contribution).

The company at the head of the tax group, EDF, recorded an income tax receivable of €687 million for 2017.

The breakdown is as follows:

- tax receivable of €677 million for the taxable loss of 2017;
- tax receivable of €69 million on the exceptional result (including €247 million due to the unconstitutionality of the 3% contribution);
- an expense of €59 million for adjustments resulting from the tax consolidation.

### 15.3 TAX CREDIT FOR COMPETITIVITY AND EMPLOYMENT (CICE)

The amounts received in 2017 under the French CICE tax credit scheme for 2016 were to fund the Company's investment and recruitment efforts.

### 15.4 DEFERRED TAXES

Deferred taxes are not recognised in EDF's individual financial statements. Deferred taxes result from differences between the accounting bases and tax bases of items. They generally arise as a result of timing differences in the recognition of income and expenses:

- deferred tax assets reflect expenses which will be tax deductible in future years or losses carried forward which will reduce taxable income in the future;
- deferred tax liabilities reflect either advance tax deduction of future accounting expenses or accounting revenues that will be taxable in future years and will increase taxable income in the future.

Changes in deferred taxes are as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>	<b>Variation</b>
<b>1. Timing differences generating a deferred tax asset</b>			
■ Non-deductible provisions <sup>(1)</sup>	(13,925)	(14,938)	1,013
■ Financial instruments and unrealised exchange gains	43	(967)	1,010
■ Other	(312)	(378)	66
<b>TOTAL DEFERRED TAX ASSETS SUBJECT TO THE STANDARD RATE</b>	<b>(14,194)</b>	<b>(16,283)</b>	<b>2,089</b>
<b>2. Timing differences generating a deferred tax liability</b>			
■ Financial instruments and unrealised exchange losses	19	2,276	(2,257)
■ Other	1,926	1,716	210
<b>TOTAL DEFERRED TAX LIABILITIES SUBJECT TO THE STANDARD RATE</b>	<b>1,945</b>	<b>3,992</b>	<b>(2,047)</b>
■ Capital gains not yet taxed, net of capital losses	-	79	(79)
■ Provisions for losses taxable at 15%	(8)	(10)	2
<b>TOTAL DEFERRED TAX LIABILITIES SUBJECT TO REDUCED RATE</b>	<b>(8)</b>	<b>69</b>	<b>(77)</b>
<b>BASIS FOR DEFERRED TAXES</b>	<b>(12,257)</b>	<b>(12,222)</b>	<b>(35)</b>
Net future tax asset at standard rate <sup>(2)</sup>	3,338	3,585	(247)
Net future tax liability at reduced rate	1	(2)	3

(1) Mainly concerning post-employment benefits for personnel.

(2) Applying a corporate income tax rate of 25.82% to long-term timing differences.

## BALANCE SHEET

### NOTE 16 GROSS VALUES OF INTANGIBLE AND TANGIBLE FIXED ASSETS

<i>(in millions of euros)</i>	Gross value at 31/12/2016	Increases	Decreases	Gross value at 31/12/2017
Software	1,379	291	84	1,586
Other	240	8	1	247
<b>Intangible assets</b>	<b>1,619</b>	<b>299</b>	<b>85</b>	<b>1,833</b>
Land	118	4	3	119
Buildings	10,351	310	61	10,600
Nuclear power plants	54,202	2,896	992	56,106
Machinery and plant other than networks	12,572	642	123	13,091
EDF-owned networks	999	28	-	1,027
Other	1,547	126	83	1,590
<b>Property, plant and equipment owned by EDF</b>	<b>79,789</b>	<b>4,006</b>	<b>1,262</b>	<b>82,533</b>
Land	40	-	-	40
Buildings	9,906	140	14	10,032
Machinery and plant other than networks	1,504	77	11	1,570
Concession networks	2,658	111	16	2,753
Other	11	10	1	20
<b>Property, plant and equipment operated under concessions <sup>(1)</sup></b>	<b>14,119</b>	<b>338</b>	<b>42</b>	<b>14,415</b>
Tangible assets <sup>(2)</sup>	14,059	6,141	4,068	16,132
Intangible assets <sup>(2)</sup>	632	388	313	707
Advances and progress payments on orders	3,050	-	46	3,004
<b>Assets in progress</b>	<b>17,741</b>	<b>6,529</b>	<b>4,427</b>	<b>19,843</b>
<b>TOTAL INTANGIBLE AND TANGIBLE FIXED ASSETS <sup>(3)</sup></b>	<b>113,268</b>	<b>11,172</b>	<b>5,816</b>	<b>118,624</b>

(1) Assets operated under concessions concern the Island Energy Systems public electricity distribution concessions and hydropower concessions.

(2) Investments during the year mainly concern equipment for existing power plants and construction of the Flamanville 3 EPR plant.

(3) Including the Flamanville 3 EPR (€9,732 million) at 31 December 2017.

### NOTE 17 DEPRECIATION, AMORTISATION AND IMPAIRMENT OF INTANGIBLE AND TANGIBLE FIXED ASSETS

<i>(in millions of euros)</i>	31/12/2016	Increases	Decreases	31/12/2017
Software	649	206	83	772
Other	102	26	-	128
<b>Intangible assets</b>	<b>751</b>	<b>232</b>	<b>83</b>	<b>900</b>
Land and buildings	6,952	244	54	7,142
Nuclear power plants	38,429	2,093	1,108	39,414
Machinery and plant other than networks	8,018	555	125	8,448
EDF-owned networks	445	29	-	474
Other	923	148	82	989
<b>Property, plant and equipment owned by EDF</b>	<b>54,767</b>	<b>3,069</b>	<b>1,369</b>	<b>56,467</b>
Land and buildings	6,211	142	11	6,342
Machinery and plant other than networks	1,033	30	11	1,052
Concession networks	1,082	72	14	1,140
Other	11	-	1	10
<b>Property, plant and equipment operated under concessions</b>	<b>8,337</b>	<b>244</b>	<b>37</b>	<b>8,544</b>
<b>Tangible assets in progress</b>	<b>141</b>	<b>54</b>	<b>7</b>	<b>188</b>
<b>TOTAL DEPRECIATION, AMORTISATION AND IMPAIRMENT</b>	<b>63,996</b>	<b>3,599</b>	<b>1,496</b>	<b>66,099</b>



## NOTE 18 FINANCIAL ASSETS

### 18.1 CHANGE IN FINANCIAL ASSETS

<i>(in millions of euros)</i>	<b>Gross value at 31/12/2017</b>	<b>Gross value at 31/12/2016</b>
Investments <sup>(1)</sup>	58,594	55,667
Receivables related to investments	55	51
Investment securities <sup>(2)</sup>	17,875	16,698
Other investments	269	257
CSPE receivable <sup>(3)</sup>	3,294	4,184
Loans to subsidiaries and other financial assets <sup>(4)</sup>	9,095	9,686
<b>TOTAL FINANCIAL ASSETS, GROSS</b>	<b>89,182</b>	<b>86,543</b>
Impairment of investments and related receivables	(204)	(171)
Impairment of investment securities	(55)	(183)
<b>TOTAL IMPAIRMENT</b>	<b>(259)</b>	<b>(354)</b>
<b>TOTAL FINANCIAL ASSETS, NET</b>	<b>88,923</b>	<b>86,189</b>

(1) The change in investments essentially corresponds to:

- the acquisition of 75.5% of Framatome for €1,894 million including purchasing expenses (see note 2.2);
- the acquisition in 2017 of further shares in CTE for €128 million, for finalisation of the sale of 49.9% of CTE;
- subscription to the capital increase of EDF Nouveaux Business Holding;
- new investments by EDF Invest:
  - . subscription to the capital increase of Altroad (minority interest in Autostrade per l'Italia, an Italian motorway concession operator),
  - . subscription to the capital increase of Cliart (the SMART SIDE real estate development: construction of an office building at Clichy Saint Ouen),
  - . subscription to the capital increase of Eureizen (minority interest in Q-Park NV, a Dutch carpark operator),
  - . subscription to the capital increase of Manostock (minority interest in Géosel, a hydrocarbon storage company),
  - . subscription to the capital increase of Siticav (minority interest in Central Sicaf, an Italian company that manages a portfolio of office and technical premises that are entirely leased to Telecom Italia),
  - . subscription to the capital increase of C60 (for a 50% stake in the Ecowest real estate development at Levallois-Perret).

(2) Changes in investment securities correspond mainly to acquisitions and sales of dedicated assets over the period. Acquisitions and sales of dedicated assets generated net gains of €872 million in 2017 (see note 14).

The shares in CTE (formerly C25) to be sold to Caisse des Dépôts and CNP Assurances (49.9%), which were classified as investment securities at the value of €2,566 million at 31 December 2016, were sold in March 2017 for finalisation of the sale operation. At 31 December 2017, EDF's 50.1% stake in CTE is classified as an investment in the balance sheet, at the value of €2,705 million (see note 2.4).

(3) This receivable consists of the accumulated shortfall at 31 December 2015 in the compensation for public service energy charges (CSPE) and the associated financing costs. Reimbursements received during 2017 amounted to €954 million including interest (€293 million in 2016) (see note 3.2).

(4) Loans to subsidiaries at 31 December 2017 total €9,004 million, including €4,309 million for EDF International, €1,425 million for EDF Energy UK Ltd, €1,223 million for Dalkia, €985 million for EDF Energies Nouvelles, €858 million for PEI and €70 million for Edison.

## 18.2 SUBSIDIARIES AND INVESTMENTS OF AT LEAST 50% OF CAPITAL

(in millions of euros)	Gross book value of shares owned	Impairment recorded at 31/12/2017	% capital owned	Equity 2016	Net income 2016	Dividends received 2017	Sales 2016
<b>I. Subsidiaries</b>							
<b>■ Holding companies</b>							
EDEV	6,891	-	100	6,430	144	123	2
EDF International	25,930	-	100	20,501	(720)	200	1
EDF Production Electrique Insulaire SAS	561	-	100	859	135	101	691
EDF Holding SAS	1,950	-	100	2,080	(91)	-	-
C3	11,196	-	100	11,646	352	334	-
EDF Immo	1,361	-	100	1,627	246	234	-
EDF group Support Services	nm	-	100	nm	nm	-	146
CTE (formerly C25) <sup>(1)</sup>	2,705	-	50,1	5,139	(4)	60	-
Other companies	1,968	15	100	1,082	75	83	7
<b>■ Industrial and commercial companies</b>							
<b>France</b>							
Centrale Electrique Rhénane de Gamsheim	3	-	50	10	-	-	4
Dalkia Investissement	200	27	100	158	8	4	nm
Dalkia France	967	-	100	599	35	8	2,040
Enedis	2,700	-	100	5,088	788	659	13,846
Framatome	1,894	-	75,5	-	-	-	-
<b>Other countries</b>							
Emission	14	14	50	130	-	-	33
Rheinkraftwerk Iffezheim (RKL)	3	-	50	109	4	0	17
Forces Motrices du Chatelôt	nm	-	50	8	nm	nm	4
<b>■ Other entities (GIE EIFER)</b>	120	117	-	-	-	-	-
<b>TOTAL I</b>	<b>58,463</b>	<b>173</b>				<b>1,806</b>	

nm: not material (less than €500,000).

(1) CTE (formerly C25) is the Company owning 100% of RTE.

## 18.3 SUBSIDIARIES AND INVESTMENTS UNDER 50%

(in millions of euros)	Gross book value of shares owned	Impairment recorded at 31/12/2017	% capital owned	Equity 2016	Net income 2016	Dividends received 2017
<b>I. Subsidiaries</b>						
<b>Total I Carried forward</b>	<b>58,463</b>	<b>173</b>				<b>1,806</b>
<b>II Investments</b>						
II.1 Companies in which EDF has an interest of between 10% and 50%						
<b>■ Industrial and commercial companies</b>						
<b>France</b>						
Trimet France	130	31	35	294	37	11
Total II.1	130	31				11
II.2 Companies in which EDF has an interest of less than 10%						
Other companies	-	-	-	-	-	-
<b>Other countries</b>						
Forces Motrices de Mauvoisin	1	-	10	110	5	nm
<b>Total II.2</b>	<b>1</b>	<b>-</b>				<b>-</b>
<b>Total II</b>	<b>131</b>	<b>31</b>				<b>11</b>
<b>Total investments, gross</b>	<b>58,594</b>	<b>204</b>				<b>1,817</b>
<b>TOTAL INVESTMENTS NET</b>	<b>58,390</b>					

nm: not material (less than €500,000).

## 18.4 INVESTMENT SECURITIES PORTFOLIO

<i>(in millions of euros)</i>	At start of year			At year-end		
	Gross book value	Net book value	Fair value	Gross book value	Net book value	Fair value
<b>VALUE OF INVESTMENT SECURITIES</b>	<b>16,698</b>	<b>16,520</b>	<b>17,606</b>	<b>17,875</b>	<b>17,825</b>	<b>19,717</b>

At 31 December 2017, the investment securities portfolio comprises €17,825 million of dedicated assets.

In 2017, EDF sold all its shares in CTE (formerly C25) for finalisation of the sale of 49.9% of CTE (see note 2.4). EDF also sold all the shares of AREVA SA.

## 18.5 VARIATION IN TREASURY SHARES

A share repurchase programme authorised by the General Shareholders' Meeting of 9 June 2006 was implemented by the Board of Directors, within the limits of 10% of the total number of shares making up the Company's capital. The initial duration of the programme was 18 months, renewed for 12 months then by tacit agreement every year.

A liquidity contract exists for this programme, as required by the French market regulator AMF.

<i>(in millions of euros)</i>	Gross value at 31/12/2016	Increases	Decreases	Gross value at 31/12/2017
<b>TREASURY SHARES</b>	<b>26</b>	<b>113</b>	<b>(102)</b>	<b>37</b>

At 31 December 2017, treasury shares included in the investment securities portfolio represent 3,379,422 shares with total value of €37 million.

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## 18.6 FINANCIAL LOANS AND RECEIVABLES RELATED TO INVESTMENTS

<i>(in millions of euros)</i>	Liquidity			Gross value at 31/12/2017	Gross value at 31/12/2016
	< 1 year	1 - 5 years	> 5 years		
Receivables related to investments	6	-	49	55	51
CSPE receivable	1,280	2,014	-	3,294	4,184
Loans and other financial assets	6,220	1,619	1,256	9,095	9,687
<b>FINANCIAL LOANS AND RECEIVABLES RELATED TO INVESTMENTS</b>	<b>7,506</b>	<b>3,633</b>	<b>1,305</b>	<b>12,444</b>	<b>13,922</b>

## NOTE 19 INVENTORIES AND WORK-IN-PROGRESS

(in millions of euros)	31/12/2017			31/12/2016		
	Gross value	Provisions	Net value	Gross value	Provisions	Net value
Nuclear fuel	8,693	(15)	8,678	8,746	(19)	8,727
Other raw materials	123	-	123	185	-	185
Other supplies	1,186	(179)	1,007	1,109	(198)	911
Work-in-progress and other inventories	161	-	161	333	(30)	303
<b>TOTAL INVENTORIES</b>	<b>10,163</b>	<b>(194)</b>	<b>9,969</b>	<b>10,373</b>	<b>(247)</b>	<b>10,126</b>

## NOTE 20 OTHER CURRENT ASSETS

(in millions of euros)	Liquidity			Gross value at 31/12/2017	Gross value at 31/12/2016
	< 1 year	1 - 5 years	> 5 years		
<b>Advances on orders</b>	<b>368</b>	<b>225</b>	<b>193</b>	<b>786</b>	<b>1,097</b>
■ Trade receivables					
Amounts billed	2,524	-	-	2,524	2,299
Unbilled receivables <sup>(1)</sup>	12,972	-	-	12,972	14,188
■ Other operating receivables <sup>(2)</sup>	5,494	84	171	5,749	5,860
<b>Operating receivables</b>	<b>20,990</b>	<b>84</b>	<b>171</b>	<b>21,245</b>	<b>22,347</b>
<b>Cash instruments <sup>(3)</sup></b>	<b>458</b>	<b>753</b>	<b>885</b>	<b>2,096</b>	<b>4,610</b>
<b>Prepaid expenses</b>	<b>570</b>	<b>280</b>	<b>508</b>	<b>1,358</b>	<b>1,334</b>
<b>TOTAL CURRENT ASSETS</b>	<b>22,386</b>	<b>1,342</b>	<b>1,757</b>	<b>25,485</b>	<b>29,388</b>

(1) Mainly receivables for energy supplied and not billed in 2017. In 2016 this item included the accrued income recognised for the portion of the retroactive tariff adjustment not yet received at 31 December 2016, amounting to €966 million (€169 million at 31 December 2017).

(2) Including €3,945 million of receivables on the State related to taxes other than income taxes, and €1,140 million for the compensation for public energy service charges (CSPE) (€1,637 million in 2016). The rest of the CSPE receivable is recorded under "Financial assets" (see note 18.1).

(3) Unrealised gains on foreign exchange instruments.

## NOTE 21 MARKETABLE SECURITIES

(in millions of euros)	31/12/2017	31/12/2016	Change
Treasury shares	3	3	-
Investment funds	2,650	3,955	(1,305)
Negotiable debt instruments (Euros or other currencies) maturing after 3 months	3,093	4,179	(1,086)
Bonds	7,179	6,787	392
Accrued interest and other marketable securities	1,613	2,280	(667)
<b>Total gross value</b>	<b>14,538</b>	<b>17,204</b>	<b>(2,666)</b>
<b>Provisions</b>	<b>(11)</b>	<b>(10)</b>	<b>(1)</b>
<b>TOTAL NET VALUE</b>	<b>14,527</b>	<b>17,194</b>	<b>(2,667)</b>

## NOTE 22 VARIATION IN CASH AND CASH EQUIVALENTS REPORTED IN THE CASH FLOW STATEMENT

<i>(in millions of euros)</i>	31/12/2017	31/12/2016	Change
Marketable securities	14,538	17,204	(2,666)
Cash and cash equivalents	5,110	5,457	(347)
<b>Sub-total in balance sheet assets</b>	<b>19,648</b>	<b>22,661</b>	<b>(3,013)</b>
Euro investment funds	(2,650)	(3,955)	1,305
Negotiable debt instruments (Euro) maturing after 3 months	(2,125)	(4,084)	1,959
Negotiable debt instruments (non Euro) maturing after 3 months	(968)	(95)	(873)
Bonds	(7,179)	(6,787)	(392)
Treasury shares	(3)	(3)	-
Accrued interest and other marketable securities	(1,613)	(2,280)	667
<b>Marketable securities included in financial assets in the cash flow statement</b>	<b>(14,538)</b>	<b>(17,204)</b>	<b>2,666</b>
Cash advances to subsidiaries (cash pooling agreements) included in "other operating receivables" in the balance sheet	-	-	-
Cash advances from subsidiaries (cash pooling agreements) included in "other operating liabilities" in the balance sheet	(7,985)	(9,438)	1,453
<b>Cash and cash equivalents, closing balance in the cash flow statement <sup>(1)</sup></b>	<b>(2,875)</b>	<b>(3,981)</b>	<b>1,106</b>
Elimination of the effect of currency fluctuations			23
Elimination of net financial income on cash and cash equivalents			(55)
<b>NET VARIATION IN CASH AND CASH EQUIVALENTS IN THE CASH FLOW STATEMENT <sup>(1)</sup></b>			<b>1,074</b>

(1) See the Cash flow statement.

## NOTE 23 UNREALISED FOREIGN EXCHANGE LOSSES

Unrealised foreign exchange losses amount to €572 million at 31 December 2017, principally reflecting movements in the US dollar and the pound sterling (€1,083 million at 31 December 2016).

## NOTE 24 CHANGES IN EQUITY

<i>(in millions of euros)</i>	Capital	Reserves and premiums	Retained earnings and interim dividends	Profit or loss for the financial year	Investment subsidies	Tax-regulated provisions	Total equity
<b>At 31 December 2015</b>	<b>960</b>	<b>11,849</b>	<b>4,075</b>	<b>271</b>	<b>170</b>	<b>6,233</b>	<b>23,558</b>
Allocation of 2015 net income	-	8	(758)	750	-	-	-
2016 profit	-	-	-	5,517	-	-	5,517
Capital increase of 30 June 2016	47	892	-	-	-	-	939
Dividend distribution	-	-	1	(1,021)	-	-	(1,020)
Capital increase of 31 October 2016	48	875	-	-	-	-	923
Interim dividend	-	-	(1,006)	-	-	-	(1,006)
Other changes	-	3	-	-	(1)	(101)	(99)
<b>At 31 December 2016</b>	<b>1,055</b>	<b>13,627</b>	<b>2,311</b>	<b>5,517</b>	<b>169</b>	<b>6,132</b>	<b>28,812</b>
Allocation of 2016 net income	-	4	4,412	(4,416)	-	-	-
2017 profit	-	-	-	1,924	-	-	1,924
Capital increase of 31 March 2017	316	3,689	-	-	-	-	4,005
Capital increase of 30 June 2017	73	951	-	-	-	-	1,024
Dividend distribution	-	-	1	(1,101)	-	-	(1,100)
Capital increase of 11 December 2017	20	378	-	-	-	-	398
Interim dividend	-	-	(433)	-	-	-	(433)
Other changes	-	2	84 <sup>(1)</sup>	-	(6)	(34)	46
<b>AT 31 DECEMBER 2017</b>	<b>1,464</b>	<b>18,651</b>	<b>6,375</b>	<b>1,924</b>	<b>163</b>	<b>6,098</b>	<b>34,676</b>

(1) Impact of application of hedge accounting in compliance with regulation ANC 2015-05 (see note 1.1).

### 24.1 SHARE CAPITAL

EDF's share capital amounted to €1,463,719,402 at 31 December 2017, comprising 2,927,438,804 fully subscribed and paid-up shares with nominal value of €0.50 each, owned 83.50% by the French State, 15.18% by the public (institutional and private investors), 1.20% by current and retired Group employees, and 0.12% held by EDF as treasury shares.

In March 2017, the capital increase with preferential subscription rights for existing shareholders led to a €316 million increase in the share capital and an issue premium of €3,689 million following the issuance of 632,741,004 new shares (see note 2.1).

In June 2017, payment of the balance of the dividend for 2016 in the form of a scrip dividend led to a €73 million increase in the share capital and an issue premium of €951 million following the issuance of 145,476,587 new shares. The formalities for this operation were completed in June 2017.

In December 2017, payment of the interim dividend for 2017 in the form of a scrip dividend led to a €20 million increase in the share capital and an issue premium of €378 million following the issuance of 40,084,530 new shares.

Under Article L. 111-67 of the French Energy Code, the French State must hold more than 70% of the capital of EDF at all times.

### 24.2 DIVIDENDS

The General Shareholders' Meeting of 18 May 2017 decided to distribute an ordinary dividend of €0.90 per share in respect of 2016, offering the choice of receiving this dividend in cash, or in the form of shares (scrip option).

In application of Article 24 of the Company's articles of association, shareholders who have held their shares continuously for at least 2 years at the year-end and still hold them at the dividend distribution date benefit from a 10% bonus on their dividends. The number of shares carrying an entitlement to the bonus dividend cannot exceed 0.5% of the Company's capital for a single shareholder. The bonus dividend amounts to €0.99 per share.

As interim dividends of €0.50 per share had been paid out in cash or in the form of shares (scrip option) on 31 October 2016, the balance payable for 2016 amounted to €0.40 per share benefiting from the ordinary dividend and €0.49 per share benefiting from the bonus dividend. The balance of the dividend was paid out on 30 June 2017.

The French government opted for the scrip dividend for the 2016 distribution.

The amount of the cash dividend paid to shareholders who did not opt for the scrip dividend for the 2016 distribution amounted to €75 million.

On 7 November 2017, EDF's Board of Directors decided to distribute an interim dividend of €0.15 per share in respect of 2017. This interim dividend amounting to a total of €433 million was paid out in the form of new shares (scrip option) or cash on 11 December 2017.

The French government chose the scrip option for the 2017 interim dividend distribution.

The amount of the cash dividend paid to shareholders who did not choose the scrip option for the 2017 interim dividend distribution amounted to €35 million.

## NOTE 25 ADDITIONAL EQUITY

Additional equity consists of the perpetual subordinated bonds issued by EDF in January 2013 and January 2014 at the value of €6,135 million and €3,973 million respectively (net of redemption premiums).

After adjustment for foreign exchange variations and amortisation of the redemption premium over the year, additional equity amounts to €10,449 million at 31 December 2017.

### PERPETUAL SUBORDINATED BONDS:

(in millions of currency units)

Entity	Issue date	Amount	Currency	Redemption option	Rate
EDF	01/2013	1,250	EUR	7 years	4.25%
EDF	01/2013	1,250	EUR	12 years	5.38%
EDF	01/2013	1,250	GBP	13 years	6.00%
EDF	01/2013	3,000	USD	10 years	5.25%
EDF	01/2014	1,500	USD	10 years	5.63%
EDF	01/2014	1,000	EUR	8 years	4.13%
EDF	01/2014	1,000	EUR	12 years	5.00%
EDF	01/2014	750	GBP	15 years	5.88%

## NOTE 26 SPECIAL CONCESSION LIABILITIES

(in millions of euros)

	31/12/2017	31/12/2016
Value in kind of assets	107	105
Revaluation difference	860	885
Additional depreciation	198	164
<b>Rights in hydropower assets</b>	<b>1,165</b>	<b>1,154</b>
Value in kind of assets	1,695	1,653
Unamortised financing by the operator	(1,026)	(999)
Amortisation of grantor financing	319	306
Contributions received for concessionary plant assets under construction	6	6
<b>Rights in public distribution concession assets <sup>(1)</sup></b>	<b>994</b>	<b>966</b>
<b>TOTAL SPECIAL CONCESSION LIABILITIES</b>	<b>2,159</b>	<b>2,120</b>

(1) Rights in public distribution concession assets concern the Island Energy Systems (SEI) public electricity distribution concession.

## NOTE 27 PROVISIONS FOR RISKS

(in millions of euros)	31/12/2016	Increases		Decreases			Other	31/12/2017
		Operating <sup>(1)</sup>	Financial	Utilisations	Reversals	Financial <sup>(2)</sup>		
Provisions for unrealised exchange losses	1,083	-	14	-	-	(525)	-	572
Provisions for losses on contracts	672	30	9	(97)	(104)	-	-	510
Provisions for other risks	434	48	-	(171)	(10)	-	1	302
<b>PROVISIONS FOR RISKS</b>	<b>2,189</b>	<b>78</b>	<b>23</b>	<b>(268)</b>	<b>(114)</b>	<b>(525)</b>	<b>1</b>	<b>1,384</b>

(1) Mainly concerning supply and sales contracts.

(2) €524 million of reversals from provisions concern perpetual bonds (see note 13).

## NOTE 28 PROVISIONS RELATED TO NUCLEAR GENERATION - BACK-END OF THE NUCLEAR CYCLE, PLANT DECOMMISSIONING AND LAST CORES

The provisions established by EDF for the nuclear generation fleet result from the Law of 28 June 2006 on long-term management of radioactive materials and waste, and the associated implementing provisions concerning secure financing of nuclear expenses.

In compliance with the accounting principles described in note 1.15:

- EDF books provisions to cover all obligations related to the nuclear facilities it operates;
- EDF holds dedicated assets for secure financing of long-term obligations (see note 38).

The calculation of provisions incorporates a level of risks and unknowns that depend on the operations concerned. The valuation of costs also carries uncertainty factors such as:

- changes in legislation, particularly regarding safety, security and environmental protection, and financing of nuclear expenses;
- changes in the regulatory decommissioning process and the time necessary for issuance of administrative authorisations;
- future methods for storing long-lived radioactive waste and provision of storage facilities by the French agency for radioactive waste management ANDRA (*Agence nationale pour la gestion des déchets radioactifs*);
- changes in certain financial parameters such as discount rates, notably in view of the regulatory limits, inflation rates, or changes in the contractual terms of spent fuel management.

Details of changes in provisions for the back-end of the nuclear cycle, decommissioning and last cores are as follows:

(in millions of euros)	31/12/2016	Increases		Decreases		Other changes <sup>(2)</sup>	31/12/2017
		Operating	Financial <sup>(1)</sup>	Utilisation	Reversals		
Provisions for spent fuel management	10,658	443	545	(756)	(95)	(9)	10,786
Provisions for removal and conditioning of waste	-	74	31	(15)	-	636	726
Provisions for long-term radioactive waste management	8,966	44	556	(221)	-	(531)	8,814
<b>Provisions for the back-end of the nuclear cycle</b>	<b>19,624</b>	<b>561</b>	<b>1,132</b>	<b>(992)</b>	<b>(95)</b>	<b>96</b>	<b>20,326</b>
Provisions for nuclear plant decommissioning	14,122	2	658	(131)	-	269	14,920
Provisions for last cores	2,287	-	95	-	-	5	2,387
<b>Provisions for decommissioning and last cores</b>	<b>16,409</b>	<b>2</b>	<b>753</b>	<b>(131)</b>	<b>-</b>	<b>274</b>	<b>17,307</b>
<b>TOTAL PROVISIONS RELATED TO NUCLEAR GENERATION</b>	<b>36,033</b>	<b>563</b>	<b>1,885</b>	<b>(1,123)</b>	<b>(95)</b>	<b>370</b>	<b>37,633</b>

(1) The discount effect comprises the €1,505 million cost of unwinding the discount, and the effects of the change of real discount rate in 2017 via the income statement for provisions with no related assets (€380 million) (cost of unwinding the discount).

(2) Other changes mainly include:

- reclassification at 1 January 2017 of provisions for removal and conditioning of waste, which were previously included in long-term radioactive waste management (€581 million);
- the effects of the change of real discount rate at 31 December 2017 for provisions with related assets (€347 million).

### 28.1 PROVISIONS FOR SPENT NUCLEAR FUEL MANAGEMENT

EDF's currently adopted strategy with regards to the fuel cycle, in agreement with the French State, is to process spent fuel and to recycle the separated plutonium in the form of MOX fuel (Mixed OXide of plutonium and uranium).

The quantities processed by AREVA (now Orano) at the request of EDF, totalling approximately 1,100 tonnes per year, are determined based on the quantity of recyclable plutonium in the reactors that are authorised to load MOX fuel.

Consequently, provisions for spent fuel cover services associated with the following:

- removal of spent fuel from EDF's generation centres, as well as reception and interim storage;
- processing, including conditioning and storage of recyclable matter and waste resulting from this processing.

The processing expenses included in these provisions exclusively concern spent fuel that can be recycled in existing facilities, including the portion in reactors but not yet irradiated.

Expenses are measured based on forecast physical flows at the year-end, with reference to the contracts with AREVA (Orano) which define the terms for implementation of the framework agreement for the period 2008-2040. The most recent of these agreements, signed on 5 February 2016, covers the period 2016-2023.

These provisions also cover long-term storage of spent fuel that cannot currently be recycled in existing installations: plutonium fuel (MOX) or uranium fuel derived from enriched processing, and fuel from Creys-Malville and Brennilis until fourth-generation reactors become available.



## 28.2 PROVISION FOR WASTE REMOVAL AND CONDITIONING - PROVISION FOR LONG-TERM RADIOACTIVE WASTE MANAGEMENT

### Provisions for waste removal and conditioning

The provisions for waste removal and conditioning are reported separately from 1 January 2017.

They cover the following future expenses for radioactive waste resulting from operations or decommissioning (apart from spent fuel):

- characterisation and conditioning of waste;
- interim storage of waste.

The provisions for long-term radioactive waste management break down as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
Very low-level and low and medium-level waste	1,161	1,066
Long-lived low-level waste	265	256
Long-lived medium and high-level waste <sup>(1)</sup>	7,388	7,644
<b>PROVISIONS FOR LONG-TERM RADIOACTIVE WASTE MANAGEMENT</b>	<b>8,814</b>	<b>8,966</b>

(1) At 31 December 2016, provisions for long-lived medium and high-level waste included €581 million of provisions for waste removal and conditioning, which are now reported separately.

### Very low-level and low and medium-level waste

Very low-level waste mainly comes from nuclear plant decommissioning, and generally takes the form of rubble (concrete, scrap metal, insulating materials and piping). This type of waste is stored at surface level at the Morvilliers storage centre managed by ANDRA.

Low and medium-level waste comes from nuclear facilities (gloves, filters, resins). This type of waste is stored at surface level at the Soulaines storage centre managed by ANDRA.

The cost of removing and storing short-lived waste (very low-level and low and medium-level) is assessed on the basis of current contracts with transporters and contracts with ANDRA for operation of the existing storage centres.

### Long-lived low-level waste

Long-lived low-level waste belonging to EDF essentially consists of graphite waste from the ongoing decommissioning of the former UNGG (natural uranium graphite gas-cooled) reactors.

As this waste has a long lifetime, but is lower-level than long-lived medium and high-level waste, specific subsurface storage requirements apply under the French Law of 28 June 2006.

Following the initial geological investigations, in July 2015 ANDRA remitted a report on the proposed storage centre for long-lived low-level waste on a site located in the Soulaines region (Aube) in France. This report was submitted to the ASN for its opinion. Uncertainties remain about the site's capacity to accommodate all of the waste included in the baseline inventory of the long-lived low-level waste storage facility. Further studies are planned under the 2016-2018 National Plan for the Management of Radioactive Materials and Waste, concerning both the feasibility of this storage centre and the search for additional waste management solutions. A general industrial plan for management of all long-lived low-level radioactive waste is also to be remitted by the end of 2019.

### Long-lived medium and high-level waste

Long-lived medium and high-level waste essentially comes from processing of spent fuel, and to a lesser extent waste resulting from nuclear plant decommissioning (metallic components that have been inside the reactor).

### Provisions for long-term radioactive waste management

These provisions concern future expenses for:

- removal and storage of radioactive waste resulting from decommissioning of nuclear installations operated by EDF;
- removal and storage of radioactive waste packages resulting from spent fuel processing;
- direct storage, where relevant, of spent fuel that cannot be recycled in existing installations: specifically plutonium fuel (MOX) or uranium fuel derived from enriched processing, and fuel from Creys-Malville and Brennilis;
- EDF's share of the costs of studies, construction, operation and maintenance, shutdown and surveillance of existing and future storage centres.

The volumes of waste concerned by provisions include existing packages of waste and all waste to be conditioned, resulting from plant decommissioning or spent fuel processing at La Hague (comprising all fuel in reactors at 31 December, irradiated or otherwise). These volumes are regularly reviewed, in keeping with the data declared for the purposes of the national waste inventory undertaken by ANDRA.

The French Law of 28 June 2006 requires reversible storage in deep geological layers for this type of waste.

The provision established for long-lived medium and high-level waste is the largest component of provisions for long-term radioactive waste management.

Until June 2015 the gross value and disbursement schedules for forecast expenses were based on a scenario of industrial geological waste storage, following conclusions presented in the first half of 2005 by a working group formed under supervision of the State involving representatives of the administrations concerned, ANDRA and the producers of waste (EDF, AREVA (now Orano), CEA). EDF applied a reasonable approach to information supplied by this working group, leading to a benchmark cost, for storage of waste from all producers, of €14.1 billion under the economic conditions of 2003 (€20.8 billion under 2011 economic conditions).

In 2012 ANDRA carried out preliminary conceptual studies for the Cigéo geological storage project, after discussing the technical optimisations proposed by the producers of waste.

On this basis, ANDRA drew up figures which, in compliance with the Law of 28 June 2006, were subjected to a consultation process with waste producers started in late 2014 by the French Department for Energy and Climate (*Direction générale de l'énergie et du climat* or DGEC). In April 2015 EDF and the other producers sent the DGEC their comments on ANDRA's report and a joint estimation of the target Cigéo storage cost due to divergent approaches. All this information was included, together with the ASN's opinion, in a report submitted to the Minister for Ecology, Sustainable Development and Energy.

On 15 January 2016 the Ministry of Ecology, Sustainable Development and Energy issued a Ministerial Order setting the target cost for the Cigéo storage project at €25 billion under 2011 economic conditions. The cost as defined constitutes an objective to be met by ANDRA, in compliance with safety standards set by the ASN, working in close liaison with the operators of nuclear installations.

Publication of this Order entailed an €820 million adjustment to the provision shown in EDF's financial statements at 31 December 2015. The cost of the Cigéo project defined in the Order has replaced the estimated benchmark cost of €20.8 billion previously used by EDF for its financial statements.

## 6. FINANCIAL STATEMENTS

### Balance Sheet

In application of this Ministerial Order, the cost of the Cigéo project will be regularly updated, at least at each key milestone in the course of the project's development (authorisation to create the facility, commissioning, end of the "pilot industrial phase", safety reviews) in accordance with the opinion of the ASN.

Design studies for future facilities are currently in process with ANDRA and stakeholders. They include technical and economic optimisation and the responses to the safety option report sent by ANDRA to the ASN in April 2016. The law of 11 July 2016 also clarified the concept of reversibility. In 2017 ANDRA opted for a new configuration to provide the basis for the preliminary project.

Under the schedule prepared by ANDRA, the application to build Cigéo (classified as a basic nuclear facility) should be made during 2019 and permission is expected to be granted in 2022. After an industrial pilot phase starting in 2026, the first waste packages should be received in 2031.

On 15 January 2018, the ASN issued its opinion on the Cigéo safety option report (DOS Cigéo). It considers that the project has reached satisfactory overall technological maturity at this stage and requires examination of alternatives to the current proposals for storage of bituminous waste at Cigéo.

### 28.3 DECOMMISSIONING PROVISIONS FOR NUCLEAR POWER PLANTS

EDF bears full technical and financial responsibility for decommissioning of the nuclear plants it operates. The decommissioning process is governed by French Law of 13 June 2006, Decree 2007-1557 of 2 November 2007, and the French Environment Code (Articles L. 593-25 and following). It involves the following operations for each site:

- a shutdown declaration, to be made at least two years prior to the planned shutdown date;
- since the Energy Transition Law of 17 August 2015, the final shutdown, which takes place during the operating phase of the basic nuclear facility, is considered separately from dismantling, as a notable change of lesser importance (simply requiring a declaration by the operator to the Minister and the ASN);
- an application for decommissioning, which after examination by the authorities and a public inquiry, leads to a single decree authorising the decommissioning;
- key progress reviews with the ASN, included in a formal safety procedure specific to dismantling operations;

Details of changes in decommissioning provisions for nuclear power plants are as follows:

(in millions of euros)	2016	Increases		Decreases	Other changes <sup>(2)</sup>	2017
		Operating	Financial <sup>(1)</sup>	Utilisations		
Provisions for decommissioning of nuclear plants in operation	10,899	2	461	(13)	267	11,616
Provisions for decommissioning of shut-down nuclear plants	3,223	-	197	(118)	2	3,304
<b>TOTAL PROVISIONS FOR NUCLEAR PLANT DECOMMISSIONING</b>	<b>14,122</b>	<b>2</b>	<b>658</b>	<b>(131)</b>	<b>269</b>	<b>14 920</b>

(1) Cost of unwinding the discount and effects of changes in the net discount rate for provisions without related assets.

(2) These are changes of estimate with a corresponding adjustment to property, plant and equipment (see note 1.15.1) or reclassifications of provisions.

#### For nuclear power plants currently in operation (PWR pressurized water reactor plants with 900MW, 1,300MW and N4 reactors)

Until 2013, provisions were estimated based on a 1991 study by the French Ministry of Trade and Industry, which set an estimated benchmark cost for decommissioning expressed in €/MW, confirming the assumptions defined in 1979 by the PEON commission. These estimates had been confirmed from 2009 by a detailed study of decommissioning costs conducted by EDF at the representative site of Dampierre (four 900MW units), and its results were corroborated by an intercomparison with the study carried out by consultants La Guardia, based mainly on the Maine Yankee reactor in the US.

- an internal authorisation procedure for the operator, independent of operational personnel and audited by the ASN, allowing some specific work to be started ahead of the authorised safety procedure;

- finally, once these operations are complete, declassification of the facility to remove it from the legal regime governing basic nuclear facilities.

The decommissioning scenario adopted by EDF complies with France's environmental code, which requires as short a period as possible to elapse between final shutdown and dismantling in economically acceptable conditions and in compliance with the principles laid down in Article L. 1333-1 of the public health code (radioprotection) and section II of Article L. 110-1 of the environmental code (protection of the environment). The intended end-state is industrial use: the sites will be restored to their original condition and will be reusable for industrial facilities.

The ongoing operations concern plants that were constructed and operated before the current nuclear fleet ("first-generation" plants), and the Superphenix plant and Irradiated Materials Workshop at Chinon. These operations cover four different technologies: a heavy water reactor (Brennilis), a sodium-cooled fast-neutron reactor (the Superphenix at Creys-Malville), natural uranium graphite gas-cooled (UNGG) reactors (at Chinon, Saint Laurent and Bugey) and a pressurised water reactor (PWR at Chooz). Each of them is a first for EDF, and apart from the PWR, they concern reactor technologies for which there is little or no international experience. They therefore require development of new methods and technologies that are riskier than technologies for which feedback already exists. Decommissioning of the Chooz PWR is benefiting from past experience (essentially in the US and limited), but the reactor has the specificity of being located in a cave, making this a unique operation, generating experience that is not immediately transposable and involves specific risks.

The experience gained from dismantling the Chooz PWR will make the studies and estimates of future decommissioning of the nuclear fleet currently in operation ("second-generation" plants) as robust as possible. But so far, neither EDF nor any other operator has begun a decommissioning programme on a scale comparable to the current PWR fleet, and as a result the estimates include both opportunities and risks, especially the risks associated with the scale effect.

The decommissioning provisions cover future decommissioning expenses as described above (excluding the cost of removing and storing waste, which is covered by the provisions for long-term waste management).

In 2014 the Dampierre study was reviewed by EDF to make sure that the previous calculations were still valid in view of recent developments and experience, both internationally and internally. For this revision, the decommissioning provisions for plants in operation were based on costs resulting from the Dampierre study, in order to incorporate best estimates and feedback from inside and outside France. This change of estimate had no significant impact on the level of provisions at 31 December 2014.

Between June 2014 and July 2015, an audit of dismantling costs for EDF's nuclear fleet currently in operation was conducted by specialised consulting firms, at the request of the French Department for Energy and Climate (Direction Générale de l'Énergie et du Climat or DGEC). On 15 January 2016 the DGEC published a summary of the audit report. It stated that although estimating the cost of decommissioning nuclear reactors is a demanding exercise due to relatively limited past experience, the prospects of changes in techniques, and the distant timing of the expenditure, overall, the audit confirmed EDF's estimate of decommissioning costs for its nuclear fleet currently in operation. The DGEC also made a number of recommendations to EDF following this audit.

In 2016, EDF revised the decommissioning estimate, in order to incorporate the audit recommendations and past experience gained from dismantling operations for first-generation reactors (particularly Chooz A).

A detailed analytical approach was used to revise this estimate, identifying all costs for the engineering, construction work, operation and waste processing involved in future decommissioning of reactors currently in operation. This led to figures based on detailed timetables for plant decommissioning. The approach adopted made it possible to explore more thoroughly the assessment of costs specific to the initial units of each series, estimated for each series based on transposition coefficients applied to the baseline costs for the initial 900MW unit, and the series and mutualisation effects, as these costs and effects are inherent to the fleet's size and configuration.

The natures of the principal mutualisation and series effects used to arrive at the estimate are explained below.

There are several types of mutualisation effects:

- some of them relate to the fact that several reactors may share common buildings and facilities on the same site, and these buildings and facilities will not have to be decommissioned twice. Structurally, decommissioning a pair of reactors on the same site costs less than decommissioning two standalone reactors on two different sites. In France, unlike other countries, there are no single reactors but sites with two or four, and in one case six reactors;
- certain costs are no higher when 2 or 4 reactors are decommissioned on the same site. This is usually the case for surveillance costs and cost of maintaining safe operating conditions on the site;
- waste processing in centralised facilities (for example for dismantling major components) costs less than having several waste processing facilities at the decommissioning location.

Series effects are mainly of two types:

- first, in a fleet using the same technology, many of the studies do not need to be repeated each time;
- second, in a fleet using the same technology, robots and tooling can be largely reused from one site to another.

Such series effects are comparable in nature to the effects observed during construction of the fleet, in terms of studies or component manufacturing plants.

For example, for the 900MW fleet, a series effect of approximately 20% is expected between the first-of-kind reactor with 2 units and an average 2-unit reactor.

Series and mutualisation effects in particular explain why it is not appropriate simply to compare the average decommissioning cost per reactor between the French fleet and other countries' nuclear fleets.

The figures only marginally reflect changes in productivity and the learning effect. The external audit of the decommissioning cost for the fleet currently in operation, ordered by the DGEC, considered that the learning effect incorporated into the estimate was conservative.

For reasons of prudence, the estimate also includes an assessment of risks, contingencies and uncertainties.

EDF considers that the work done to revise the estimate answers the recommendations issued after the audit. The approach adopted and its results have been presented to the administrative authority and are currently the subject of further questions and discussion.

EDF is also continuing to support its analyses through an international comparison, making it sure it takes into consideration a number of factors that could distort direct comparisons, for example differences in the scope concerned by costs estimate, or national and regulatory contexts.

The results of this detailed approach led to limited changes overall in the cost estimate and the associated provisions at 31 December 2016, apart from the consequences of the change in the depreciation period for 900MW series plants (excluding Fessenheim) at 1 January 2016, and the effect of changes in discount rates at 31 December 2016, *i.e.*:

- an increase of €321 million in the estimated decommissioning costs and an increase of €334 million in the estimated cost of long-term management of long-lived medium-level waste;
- a decrease of €(451) million in the provision for plant decommissioning, and an increase of €162 million in the provision for long-term management of long-lived medium-level waste, with corresponding changes in the underlying assets.

After its revision in 2016, it was decided that the estimate would be reviewed annually. The 2017 review led to non-significant adjustments.

### For permanently shut-down nuclear power plants

Unlike the PWR fleet currently in operation, the first-generation reactors now shut down used a range of different technologies: a PWR reactor at Chooz A, UNGG (natural uranium graphite gas-cooled) reactors at Bugey, St-Laurent and Chinon, a heavy water reactor at Brennilis, and a sodium-cooled fast neutron reactor at Creys-Malville.

The decommissioning costs are based on contractor quotes, which take account of accumulated industrial experience, unforeseen and regulatory developments, and the latest available figures.

In 2015 the industrial decommissioning strategy for UNGG plants was totally revised. The previously selected strategy was based on a scenario involving "underwater" dismantling of caissons (UNGG reactor buildings) for four of the reactors, with direct graphite storage in a centre currently under examination by ANDRA (see Long-lived low-level waste, note 28.2). Several new technical developments showed that the alternative "in-air" dismantling solution for the caissons would improve industrial control of operations and was apparently more favourable in terms of safety, radioprotection and environmental impact. The Company therefore selected a new "in-air" dismantling scenario as the benchmark strategy for all six caissons. This scenario includes a consolidation phase, building on experience acquired from dismantling the first caisson before beginning work on the other five. The decommissioning phase will ultimately be longer than previously planned, leading to higher contractor quotes due to the induced operating costs.

The amended industrial scenario was presented to the ASN's commissioners on 29 March 2016.

At the request of the ASN, an independent expert review was ordered in the first quarter of 2017 to analyse EDF's chosen solutions for decommissioning of its six UNGG reactors. The conclusions did not challenge the main options chosen. A meeting took place with the ASN commissioners in June 2017 based on these conclusions and a justification file remitted by EDF in March.

This led to a further presentation in 2018 after EDF remitted another file presenting a detailed schedule for operations to be undertaken in the next 15 years, and the findings of a large number of studies concerning the stability of reactor buildings in the long term.

The strategy file and the safety option report concerning establishment of a secure configuration were sent to the ASN in late December 2017, together with the detailed timetable for operations over the period 2017-2032.

Updating the industrial decommissioning scenario for first-generation power plants, particularly UNGGs, led to a €590 million increase in the provision at 31 December 2015.

After the revision of the estimated cost in 2015, the decision was made that it should be reviewed annually. The 2016 review led to non-significant adjustments, apart from one increase of €125 million for a specific installation (the Irradiated Materials Workshop at Chinon). The 2017 review led to non-significant adjustments.

## 28.4 PROVISIONS FOR LAST CORES

These provisions cover the future expenses resulting from scrapping fuel that will only be partially irradiated when the reactor is shut down. They are measured based on:

- the cost of the loss on fuel in the reactor that is not totally spent at the time of final reactor shutdown and cannot be reused due to technical and regulatory constraints;
- the cost of fuel processing, and waste removal and storage operations. These costs are valued in a similar way to provisions for spent fuel management and long-term radioactive waste management.

These unavoidable costs are components of the cost of nuclear reactor shutdown and decommissioning. As such, they are fully covered by provision from the commissioning date and an asset associated with the provision is recognised.

## 28.5 DISCOUNTING OF PROVISIONS RELATED TO NUCLEAR GENERATION AND SENSITIVITY ANALYSES

### 28.5.1 Discount rate

#### (1) Calculation of the discount rate

The discount rate is determined based on long-series data for a sample of bonds with maturities as close as possible to that of the liability. However, some expenses covered by these provisions will be disbursed over periods significantly longer than the duration of instruments generally traded on the financial markets.

The benchmark used to determine the discount rate is the sliding 10-year average of the return on French OAT 2055 treasury bonds, which have a similar duration to the obligations, plus the spread of corporate bonds rated A to AA, which include EDF.

The methodology used to determine the discount rate, particularly the reference to sliding 10-year averages, is able to prioritise long-term trends in rates, in keeping with the long-term horizon for disbursements. The discount rate is therefore revised in response to structural developments in the economy leading to medium and long-term changes.

The assumed inflation rate is determined in line with the forecasts provided by consensus and expected inflation based on the returns on inflation-linked bonds.

The discount rate determined in this way is 4.1% at 31 December 2017, assuming inflation of 1.5% (4.2% and 1.5% respectively at 31 December 2016), giving a real discount rate of 2.6% at 31 December 2017 (2.7% at 31 December 2016).

#### (2) Regulatory discount rate limit

The discount rate applied must also comply with two regulatory limits. Under the amended decree of 23 February 2007 and the ministerial order of 21 March 2007, itself modified by the order of 29 December 2017, the discount rate must be lower than:

- a regulatory maximum, set until 31 December 2026 as the weighted average of two terms, the first set at 4.3%, and the second corresponding to the arithmetic average over the 48 most recent months of the TEC 30-year rate plus 100 points. The weighting given to the first constant term of 4.3% reduces on a straight-line basis from 100% at 31 December 2016 to 0% at 31 December 2026;
- and the expected rate of return on assets covering the liability (dedicated assets).

The ceiling rate based on the TEC 30-year rate is 4.1% at 31 December 2017 (4.3% at 31 December 2016).

The discount rate used at 31 December 2017 is 4.1%.

### 28.5.2 Analysis of sensitivity to macro-economic assumptions

Sensitivity to assumptions concerning costs, inflation rate, long-term discount rate, and disbursement schedules can be estimated through comparison of the gross amount estimated under year-end economic conditions with the present value of the amount.

	2017		2016	
	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
<i>(in millions of euros)</i>				
Spent fuel management	19,058	10,786	18,460	10,658
Provisions for removal and conditioning of waste	1,203	726	-	-
Long-term radioactive waste management	29,396	8,814	29,631	8,966
<b>BACK-END NUCLEAR CYCLE EXPENSES</b>	<b>49,657</b>	<b>20,326</b>	<b>48,091</b>	<b>19,624</b>
Decommissioning provisions for nuclear power plants in operation	20,563	11,616	20,185	10,899
Decommissioning provisions for shut-down nuclear power plants	6,472	3,304	6,431	3,223
Provisions for last cores	4,332	2,387	4,344	2,287
<b>DECOMMISSIONING AND LAST CORE EXPENSES</b>	<b>31,367</b>	<b>17,307</b>	<b>30,960</b>	<b>16,409</b>

This approach can be complemented by estimating the impact of a change in the discount rate on the present value.

In application of Article 11 of the decree of 23 February 2007, the following table reports these details for the main components of provisions for the back-end of the nuclear cycle, decommissioning of nuclear plants and last cores for EDF:

	Amounts in provisions at present value		Sensitivity to discount rate			
	31/12/2017	Balance sheet provision		Pre-tax net income		
		+0.20%	-0.20%	+0.20%	-0.20%	
<b>BACK-END NUCLEAR CYCLE EXPENSES</b>						
■ spent fuel management	10,786	(221)	238	190	(206)	
■ removal and conditioning of waste	726	(22)	24	13	(14)	
■ long-term radioactive waste management	8,814	(497)	562	407	(464)	
<b>DECOMMISSIONING AND LAST CORE EXPENSES</b>						
■ decommissioning of nuclear power plants in operation	11,616	(477)	501	7	(7)	
■ decommissioning of shut-down nuclear power plants	3,304	(125)	135	125	(135)	
■ last cores	2,387	(85)	90	-	-	
<b>TOTAL</b>	<b>37,633</b>	<b>(1,427)</b>	<b>1,550</b>	<b>742</b>	<b>(826)</b>	

## NOTE 29 OTHER PROVISIONS FOR DECOMMISSIONING

Other provisions for decommissioning principally concern fossil-fired power plants.

The costs of decommissioning fossil-fired power plants are calculated using regularly updated studies based on estimated future costs, measured by reference to the charges recorded on past operations and the most recent estimates for plants still in operation.

The provision recorded at 31 December 2017 reflects the most recent known contractor quotes and commissioning of new generation assets.

## NOTE 30 PROVISIONS FOR EMPLOYEE BENEFITS

Changes in provisions for employee benefits were as follows:

(in millions of euros)	31/12/2016	Increases		Decreases		31/12/2017
		Operating <sup>(1)</sup>	Financial	Operating <sup>(2)</sup>	Financial <sup>(3)</sup>	
Provisions for post-employment benefits	9,837	838	566	(918)	(266)	10,056
Provisions for long-term benefits	1,009	51	19	(80)	-	999
<b>PROVISIONS FOR EMPLOYEE BENEFITS</b>	<b>10,846</b>	<b>889</b>	<b>584</b>	<b>(998)</b>	<b>(266)</b>	<b>11,055</b>

(1) including a past service cost of €530 million, amortisation of actuarial losses amounting to €356 million, and unvested benefits of €10 million.

(2) including €(974) million for employers' contributions and €(31) million for actuarial gains.

(3) for the expected return on fund assets.

### DETAILS OF CHANGES IN PROVISIONS:

(in millions of euros)	Obligations	Fund assets	Obligations net of fund assets	Unrecognised past service cost	Unrecognised actuarial gains and losses	Provision in the balance sheet
<b>BALANCE AT 31/12/2016</b>	<b>30,887</b>	<b>(11,317)</b>	<b>19,570</b>	<b>(59)</b>	<b>(8,665)</b>	<b>10,846</b>
Net expense for 2017	1,115	(266)	849	10	325	1,184
Unrecognised actuarial gains and losses	(600)	(102)	(702)	-	702	-
Contributions to funds	-	(131)	(131)	-	-	(131)
Benefits paid	(1,294)	450	(844)	-	-	(844)
<b>BALANCE AT 31/12/2017</b>	<b>30,108</b>	<b>(11,366)</b>	<b>18,742</b>	<b>(49)</b>	<b>(7,638)</b>	<b>11,055</b>

The actuarial gains and losses generated over 2017 amount to €600 million, comprising €66 million resulting from revisions of assumptions and €534 million of experience adjustments.

### POST-EMPLOYMENT AND LONG-TERM EMPLOYEE BENEFIT EXPENSES:

(in millions of euros)	31/12/2017	31/12/2016
Current service cost	530	480
Interest expenses (discount effect)	584	688
Expected return on fund assets	(266)	(272)
Amortisation of unrecognised actuarial gains and losses - post-employment benefits	283	257
Change in actuarial gains and losses - long-term benefits	42	118
Effect of plan curtailment or settlement	-	-
Past service cost - vested benefits	-	-
Past service cost - unvested benefits	10	10
<b>NET CHARGES RELATED TO POST-EMPLOYMENT BENEFITS AND LONG-TERM BENEFITS</b>	<b>1,184</b>	<b>1,281</b>
<b>including:</b>		
Operating expenses <sup>(1)</sup>	865	866
Financial expenses	318	415

(1) In 2017, this amount corresponds to operating increases (€889 million) net of reversals for actuarial gains and losses (€(31) million).

### 30.1 PROVISIONS FOR POST-EMPLOYMENT BENEFITS

Details of these provisions are shown below:

<i>(in millions of euros)</i>	31/12/2016	Increases		Decreases		31/12/2017
		Operating	Financial	Operating	Financial	
<b>Provisions for post-employment benefits comprising:</b>	<b>9,837</b>	<b>838</b>	<b>566</b>	<b>(918)</b>	<b>(266)</b>	<b>10,056</b>
Pensions	7,343	526	440	(723)	(256)	7,331
CNIEG expenses	443	10	10	(14)	-	449
Benefits in kind (energy)	1,547	210	87	(119)	-	1,725
Retirement gratuities	(19)	42	12	(40)	(10)	(15)
Other benefits	523	50	17	(22)	-	567

<i>(in millions of euros)</i>	Obligations	Fund assets	Unrecognised past service cost	Unrecognised actuarial gains and losses	Provision in the balance sheet
<b>comprising:</b>					
Pensions	22,582	(10,845)	-	(4,407)	7,331
CNIEG expenses	472	-	-	(23)	449
Benefits in kind (energy)	4,572	-	-	(2,847)	1,725
Retirement gratuities	584	(506)	(28)	(65)	(15)
Other benefits	899	(15)	(20)	(297)	567

<i>(in millions of euros)</i>	Obligations	Fund assets	Unrecognised past service cost	Unrecognised actuarial gains and losses	Provision in the balance sheet
<b>comprising:</b>					
Pensions	23,294	(10,797)	-	(5,155)	7,343
CNIEG expenses	499	-	-	(55)	443
Benefits in kind (energy)	4,580	-	-	(3,033)	1,547
Retirement gratuities	617	(506)	(35)	(95)	(19)
Other benefits	888	(15)	(23)	(327)	523

### 30.2 PROVISIONS FOR OTHER LONG-TERM BENEFITS FOR CURRENT EMPLOYEES

The amount of obligations for other long-term benefits awarded to current employees is identical to the corresponding balance sheet provisions. Details are as follows:

<i>(in millions of euros)</i>	31/12/2016	Increases		Decreases		31/12/2017
		Operating	Financial	Operating	Financial	
<b>Provisions for other long-term benefits for current employees</b>	<b>1,009</b>	<b>51</b>	<b>19</b>	<b>(80)</b>		<b>999</b>
<b>comprising:</b>						
Annuities following work-related accident and illness	859	48	16	(69)		854
Long service awards	128	2	3	(8)		125
Other	22	1	-	(3)		20

### 30.3 FUND ASSETS

Fund assets amount to €11,366 million at 31 December 2017 (€11,317 million at 31 December 2016) and are principally allocated to coverage of the past specific

benefits earned under the special pension system (€10,845 million) and retirement gratuities (with target coverage of 100%) (€506 million).

Investments under the contracts concerned break down as follows:

<i>(in millions of euros)</i>	<b>31/12/2017</b>	<b>31/12/2016</b>
<b>TOTAL FUND ASSETS</b>	<b>11,366</b>	<b>11,317</b>
<b>Assets funding special pension benefits</b>	<b>10,845</b>	<b>10,797</b>
%		
Equities	30%	31%
Bonds and monetary instruments	70%	69%
<b>Assets funding retirement gratuities</b>	<b>506</b>	<b>506</b>
%		
Equities	32%	33%
Bonds and monetary instruments	68%	67%
<b>Assets funding other benefits</b>	<b>15</b>	<b>15</b>

### 30.4 ACTUARIAL ASSUMPTIONS

The main actuarial assumptions used for provisions for post-employment benefits and long-term employee benefits under the IEG system are summarised below:

- the discount rate is 1.9% at 31 December 2017 (identical to the rate used at 31 December 2016);
- the inflation rate is estimated at 1.5% at 31 December 2017 (identical to the rate used at 31 December 2016);
- the average residual period of employment is 19.68 years;
- the staff turnover rate is considered non-significant;
- the "tarif agent" (special energy price for EDF employees) includes changes in taxes based on that tariff;
- the expected return on fund assets covering past specific benefits under the special pension system is 2.37% for 2017;
- the expected return on fund assets covering retirement gratuities is 1.99% for 2017.

The discount rate used for employee benefit obligations is determined by applying the yield rate on high-quality corporate bonds based on their duration to maturities corresponding to the future disbursements resulting from these obligations. For longer durations, the calculation also takes into consideration data from a wider selection of corporate bonds adjusted for comparability with the high-quality bonds, since 2017 saw a reduction in the number of such bonds with these durations.

The obligations are based on wage increase assumptions that are differentiated by age group and employee category, leading to an average annual rise of 1.7% excluding inflation (3.2% including inflation).



**NOTE 31 PROVISIONS FOR OTHER EXPENSES**

(in millions of euros)	31/12/2016	Operating increases	Decreases		Other	31/12/2017
			Utilisations	Reversals		
Provisions for:						
■ Personnel expenses	88	51	(65)	(5)	-	69
■ Renewal of facilities operated under concessions	262	13	-	-	(11)	264
■ Other expenses	529	194	(92)	(26)	-	605
<b>PROVISIONS FOR OTHER EXPENSES</b>	<b>879</b>	<b>258</b>	<b>(157)</b>	<b>(31)</b>	<b>(11)</b>	<b>938</b>

**NOTE 32 LIABILITIES**

	Maturity			Gross value at 31/12/2017	Gross value at 31/12/2016
	< 1 year	1 - 5 years	> 5 years		
<b>Liabilities</b>					
Bonds	1,500	13,010	32,042	46,552	50,143
Borrowings from financial institutions	-	-	1,200	1,200	1,245
Other borrowings	1,949	7	6	1,962	3,986
Other financial liabilities:				-	
■ Advances on consumption	1	7	19	27	29
■ Other	1,697	3	-	1,700	1,458
<b>Financial liabilities (see note 33)</b>	<b>5,147</b>	<b>13,027</b>	<b>33,267</b>	<b>51,441</b>	<b>56,861</b>
<b>Advances and progress payments received <sup>(1)</sup></b>	<b>6,861</b>	<b>-</b>	<b>-</b>	<b>6,861</b>	<b>7,068</b>
Trade payables and related accounts	7,550	88	32	7,670	7,103
Tax and social security liabilities <sup>(2)</sup>	8,011	-	-	8,011	8,539
Liabilities related to fixed assets and related accounts	2,206	102	-	2,308	1,813
Other liabilities <sup>(3)</sup>	13,922	-	-	13,922	15,717
<b>Operating, investment and other liabilities</b>	<b>31,689</b>	<b>190</b>	<b>32</b>	<b>31,911</b>	<b>33,172</b>
<b>Cash instruments <sup>(4)</sup></b>	<b>1,866</b>	<b>1,168</b>	<b>1,437</b>	<b>4,471</b>	<b>5,283</b>
<b>Deferred income <sup>(5)</sup></b>	<b>577</b>	<b>912</b>	<b>1,796</b>	<b>3,285</b>	<b>3,627</b>
<b>TOTAL LIABILITIES</b>	<b>46,140</b>	<b>15,297</b>	<b>36,532</b>	<b>97,969</b>	<b>106,011</b>

(1) Advances and progress payments received principally include monthly standing order payments by EDF's residential and business customers, amounting to €6,568 million (€6,828 million at 31 December 2016).

(2) In 2017 this item includes an amount of €1,562 million for the CSPE compensation to be collected by EDF on energy supplied but not yet billed (€1,632 million in 2016).

(3) Mainly the amount of current accounts, cash pooling and cash management agreements with subsidiaries.

(4) Essentially unrealised losses on foreign exchange instruments.

(5) Deferred income at 31 December 2017 comprises the partner advances made to EDF under nuclear plant financing plans and the associated long-term contracts, amounting to €1,711 million (€1,822 million in 2016). Deferred income on long-term contracts also includes the advance paid to EDF in 2010 under the agreement with the Exeltium consortium. This advance is transferred to the income statement progressively over the term of the contract.

## NOTE 33 FINANCIAL LIABILITIES

<i>(in millions of euros)</i>	Balance at 31/12/2016	New borrowings	Repayments	Translation adjustments	Other	Balance at 31/12/2017
Bonds in euros	1,013	-	-	-	-	1,013
Bonds in other currencies	15,309	1,124	(2,270)	(1,725)	-	12,438
Euro-Medium Term Notes (EMTN) in euros	20,483	-	-	-	-	20,483
Euro-Medium Term Notes (EMTN) in other currencies	13,338	146	-	(866)	-	12,618
<b>Bonds</b>	<b>50,143</b>	<b>1,270</b>	<b>(2,270)</b>	<b>(2,591)</b>	-	<b>46,552</b>
Long-term loans in euros	1,245	-	(45)	-	-	1,200
<b>Borrowings from financial institutions</b>	<b>1,245</b>	-	<b>(45)</b>	-	-	<b>1,200</b>
Negotiable debt instruments in euros <sup>(1)</sup>	1,674	-	(974)	-	-	700
Negotiable debt instruments (non Euro) <sup>(1)</sup>	2,298	-	(790)	(261)	-	1,247
Contractual financial borrowings	14	2	(1)	-	-	15
<b>Other borrowings</b>	<b>3,986</b>	<b>2</b>	<b>(1,765)</b>	<b>(261)</b>	-	<b>1,962</b>
<b>Total borrowings</b>	<b>55,374</b>	<b>1,272</b>	<b>(4,080)</b>	<b>(2,852)</b>	-	<b>49,714</b>
<b>Advances on consumption</b>	<b>29</b>	-	-	-	<b>(2)</b>	<b>27</b>
Miscellaneous advances	82	11	(13)	-	-	80
Bank overdrafts	134	-	-	-	299	433
Deferred bank debits	38	-	-	-	1	39
Interest payable	1,204	-	-	-	(56)	1,148
<b>Total other financial liabilities</b>	<b>1,458</b>	<b>11</b>	<b>(13)</b>	-	<b>244</b>	<b>1,700</b>
<b>TOTAL FINANCIAL LIABILITIES</b>	<b>56,861</b>	<b>1,283</b>	<b>(4,093)</b>	<b>(2,852)</b>	<b>242</b>	<b>51,441</b>

(1) Issues net of repayments.

On 20 January 2017, EDF raised ¥137 billion, i.e. around €1.1 billion, through 4 senior bond issues on the Japanese market ("Samurai bonds") (see note 2.5)

Redemption of bonds totalled €2,270 million and concerned bonds in foreign currencies that reached maturity.

### 33.1 BREAKDOWN OF LOANS BY CURRENCY, BEFORE AND AFTER HEDGING INSTRUMENTS

<i>(in millions of euros)</i>	Debt structure in balance sheet				Impact of hedging instruments		Debt structure after hedging			
	Non-Euro	In euros	Non-Euro	of debt	Non-Euro	In euros	Non-Euro	In euros	% Non-Euro	% of debt
<b>Total I - Euros</b>		<b>23,411</b>		<b>47</b>		<b>21,360</b>		<b>44,771</b>		<b>90</b>
CHF	550	470	1.8	1	(550)	(470)	-	-	-	-
GBP	7,385	8,324	31.6	17	(3,000)	(3,381)	4,385	4,943	100	10
HKD	2,416	258	1.0	1	(2,416)	(258)	-	-	-	-
JPY	137,000	1,015	3.9	2	(137,000)	(1,015)	-	-	-	-
NOK	1,000	101	0.4	-	(1,000)	(101)	-	-	-	-
USD	19,351	16,135	61.3	32	(19,351)	(16,135)	-	-	-	-
<b>Total II - Non Euro currencies</b>		<b>26,303</b>	<b>100</b>	<b>53</b>		<b>(21,360)</b>		<b>4,943</b>	<b>100</b>	<b>10</b>
<b>TOTAL I+II</b>		<b>49,714</b>		<b>100</b>		<b>-</b>		<b>49,714</b>		<b>100</b>

The nominal value of hedging instruments included in off-balance sheet commitments (see note 35.1) has no effect on loans in the balance sheet.

### 33.2 BREAKDOWN OF LOANS BY TYPE OF INTEREST RATE BEFORE AND AFTER HEDGING

<i>(in millions of euros)</i>	Debt structure in balance sheet			Impact of hedging instruments	Debt structure after hedging		
	Total	% 31/12/2017	% 31/12/2016		Total	% 31/12/2017	% 31/12/2016
Long-term borrowings and EMTN	47,057			(22,679)	24,378		
Short-term borrowings	1,947			-	1,947		
<b>Borrowings at fixed rate</b>	<b>49,004</b>	<b>99</b>	<b>97</b>	<b>(22,679)</b>	<b>26,325</b>	<b>53</b>	<b>54</b>
Long-term borrowings and EMTN	710			22,679	23,389		
Short-term borrowings	-			-	-		
<b>Borrowings at floating rate</b>	<b>710</b>	<b>1</b>	<b>3</b>	<b>22,679</b>	<b>23,389</b>	<b>47</b>	<b>46</b>
<b>TOTAL</b>	<b>49,714</b>	<b>100</b>	<b>100</b>	<b>-</b>	<b>49,714</b>	<b>100</b>	<b>100</b>

### NOTE 34 UNREALISED FOREIGN EXCHANGE GAINS

Unrealised foreign exchange gains at 31 December 2017 amount to €485 million (€384 million at 31 December 2016), of which €122 million concerned two perpetual bonds in pounds sterling, €128 million concerned a bond in pounds sterling that is totally hedged by cross-currency swaps, and €196 million concerned

currency swaps and forward currency contracts to hedge dedicated assets, in accordance with the netting rule applied as part of the implementation of the new regulation ANC 2015-05 (see note 1.11).

## OTHER INFORMATION

### NOTE 35 FINANCIAL INSTRUMENTS

#### 35.1 OFF-BALANCE SHEET COMMITMENTS RELATED TO CURRENCY AND INTEREST RATE DERIVATIVES

EDF uses financial instruments to limit the impact of foreign exchange rate risks and interest rate risks.

	31/12/2017		31/12/2016	
	To be received (notional)	To be given (notional)	To be received (notional)	To be given (notional)
<i>(in millions of euros)</i>				
<b>1 - Interest rate transactions</b>				
<b>Short-term interest rate swaps</b>				
EUR	-	-	-	-
<b>Long-term interest rate swaps</b>				
EUR	7,184	7,184	7,423	7,423
USD	3,043	3,043	3,463	3,463
GBP	3,593	3,593	3,730	3,730
JPY	-	-	-	-
<b>Sub-total</b>	<b>13,820</b>	<b>13,820</b>	<b>14,616</b>	<b>14,616</b>
<b>2 - Exchange rate transactions</b>				
<b>Forward transactions</b>				
EUR	20,232	22,032	20,619	21,819
CAD	637	525	662	518
USD	13,634	12,941	15,756	14,644
GBP	6,848	4,521	5,624	4,575
CHF	857	557	141	242
HUF	11	11	458	458
ILS	180	180	183	183
PLN	1,171	1,255	1,360	1,432
JPY	102	1,680	48	862
CNY	15	15	-	-
MXN	62	61	60	60
Other currencies	123	123	92	92
<b>Long-term currency swaps</b>				
EUR	9,099	33,253	9,315	35,407
JPY	1,015	103	-	113
USD	18,515	4,385	22,726	5,615
GBP	11,337	4,126	13,011	4,213
CHF	470	427	1,257	93
HUF	-	-	-	-
CAD	37	37	42	42
ILS	132	132	140	140
PLN	6	3	4	1
NOK	102	-	110	-
MXN	-	11	-	-
HKD	258	-	149	-
<b>Sub-total</b>	<b>84,843</b>	<b>86,378</b>	<b>91,757</b>	<b>90,509</b>
<b>3 - Securitisation swaps</b>				
	<b>264</b>	<b>264</b>	<b>350</b>	<b>350</b>
<b>Total financial off-balance sheet commitments</b>	<b>98,927</b>	<b>100,462</b>	<b>106,723</b>	<b>105,475</b>
<b>4- Commodity swaps</b>				
Coal (in millions of tonnes)	4	4	3	3
Oil products (in thousands of barrels)	7,348	7,348	7,634	7,634

The amounts shown in the above table are the nominal values of contracts, translated where necessary using 2017 year-end exchange rates (regardless of whether they are classified as hedges).

## 35.2 IMPACTS OF FINANCIAL INSTRUMENT TRANSACTIONS ON NET INCOME

<i>(in millions of euros)</i>	<b>2017</b>	<b>2016</b>
<b>Instruments not classified as hedges</b>		
Interest rate instruments <sup>(1)</sup>	104	136
Forex instruments	(202)	(979)
<b>Instruments classified as hedges</b>		
Interest rate instruments	600	596
Forex instruments	442	94

(1) Including interest on swaps.

## 35.3 FAIR VALUE OF DERIVATIVE FINANCIAL INSTRUMENTS

The fair value of currency and interest rate swaps was calculated by discounting future cash flows using year-end market exchange and interest rates, over the remaining term of the contracts (market value includes accrued interest).

The book value of off-balance sheet derivatives includes accrued interest, equalisation payments and premiums paid or received, plus translation adjustments, which are already booked in EDF's accounts. The difference between book value and market value is the unrealised gain or loss.

The fair value of derivative financial instruments reported off-balance sheet at 31 December 2017 as calculated by EDF is as follows:

<i>(in millions of euros)</i>	<b>Book value</b>	<b>Fair value</b>
<b>Interest rate hedges</b>		
■ Interest rate swaps	156	1,727
<b>Exchange rate hedges</b>		
■ Forward exchange transactions and currency swaps	(37)	(167)
■ Cross-currency swaps	(1,390)	(2,435)
<b>Commodity hedges</b>		
■ Coal	-	72
■ Oil products	-	21
<b>TOTAL</b>	<b>(1,271)</b>	<b>(782)</b>

## NOTE 36 OTHER OFF-BALANCE SHEET COMMITMENTS AND OPERATIONS

At 31 December 2017, off-balance sheet commitments related to operations, financing and investments (other than electricity supply commitments and partnership agreements) comprise the following:

	Maturity				31/12/2017	31/12/2016
	< 1 year	1 - 5 years	5 - 10 years	> 10 years		
<b>Off-balance sheet commitments given</b>	<b>13,882</b>	<b>19,412</b>	<b>12,646</b>	<b>9,599</b>	<b>55,539</b>	<b>58,437</b>
<b>Operating commitments</b>	<b>6,672</b>	<b>13,672</b>	<b>11,379</b>	<b>9,562</b>	<b>41,285</b>	<b>45,232</b>
■ Commitments related to fuel and energy purchases	3,266	10,659	9,418	9,317	32,660	38,282
■ Other operating commitments	3,406	3,013	1,961	245	8,625	6,950
<b>Investment commitments</b>	<b>3,203</b>	<b>3,519</b>	<b>506</b>	<b>27</b>	<b>7,255</b>	<b>8,065</b>
<b>Financing commitments</b>	<b>4,007</b>	<b>2,221</b>	<b>761</b>	<b>10</b>	<b>6,999</b>	<b>5,140</b>
<b>Off-balance sheet commitments received</b>	<b>2,574</b>	<b>10,823</b>	<b>244</b>	<b>164</b>	<b>13,805</b>	<b>16,076</b>
<b>Operating commitments</b>	<b>1,715</b>	<b>1,362</b>	<b>244</b>	<b>164</b>	<b>3,485</b>	<b>3,258</b>
<b>Investment commitments</b>	<b>25</b>	<b>11</b>	-	-	<b>36</b>	<b>2,603</b>
<b>Financing commitments</b>	<b>834</b>	<b>9,450</b>	-	-	<b>10,284</b>	<b>10,215</b>

### 36.1 COMMITMENTS GIVEN

In almost all cases, commitments given are reciprocal, and the third parties concerned are under an obligation to supply EDF with assets or services related to operating, investing and financing transactions.

At 31 December 2017, these commitments mature as follows:

	Maturity				31/12/2017	31/12/2016
	< 1 year	1 - 5 years	5 - 10 years	> 10 years		
Electricity purchases and related services	1,736	3,504	3,804	5,316	14,360	16,469
Nuclear fuel purchases	1,530	7,155	5,614	4,001	18,300	21,813
<b>FUEL AND ENERGY PURCHASE COMMITMENTS</b>	<b>3,266</b>	<b>10,659</b>	<b>9,418</b>	<b>9,317</b>	<b>32,660</b>	<b>38,282</b>

#### Electricity purchases and related services

Electricity purchase commitments mainly concern:

- Island Energy Systems (SEI), which has given commitments to purchase electricity generated from bagasse and coal, and electricity generated by the plants of EDF's Island Electricity Production subsidiaries;
- hedging contracts: these are forward purchases, for which the volumes and prices are set in contracts with EDF Trading.

In addition to the obligations reported above and under Article 10 of the Law of 10 February 2000, in mainland France EDF is obliged, at the producer's request and subject to compliance with certain technical features, to purchase the power produced by co-generation plants and renewable energy generation units (wind turbines, small hydro-electric plants, photovoltaic power, etc).

The additional costs generated by this obligation are offset, after validation by the CRE, by the CSPE. These purchase obligations total 47TWh for 2017 (43TWh for 2016), including 6TWh for co-generation (6TWh for 2016), 23TWh for wind power (20TWh for 2016), 9TWh for photovoltaic power (8TWh for 2016) and 3TWh for hydropower (3TWh for 2016).

#### Nuclear fuel purchases

Commitments for purchases of nuclear fuel arise from supply contracts for the nuclear plants intended to cover EDF's needs for uranium and fluorination, enrichment and fuel assembly production services.

The decrease in nuclear fuel purchases in 2017 is mainly explained by the acquisition of Framatome (see note 2.2).

### 36.1.1 Fuel and energy purchase commitments

In the course of its ordinary Generation and supply activities, EDF has entered into long-term contracts for purchases of electricity, other energies and commodities and nuclear fuel, for periods of up to 20 years.

### 36.1.2 Other operating commitments

These are mostly commitments undertaken by EDF through signature of orders relating to operations or contracts in progress, related guarantees, and commitments as lessee under irrevocable operating lease contracts principally for premises, equipment and vehicles. The corresponding rents are subject to renegotiation at intervals defined in the contracts.

The main explanations for the increase in other operating commitments are:

- the signature of the PIDU intellectual property agreement. On 30 June 2017, EDF and AREVA NP (now Framatome) signed a framework contract concerning Framatome's intellectual property and the rights of use granted to EDF and its affiliates for their own purposes (fleet in operation and new nuclear projects);
- the recovery of €464 million of contractual and bank guarantees in connection with acquisition of Framatome on 31 December 2017.

### 36.1.3 Investment commitments

Investment commitments are mostly commitments for acquisition of property, plant and equipment. The decrease in EDF's commitments for acquisition of intangible assets and property, plant and equipment is explained by progress on the Flamanville 3 EPR project, changes in contracts for replacement of steam supply systems, and changes contracts for emergency diesel generators.

### 36.1.4 Financing commitments

These are commitments by EDF to its subsidiaries, in 2017 mainly €2,060 million to EDF Trading, €1,637 million to EDF Energies Nouvelles, €953 million to EDF Energy, €929 million to Edison, and €800 million to Enedis.

## 36.2 COMMITMENTS RECEIVED

### 36.2.1 Operating commitments

These commitments mainly comprise:

- operating lease commitments received as lessor;
- operating guarantees received;
- operating sale commitments, essentially concerning engineering services for HPC;
- personnel secondment commitments to EDVANCE.

### 36.2.2 Financing commitments

These commitments correspond to the total value of credit lines available to EDF from various banks.

### 36.2.3 Investment commitments

Investment commitments received at 31 December 2016 primarily included an amount of €2,566 million for the future sale of 49.9% of the subsidiary RTE via the new company CTE (formerly C25). This operation was finalised in 2017 (see note 2.4).

## 36.3 OTHER TYPES OF COMMITMENT

### 36.3.1 Electricity supply commitments

In the course of its business, EDF has signed long-term contracts to supply electricity as follows:

- long-term contracts with a number of European electricity operators, for a specific plant or for a defined group of plants in the French nuclear generation fleet, corresponding to installed power capacity of 3.5GW;
- in execution of France's NOME Law on organisation of the French electricity market, EDF has a commitment to sell some of the energy generated by its existing nuclear power plants to other suppliers. This covers volumes of up to 100TWh each year until 31 December 2025.

### 36.3.2 Gas purchases and related services

Gas purchase commitments are given by EDF in connection with its expanding gas supply business.

Gas purchases for supply, delivery and storage are mostly undertaken through long-term contracts and forward purchases from EDF Trading.

In 2011, EDF signed a capacity subscription contract for the Dunkirk methane terminal, which began commercial operations in early January 2017.

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## NOTE 37 CONTINGENT LIABILITIES

### Personal Training Account (*Compte Personnel de Formation* or CPF)

French Law 2014-288 of 5 mars 2014, which took effect from 1 January 2015, reformed the system for in-service training, replacing the former Individual training entitlement (*droit individuel à la formation* or DIF) by the Personal Training Account (*Compte Personnel de Formation* or CPF). The CPF is a "universal" system that relates to the person, not the work contract. It concerns all EDF's employees, whether full or part-time, on permanent or fixed-term contracts, and there is no requirement concerning the length of service. It represents a progressive "capital" of training time entitlement, capped at 150 hours.

### Tax inspections

Following inspections of previous years' accounts, the French tax authorities disputed the tax-deductibility of the provision for annuities following work-related accidents and illness paid by the Company. As this issue related to the special gas and electricity (IEG) statutes, it also concerned RTE, Enedis and Électricité de Strasbourg as well as other entities. In two rulings of 22 November 2017, the Council of State definitively validated the Company's position and recognised the tax-deductible nature of these provisions, putting an end to all the related litigations.

For the period 2008 to 2015, EDF was notified of proposed tax adjustments, notably concerning the tax-deductibility of certain long-term liabilities. This recurrent reassessment, which is applied for each year, represents a cumulative financial risk of some €536 million in income taxes at 31 December 2017. In September 2017 the Montreuil Administrative Court issued two rulings that recognised the tax-deductibility of these liabilities and validated the position taken by the Company.

For the years 2012 and 2015, the French tax authorities notified the Company of certain recurrent tax reassessments concerning the *Contribution sur la Valeur ajoutée des Entreprises* (tax on corporate value added), and questioned the deductibility of long-term provisions.

### Labour litigation

EDF is party to a number of labour lawsuits, primarily regarding working hours. EDF estimates that none of these lawsuits, individually, is likely to have a significant impact on its financial results or financial position. However, because they relate to situations that could concern a large number of EDF's employees in France, any increase in such litigations could have a potentially negative impact on EDF's financial position (although the risk has been mitigated by the signature of the agreement on fixed numbers of working days in 2016).

## NOTE 38 DEDICATED ASSETS

### 38.1 REGULATIONS

Article L. 594 of France's Environment code and its implementing regulations require assets (dedicated assets) to be set aside for secure financing of nuclear plant decommissioning expenses and long-term storage expenses for radioactive waste. The regulations govern the way dedicated assets are built up, and the management and governance of the funds themselves. These assets are clearly identified and managed separately from the Company's other financial assets and investments. They are also subject to specific monitoring and control by the Board of Directors and the administrative authorities.

The law requires the realisable value of these dedicated assets to be higher than the value of the provisions corresponding to the present value of the long-term nuclear expenses defined above.

The decree of 29 December 2010 made RTE shares eligible for inclusion in dedicated assets subject to certain conditions and administrative authorisation. The decree of 24 July 2013 revised the list of eligible assets by reference to the Insurance Code, and unlisted securities are also now eligible subject to certain conditions.

The decree of 24 March 2015 contains two measures concerning dedicated assets:

- the annual allocation to dedicated assets, net of any increases to provisions, must be positive or zero as long as their realisable value is below 110% of the amount of the provisions concerned;
- subject to certain conditions, real estate property owned by the operators of nuclear facilities may be allocated to coverage of these provisions.

Subject to certain conditions, the decree of 19 December 2016 allows allocation of the shares of CTE, which holds 100% of the capital of RTE, to the portfolio of dedicated assets at 31 December 2017 (see note 38.2.2 below).

### 38.2 PORTFOLIO CONTENTS AND MEASUREMENT

Given the applicable regulations, these dedicated assets are a highly specific category of assets.

The dedicated assets are structured and managed according to a strategic allocation defined by the Board of Directors and reported to the administrative authorities. The strategic allocation is designed to meet the overall objective of long-term coverage of obligations, and determines the structure and management of the portfolio as a whole. It takes into account regulatory constraints concerning the nature and liquidity of the dedicated asset, the financial outlook for the equity and bond markets, and the diversifying contribution of unlisted assets.

As part of the strategic allocation review process and in order to pursue the diversification into unlisted assets begun in 2010 with the shares in RTE, in 2013 the Board of Directors approved the introduction of an unlisted asset portfolio alongside the diversified equity and bond investments. This portfolio is managed by the EDF Invest Division, which was formed following the decree of 24 July 2013 on securing the funding for nuclear expenses.

EDF Invest has three target asset classes: principally infrastructures, and also real estate and private equity funds.

Following the French government's authorisation issued on 8 February 2013, and the approval of the Nuclear Commitments Monitoring Committee and the Board of Directors' decision of 13 February 2013, EDF allocated the entire receivable

recognised by the French state, representing the accumulated shortfall in CSPE financing at 31 December 2012, to its dedicated assets.

This financial receivable was increased in the financial statements at 31 December 2015 by an additional amount estimated at €644 million that was not allocated to dedicated assets, corresponding to the shortfalls in compensation that arose between the beginning of 2013 and the end of 2015, as acknowledged by the State in a ministerial letter of 26 January 2016. In accordance with this letter, the total financial receivable bears interest at 1.72% and will be repaid under a revised schedule ending in late 2020. This schedule was laid down in a decision of 2 December 2016, based on the CRE's confirmation of the shortfall for 2015.

On 22 December 2016, EDF assigned a 26.4% portion of this financial receivable, including the additional receivable corresponding to the shortfalls in compensation between 2013 and 2015, to a pool of investors.

Consequently, the realisable value of the non-assigned portion of the receivable, which is totally allocated to dedicated assets, is calculated based on the assignment value at that date.

The amount received for assignment of the portion of the CSPE receivable that was allocated to dedicated assets (€894 million) has been reinvested in dedicated assets, in the same way as the reimbursements received (see note 3.2).

#### 38.2.1 Diversified equity and bond investments

Certain dedicated assets take the form of bonds held directly by EDF. The rest comprise specialised collective investment funds on leading international markets, managed by independent asset management companies. They take the form of open-end funds and "reserved" funds established solely for the use of EDF (which does not participate in the fund management).

These investments are structured and managed in line with the strategic allocation, which takes into consideration international stock market cycles, for which the statistical inversion generally observed between equity market cycles and bond market cycles – as well as between geographical areas – has led EDF to define an overall composite benchmark indicator that guarantees continuation of the long-term investment policy.

#### 38.2.2 Unlisted assets (EDF Invest)

The assets managed by EDF Invest consist of unlisted securities related to investments in infrastructures, real estate, and private equity funds.

At 31 December 2017, the assets managed by EDF Invest represent a realisable value of €5,408 million, mainly including:

- 50.1% of EDF's shares in CTE, the joint venture that owns RTE, in compliance with decree 2016-1781 of 19 December 2016 amending the decree of 23 February 2007. These shares amount to €2,705 million at 31 December 2017 (€3,905 million for 75.93% of the shares in CTE at 31 December 2016) (see note 2.4);
- EDF's investments in TIGF, Porterbrook, Autostrade, Q-Park, Thyssengas, Aéroports de la Côte d'Azur, Madrileña Red de Gas (MRG), Géosel, and Central Sicaf.

#### 38.2.3 Valuation of EDF's dedicated assets

Dedicated assets are classified in the balance sheet according to their accounting nature: investments, investment securities, and marketable securities. They are valued under the accounting principles presented in note 1.



Details of the portfolio at 31 December 2017 are as follows:

	31/12/2017		31/12/2016	
	Net book value	Realisable value	Net book value	Realisable value
Investments - CTE (the Company that owns RTE) <sup>(1)</sup>	2,705	2,705	3,905	3,905
■ Investment Securities	17,825	19,717	13,917	16,027
■ Other financial investments	2,063	2,314	1,291	1,477
<b>Dedicated assets - Investments</b>	<b>22,593</b>	<b>24,736</b>	<b>19,113</b>	<b>21,409</b>
CSPE receivable <sup>(2)</sup>	3,294	3,349	4,184	4,288
<b>Total dedicated assets before hedging</b>	<b>25,887</b>	<b>28,085</b>	<b>23,297</b>	<b>25,697</b>
Hedging instruments and other	-	30	(20)	(20)
<b>TOTAL DEDICATED ASSETS AFTER HEDGING <sup>(3)</sup></b>	<b>25,887</b>	<b>28,115</b>	<b>23,277</b>	<b>25,677</b>

(1) In 2017, EDF's investment of 50.1% of CTE (formerly C25), the Company that holds 100% of the shares in RTE. In 2016, 75.93% of EDF's investment in CTE (see note 2.4).

(2) The receivable consisting of accumulated shortfalls in compensation at 31 December 2015, less the portion assigned on 22 December 2016 and reimbursements received in 2017, in line with the repayment schedule. The realisable value of the CSPE receivable is estimated based on market rates.

(3) Limiting the value of certain investments in compliance with Article 16 of Decree 2007-243 concerning calculation of the regulatory realisable value of dedicated assets has no effect at 31 December 2017. By limiting the value of certain investments in compliance with Article 16 of Decree 2007-243 concerning calculation of the amount of the regulatory realisable value of dedicated assets, the regulatory realisable value was reduced to €24,312 million at 31 December 2016.

Net book value and fair value include unmatured accrued interest.

### 38.2.4 Changes in dedicated assets in 2017

At 31 December 2017, the degree of coverage of provisions by dedicated assets was 108.5% applying the regulatory calculations. The regulatory limit on the realisable value of certain investments (decree 2007-243) has no effect at 31 December 2017.

At 31 December 2016, provisions were 99.8% covered by dedicated assets applying the regulatory calculations. Without application of the regulatory limits set by Decree 2007-243, the provision coverage rate was 105.4%.

Withdrawals from dedicated assets totalled €378 million, equivalent to the payments made in respect of the long-term nuclear obligations to be covered in 2017 (€377 million in 2016).

The regulatory allocation to dedicated assets (required by Article 2-IV of decree 2007-243, amended) for 2016, amounting to €1,095 million, was made during the first half of 2017 in compliance with the ministerial letter of 10 February 2017 (no allocations were made in 2016). The regulatory allocation to dedicated assets for 2017 amounts to €386 million and will be made during 2018.

2017 was a remarkable year for the equity markets, which were boosted by simultaneous worldwide economic growth and monetary policies that remained generous, and the financial portfolio achieved excellent results, outperforming its strategic benchmark index. This good performance was primarily driven by prudent positioning in terms of sensitivity and exposure to government bonds in core Euro zone countries, as long rates on government bonds rose slightly. The credit portfolio also outperformed its benchmark, particularly thanks to subordinated bank notes. The very slight overexposure on equities maintained over the year was beneficial, and so were the active management approaches selected.

On 31 March 2017, EDF finalised the sale of a 49.9% stake in CTE, the Company which has held 100% of the shares of RTE since December 2016. Since completion, EDF's entire investment in CTE, i.e. 50.1%, has been allocated to dedicated assets (see note 2.4).

For the unlisted asset portfolio, EDF Invest continued over 2017 to build up a portfolio of infrastructures, real estate property and investment funds.

On 26 July 2017 EDF Invest completed the acquisition by the consortium consisting of Allianz (60%), EDF Invest (20%) and the investment fund DIF (20%), of 6.94% of the capital of Autostrade per l'Italia, one of Europe's largest motorway concession operators.

In June and September 2017, EDF Invest, together with Beni Stabili, the Italian subsidiary of Foncière des Régions, and Predica, acquired a non-controlling interest in Central Sicaf, which manages a portfolio of offices and technical premises that are all leased to Telecom Italia and were previously owned 100% by Beni Stabili.

In October 2017, EDF Invest, together with KKR Infrastructure, finalised the acquisition of a minority interest in the Dutch carpark operator Q-Park NV, one of Europe's largest carpark operators.

In December 2017, EDF Invest acquired 50% of the Ecowest real estate development in Levallois-Perret, which is leased principally to L'Oreal's Luxury Division.

### 38.3 PRESENT COST OF LONG-TERM NUCLEAR OBLIGATIONS

The long-term nuclear obligations concerned by the regulations for dedicated assets related to nuclear generation are included in EDF's financial statements at the following values:

	31/12/2017	31/12/2016
(in millions of euros)		
Provisions for spent fuel management – portion unrelated to the operating cycle as defined in the regulations	983	820
Provisions for long-term radioactive waste management <sup>(1)</sup>	8,814	8,966
Provision for removal and conditioning of waste	726	-
Provisions for nuclear plant decommissioning	14,920	14,122
Provisions for last cores - portion for future long-term radioactive waste management	467	450
<b>PRESENT COST OF LONG-TERM NUCLEAR OBLIGATIONS</b>	<b>25,910</b>	<b>24,358</b>

(1) At 31 December 2016, provisions for long-term radioactive waste management included the provision for waste removal and conditioning which amounted to €581 million.

## NOTE 39 RELATED PARTIES

### 39.1 RELATIONS WITH SUBSIDIARIES

(in million of euros)	EDF's receivables <sup>(1)</sup>		EDF's liabilities <sup>(1)</sup>		Financial expenses	Financial income (excluding dividends)
	Loans	Trade receivables	Net liabilities included in current account	Trade liabilities		
<b>Companies</b>						
CTE (formerly C25)		249		99		0
Framatome		123		461		
EDF Energy		128		144		4
EDF Energies Nouvelles	985					33
EDF Energy UK LTD	1,425					8
EDF International	4,309					78
EDF Trading		1,054		1,276		6
Edison	70					2
Enedis		83		1,879		0
Dalkia	1,223			113		28
Groupe PEI	858			51		19
Current account <sup>(2)</sup>				3,036		
Investment for agreement for liquidities of subsidiaries			892		(8)	
Group cash management agreement with subsidiaries <sup>(3)</sup> (see note 22)			7,985		(2)	
Tax consolidation agreement				1,560		

(1) Receivables and payables of more than €50 million.

(2) Including €1,943 million concerning Enedis.

(3) Including €2,943 million concerning C3, €1,822 million for EDF Trading and €758 million for EDF International.

### 39.2 RELATIONS WITH THE FRENCH STATE AND STATE-OWNED ENTITIES

#### 39.2.1 Relations with the French state

The French State holds 83.50% of the capital of EDF at 31 December 2017, and is thus entitled in the same way as any majority shareholder to control decisions that require approval by the shareholders.

In accordance with the legislation applicable to all companies having the French State as their majority shareholder, EDF is subject to certain inspection procedures, in particular economic and financial inspections by the State, audits by the French Court of Auditors (*Cour des comptes*) or Parliament, and verifications by the French General Finance Inspectorate (*Inspection générale des finances*).

The public service contract between the French State and EDF was signed on 24 October 2005. This contract is intended to form the framework for public service missions assigned to EDF by the lawmaker for an unlimited period. The Law of 9 August 2004 does not stipulate the duration of the contract.

EDF, like other electricity producers, also participates in the multi-annual energy program established in the Decree of 27 October 2016, which defines objectives for generation and load shedding.

Finally, the French State intervenes through the regulation of electricity and gas markets, particularly for authorisation to build and operate generation facilities, establishment of sales tariffs for customers that have stayed on the regulated tariffs, transmission and distribution tariffs, and also determination of the ARENH price in accordance with France's Energy Code, and the level of the Contribution to the Public Electricity Service.

#### 39.2.2 Relations with public sector entities

EDF's relations with public sector entities mainly concern the two entities belonging to the former AREVA group (Orano and Framatome).

EDF took over Framatome at 31 December 2017 (see note 2.2).

Transactions with Orano concern:

- the front-end of the nuclear fuel cycle (uranium supplies, conversion and enrichment services);
- the back-end of the nuclear fuel cycle (transportation, storage, processing and recycling services for spent fuel).

Transactions with Framatome are described in note 2.2.2.

##### Front-end of the cycle:

Several important agreements were negotiated between EDF and Orano:

- for supplies of natural uranium: an AREVA Mines (now Orano Mining) contract covering the period 2021-2030;
- for fluorination: a contract covering the period 2019-2030;
- for enrichment of natural uranium into uranium 235: an AREVA NC (now Orano Cycle) contract for the period 2019-2030.

As part of the plan to construct two EPRs in the United Kingdom at the Hinkley Point site, on 29 September 2016 EDF and AREVA (Orano) signed a uranium contract with AREVA Mines (Orano Mining), and a conversion contract and enrichment contract with AREVA NC (Orano Cycle).

**Back-end of the cycle:**

Relations between EDF and AREVA (Orano) concerning transportation, processing and recycling of spent fuels are described in note 28.1.

**Relations with Framatome:**

In December 2014, EDF and Framatome signed a contract for supplies of enriched-uranium fuel assemblies over the period 2015-2021.

Another agreement with Framatome was signed for the supply of initial core assemblies for the Flamanville 3 EPR.

A contract for the supply of control rod clusters was also signed with Framatome for the period 2018-2020.

As part of the plan to construct two EPRs in the United Kingdom at the Hinkley Point site, EDF signed a fabrication contract with Framatome.

EDF and Framatome have signed the following main contracts for the 900MW, 1300MW and N4 nuclear power plants:

- in 2011, a contract for supply of 32 steam generators and a contract for renewal of the instrumentation and control systems;
- in August 2012, a contract for services related to replacement operations for the first steam generators;
- in mid-2017, a framework contract concerning EDF's rights to use AREVA intellectual property. This contract will be applied through specific agreements such as the one signed in December 2017 for the nuclear fleet;
- in late 2017, a framework agreement with no financial commitment, for the provision of engineering, design and production services relating to the steam supply system.

In 2013, EDF and Framatome signed two amendments to the initial 2007 contract for the Flamanville EPR steam supply system, covering the period from development studies to industrial commissioning.

**NOTE 40 ENVIRONMENT****40.1 GREENHOUSE GAS EMISSION RIGHTS**

In ratifying the Kyoto Protocol Europe made a commitment to reduce its greenhouse gas emissions. EU Directive 2003/87/EC set up a greenhouse gas emission quota system for the European Union which has been in operation since 1 January 2005.

This system is adapted into national laws. Among other things it requires obligated actors, which is the case of EDF, to surrender to the State a number of greenhouse gas emission credits each year, corresponding to their emissions for the year. This Directive came into effect in 2005 for an initial three-year period, followed by a second period from 2008 to 2012, with progressive reduction of the emission rights allocated.

One of the main features of the third phase, running from 2013 to 2020, is the discontinuation of free allocation of emission rights in certain countries, including France.

The volume of emissions at 31 December 2017 stood at 11 million tonnes (8 million tonnes at 31 December 2016).

In 2017, EDF surrendered 8 million tonnes in respect of emissions generated in 2016. In 2016, EDF surrendered 7 million tonnes in respect of emissions generated in 2015.

**40.2 ENERGY SAVINGS CERTIFICATES**

The French Law of 13 July 2005 introduced a system of energy savings certificates. Suppliers of energy (electricity, gas, heat, cold, domestic fuel oil and fuel for vehicles) with sales above a certain level are subject to energy savings obligations for a defined period. They fulfil these obligations by making direct or indirect energy savings rewarded by certificates, or by purchasing energy savings certificates. At the end of the set period, the entities concerned must provide evidence of compliance with obligations by surrendering the certificates, or pay a fine to the Treasury.

This system was renewed by Decree 2014-1557 of 24 December 2014 for a third period running from 1 January 2015 to 31 December 2017. The energy savings objectives for this period are more ambitious, and the system has been simplified. The volumes of Energy Savings Certificates obtained during the second period will count towards achievement of the objectives for the third period.

In application of Article 30 of the Law of 17 August 2015 on the energy transition for green growth, a new additional energy savings obligation for 2016-2017 applies from 1 January 2016, for the benefit of households in a situation of energy poverty. This new obligation is added to the energy savings obligations for the third period. The annual volume of the obligation is proportional to the annual energy savings obligation.

A fourth three-year period of energy savings obligations will begin on 1 January 2018 (see regulatory changes, note 3.5).

EDF is well-placed to meet its obligations thanks to energy-efficient offers for each market segment: residential customers, business customers, local authorities and organisations funding social projects.

## NOTE 41 MANAGEMENT COMPENSATION

The Company's key management and governance personnel are the Chairman and CEO and the directors. Directors representing the employees receive no remuneration for their services.

The total gross compensation paid by EDF (salaries, all types of benefits and director's fees, excluding employer contributions) to the Company's key management personnel was as follows:

<i>(in euros)</i>	<b>2017</b>	<b>2016</b>
Chairman and CEO <sup>(1)</sup>	452,868	452,868
Directors <sup>(2)</sup>	496,556	475,500

*(1) At its meeting of 15 February 2016 the Board of Directors set the fixed annual compensation of the Chairman and Chief Executive Officer at €450,000 for 2016. At its meeting of 24 January 2017 the Board decided to keep the fixed annual compensation of the Chairman and Chief Executive Officer at €450,000 for 2017.*

*(2) At its meeting of 8 March 2016 the Board of Directors decided to submit a proposal to the shareholders at their General Meeting to be held on 12 May 2016, setting the annual budget for directors' fees at €510,000 for 2016 including specific remuneration for the work done in 2015 and 2016 by the independent directors' working party in connection with EDF's plan to acquire control of AREVA NP. At its meeting of 13 February 2017, the Board decided to submit a proposal to the shareholders at their General Meeting to be held on 18 May 2017, setting the annual budget for directors' fees at €500,000 for 2017, including specific remuneration for the work done in 2016 and 2017 by the independent directors' working party in connection with the plan to close down the Fessenheim power plant.*

## NOTE 42 SUBSEQUENT EVENTS

### 42.1 CONFIRMATION OF THE EUROPEAN COMMISSION DECISION ON THE TAX TREATMENT OF PROVISIONS ESTABLISHED BETWEEN 1987 AND 1996 FOR RENEWAL OF GENERAL NETWORK FACILITIES

On 16 January 2018, the General Court of the European Union rejected EDF's appeal against the European Commission's decision of 22 July 2015 classifying the tax treatment of provisions established between 1987 and 1996 for renewal of General Network facilities as state aid, and ordering that it be recovered by the French State.

Following this decision by the Commission, on 13 October 2015, EDF repaid €1.383 billion, corresponding to the amount of state aid including interest. Enedis and RTE contributed their respective shares.

In its ruling, the General Court upheld the European Commission's decision of 22 July 2015 classifying the tax treatment of provisions established for renewal of General Network as state aid. As EDF had already repaid €1.383 billion on 13 October 2015, the execution of this ruling will not entail any additional payment.

The Commission had previously issued a similar decision on 16 December 2003. That decision was cancelled by the Court of Justice of the European Union in a ruling on 5 June 2012, confirming a ruling by the General Court of the European Union dated 15 December 2009. Following that ruling, the Commission reopened an inquiry into state aid, at the end of which it issued the decision of 22 July 2015 which was challenged by EDF.

EDF acknowledges this decision and will consider the advisability of submitting an appeal to the Court of Justice of the European Union.

## 6.4 STATUTORY AUDITORS' REPORT ON THE FINANCIAL STATEMENTS

### For the year ended December 31, 2017

*This is a translation into English of the Statutory Auditors' report on the financial statements of the Company issued in French and it is provided solely for the convenience of English speaking users.*

*This Statutory Auditors' report includes information required by European regulation and French law, such as information about the appointment of the Statutory Auditors or verification of the management report and other documents provided to shareholders. This report should be read in conjunction with, and construed in accordance with, French law and professional auditing standards applicable in France.*

To the Shareholders of Electricité de France,

#### Opinion

In compliance with the engagement entrusted to us by your General Meeting, we have audited the accompanying financial statements of Électricité de France S.A. (« EDF », or the « Company ») for the year ended December 31, 2017.

In our opinion, the financial statements give a true and fair view of the assets and liabilities and of the financial position of the Company as at December 31, 2017 and of the results of its operations for the year then ended in accordance with French accounting principles.

The audit opinion expressed above is consistent with our report to the Audit Committee.

#### Basis for Opinion

##### Audit Framework

We conducted our audit in accordance with professional standards applicable in France. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

#### Valuation of provisions related to nuclear production in France – back-end of the nuclear cycle, plant decommissioning and last cores – and dedicated assets

##### Notes 1.2.2, 1.7.2, 1.15.1, 18, 28 and 38 to the financial statements

##### Key Audit Matter

As at December 31, 2017, the provisions recorded to cover obligations relating to nuclear power plants for which EDF is the operator in France total €37,633 million, including €20,326 million with respect to the back-end of the nuclear cycle (management of spent fuel and radioactive waste) and €17,307 million with respect to the decommissioning of nuclear power plants and last cores.

The valuation of these provisions is described in Note 28. It involves defining technical and financial assumptions and using complex calculation models and falls within the scope of the regulatory context described in Note 28.

They are updated and the assumptions taken into consideration in the models are reviewed at least once a year. These assumptions reflect management's best estimate at the reporting date of the impacts of the applicable regulation, the implementation of decommissioning and storage processes or changes in the main financial parameters.

Furthermore, the Company is required to allocate so-called "dedicated" assets to secure financing of certain categories of nuclear provisions in France. The realisable value of these assets should allow the Company's commitments relating to the decommissioning of nuclear power plants and long-term storage of radioactive waste in France to be covered (Note 38). The realisable value of these dedicated assets, for an amount of €28,115 million (or a net carrying amount of €25.887 million) as of December 31, 2017, was determined based on the fair value of diversified placements of shares and bonds, and the fair value or the equity value of non-listed assets managed by EDF Invest.

Our responsibilities under those standards are further described herein in the *Statutory Auditors' Responsibilities for the Audit of the Financial Statements* section of our report.

#### Independence

We conducted our audit engagement in compliance with independence rules applicable to us, for the period from January 1, 2017 to the date of our report and specifically we did not provide any prohibited non-audit services referred to in Article 5(1) of Regulation (EU) No 537/2014 or in the French Code of ethics (*Code de Déontologie*) for Statutory Auditors.

#### Observation

Without qualifying our conclusion, we draw your attention to the following matter set out in the note 1.1 to the financial statements on the impacts of the change of accounting principle relating to the first application of the regulation n°2015-05 issued on July 2, 2015 (*règlement n°2015-05 du 2 juillet 2015*) related to forward financial instruments and hedging operations.

#### Justification of Assessments – Key Audit Matters

In accordance with the requirements of Articles L. 823-9 and R. 823-7 of the French Commercial Code (*Code de commerce*) relating to the justification of our assessments, we inform you of the key audit matters relating to risks of material misstatement that, in our professional judgment, were of most significance in our audit of the financial statements of the current period, as well as how we addressed those risks.

These matters were addressed in the context of our audit of the financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on specific items of the financial statements.

6.

#### Responses

We have analysed the measures for recognising provisions related to nuclear production in France and gained an understanding of the industrial scenarios for decommissioning nuclear power plants and the solutions adopted in terms of management of spent fuel and radioactive waste. We have assessed the compliance of the provisions with regard to applicable accounting, legal and regulatory measures.

We have verified the calculation models used by the Company and assessed the sensitivity of the valuations to the assumptions adopted in terms of cost, forecast cash outflows and financial parameters (discount and inflation rates).

Our work also consisted in verifying the type of costs used to determine provisions, assessing the consistency of industrial scenarios adopted by the Company and verifying the reconciliation of forecast costs and forecast cash outflows with these scenarios as well as the available studies and quotes.

We have also assessed the reasonableness of:

- margins for uncertainties and risks included in the provisions, to take into account the degree of control over decommissioning techniques and the management of spent fuel and radioactive waste;
- the series and pooling effects adopted in the quotes for decommissioning nuclear power plants in operation, for which the nominal cost represents €20,563 million to economic conditions at the end of the period, for a provision of €11,616 million in discounted value (Note 28).

# 6. FINANCIAL STATEMENTS

## Statutory Auditors' Report on the financial statements

### Valuation of provisions related to nuclear production in France – back-end of the nuclear cycle, plant decommissioning and last cores – and dedicated assets

#### Notes 1.2.2, 1.7.2, 1.15.1, 18, 28 and 38 to the financial statements

We considered the valuation of nuclear provisions and dedicated assets to be a key audit matter due to:

- the sensitivity of the assumptions on which the valuation of these provisions is based, notably in terms of cost, inflation and long-term discount rates, as well as the depreciation periods of nuclear power plants in operation, forecast cash outflows; the modification of these parameters can lead to a material revision in the provisioned amounts;
- the negative impacts on the financial position of the Company (cash earmarked to increase the amount of dedicated assets) in the event of an increase in nuclear provisions in France, a change in the realisable values of dedicated assets or changes in the coverage rate of nuclear provisions for dedicated assets.

it being specified that the valuation of provisions covers and includes uncertainties related to the fact that certain scenarios and technical solutions have never been implemented.

Concerning the inflation and discount rates adopted by management, we have verified their compliance with applicable accounting standards and regulatory measures, notably the ministerial order of March 21, 2007, as amended. We have reconciled the data used for this purpose with market data and available historical information.

Concerning the securing of financing for certain of these provisions through dedicated assets, we have verified, by sampling, the portfolio movements and reconciled the realisable value of the dedicated assets in the portfolio at the reporting date with the available certificate of depository statements and available external valuations. We have also assessed the accounting treatment and their valuation, in particular, the compliance with the accounting standard of the impairment criteria described in Note 1.7.2.

Finally, we have verified the appropriateness of the disclosures given for the provisions related to nuclear production in France and the dedicated assets in the notes to the financial statements, notably regarding the sensitivity of the valuation of provisions to changes in macro-economic assumptions (Note 28).

### Verification of management report of the Board of Directors and other documents addressed to Shareholders

We have also performed, in accordance with professional standards applicable in France, the specific verifications required by French law.

#### Information given in the management report and in the other documents provided to Shareholders with respect to the financial position and the financial statements

We have no matters to report as to the fair presentation and the consistency with the financial statements of the information given in the management report of the Board of Directors, and in the documents addressed to shareholders with respect to the financial position and the financial statements.

#### Information relating to corporate governance

We attest that the section of the management report devoted to corporate governance sets out the information required by Articles L. 225-37-3 and L. 225-37-4 of the French Commercial Code.

Concerning the information given in accordance with the requirements of Article L. 225-37-3 of the French Commercial Code relating to remunerations and benefits received by the directors and any other commitments made in their favour, we have verified its consistency with the financial statements or with the underlying information used to prepare these financial statements and, where applicable, with the information obtained by your Company from controlling and controlled companies. Based on this work, we attest the accuracy and fair presentation of this information.

With respect to the information relating to items that your Company considered likely to have an impact in the event of a public purchase or exchange offer, provided pursuant to Article L. 225-37-5 of the French Commercial Code, we have verified their compliance with the source documents communicated to us. Based on our work, we have no observations to make on this information.

#### Other information

In accordance with French law, we have verified that the required information concerning the purchase of investments and controlling interests and the identity of the shareholders and holders of the voting rights has been properly disclosed in the management report.

### Report on Other Legal and Regulatory Requirements

#### Appointment of the Statutory Auditors

We were appointed as Statutory Auditors of Electricité de France S.A. by the General Meeting of June 6, 2005 for KPMG Audit and the by decision of the Board of Directors of April 25, 2002 for Deloitte & Associés.

As at December 31, 2017, KPMG Audit was in the 13<sup>th</sup> year of total uninterrupted engagement and Deloitte & Associés was in the 16<sup>th</sup> year of total uninterrupted engagement, which for both, 13 years since securities of the Company were admitted to trading on a regulated market.

#### Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with French accounting principles, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless it is expected to liquidate the Company or to cease operations.

The Audit Committee is responsible for monitoring the financial reporting process and the effectiveness of internal control and risks management systems and where applicable, its internal audit, regarding the accounting and financial reporting procedures.

The financial statements were approved by the Board of Directors.

#### Statutory Auditors' Responsibilities for the Audit of the Financial Statements

##### Objectives and audit approach

Our role is to issue a report on the financial statements. Our objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with professional standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As specified in Article L. 823-10-1 of the French Commercial Code (*Code de commerce*), our statutory audit does not include assurance on the viability of the Company or the quality of management of the affairs of the Company.

As part of an audit conducted in accordance with professional standards applicable in France, the Statutory Auditor exercises professional judgment throughout the audit and furthermore:

- identifies and assesses the risks of material misstatement of the financial statements, whether due to fraud or error, designs and performs audit procedures responsive to those risks, and obtains audit evidence considered to be sufficient and appropriate to provide a basis for his opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtains an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the internal control;
- evaluates the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management in the financial statements;
- assesses the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. This assessment is based on the audit evidence obtained up to the date of his audit report. However, future events or conditions may cause the Company to cease to continue as a going concern. If the Statutory Auditor concludes that a material uncertainty exists, there is a requirement to draw attention in the audit report to the related disclosures in the financial statements or, if such disclosures are not provided or inadequate, to modify the opinion expressed therein;

- evaluates the overall presentation of the financial statements and assesses whether these statements represent the underlying transactions and events in a manner that achieves fair presentation.

**Report to the Audit Committee**

We submit a report to the Audit Committee which includes in particular a description of the scope of the audit and the audit program implemented, as well as the results of our audit. We also report, if any, significant deficiencies in internal control regarding the accounting and financial reporting procedures that we have identified.

Our report to the Audit Committee includes the risks of material misstatement that, in our professional judgment, were of most significance in the audit of the financial statements of the current period and which are therefore the key audit matters, that we are required to describe in this report.

We also provide the Audit Committee with the declaration provided for in Article 6 of Regulation (EU) N° 537/2014, confirming our independence within the meaning of the rules applicable in France such as they are set in particular by Articles L.822-10 to L.822-14 of the French Commercial Code (*Code de commerce*) and in the French Code of Ethics (*Code de Déontologie*) for Statutory Auditors. Where appropriate, we discuss with the Audit Committee the risks that may reasonably be thought to bear on our independence, and the related safeguards.

**6.**

Paris La Défense and Neuilly-sur-Seine, February 15, 2018

**The Statutory Auditors**

**KPMG Audit**

*Department of KPMG S.A.*

Jay Nirsimloo

Michel Piette

**Deloitte & Associés**

Damien Leurent

Anthony Maarek

## 6.5 RESULTS FOR THE LAST FIVE FISCAL YEARS

(taken from EDF's corporate financial statements):

	2017	2016	2015	2014	2013
<b>Capital at year end</b>					
Share capital (in millions of euros)	1,464	1,055	960	930	930
Capital contributions (in millions of euros)					
Number of common shares in existence	2,927,438,804	2,109,136,683	1,920,139,027	1,860,008,468	1,860,008,468
Number of priority dividend shares (with no voting rights) in existence					
Maximum number of future shares to be created by conversion of bonds by exercise of subscription rights					
<b>Operating results for the year (in millions of euros)</b>					
Sales excluding taxes	42,371	40,857	41,553	41,717	43,423
Income before tax, employee profit-sharing, depreciation, amortisation and provisions	5,091	9,495	7,224	8,252	6,782
Income tax	(687)	680	(63)	577	748
Employee profit-sharing for the year					
Income after tax, employee profit-sharing, depreciation, amortisation and provisions	1,924	5,517	271	1,649	2,938
Dividends		2,105 <sup>(1)</sup>	2,079 <sup>(1)</sup>	2,327 <sup>(1)</sup>	2,327 <sup>(1)</sup>
Interim dividends	433	1,006	1,059	1,059	1,059
<b>Earnings per share (euros/share)</b>					
Income after tax and employee profit-sharing but before depreciation, amortisation and provisions	1.97	4.18	3.79	4.13	3.24
Income after tax, employee profit-sharing, depreciation, amortisation and provisions	0.66	2.62	0.14	0.89	1.58
Dividend per share		0.90 <sup>(1) (5)</sup>	1.10 <sup>(4)</sup>	1.25 <sup>(1) (3)</sup>	1.25 <sup>(1) (3)</sup>
Interim dividend per share	0.15	0.50	0.57	0.57	0.57
<b>Employees</b>					
Average number of employees over the year	66,577	69,494	70,769	70,153 <sup>(2)</sup>	68,643 <sup>(2)</sup>
Total payroll expense for the year (in millions of euros)	3,831	4,001	3,964	3,905	3,843
Amounts paid for employee fringe benefits and similar (social security, company benefit schemes, etc.) (in millions of euros)	2,923	2,873	2,848	2,699	2,614

(1) Including interim dividends paid out.

(2) The scope of the workforce was broadened (mainly to include apprentices). At fixed scope the workforce in 2014 and 2013 stood at 66,876 and 65,775 respectively.

(3) I.e. €1.375 per share bearing a loyalty dividend.

(4) I.e. €1.21 per share bearing a loyalty dividend.

(5) I.e. €0.99 per share bearing a loyalty dividend.



## 6.6 DIVIDEND POLICY

### 6.6.1 DIVIDENDS AND INTERIM DIVIDENDS PAID IN THE LAST THREE FISCAL YEARS

The amount of dividends and interim dividends paid in the last three fiscal years was as follows:

Fiscal year	Number of shares	Dividend per share (in euros)	Total dividends paid <sup>(1)</sup> (in euros)	Dividend payment date
2014	1,860,008,468	1.25 <sup>(2)</sup>	2,327,233,892.26 <sup>(3)</sup>	5 June 2015
2015	1,920,139,027	1.10 <sup>(4)</sup>	2,079,072,045.71 <sup>(5)</sup>	30 June 2016
2016	2,741,877,687 <sup>(6)</sup>	0.90 <sup>(7)</sup>	2,105,349,378.42 <sup>(8)</sup>	30 June 2017

(1) After deduction of treasury shares.

(2) I.e. €1.375 for shares benefiting from the loyalty dividend.

(3) Of which €1,059,262,163.04 in interim dividends paid on 17 December 2014 for that year.

(4) I.e. €1.21 for shares benefiting from the loyalty dividend.

(5) Of which €1,058,682,286.08 in interim dividends paid on 18 December 2015 for that year.

(6) When the remaining dividend was paid, i.e. after the capital increase of 30 March 2017 in which 632,741,004 new shares were issued.

(7) I.e. €0.99 for shares benefiting from the loyalty dividend.

(8) Of which €1,005,552,797 in interim dividends paid on 31 October 2016 for that year comprising €922,416,509.04 in new shares, €82,548,293.00 in cash and a balancing payment of €587,994.96. The remaining €1,099,796,581.42 of the dividend for 2016, paid on 30 June 2017, comprised €1,024,155,172.48 in new shares, €74,454,959.22 in cash and a balancing payment of €1,186,449.72.

On 7 November 2017, EDF's Board of Directors decided to distribute an interim dividend of €0.15 per share for 2017, offering the choice of receiving this dividend in cash or in the form of new shares (scrip option) on the terms set in the fourth resolution adopted at the Combined Shareholders' Meeting of 18 May 2017.

The interim dividend for the 2017 fiscal year came to €432,632,648.85 and was paid on 11 December 2017 consisting of:

- a payment in shares *via* a share capital increase of €20,042,265.00 following the issue of 40,084,530 shares at a par value of €0.50 on top of a share premium of €378,397,963.20 and a balancing payment of €445,953.15;
- a payment in cash of €33,746,467.50.

At its meeting of 15 February 2018, the Board of Directors decided to ask the Shareholders' Meeting of 15 May 2018 to pay a dividend of €0.46 per share (excluding loyalty dividend) for 2017. In view of the interim dividend of €0.15 per share paid on 11 December 2017, the remaining dividend payable for that year

comes to €0.31 per share for shares benefiting from the ordinary dividend and €0.356 per share for shares benefiting from the loyalty dividend.

Shareholders will be offered the option of having the remaining dividend paid out in new Company shares. This option will be available between 25 May and 11 June 2018 inclusive. For shareholders who have not exercised their option by 11 June 2018 at the latest, all remaining dividend payments will be made in cash. The French State has undertaken to have its dividend paid out in the form of new shares.

New common shares issued to pay for the share capital increase will only entitle their holders to payment of the balance of the dividend for 2017.

Subject to the approval of the Shareholders' Meeting the dividend will be paid on 19 June 2018 with the ex-dividend date set at 25 May 2018.

### 6.6.2 DISTRIBUTION POLICY, INCREASED DIVIDEND

The dividend policy formulated by the Board of Directors takes the Group's investment needs, the economic context and any other relevant factor into account.

In accordance with the amendment to the articles of association passed by the Shareholders' Meeting of 24 May 2011, the first loyalty dividend was paid in 2014 for the previous year. Shareholders holding their shares in registered form for at

least two years are entitled to a loyalty dividend. The number of shares eligible for the 10% increased dividend may not exceed 0.5% of the share capital.

On 21 November 2014 the Shareholders' Meeting amended the articles of association to the effect of authorizing it to approve the payment of any dividend, interim dividend, reserves or premium that is distributed or any reduction in capital, through delivery of the Company's assets, including financial securities.

### 6.6.3 UNCLAIMED DIVIDENDS

Dividends not claimed within five years of their payment date lapse in favour of the French State.

## 6. FINANCIAL STATEMENTS

Significant change in the issuer's financial or trading position

### 6.7 SIGNIFICANT CHANGE IN THE ISSUER'S FINANCIAL OR TRADING POSITION

Significant events occurring between the last day of the 2017 fiscal year and the date of filing of this Reference Document are mentioned in (i) note 50 to the consolidated financial statements for the year ended 31 December 2017, for events

before 15 February 2018 when the Board of Directors approved the financial statements, and (ii) for events after 15 February 2018, in section 5.2 "Subsequent events" of this Reference Document.

### 6.8 INFORMATION RELATING TO THE ALLOCATION OF FUNDS RAISED THROUGH GREEN BONDS ISSUED BY EDF

Since 2013 the Group has conducted four Green Bond issues for a total of around €4.5 billion in order to support its development in renewable energies.

After two bond issues chiefly meant to finance the building of new wind and solar projects by its subsidiary EDF Énergies Nouvelles (€1.4 billion in November 2013 and \$1.25 billion in October 2015), the Group expanded its Green Bond Framework to finance investments in the renovation and modernisation of its hydropower assets in mainland France. The new Framework was first applied to a €1.75 billion issue in October 2016 and then to a 26 billion yen issue in two tranches in January 2017.

The commitments made by EDF in the context of these two bond issues follow the four Green Bond Principles<sup>(1)</sup> guiding (i) the use of proceeds, (ii) processes for project evaluation and selection, (iii) the management of proceeds, and (iv) reporting. A detailed description of these investments can be found in the EDF Green Bond Framework of September 2016 available on the Green Bonds page of the Company's website.

This section provides a summary of these commitments and how EDF has fulfilled them as at the end of 2017.

#### USE OF PROCEEDS

EDF has committed itself to allocate the proceeds from its Green Bonds programme to fund new investments in renewable energy projects. Projects eligible<sup>(2)</sup> for Green Bond financing ("Eligible Projects") are:

- projects built by EDF Énergies Nouvelles (EDF EN) to generate electricity from renewable sources;
- investments in existing hydropower facilities in mainland France within the following categories: renovation and heavy maintenance, modernisation and automation, and works on existing plants (including, in particular, capacity increases).

There are no plans to use the funds raised to refinance existing projects or acquire operational businesses or facilities.

#### PROCESS EVALUATION AND SELECTION OF GREEN BONDS FINANCED ELIGIBLE PROJECTS

Each Eligible Project likely to be financed is assessed against the environmental and social eligibility criteria<sup>(3)</sup> ("E&S criteria") applied, on the one hand, to EDF EN investments and, on the other hand, to hydropower investments, by the Finance Department of EDF EN and by the Finance Department of the Hydropower Division

respectively. Assessments are based on information provided by the teams in charge of development, purchasing and sustainable development matters.

Only projects meeting the E&S criteria qualify for Green Bond financing. Those projects over which EDF EN has direct control are financed as a priority.

The entire project assessment process is documented so as to be able to show an independent auditor that projects financed meet the eligibility criteria.

On this basis the Finance Departments of EDF EN and the Hydropower Division select which Eligible Projects are financed.

#### MANAGEMENT OF PROCEEDS

Funds raised are managed according to a strict ring-fencing principle in order to ensure that their use is exclusively and effectively reserved for financing Eligible Projects.

Once received by EDF SA's Finance and Investment Department, proceeds from each bond issue are invested and tracked in a dedicated sub-portfolio of treasury assets until allocated to Eligible Projects. Proceeds are invested in priority in treasury assets identified as Socially Responsible Investments (SRI).

The Finance Departments of EDF EN and the Hydropower Division notify EDF's Treasury Department, as the case may be or at regular intervals, of the funds needed to cover investments related to selected projects. Based on this information the Treasury Department adjusts the amounts available in the dedicated treasury asset sub-portfolios.

EDF aims to allocate the entirety of funds raised within 24 months of a bond issue.

#### REPORTING

##### Effective use of funds

All the funds raised in November 2013 under the first Green Bond issued by EDF for €1.4 billion were allocated by June 2015. All the funds raised in October 2015 under the second Green Bond issued for \$1.25 billion were allocated by the end of 2017.

Of the €1.75 billion raised in October 2016 under the third Green Bond issued by EDF, €678 million were allocated to Eligible Projects as at 31 December 2017. The funds raised in January 2017 in the context of the fourth Green bond issued by EDF (JPY 26 billion in two tranches) have not yet been allocated. The balance of funds raised under the Green Bonds issued in October 2016 and January 2017 was invested in a dedicated treasury asset portfolio, as indicated above, where it will remain until allocated to Eligible Projects.

(1) The Green Bond Principles, updated in March 2015, are voluntary guidelines for issuance of green bonds. They recommend transparency and disclosure and promote integrity to support development of the green bond market. For more information, see <http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles>.

(2) Only projects from the first category are eligible for financing using funds raised in the bond issues of November 2013 and October 2015.

(3) The E&S criteria for each project type are presented in the appendix to the EDF Green Bond Framework of September 2016.

Allocation of proceeds at 31 December 2017:

	<b>Funds raised</b>	<b>Funds allocated to Eligible Projects</b>	<b>Number of Green Bond funded projects</b>	<b>Share of investment financed via Green Bonds funds</b>
Green Bond no. 1 – November 2013	€1.4 billion	€1.4 billion	13 <sup>(1)</sup>	57%
Green Bond no. 2 – October 2015	\$1.25 billion	\$1.25 billion	7 <sup>(1)(2)</sup>	74%
		EDF EN: €443 million	3 <sup>(2)</sup>	67%
Green Bond no. 3 – October 2016	€1.75 billion	Hydropower: €235 million	111 operations	100% <sup>(3)</sup>

(1) Including the Roosevelt Project financed by Green Bonds 1 and 2.

(2) Including the Red Pine Project financed by Green Bonds 2 and 3.

(3) Total of investments financed by EDF including half of the investment in the Romanche-Gavet project.

At 31 December 2017 the following Eligible Projects had been chosen by EDF EN for financing under the first three Green Bonds issued in November 2013 (GB1), October 2015 (GB2) and October 2016 (GB3):

<b>Project</b>	<b>Type and Capacity</b>	<b>Location</b>	<b>Year come into service</b>	<b>Financing GB1/GB2</b>
CID Solar	PV Solar, 27MWp	California (USA)	In service	GB1
Cottonwood	PV Solar, 33MWp	California (USA)	In service	GB1
Catalan wind farm	Onshore wind, 96MW	Pyrénées-Orientales (France)	In service	GB1
Great Western	Onshore wind, 225MW	Oklahoma (USA)	In service	GB2
Heartland	Biogas, 20MW	Colorado (USA)	In service	GB1
Hereford	Onshore wind, 200MW	Texas (USA)	In service	GB1
Kelly Creek	Onshore wind, 184MW	Illinois (USA)	In service	GB2
La Mitis	Onshore wind, 25MW	Quebec (Canada)	In service	GB1
Le Granit	Onshore wind, 25MW	Quebec (Canada)	In service	GB1
Longhorn North	Onshore wind, 200MW	Texas (USA)	In service	GB1
Nicolas Riou	Onshore wind, 112MW	Quebec (Canada)	In service	GB3
Pilot Hill	Onshore wind, 175MW	Illinois (USA)	In service	GB1
Red Pine	Onshore wind, 200MW	Minnesota (USA)	In service	GB2 & GB3
Rivière du Moulin	Onshore wind, 350MW	Quebec (Canada)	In service	GB1
Rock Falls	Onshore wind, 154MW	Oklahoma (USA)	In service	GB3
Roosevelt	Onshore wind, 250MW	New Mexico (USA)	In service	GB1 & GB2
Salt Fork	Onshore wind, 174MW	Texas (USA)	In service	GB2
Slate Creek	Onshore wind, 150MW	Texas (USA)	In service	GB2
Spinning Spur 2	Onshore wind, 161MW	Texas (USA)	In service	GB1
Spinning Spur 3	Onshore wind, 194MW	Texas (USA)	In service	GB1
Tyler Bluff	Onshore wind, 126MW	Texas (USA)	In service	GB2

## 6. FINANCIAL STATEMENTS

### Information on the use of funds raised through *Green Bonds* issued by EDF

At 31 December 2017 the following Eligible Projects had been chosen by the Hydropower Division for financing under the Green Bond issued in October 2016:

	Number of operations by type	Capacity in question (MW)	Average generation (2011-2017) (TWh)	Additional generation potential (TWh)	Amounts (in €m)
1. Renovation and heavy maintenance	96	6,788	15.6		83
2. Modernisation and automation	4	15,840	31.2		37
3. Works on existing plants	11	1,148	2.4	0.3	116
<b>TOTAL (EXCL. DUPLICATION)</b>	<b>111</b>	<b>16,341</b>	<b>32.3</b>	<b>0.3</b>	<b>235</b>

As part of managing its portfolio of renewable energy assets, the Group may sell stakes in the assets it develops. At 31 December 2016 the Group held 53%, 53% and 97% of generation capacity financed under Green Bonds no. 1, 2 and 3 respectively.

### Impact of Eligible Projects financed

The table below shows three main impacts associated with the renewable energy projects that received Green Bond financing:

- the electricity generation capacity built under each EDF EN project or renovated, modernised or developed as part of the hydropower investments;
- the expected additional electricity generation from each project; and
- the estimated CO<sub>2</sub> emissions avoided by injecting this renewable electricity output into the electricity grid.

These impacts are presented in aggregate: gross data correspond to the aggregate impact of projects that received funding from the Green Bond in question; while the net values correspond to the sum total of the impact of each Eligible Project weighted by the share of project investment amount financed by the Green Bond considered.

	Total capacity of projects financed at 31 December 2017 (in MW)		Expected output (in TWh/year)		Estimated CO <sub>2</sub> emissions avoided (in tonnes/year)		
	Gross <sup>(1)</sup>	Net <sup>(2)</sup>	Gross <sup>(1)</sup>	Net <sup>(2)</sup>	Gross <sup>(1)</sup>	Net <sup>(2)</sup>	
Green Bond no. 1 – November 2013	1,755	976	7.0	4.1	3.29	1.82	
Green Bond no. 2 – October 2015	1,306	832	5.1	3.2	3.46	2.15	
	EDF EN	466	251	2.3	1.3	1.04	0.49
Green Bond no. 3 – October 2016	Hydropower	16,341	16,341	0.2 <sup>(3)</sup>	0.2 <sup>(3)</sup>	0.01 <sup>(3)</sup>	0.01 <sup>(3)</sup>

(1) Sum of the gross impacts of each project that received Green Bond financing.

(2) Sum of the impacts of each project weighted by the project investment amount financed by the Green Bond in question.

(3) Only related to the expected additional generation resulting from development investments, including half of the expected additional generation of the *Romanche-Gavet* project.

The above impacts are established using the methodological principles below:

- generation capacity of financed projects: installed capacity at the end of the construction of each Eligible Project as defined in the project's investment memorandum and updated as appropriate during the construction phase or at project commissioning;
- expected output: generation forecast (the "P50") taken into account when the investment decision of each Eligible Project is made;
- expected avoided CO<sub>2</sub> emissions: the average emission factor per kWh of the electric system is estimated on the basis of the energy mix of the electric system and LCA emission factors of each generation technology. The emission factor of

the project corresponds to the LCA emission factor of the project's technology. Energy mix are those published by the Environmental Protection Agency (2012) for large power networks in the United States, Statistics Canada (2013) for networks and provinces of Canada, and the International Energy Agency (2013) for other countries. LCA emission factors of each technology correspond to the median values established by the IPCC and published in its fifth assessment report (2014). The detailed methodology is available on request at the office of the EDF group. It is important to note that (i) there is no single reference defining a methodology for calculating avoided CO<sub>2</sub> emissions and (ii) the expected output and, therefore avoided, CO<sub>2</sub> emissions are estimated forecast data and not actual data.

## DECLARATION BY ONE OF THE STATUTORY AUDITORS ON THE INFORMATION ON THE ALLOCATION OF FUNDS RAISED FROM THE ISSUE OF GREEN BONDS AS AT 31 DECEMBER 2017

This is a free translation into English of the attestation from one of the Statutory Auditors of EDF SA on the information related to the allocation, as of 31 December 2017, of funds raised for the "Green Bonds" issued by EDF on 25 November 2013, 8 October 2015, 11 October 2016 and 26 January 2017 originally issued in French and is provided solely for the convenience of English speaking readers.

This attestation should be read in conjunction with, and is construed in accordance with, French law and professional standards applicable in France.

### Attestation from one of the Statutory Auditors of EDF SA on the information related to the allocation, as of 31 December 2017, of funds raised for the "Green Bonds" issued by EDF on 25 November 2013, 8 October 2015, 11 October 2016 and 26 January 2017

To the Chairman and Chief Executive Officer,

In our capacity as Statutory Auditor of Electricité de France S.A. (the "Company") and in accordance with your request, we have prepared this attestation on the information related to the allocation, as of 31 December 2017, of funds raised for the "Green Bonds" issued by EDF on 25 November 2013 (the "GB 2013 Offering"), 8 October 2015 (the "GB 2015 Offering", 11 October 2016 (the "GB 2016 Offering") and 26 January 2017, (together the "Green Bond Offerings"), which amounts to €1.4 billion, US\$1.25 billion, €1.75 billion and ¥26.0 billion, respectively, contained in the attached document "Information on the use of funds raised through "Green Bonds" issued by EDF", and prepared pursuant to the terms and conditions of the final terms of the Green Bond Offerings dated 25 November 2013, 8 October 2015, 11 October 2016 and 26 January 2017 (the "Final Terms").

This document, prepared under your responsibility for the purposes of the information of the "Green Bond" debt securities holders, presents an allocation of the funds raised from the Green Bond Offerings to eligible projects (the "Eligible Projects") for the period beginning as of the receipt of the funds raised from the Green Bond Offerings to 31 December 2017 (the "Allocation of Proceeds"):

- For an amount of €1.4 Billion in relation to the GB 2013 Offering, from 27 November 2013 to 31 December 2015, noting that the allocation of proceeds has been completed in full in June 2015;
- For an amount of US\$1.25 billion in relation to the GB 2015 Offering, from 13 October 2015 to 31 December 2017, noting that the allocation of proceeds has been completed in full by the end of 2017;
- For an amount of €1.75 billion in relation to the GB 2016 Offering, from 11 October 2016 to 31 December 2017;
- For an amount of ¥26.0 billion in relation to the GB 2017 Offering, from 26 January 2017 to 31 December 2017.

This information was prepared based on the accounting records used for the preparation of the consolidated financial statements for the year ended 31 December 2017.

Our role is to report on:

- the compliance with the four components of the *Green Bond Principles* defined by the *International Capital Market Association*<sup>(1)</sup> being (i) Use of proceeds (ii) Existing processes for project evaluation and selection of the Eligible Projects (iii) Management of proceeds and (iv) Reporting;
- the compliance, in all material respects, of the Eligible Projects referred to in the attached document, with the eligibility criteria defined in the Final Terms;
- the tracking of the funds raised from the Green Bond Offerings, in a dedicated portfolio of financial assets, to the allocation of such funds to Eligible Projects and on the reconciliation of the amount of funds allocated to Eligible Projects as at 31 December 2017 as part of the Green Bond Offerings, with the accounting records and data underlying the accounting records;

- the compliance, in all material respects, of the methods used by the Company to estimate the CO<sub>2</sub> emissions avoided by the Eligible Projects financed as at 31 December 2017 with the methodology described in the section "Impact of financed Eligible Projects" of the attached document.

However, we have no responsibility:

- for challenging the eligibility criteria defined as an appendix to the Final Terms and, in particular, we give no interpretation on the terms of the Final Terms;
- for forming an opinion on the use of the allocated funds to Eligible Projects after such funds have been allocated;
- for concluding on whether the methodology used by the Company to estimate the CO<sub>2</sub> emissions avoided is appropriate.

In the context of our role as Statutory Auditor, we have audited, jointly with the other Statutory Auditor, the consolidated financial statements of the Company for the year ended 31 December 2017. Our audit was conducted in accordance with professional standards applicable in France, and was planned and performed for the purpose of forming an opinion on the consolidated financial statements taken as a whole and not on any individual component of the accounts used to determine the information. Accordingly, our audit tests and samples were not carried out with this objective and we do not express any opinion on any components of the accounts taken individually. These consolidated financial statements, which have not yet been approved by the Shareholders' meeting, have been audited and our report thereon is dated 15 February 2018.

Furthermore, we have not performed any procedures to identify events that may have occurred after the date of our report on the consolidated financial statements of the Company which was issued on 15 February 2018.

Our engagement, which constitutes neither an audit nor a review, was performed in accordance with professional standards applicable in France. For the purpose of this attestation, our work consisted, using sampling techniques or other methods of selection, in:

*For the information related to the Allocation of Proceeds and the compliance with the four components of the Green Bond Principles*

- verifying the appropriate consideration of the four components of the *Green Bond Principles* of the *International Capital Market Association* being (i) the use of proceeds (ii) the existing processes for evaluation and selection of the Eligible Projects (iii) the management of proceeds and (iv) the reporting;
- understanding the procedures implemented by the Company for producing the information contained in the attached document;
- verifying the compliance, in all material respects, of the Eligible Projects referred to in the attached document, with the eligible criteria, as defined in the appendix to Final Terms;
- verifying the appropriate segregation of the funds raised from the Green Bond Offerings and their exclusive allocation to Eligible Projects;
- verifying the global allocation of the capital expenditures incurred in relation to the Eligible Projects financed by each of the Green Bond Offerings;
- performing the necessary reconciliations between this information and the accounting records from which it is derived and verifying that the information agrees with the data used to prepare the consolidated financial statements for the year ended 31 December 2017.

(1) *International Capital Market Association - Green Bond Principles, 2015 – Voluntary Process Guidelines for Issuing Green Bonds, 27 March 2015*

## 6. FINANCIAL STATEMENTS

### Information on the use of funds raised through *Green Bonds* issued by EDF

*For the estimation of the CO<sub>2</sub> emissions avoided*

- understanding and considering the methodology used to estimate the avoided CO<sub>2</sub> emissions;
- verifying the compliance, in all material respects, of the methods used to estimate the CO<sub>2</sub> emissions avoided by the Eligible Projects financed during the period with the methodology described in the section "Impact of Eligible Projects financed" of the attached document;
- verifying the consistency of the information related to the estimation of the electricity output as well as the choice of emission factors used (based on the calculation of the emission factors of the applicable electrical grids where the projects are located and the choice of emission factors by technology), should it be noted that there is no single framework defining a methodology for the calculation of CO<sub>2</sub> emissions avoided.

On the basis of our work, we have no matters to report on:

- the compliance with the four components of the *Green Bond Principles* of the *International Capital Market Association*;
- the compliance, in all material respects, of the Eligible Projects referred to in the attached document, with the eligible criteria, as defined in the Final Terms;
- the tracking of the funds raised from the Green Bond Offerings, in a dedicated portfolio of financial assets, to the allocation of such proceeds to Eligible Projects and the consistency of the amount of allocated funds to Eligible Projects as at 31 December 2017 in the context of the Green Bond Offerings, with the accounting records and data underlying the accounting records;
- the compliance, in all material respects, of the methods used by the Company to estimate the avoided CO<sub>2</sub> emissions by the Eligible Projects financed as at 31 December 2017 with the methodology described in the section "Impact of financed Eligible Projects" of the attached document.

This attestation has been prepared solely for your attention within the context described above and may not be used, distributed or referred to for any other purpose.

Neuilly-sur-Seine, March 13, 2018

**One of the Statutory Auditors**

**Deloitte & Associés**

Anthony Maarek  
Partner

# 7 GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

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# 7. GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

## General information about the Company

### 7.1 GENERAL INFORMATION ABOUT THE COMPANY

#### 7.1.1 COMPANY NAME, ADDRESS AND TELEPHONE NUMBER OF THE REGISTERED OFFICE

The name of the Company is: "Électricité de France". The Company may also be legally designated by the acronym "EDF".

The Company's registered office is at 22-30 Avenue de Wagram in the 8<sup>th</sup> arrondissement of Paris.

The telephone number is +33(0) 1 40 42 22 22.

#### 7.1.2 TRADE AND COMPANIES REGISTRY, APE CODE

The Company is registered with the Paris Trade and Companies Registry under number 552 081 317. Its APE code is 401E.

#### 7.1.3 DATE OF INCORPORATION AND TERM OF THE COMPANY

EDF was incorporated pursuant to Act no. 46-628 of 8 April 1946 as a French public industrial and commercial establishment (EPIC). It was converted into a French société anonyme (public limited company) by the Act of 9 August 2004 and the Decree of 17 November 2004.

The Company was incorporated for a term of 99 years as from 19 November 2004, unless the Company is dissolved before such date or unless its term is extended.

#### 7.1.4 LEGAL FORM AND APPLICABLE LEGISLATION

Since 20 November 2004, EDF has been a French société anonyme with a Board of Directors. It is governed by the laws and regulations applicable to commercial companies, in particular the French Commercial Code, except in the event of specific exceptions stipulated in the French Energy Code or Order no. 2014-948 of 20 August 2014 on the governance and capital transactions of companies with State holdings and by its articles of association.

### 7.2 INCORPORATION DOCUMENTS AND ARTICLES OF ASSOCIATION

In this Reference Document, a reference to the articles of association means the Company's articles of association as approved by French Decree no. 2004-1224 of 17 November 2004 adopted under French Act no. 2004-803 of 9 August 2004 relating to the public electricity and gas service and electricity and gas companies (the "9 August 2004 law"), which have subsequently been amended on various occasions.

#### 7.2.1 CORPORATE PURPOSE

EDF's purpose, both in France and abroad and in compliance with the laws set out in the first article of its articles of association, is:

- to ensure the generation, transmission, distribution, supply and trading of electrical energy, and the import and export of said energy;
- to carry out the public service missions assigned to EDF by the laws and regulations, in particular by the French Energy Code, and Article L. 2224-31 of the French Local Authorities Code (*Code général des collectivités territoriales*), as well as by concession agreements, and in particular the mission to develop and operate public electricity grids and the mission to supply energy at regulated rates, and to supply back-up power to electricity producers and customers with the aim of compensating for unforeseen supply failures, and electricity to eligible customers who cannot find a supplier, while contributing to the balanced development of electricity supply by reaching the goals defined by the multi-year generation investments programme defined by the Minister for Energy;
- more generally, to engage in any industrial, commercial or service activity, including research and engineering activities, in the field of energy, for all categories of customer;
- to enhance the value of all the personal and real property assets it holds or uses;
- to create, acquire, rent or lease under a business lease, all personal property, real property, businesses and clientele, to lease, install and operate all establishments, businesses and clientele, plants and workshops relating to any one of the aforementioned purposes;
- to obtain, acquire, operate or sell all processes and patents concerning the activities that are related to any of the aforementioned purposes;
- to take part, directly or indirectly, in all transactions that may be connected to any of the aforementioned purposes, by creating new companies or undertakings, by contributing, subscribing for or purchasing equity or ownership interests, stakes, or through mergers, partnerships or in any other way whatsoever; and
- more generally, to engage in all industrial, commercial, financial transactions, whether in personal or real property, that are directly or indirectly connected, in

whole or in part, to any similar or related purposes or even to any purposes that may favour or develop the Company's business.

#### 7.2.2 FISCAL YEAR

Each financial year lasts for 12 months, starting on 1 January and ending on 31 December of each year.

#### 7.2.3 APPROPRIATION OF PROFITS UNDER THE ARTICLES OF ASSOCIATION

The distributable profit consists of the net profit for the financial year, less prior losses carried forward and the various deductions provided for by the law or the articles of association, plus any retained earnings carried forward.

The Shareholders' Meeting may decide to distribute amounts deducted from the reserves that are freely available to it, but must expressly state the reserve items from which the deductions are made.

After approving the financial statements and confirming the existence of distributable amounts (which include the distributable profit and any amounts deducted from the reserves mentioned above), the Shareholders' Meeting can decide to distribute all or part of such amounts to the shareholders in the form of a dividend, allocate them to reserve items or carry them forward. The Board of Directors may also distribute interim dividends prior to the approval of the financial statements for the financial year, under the conditions laid down by law.

The Shareholders' Meeting has the option of granting the shareholders a choice, for all or part of the dividend or interim dividend paid out, between payment in cash and payment in shares. Moreover, the Shareholders' Meeting may decide to pay any dividend, interim dividend, reserve or premium that is distributed or any reduction in capital, through remittance of the Company's assets, including financial securities.



Any shareholder who can prove, at the close of a financial year, that he has held registered shares for at least two years and still holds such shares on the date of payment of the dividend declared for the said financial year, will be entitled to an increased dividend for the said registered shares, equal to 10% of the dividend paid for the other shares, including in cases where the dividend is paid in shares. The number of shares eligible for the 10% increased dividend may not exceed 0.5% of the share capital at the close of the previous financial year, for any one shareholder. The first increased dividend was paid in 2014 for the 2013 financial year (see section 6.6.2 "Distribution policy, increased dividend").

The terms governing the payment of distributions decided by the Shareholders' Meeting, and the ex-dividend date of the distributed shares are fixed by the Shareholders' Meeting or, failing this, by the Board of Directors, in accordance with the applicable statutory provisions. If the amount of the non-cash distributions to which a shareholder is entitled does not correspond to a whole number of shares, the said number will be rounded down to the next whole number and a balancing cash payment made to the shareholder or, if requested by the Shareholders' Meeting, rounded up to the next whole number, with the difference being paid in cash by the relevant shareholder.

## **7.2.4 RIGHTS ATTACHED TO SHARES**

Each share entitles its holder to a portion of the Company's profit and corporate assets that is proportional to the percentage of the capital that the share represents. Moreover, each share confers a voting right and the right to be represented at Shareholders' Meetings in accordance with legislative, regulatory and bylaw restrictions.

On the filing date of this Reference Document, EDF has only issued a single class of shares.

Ownership of a share automatically entails acceptance of the articles of association and decisions adopted by Shareholders' Meetings.

Pursuant to Article L. 225-123 of the French Commercial Code, as amended by Act no. 2014-384 of 29 March 2014, all fully paid-up shares that have been registered for at least two years in the name of the same shareholder will automatically entitle their holder to voting rights that are double that of the other shares. These provisions took effect on 3 April 2016. EDF's Board of Directors had decided not to submit an amendment to the articles of association to the Shareholders' Meeting, preventing the application of the double voting right set out in Article L. 225-123 of the French Commercial Code.

Shareholders are only liable for losses within the limit of their contributions.

Whenever it is necessary to hold more than one share in order to exercise any right whatsoever, in the event of an exchange, reverse stock split or allocation of shares, or due to a capital increase or reduction, a merger or any other corporate transaction, owners of single shares or numbers of shares below that required may only exercise such right if they take personal responsibility for consolidating or, if necessary, purchasing or selling the requisite number of shares.

Shareholders can choose to hold shares in registered or bearer form, subject to compliance with the laws and regulations.

Shares may be registered with an intermediary under the conditions provided for in Articles L. 228-1 et seq. of the French Commercial Code. Intermediaries must declare their status as intermediaries who hold shares for a third party, under the conditions provided for by the laws and regulations. These provisions are also applicable to the other securities issued by the Company.

Under the conditions provided for by the laws and regulations in force, the Company is entitled to request from the central custodian of financial instruments, at any time and provided that it pays the required consideration, as applicable, the name or corporate name, the nationality, the year of birth or the year of incorporation, and the address of the holders of bearer shares that grant an immediate or deferred right to vote at its own Shareholders' Meetings, as well as the quantity of securities held by each of these shareholders and, where applicable, any restrictions to which the securities may be subject. On the basis of the list provided by such custodian, the Company has the option of asking the persons or entities listed that the Company believes may be registered on behalf of third parties, for the information stated above concerning the owners of the securities.

For registered shares that grant immediate or deferred access to the capital, intermediaries that are registered under the conditions provided for in Article L. 228-1

of the French Commercial Code mentioned above, are required, within ten business days as from the request made by the Company or its agent, which may be made at any time, to disclose the identity of the owners of said securities.

## **7.2.5 ASSIGNMENT AND TRANSFER OF SHARES**

Shares can be traded without restriction, subject to compliance with the provisions of the laws and regulations. They are registered in an account and are transmitted by transfer from one account to another.

## **7.2.6 CHANGES TO THE ARTICLES OF ASSOCIATION, THE CAPITAL AND VOTING RIGHTS**

All changes to the articles of association, the capital or the voting rights attached to the securities that make up the capital are subject to the requirements of law, as the articles of association contain no specific provisions regarding such matters.

## **7.2.7 COMPOSITION AND FUNCTIONING OF THE BOARD OF DIRECTORS**

The Board of Directors adopted internal rules of procedure, which are regularly updated, defining the operating procedures of the Board of Directors in addition to applicable legal and regulatory requirements and the provisions of the Company's articles of association.

These procedures are described in section 4.2.2 "Members and functioning of the Board of Directors".

The Group's internal rules of procedure are accessible on the Group's website ([www.edf.fr](http://www.edf.fr)).

## **7.2.8 SHAREHOLDERS' MEETINGS**

### **7.2.8.1 Convening notices to meetings**

Shareholders' Meetings are convened by the Board of Directors or, in the last resort, by the Statutory Auditors or by any person empowered to do so. Meetings are held at the registered office or at any other place stated in the convening notice.

### **7.2.8.2 Participation in meetings and exercise of voting rights**

Shareholders' Meetings may be held by video conference or telecommunication means that allow shareholders to be identified. The conditions governing the type and use of such means are specified in Articles R. 225-97 to R. 225-99 of the French Commercial Code. In such cases, shareholders who participate in the meeting by such means are deemed to be present for the calculation of the quorum and majority, under the conditions specified by law.

All shareholders can attend Shareholders' Meetings, regardless of the number of shares they own.

Shareholders can choose between one of the three following methods of participation: attend the meeting in person by requesting an admission card, grant authorisation (a proxy) to the Chairman of the Shareholders' Meeting or to any individual or legal entity of their choice (Article L. 225-106 of the French Commercial Code), or vote remotely.

In accordance with Article R. 225-85 of the French Commercial Code, proof of the right to participate in a Shareholders' Meeting is obtained by the registration of the securities in an account in the name of the shareholder or of the intermediary that is registered on the shareholder's behalf (pursuant to paragraph 7 of Article L. 228-1 of the French Commercial Code), on the second day prior to the meeting, *i.e.* at midnight, Paris time, either in the registered share accounts held by the Company (or its authorised representative), or in the bearer share accounts held by the accredited intermediary.

# 7. GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

## Incorporation documents and articles of association

In accordance with Article R. 225-85 of the French Commercial Code, the registration of the securities in the bearer share accounts held by financial intermediaries is evidenced by a shareholding certificate issued by these intermediaries, where applicable by electronic means under the conditions provided for in Article R. 225-61 of the French Commercial Code, as an appendix to the postal voting form, the voting proxy or admission card request made on behalf of a shareholder or on behalf of a shareholder who is represented by the registered intermediary.

All shareholders may grant a proxy to any individual or legal entity of their choice in order to be represented at a Shareholders' Meeting. Proxies, as well as any proxy revocations, must be evidenced in writing and notified to the Company. Proxies may be revoked in the same forms as those required for the designation of the proxy holder, including by electronic means if need be. The owners of shares that are properly registered in the name of an intermediary under the conditions provided for in Article L. 228-1 of the French Commercial Code may be represented by a registered intermediary under the conditions provided for in said article.

EDF gives its shareholders the possibility of voting online, prior to the Shareholders' Meeting.

Certain shares may carry double voting rights in accordance with the conditions laid down in Act no. 2014-384 of 29 March 2014 (see section 7.2.4 "Rights attached to shares").

### 7.2.8.3 Requests for the inclusion of items or draft resolutions on the agenda and written questions to the Board of Directors

Requests for the inclusion of items or draft resolutions on the Shareholders' Meeting agenda made by shareholders who meet the conditions provided for in Article R. 225-71 of the French Commercial Code must be received by the Company by the twenty-fifth day prior to the date of the Shareholders' Meeting at the latest, but may not be sent more than 20 calendar days after the publication of the prior meeting notice, in accordance with Article R. 225-73 of the French Commercial Code.

Requests for the inclusion of items on the agenda must be substantiated. The wording of the draft resolutions must accompany requests for the inclusion of such resolutions, and a brief explanation of the reasons may also be given.

On the date of the request, the authors must provide proof of owning or representing the percentage of the capital required by Article R. 225-71 of the French Commercial Code. Requests must be accompanied by proof of entry in an account. Agenda items or draft resolutions that are proposed for inclusion are only reviewed if the authors of the request submit a new certificate proving the registration of the securities in the same accounts on the second day prior to the meeting.

Each shareholder also has the option of sending the Board of Directors written questions of his or her choice. The Board of Directors will answer the questions during the meeting, or, in accordance with Article L. 225-108 of the French Commercial Code, the answer is deemed to have been given provided that it is published on the Company's website.

Written questions must be sent to the Company by registered letter with return receipt or by electronic telecommunication at the latest on the fourth business day prior to the date of the Shareholders' Meeting. In accordance with Article R. 225-84 of the French Commercial Code, these questions must be accompanied by a shareholding certificate, in order to be taken into account.

### 7.2.8.4 Temporary disposals during meeting periods

In accordance with the provisions of Article L. 225-126 of the French Commercial Code, any person who holds, alone or together with other persons, in respect of one or more temporary disposals or any transaction that grants the right to or requires the resale or return of said shares to the assignor, a number of shares that represents more than 0.5% of the voting rights in a listed company, must inform the Company and the French Market Authority no later than midnight, Paris time, on the second business day prior to the Shareholders' Meeting, and when the contract that arranges this transaction remains in force on this date, said information must include the total number of shares held on a temporary basis. In addition to the number of shares acquired, this declaration must contain the identity of the assignor, the date

and the expiration of the contract that organises the transaction and, as applicable, the voting agreement.

If no information is provided to the Company and the French Market Authority, the shares thus acquired are automatically stripped of voting rights for the Shareholders' Meeting concerned and for all Shareholder's Meetings that are held until such shares are resold or returned.

Moreover, the Company representative, a shareholder or the French Market Authority may petition the Commercial Court to order the complete or partial suspension, for a maximum of five years, of the voting rights of any shareholder who fails to provide such information, regardless of whether or not the voting borrowing shareholder has exercised his or her voting rights.

## 7.2.9 BYLAW OR STATUTORY PROVISIONS THAT DELAY ACQUISITION OF CONTROL OVER THE COMPANY

Pursuant to Article L. 111-67 of the French Energy Code and the EDF articles of association, changes in share capital cannot result in the French State's shareholding falling below the statutory 70% threshold.

Certain shares may carry double voting rights in accordance with the conditions laid down in Act no. 2014-384 of 29 March 2014 (see section 7.2.4 "Rights attached to shares").

With the exception of the foregoing, no other provision specifically aims to prevent or delay the takeover of the Company by a third party.

## 7.2.10 THRESHOLD DISCLOSURE REQUIREMENTS

Pursuant to the provisions of the French Commercial Code, any individual or legal entity, acting alone or together with other persons or entities, that acquires a number of shares that represents more than 5%, 10%, 15%, 20%, 25%, 30%, 33.3%, 50%, 66.6%, 90% or 95% of the capital or voting rights must inform the Company, no later than prior to the close of business on the fourth trading day following the day on which the shareholding threshold is exceeded, of the total number of shares or voting rights owned (Article R. 233-1 of the French Commercial Code). Moreover, such individuals or legal entities must also inform the AMF of these acquisitions no later than prior to the close of business on the fourth trading day after exceeding the shareholding threshold (Article 223-14 of the AMF General Regulation). The AMF publishes threshold crossings that are notified to it.

Since 2012, cash payoff or physically-settled derivatives having a similar economic effect to detention of underlying shares, are taken into account for this calculation of threshold crossing (Article L. 233-9(I)(4) *bis* of the French Commercial Code). Pursuant to AMF general regulations, holders of these financial instruments must take into account the number of shares that carry this type of agreement and financial instruments for the calculation of their participation in the framework of their reporting obligation, and must precise, when they declare threshold crossing, their intention as to the outcome of this type of agreements and financial instruments they benefitate.

Within the same timeframes and under the same conditions, this information must also be disclosed when the capital or voting rights fall below the thresholds stated above.

Absent a proper declaration, the shares that exceed the fraction which should have been declared in accordance with the provisions of law mentioned above will be stripped of voting rights for all Shareholders' Meetings that are held during a two-year period following the date on which the effective disclosure is made.

Moreover, the Company articles of association provide that any individual or legal entity, acting alone or jointly, who acquires or ceases to hold, directly or indirectly, a number of shares that corresponds to 0.5% of the Company's capital or voting rights, or a multiple of said fraction, is required to inform the Company, by registered letter with return receipt requested, at the latest before the close of business on the fourth trading day following the crossing of such threshold, of the total number of shares, voting rights or equity interests held. The Company's articles of association state that the rules for the calculation and assimilation of shareholdings applicable to the statutory thresholds, as well as the obligations to provide information on financial

instruments that are not assimilated to shares, apply to the disclosure requirements set out in the articles of association for bylaw thresholds.

Failure to comply with the above provisions is punishable by the loss of voting rights for the shares that exceed the fraction that should have been declared, for all Shareholders' Meetings that are held until the expiration of a two-year period

following the date of the effective threshold disclosure provided for above, if the application of this penalty is requested by one or more shareholders who hold at least 1% of the Company's capital. Such requests are recorded in the minutes of Shareholders' Meetings.

## 7.3 INFORMATION REGARDING CAPITAL AND SHARE OWNERSHIP

### 7.3.1 AMOUNT AND CHANGES IN SHARE CAPITAL

On the filing date of this Reference Document, the details of the Company's share capital are as follows:

<b>Number of shares issued</b>	<b>2,927,438,804</b>
Par value	€0.50 per share
Type of shares issued	common shares
Share capital amount	€1,463,719,402

The share capital issued by the Company has been paid up in full. The Company has not issued or authorised any preference shares.

Pursuant to the law of 9 August 2004, EDF was converted into a société anonyme (public limited company) on 20 November 2004 and its capital set at €8,129,000,000, divided into 1,625,800,000 shares with a par value of €5.

The EDF Shareholders' Meeting of 31 August 2005 granted full powers to the EDF Board of Directors with a view to reducing the capital by a maximum amount of €7,316,100,000, via a reduction in the par value of shares from €5 to a minimum of €0.5. During its meeting of 27 October 2005, the Board of Directors decided to reduce the share capital by €7,316,100,000, via a €4.50 reduction in the par value of shares, which therefore decreased from €5 to €0.50. The share capital was thus reduced to €812,900,000.

During its 18 November 2005 meeting, the Board of Directors used the authority granted to it by the Combined Shareholders' Meeting of 10 October 2005, and approved the increases in the Company's share capital in connection with the Open Price Offering and the Guaranteed Global Placement that were performed when the Group was first listed on the stock market. As a result, the Board of Directors increased the share capital to €906,834,514.

On 20 December 2005, Calyon (now Crédit Agricole-CIB) paid EDF the price that corresponded to the exercise of 8,502,062 warrants that the EDF Board issued to Calyon by decision taken on 18 November 2005. Consequently, the share capital was increased to €911,085,545 divided into 1,822,171,090 common shares.

The payment of dividends in shares on 17 December 2009 resulted in an increase in the share capital of €13,347,786 following the issue of 26,695,572 shares. On 21 January 2010, the share capital was thus increased to €924,433,331 divided into 1,848,866,662 common shares.

On 24 June 2011, the capital was increased to €930,406,055 divided into 1,860,812,110 common shares, via the issue of new shares as consideration for the EDF Énergies Nouvelles shares contributed to EDF in exchange for the EDF shares tendered as part of the alternative simplified public purchase or exchange offer involving EDF Énergies Nouvelles shares, which was initiated by EDF (see section 1.4.1.5.3 "EDF Énergies Nouvelles"). Then, on 28 September 2011, the capital was reduced to €924,433,331 divided into 1,848,866,662 common shares, via the cancellation of the shares purchased as part of the share buyback programme with a view to cancellation, in order to offset the dilution caused by the aforementioned offer.

On 29 July 2013, the capital was increased to €930,004,234, divided into 1,860,008,468 common shares. This increase of capital followed the decision of the

EDF Shareholders' Meeting of 30 May 2013 to offer each shareholder in the Company the possibility to elect for the payment in new shares of a fraction of the remaining dividend to be distributed for the financial year ending 31 December 2012.

The payment of interim dividends in shares on 18 December 2015 resulted in an increase in the capital of €30,065,279.50 following the issue of 60,130,559 shares. The share capital was thus increased from €930,004,234 to €960,069,513.50 divided into 1,920,139,027 common shares.

On 31 October 2016, the capital was increased to €1,054,568,341.50, divided into 2,109,136,683 common shares. This increase of capital followed the decision of the EDF Shareholders' Meeting of 12 May 2016 to offer each shareholder in the Company the possibility to elect for the payment in new shares of the remaining dividend to be distributed for the financial year ending 31 December 2016.

The payment of interim dividends in shares on 31 October 2016 resulted in an increase in the capital of €922,416,509.04 following the issue of 95,885,292 shares. The capital was thus increased from €1,006,625,695.50 to €1,054,568,341.50, divided into 2,109,136,683 common shares.

At its meeting of 3 March 2017, the Board of Directors, making use of the delegation of authority given by the Combined Shareholders' Meeting of 26 July 2016 in its second resolution, decided to increase the capital with maintenance of the shareholders' preferential subscription right. The capital was increased to €1,370,938,843.50, divided into 2,741,877,687 common shares. The final gross capital increase, including the issue premium, stood at €4,017,905,375.40 and resulted in the issue of 632,741,004 new shares. It was launched on 6 March 2017 and was completed on 30 March 2017.

On 12 July 2017, the capital was increased to €1,443,677,137, divided into 2,887,354,274 common shares. This increase of capital followed the decision of the EDF Shareholders' Meeting of 18 May 2017 to offer each shareholder in the Company the possibility to elect for the payment in new shares of the remaining dividend to be distributed for the financial year ending 31 December 2016.

The payment of interim dividends in shares on 14 December 2017 resulted in an increase in the share capital of €398,440,228.20 following the issue of 40,084,530 shares. The capital was thus increased from €1,443,677,137 to €1,463,719,402, divided into 2,927,438,804 common shares.

On the filing date of this Reference Document, other than the common shares of Company stock, there are no other securities that grant access to EDF's share capital, either directly or indirectly.

# 7. GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

## Information regarding capital and share ownership

### 7.3.2 TREASURY SHARES AND SHARE BUYBACK PROGRAMME

A share buyback programme initially authorised by the Shareholders' Meeting held on 9 June 2006, has been used by the Board of Directors within a limit of 10% of the Company's share capital and for an initial period of 18 months. This programme was continued for 18 months by the following Shareholders' Meetings held since 2006, including by the Shareholders' Meeting held on 18 May 2017.

#### 7.3.2.1 Share buyback programme in force as of the filing date of the Reference Document (programme authorised by the Shareholders' Meeting of 18 May 2017)

After consulting the Board of Directors' report, and in accordance with the provisions of Articles L. 225-209 *et seq.* of the French Commercial Code, the seventh resolution adopted by the Shareholders' Meeting held on 18 May 2017 authorised the Board of Directors to implement a programme to buy back Company shares, capped at a maximum of 10% of the Company's capital.

This resolution immediately terminated the unused portion of the authorisation to purchase Company shares, which was granted by the seventh resolution adopted by the Shareholders' Meeting held on 12 May 2016.

The aims of the share buyback programme are as follows: to deliver shares when rights are exercised that are attached to options or securities which grant immediate or deferred access to the Company's shares by all means, as well as to perform all hedging transactions with respect to the obligations of EDF (or one of its subsidiaries) that are connected with such options or securities; to retain shares for future delivery in exchange or as payment in the context of external growth or contribution operations or mergers or demergers; to allocate shares to EDF group employees, in particular, within the framework of any share purchase or bonus share

award plans under the terms stipulated by law and, in particular, by Articles L. 225-197-1 *et seq.* of the French Commercial Code or Articles L. 3332-18 *et seq.* of the French Labour Code; to reduce the Company's capital by cancelling all or part of the shares purchased; and, finally, to ensure the liquidity of EDF shares *via* an investment services provider, under a liquidity agreement that is consistent with the code of ethics recognised by the *Autorité des marchés financiers* (French Market Authority).

Purchases of Company shares may involve any number of shares, provided that the number of shares that the Company purchases during the buyback programme does not exceed 10% of the shares that make up the Company's existing share capital on the date of the Shareholders' Meeting, and provided that the number of shares that the Company holds at any given time does not exceed 10% of the shares that make up the Company's capital.

These shares may be acquired or transferred, under the conditions and within the limits, in particular in terms of volumes and price, provided for by the laws and regulations in force on the date of the relevant transactions, by any means, such as on the market or over the counter, including *via* block trades (purchases or sales), by the use of derivative financial instruments or notes or securities that grant access to Company shares, or by implementing option strategies, under the conditions stipulated by the market authorities and at such times as determined by the Board of Directors or any person who is acting on the Board's behalf. This authorisation may be used during public takeover bids, within the limits permitted by the applicable regulations.

The Shareholders' Meeting has set at €30 the maximum purchase price per share <sup>(1)</sup> and at €2 billion the maximum amount of funds allocated to the implementation of the programme, and has granted the Board of Directors full powers, with the right of delegation, to use this authorisation.

The authorisation was granted for a maximum of 18 months as from the Shareholders' Meeting of 18 May 2017, and will therefore end on 18 November 2017, unless the Shareholders' Meeting of 15 May 2018 adopts the new programme described in section 7.3.2.3 below.

#### 7.3.2.2 Summary of the Company's trading in its own shares during the 2017 financial year

<b>Number of treasury shares held at 31 December 2017</b>	<b>3,430,016</b>
Percentage of capital held through treasury shares at 31 December 2017	0.1172%
Carrying value of the portfolio at 31 December 2017 <sup>(1)</sup> (in euros)	40,035,081.84
Market value of the portfolio at 31 December 2017 <sup>(2)</sup> (in euros)	35,740,766.72
Number of shares cancelled over the past 24 months	0

(1) Valued at the purchase price.

(2) Based on the closing price at 31 December 2017, i.e. €10.42.

#### Liquidity contract

From 25 July 2012, EDF engaged Oddo Corporate Finance to implement a new liquidity agreement that complies with the Charter of Ethics of the *Association Française des Marchés Financiers* (AMAFI) as approved by the French market authority (AMF). The following assets were allocated to this liquidity contract: 1,350,000 EDF shares transferred from the former liquidity contract and €50 million in cash.

In 2017, EDF paid the following commissions on its liquidity contracts: €80,000 to Oddo Corporate Finance.

#### Number of shares bought and sold during the 2017 financial year

During the 2017 financial year, EDF purchased, within the framework of its liquidity contracts, a total of 11,658,958 treasury shares and sold 10,898,157 shares. The average share purchase price was €9.6823 and the average share sale price was €9.7256.

#### Portfolio breakdown at 31 December 2017

At 31 December 2017, the Company held a total of 3,430,016 treasury shares. 3,379,422 of these shares (or 0.1154% of its share capital) are held under the liquidity contract, and the remaining 50,594 shares (0.0017% of its share capital), were acquired on the market with a view to being allocated to employees within the framework of the "ACT 2007" bonus share award plan, but were not actually allocated.

On this date, EDF's subsidiaries did not hold any shares, either directly or indirectly.

#### Post-closing transactions

Between 1 January 2018 and 28 February 2018, the Company acquired 2,794,864 treasury shares for an average unit value of €10.5905, and sold 2,720,421 shares for an average unit value of €10.71755.

(1) The Board of Directors may, however, adjust the aforementioned purchase price if premiums, reserves or profits are capitalised, which results either in an increase in the par value of the shares or the creation and award of bonus shares, and in the event of a stock split or reverse stock split, or any other transaction involving the shareholders' equity, in order to take into account the impact of these operations on share value.

### 7.3.3 CAPITAL AUTHORISED NOT ISSUED

The following table presents a summary of the delegations of authority and authorisations to increase or reduce the share capital that are in force on the filing date of this Reference Document, which the Board of Directors was granted by the Combined Shareholders' Meeting of 12 May 2016, as amended by the Combined Shareholders' Meeting of 26 July 2016, and the extent to which they have been used at 31 December 2016:

#### Status of the authorisations adopted by the Combined Shareholders' Meeting of 12 May 2016, as amended by the Combined Shareholders' Meeting of 26 July 2016

Securities concerned / type of issue	Term <sup>(1)</sup> of the authorisation and expiration	Maximum nominal increase or reduction in capital (in millions of euros)	Use made of the authorisations (in millions of euros)
<b>Delegation of authority to the Board to increase the capital with maintenance of the shareholders' preferential subscription right</b>			Capital increase 6 March 2017
Capital increase, all securities	26 months 26 September 2018	480 <sup>(2)</sup>	Nominal amount of 316.4
<b>Delegation of authority to the Board to increase the capital, via a public offering, with cancellation of the shareholders' preferential subscription right</b>			
Capital increase, all securities	26 months 12 July 2018	95 <sup>(2)</sup>	none
<b>Delegation of authority to the Board to make offers for private placements <sup>(3)</sup> with cancellation of the shareholders' preferential subscription right</b>			
Capital increase, all securities	26 months 12 July 2018	95 <sup>(2)</sup> and 20% of the share capital per year	none
<b>Authorisation for the Board to increase the number of securities to be issued in the event of a capital increase, with or without preferential subscription rights</b>			
Capital increase, all securities	26 months 12 July 2018	15% of the amount of the initial issue <sup>(2)</sup>	none
<b>Delegation of authority to the Board to increase the capital through the capitalisation of reserves, profits, premiums or otherwise</b>			
	26 months 12 July 2018	1,000	none
<b>Delegation of authority to the Board to increase the capital as consideration for a public exchange bid initiated by the Company</b>			
	26 months 12 July 2018	95 <sup>(2)</sup>	none
<b>Delegation of authority to the Board to increase the capital to compensate in-kind contributions <sup>(4)</sup></b>			
	26 months 12 July 2018	10% of the Company's capital up to a maximum of 95 <sup>(2)</sup>	none
<b>Delegation of authority to the Board to increase the capital for the benefit of savings plan members</b>			
Issues reserved for the personnel	26 months 26 September 2018	10	none
<b>Authorisation for the Board to reduce the capital by cancelling treasury shares</b>			
	26 months 12 July 2018	10% of the capital by 24-month periods	none
<b>Authorisation for the Board, in the event of an increase of capital, via private placements, with cancellation of the shareholders' preferential subscription right, to decide the issue price at its discretion</b>			
	26 months 26 September 2018	10% of the capital by 12-month periods	none
<b>Delegation of authority to the Board to carry out increases of capital reserved for a category of beneficiaries, with cancellation of the shareholders' preferential subscription right</b>			
	18 months 26 January 2018	10	none

(1) As from 12 May 2016, date of the Combined Shareholders' Meeting with the exception of the delegation of authority to the Board to increase the capital with maintenance of the shareholders' preferential subscription right, the delegation of authority to the Board to increase the capital for the benefit of savings plan members, the authorisation for the Board to decide the issue price at its discretion in the event of an increase of capital with cancellation of the shareholders' preferential subscription right and the delegation of authority to the Board to carry out increases of capital reserved for a category of beneficiaries, with cancellation of the shareholders' preferential subscription right, which were adopted by the Combined Shareholders' Meeting of 26 July 2016.

(2) The nominal aggregate limit on the share capital increase of €480 million provided for in the second resolution submitted to the Shareholders' Meeting of 26 July 2016, applies to all capital increases, with the exception of capital increases through capitalisation of reserves, premiums, profits or otherwise and capital increases that are reserved for savings plan members.

(3) Offers governed by Article L. 411-2 II of the French Monetary and Financial Code, in that they are exclusively intended for persons who provide investment portfolio management services on behalf of third parties or qualified investors or a restricted circle of investors acting on their own behalf.

(4) Article L. 225-147 of the French Commercial Code.

### Status of the authorisations adopted by the Combined Shareholders' Meeting of 18 May 2017

Securities concerned / type of issue	Term of the authorisation and expiration	Maximum nominal increase or reduction in capital (in millions of euros)	Use made of the authorisations (in millions of euros)
Delegation of authority to the Board to carry out increases of capital reserved for a category of beneficiaries, with cancellation of the shareholders' preferential subscription right	18 months 18 November 2018	10	none

### Authorisations to be submitted to the Combined Shareholders' Meeting of 15 May 2018 for approval

The table set out below shows the authorisations to be submitted for approval to the Combined Shareholders' Meeting of 15 May 2018, in accordance with the draft resolutions decided by the Board of Directors on 15 February 2018.

Securities concerned / type of issue	Term of the authorisation and expiration	Maximum nominal increase or reduction in capital (in millions of euros)
Delegation of authority to the Board to increase the capital with maintenance of the shareholders' preferential subscription right Capital increase, all securities	26 months 15 July 2020	365 <sup>(1)</sup>
Delegation of authority to the Board to increase the capital, via a public offering, with cancellation of the shareholders' preferential subscription right Capital increase, all securities	26 months 15 July 2020	290 <sup>(1)</sup>
Delegation of authority to the Board to make offers for private placements <sup>(2)</sup> with cancellation of the shareholders' preferential subscription right Capital increase, all securities	26 months 15 July 2020	290 <sup>(1)</sup> and 20% of the share capital per year
Authorisation for the Board, in the event of an increase of capital, via private placements, with cancellation of the shareholders' preferential subscription right, to decide the issue price at its discretion	26 months 15 July 2020	10% of the capital by 12-month periods
Authorisation for the Board to increase the number of securities to be issued in the event of a capital increase, with or without preferential subscription rights Capital increase, all securities	26 months 15 July 2020	15% of the amount of the initial issue <sup>(1)</sup>
Delegation of authority to the Board to increase the capital through the capitalisation of reserves, profits, premiums or otherwise	26 months 15 July 2020	1,000
Delegation of authority to the Board to increase the capital as consideration for a public exchange bid initiated by the Company	26 months 15 July 2020	145 <sup>(1)</sup>
Delegation of authority to the Board to increase the capital to compensate in-kind contributions <sup>(3)</sup>	26 months 15 July 2020	10% of the Company's capital up to a maximum of 95 <sup>(1)</sup>
Delegation of authority to the Board to increase the capital for the benefit of savings plan members Issues reserved for the personnel	26 months 15 July 2020	15
Delegation of authority to the Board to carry out increases of capital reserved for a category of beneficiaries, with cancellation of the shareholders' preferential subscription right	18 months 15 November 2019	10
Authorisation for the Board to reduce the capital by cancelling treasury shares	26 months 15 July 2020	10% of the capital by 24-month periods

(1) The nominal aggregate limit on the share capital increase of € 365 million provided for in the second resolution submitted to the Shareholders' Meeting of 15 May 2018, applies to all capital increases, with the exception of capital increases through capitalisation of reserves, premiums, profits or otherwise and capital increases that are reserved for savings plan members.

(2) Offers governed by Article L. 411-2 II of the French Monetary and Financial Code, in that they are exclusively intended for persons who provide investment portfolio management services on behalf of third parties or qualified investors or a restricted circle of investors acting on their own behalf.

(3) Article L. 225-147 of the French Commercial Code.

### 7.3.4 OTHER EQUITY SECURITIES

On the filing date of this Reference Document, other than the common shares of Company stock, there are no other securities that grant access to EDF's share capital, either directly or indirectly.

### 7.3.5 NON-EQUITY SECURITIES

On 18 April 1996, EDF set up a programme to issue debt securities in the form of *Euro Medium Term Notes* (the "EMTN" programme). Since this date, this programme has been regularly renewed.

On 6 October 2016, EDF successfully raised \$2.655 billion from 2 senior bonds subscribed for by twenty or so investors on the Taiwanese market ("Formosa bonds"):

## GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

### Information regarding capital and share ownership

- \$491 million, with a fixed coupon of 4.65%, 30-year bond;
- \$2.164 billion, with a fixed coupon of 4.99%, 40-year bond.

On 6 October 2016, EDF also successfully launched a senior multi-currency bond issue of approximately €3 billion in four tranches:

- €1.75 billion, with a fixed coupon of 1%, 10-year green bond;
- €750 million, with a fixed coupon of 1.875%, 20-year bond;
- CHF400 million, with a fixed coupon of 0.3%, 8-year bond;
- CHF150 million, with a fixed coupon of 0.65%, 12-year bond.

This third Green Bond issue, in an amount of €1.75 billion, is the largest tranche of Green Bonds issued to date and means that EDF has already issued the equivalent of more than €4 billion in Green Bonds over a three-year period to support its expansion in the renewable energies field.

On 20 January 2017, EDF successfully raised JPY137 billion, corresponding to approximately €1.1 billion<sup>(1)</sup>, through four senior bonds issued on the Japanese market ("Samurai bonds"):

- JPY107.9 billion, with a fixed coupon of 1.088%, 10-year bond;
- JPY19.6 billion, with a fixed coupon of 1.278%, 12-year green bond;
- JPY6.4 billion, with a fixed coupon of 1.569%, 15-year green bond;
- JPY3.1 billion, with a fixed coupon of 1.870%, 20-year bond, which is the longest bond maturity ever issued on the Samurai market.

With the issue of two green tranches, in a total amount of 26 billion yen to be used to finance its renewable investments, EDF opens the Samurai Green market and thus continues to actively participate in the development of Green Bonds as tools to finance the energy transition.

These operations contribute to the Group's investment strategy and are part of its policy to extend the average maturity of its debt.

A description of the Group's bond debt is provided in note 38.2 to the consolidated financial statements for the fiscal year ended 31 December 2017.

### 7.3.6 INFORMATION ABOUT THE SHARE CAPITAL OWNED BY ANY MEMBER OF THE GROUP SUBJECT TO A CONDITIONAL OR UNCONDITIONAL AGREEMENT

Acquisition and disposal commitments involving securities in subsidiaries are described in note 44 to the consolidated financial statements for the fiscal year ended 31 December 2017.

With the exception of these commitments to acquire and dispose of securities and any other commitments that are described in section 1 ("Presentation of the EDF group") of this Reference Document, EDF has not made any promises to purchase or sell that would make it possible to acquire or dispose of, as applicable, all or part of the capital of the Company or of any of its subsidiaries, as defined in Article L. 233-1 of the French Commercial Code.

### 7.3.7 PLEDGE OF THE COMPANY'S SECURITIES

To the Company's knowledge, none of the Company's common shares that make up its share capital have been pledged.

### 7.3.8 OWNERSHIP OF THE COMPANY'S CAPITAL AND VOTING RIGHTS

For the past three financial years, EDF's share capital has been owned as follows as at 31 December of each year:

	Position as at 31/12/2017			Position as at 31/12/2016			Position as at 31/12/2015		
	Number of shares	% of capital	% of voting rights <sup>(1)</sup>	Number of shares	% of capital	% of voting rights <sup>(1)</sup>	Number of shares	% of capital	% of voting rights <sup>(1)</sup>
State	2,444,361,086	83.50	83.60	1,805,952,345	85.62	85.73	1,630,870,545	84.94	85.04
Institutional and private investors	444,381,189	15.18	15.20	267,417,384	12.68	12.70	255,445,264	13.30	13.32
Employee shareholders	35,266,513 <sup>(2)</sup>	1.20	1.20	33,097,739 <sup>(3)</sup>	1.57	1.57	31,512,465 <sup>(4)</sup>	1.64	1.64
Treasury shares	3,430,016	0.12	–	2,669,215	0.13	–	2,310,753	0.12	–
<b>TOTAL</b>	<b>2,927,438,804</b>	<b>100.00</b>	<b>100.00</b>	<b>2,109,136,683</b>	<b>100.00</b>	<b>100.00</b>	<b>1,920,139,027</b>	<b>100.00</b>	<b>100.00</b>

(1) These percentages do not include the double voting rights that may have been acquired under Article L. 225-123 of the French Commercial Code.

(2) This number includes 30,856,184 shares (representing 1.05% of the capital) based on the definition of employee shareholdings under Article L. 225-102 of the French Commercial Code (shares held by EDF's employees and former employees through the "Actions EDF" FCPE of the EDF Group's savings plan). This number also includes almost 4.4 million shares, representing 0.15% of the capital, held as directly or administered registered shares, with no lock-in periods or whose lock-in periods have expired, by employees or former employees.

(3) This number includes 28,771,251 shares (representing 1.36% of the capital) based on the definition of employee shareholdings under Article L. 225-102 of the French Commercial Code (shares held by EDF's employees and former employees through the "Actions EDF" FCPE of the EDF Group's savings plan). This number also includes almost 4.3 million shares, representing 0.21% of the capital, held as directly or administered registered shares, with no lock-in periods or whose lock-in periods have expired, by employees or former employees.

(4) This number includes 27,122,068 shares (representing 1.41% of the capital) based on the definition of employee shareholdings under Article L. 225-102 of the French Commercial Code (shares held by EDF's employees and former employees through the "Actions EDF" FCPE of the EDF Group's savings plan and the EDF International Group's savings plan). This number also includes almost 4.4 million shares, representing 0.23% of the capital, held as directly or administered registered shares, with no lock-in periods or whose lock-in periods have expired, by employees or former employees.

(1) According to the exchange rate on 20 January 2017.

## 7. GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

### Information regarding capital and share ownership

On 15 January 2018, the French State entered into a share allotment agreement with Bpifrance, an industrial and commercial public undertaking (EPIC), whereby it allotted 389,349,361 EDF shares to the latter, or 13.3% of the capital and 8.46% of the voting rights. They will act together and have to consult each other before every Shareholders' Meeting of EDF. Bpifrance undertook not to transfer, pledge or otherwise dispose of the shares.

On 29 January 2018, BPI France and the French State combined crossed the statutory thresholds of 5%, 10%, 15%, 20%, 30%, one third, 50% and two-thirds of the Company's capital and voting rights.

To the Company's knowledge, no shareholder other than the French State and Bpifrance directly or indirectly holds more than 5% of the capital and voting rights.

The Company conducted a study on identifiable bearer shares as at 31 December 2017, which allowed it to examine the ownership of its capital and the geographical location of its shareholders on this date. The table set out below summarises this information as at 31 December 2017 and 31 December 2016:

	As at 31 December 2017		As at 31 December 2016	
	Number of shares held	% of capital	Number of shares held	% of capital
State	2,444,361,086	83.50	1,805,952,345	85.62
Institutional investors in Europe (other than France)	111,751,510	3.81	55,533,724	2.63
Institutional investors in the rest of the world	174,348,008	5.96	105,599,615	5.01
Institutional investors in France	83,945,491	2.87	44,821,849	2.13
Private shareholders	74,336,180	2.54	61,462,195	2.91
Employee shareholders	35,266,513	1.20	33,097,739	1.57
Treasury shares	3,430,016	0.12	2,669,215	0.13
<b>TOTAL</b>	<b>2,927,438,804</b>	<b>100.00</b>	<b>2,109,136,683</b>	<b>100.00</b>

Following the allotment of double voting rights attached to the 1,630,870,545 shares held as directly registered shares by the French State for at least two years since the entry into force of French Act no. 2014-384 of 29 March 2014 aimed at recapturing the real economy, the State has notified a holding of 2,055,011,725 EDF shares and 3 685,882,270 EDF voting rights at 28 February 2018 (representing 70.20% of the capital and 80.10% of the voting rights of EDF).<sup>(1)</sup>

On 22 April 2016, the State announced that it would receive its dividend in the form of shares for 2016 and 2017.

### 7.3.9 AGREEMENTS WHOSE IMPLEMENTATION COULD LEAD TO A CHANGE OF CONTROL

To EDF's knowledge, there are no agreements whose implementation could subsequently lead to a change in the Company's control.

Moreover, pursuant to Article L. 111-67 of the French Energy Code, the State may not hold less than 70% of EDF's capital.

(1) This percentage was calculated based on the number of theoretical voting rights for all shares carrying voting rights, including those stripped of voting rights.



## 7.4 MARKET FOR THE COMPANY'S SHARES

The Company's shares have been listed for trading by Euronext Paris (Compartment A) since 21 November 2005, under ISIN code FR 0010242511, Reuters code (EDF.PA) and Bloomberg code (EDF:FP).

The following graph shows the changes in the Company's share price between 21 November 2005 and 31 January 2018 (base 100 as at 21 November 2005):



(Source: Bloomberg)

The following table shows the share price and volume of EDF shares traded between 1 January 2017 and 30 January 2018 on the Euronext Paris stock market:

	Transactions		Closing price (in euros)	
	(in millions of shares)	(in millions of euros <sup>(1)</sup> )	High	Low
<b>2018</b>				
January 2018	56,290,039	610,526,900	11.245	10.335
<b>2017</b>				
December 2017	52,432,859	566,135,400	11.300	10.400
November 2017	107,510,999	1,187,215,000	12.345	10.040
October 2017	69,845,090	764,047,500	11.540	10.180
September 2017	88,147,815	888,649,400	10.855	8.944
August 2017	53,895,771	481,456,500	9.408	8.594
July 2017	68,951,830	610,640,800	9.549	8.572
June 2017	88,559,298	865,065,300	10.170	9.316
May 2017	127,529,520	1,149,602,000	9.625	7.927
April 2017	63,449,865	490,337,800	8.081	7.400
March 2017	107,607,441	843,932,700	8.985	7.447
February 2017	39,629,553	338,186,200	8.724	8.301
January 2017	45,360,673	389,944,000	9.041	8.187

(1) The transactions expressed in millions of euros correspond to the monthly sum of the daily number of securities traded, multiplied by the market closing price on the same day. (Source: Euronext).

# 7. GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

## Related party transactions

### 2017

In 2017, EDF's share price decreased by 16.09%. The French CAC 40 index increased by 9.26%, while the Euro Stoxx Utility sector index decreased by 5.49%.

At 29 December 2017, the closing price of the EDF share was €10.420 (€9.680 at 31 December 2016). Its highest closing price in 2017 was €12.345 on 9 November 2017 and its lowest closing price was €7.400 on 19 April 2017.

At 30 December 2017, EDF's market capitalisation totalled €30.50 billion (compared to €20.42 billion at 31 December 2016).

### 2018

Between the start of 2018 and 31 January 2018 inclusive, EDF's share price rose by 6.29%, the CAC 40 index increased by 3.19% and the Euro Stoxx Utility (SX6P) sector index decreased by 2.64%.

At 31 January 2018, the closing price of the EDF share was €11.075. Its lowest closing price in 2018, through 31 January 2018 inclusive, was €10.335 on 11 January 2018 and its highest closing price was €11.245 on 29 January 2018.

At 31 January 2018, EDF's market capitalisation totalled €32.42 billion.

## 7.5 RELATED PARTY TRANSACTIONS

In addition to the information set out below, the details of the transactions concluded by the Company with related parties, as defined by the IFRS, in respect of the 2017 financial year, are contained in notes 23 and 48 to the consolidated financial statements for the financial year ended 31 December 2017.

The information on the regulated agreements and commitments referred to in Article L. 225-38 of the French Commercial Code is stated in the Statutory Auditors' special report, which is reproduced in section 7.5.4 to this Reference Document.

### 7.5.1 RELATIONS WITH THE FRENCH STATE

As of 31 December 2017, the French State held 83.50% of the share capital and 83.60% of the voting rights in EDF. Pursuant to the Article L. 111-67 of the French Energy Code, the state must remain the owner of at least 70% of its capital. The French State thus has the option, as the majority shareholder, of reviewing corporate decisions that require the approval of the shareholders and, in particular, of determining the result of the shareholders' vote for all issues over which Shareholders' Meetings have authority.

The regulations applicable to EDF, as a result of its majority ownership by the French State, are described in section 1.5 "Legislative and regulatory environment".

The relations with the French State are also described in note 48 to the consolidated financial statements for the financial year ended 31 December 2017.

### 7.5.2 RELATIONS WITH ENGIE (EX-GDF SUEZ)

The missions of the common service shared by the two network managers, Enedis and GRDF, which are respectively in charge of the distribution of electricity and gas, as defined by Article L. 111-71 of the French Energy Code, are in the electricity and gas distribution sector: construction of structures, project management work, operation and maintenance of networks, and metering operations. It does not have the status of a legal entity. The organisational and functional rules are described in section 1.4.4.2.3 ("Service shared by Enedis and GRDF").

### 7.5.3 RELATIONS WITH PUBLIC SECTOR COMPANIES

Relations with public sector companies mainly concern the AREVA group. Transactions with AREVA concern upstream of the nuclear fuel cycle, the end of the cycle and the maintenance of plants and equipment purchase. These relations are primarily described in sections 2.3 ("Dependency factors"), 1.4.1.1.4 ("The nuclear fuel cycle and related issues"), 1.4.1.1.5 ("Preparing for the future of the nuclear fleet in France" – "Operating life of the EDF's PWR fleet"), 1.4.1.2.2 ("Update on the Flamanville EPR project") and 1.4.1.1.6 ("Decommissioning of nuclear power plants") and in note 48 to the consolidated financial statements for the financial year ended 31 December 2017.

In addition to the transactions described above, on 31 December 2017 EDF acquired 75.5% of the capital of New NP (now Framatome), an entity of the AREVA Group (now Orano) and combining activities relating to nuclear reactor and equipment design and manufacturing, fuel assemblies, and installed base services. (see section 1.4.1.3 "Framatome").

## 7.5.4 STATUTORY AUDITORS' SPECIAL REPORT ON REGULATED AGREEMENTS AND COMMITMENTS

### Shareholders' Meeting held to approve the financial statements for the year ended December 31, 2017

*This is a free translation into English of the Statutory Auditors' special report on regulated agreements and commitments with third parties that is issued in the French language and is provided solely for the convenience of English speaking readers. This report on regulated agreements and commitments should be read in conjunction with, and construed in accordance with, French law and professional auditing standards applicable in France. It should be understood that the agreements reported on are only those provided by the French Commercial Code and that the report does not apply to those related party transactions described in IAS 24 or other equivalent accounting standards.*

To the Shareholders' Meeting of Electricité de France SA,

In our capacity as Statutory Auditors of Electricité de France SA (the "Company"), we hereby report to you on regulated agreements and commitments.

The terms of our engagement require us to communicate to you, based on information provided to us, the principal terms and conditions of those agreements and commitments brought to our attention or which we may have discovered during the course of our audit, without expressing an opinion on their usefulness and appropriateness or identifying such other agreements and commitments, if any. It is your responsibility, pursuant to Article R. 225-31 of the French Commercial Code (*Code de Commerce*), to assess the interest involved in respect of the conclusion of these agreements and commitments for the purpose of approving them.

Our role is also to provide you with the information stipulated in Article R. 225-31 of the French Commercial Code relating to the implementation during the past year of agreements and commitments previously approved by the Shareholders' Meeting, if any.

We conducted the procedures we deemed necessary in accordance with the professional guidelines of the French National Institute of Statutory Auditors (*Compagnie Nationale des Commissaires aux Comptes*) relating to this engagement. These procedures consisted in agreeing the information provided to us with the relevant source documents.

## AGREEMENTS AND COMMITMENTS SUBMITTED TO THE APPROVAL OF THE SHAREHOLDERS' MEETING

7.

### Agreements and commitments authorized during the year

Pursuant to Article L. 225-40 of the French Commercial Code, the following agreements and commitments, which were previously authorized by the Board of Directors have been brought to our attention.

#### 1 Underwriting agreement entrusted by EDF to a banking syndicate including, in particular, BNP Paribas and Société Générale as part of the capital increase carried out in March 2017

**Persons concerned:** Mrs. Laurence Parisot, director of EDF SA and BNP Paribas and Mr. Jean-Bernard Levy, Chairman and Chief Executive Officer of EDF SA and director of Société Générale.

**Nature, purpose, terms & conditions and reasons:** the EDF capital increase carried out in March 2017 led to the signing of an Underwriting Agreement on March 6, 2017 between the Company and a banking syndicate including, in particular, BNP Paribas and Société Générale as Joint Global Coordinators. Pursuant to the terms of the agreement, the Underwriters, acting jointly but with separate liability, undertook to have subscribed or, failing which, to subscribe to all of the shares which remain unsubscribed following the subscription period for the above-mentioned capital increase.

The agreement provides for the remuneration of the Underwriters, notably, with an underwriting fee of 1.0% of the difference between the gross amount of the capital increase and the amount resulting from the subscription commitment of the French State, allocated between the Underwriters proportionally to their underwriting commitments. In addition, the Company may decide to pay a discretionary fee of a maximum of 0.30% of the difference referred to above.

BNP Paribas and Société Générale have each underwritten 12.5% of the difference referred to above and have earned a fee equal to €1.5 million

The Board of Directors, which had authorized the signing of engagement letters and a draft underwriting agreement during its meeting of June 21, 2016, authorized the conclusion of the final agreement at its March 3, 2017 meeting; it considered that its conclusion was motivated by the proposed capital increase of EDF for which the Company had to appoint banks to be Global Coordinators. At the end of the tender bid, during which 20 banks were interviewed, the Company selected 4 global coordinators, of which BNP Paribas and Société Générale.

#### 2 Agreements signed by EDF as part of the sale by AREVA SA of its entire interest in the capital of NEW NP (henceforth Framatome)

**Persons concerned:** the French State, represented by Mr. Martin Vial on the Board of Directors, a shareholder owning more than 10% of the voting rights of EDF SA and AREVA SA, and Mr. Maurice Gourdault-Montagne, director of EDF SA and AREVA SA.

The Board of Directors, which had previously authorized the conclusion of these agreements successively during its meetings of June 23, 2017 and December 14, 2017, considered that their conclusion was motivated by the reorganization of the French nuclear industry, EDF becoming the leader, which will enable the Group to be more efficient to carry out major projects such as the major overhaul and refitting ("*grand carénage*") of the nuclear power plants in service and the construction of new nuclear power plants, and to be more competitive to win new international markets.

##### a. Agreement between EDF, AREVA SA and AREVA NP to acquire 75% of the capital of Framatome

**Nature, purpose, terms & conditions and reasons:** following the memorandum of understanding signed on July 28, 2016, the Board of Directors which met on November 15, 2016 had previously authorized the agreement, signed the same day, setting the terms of the sale of the interest conferring to EDF exclusive control of an entity ("NEW NP" which has become "Framatome"), 100%-held by AREVA NP, a subsidiary of AREVA SA, regrouping the activities relating to the design and manufacturing of nuclear reactors and equipment, fuel assemblies and services to the nuclear installed base within the Group.

This agreement, which appears in our special report on agreements and commitments relating to fiscal year 2016, was not approved by the Combined Shareholders' Meeting of May 18, 2017 convened to approve the financial statements for the year ended December 31, 2016.

## 7. GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

### Related party transactions

This acquisition covering 75.5% of the capital of Framatome has been authorized by your Board of Directors on December 14, 2017, signed on December 22, 2017 and was carried out on December 31, 2017 for €1,868 million, excluding acquisition costs.

#### b. Signature by EDF of the agreement relating to the acquisition of 19.5% of the Framatome shares by Mitsubishi Heavy Industries (MHI)

**Nature, purpose, terms and conditions and reasons:** the final acquisition agreement was signed on December 14, 2017, concomitantly with the acquisition by EDF of 75.5% of the shares. It allows MHI to acquire 19.5% of Framatome from AREVA SA and AREVA NP, in the presence of EDF and under financial conditions similar to those of EDF.

The Board of Directors on June 23, 2017, which had authorized the first agreement signed on July 7, 2017, considered that it was in the Company's interest to conclude the agreement since it is part of the global transaction involving the acquisition of Framatome by EDF.

#### c. Signature by EDF of the agreement relating to the acquisition of 5% of the Framatome shares by Assystem

**Nature, purpose, terms & conditions and reasons:** the final acquisition agreement was signed on December 14, 2017, concomitantly with the acquisition by EDF of 75.5% of the Framatome shares. It allows Assystem to acquire 5% of Framatome from AREVA SA and AREVA NP, in the presence of EDF and under financial conditions similar to those of EDF.

The Board of Directors on June 23, 2017, which had authorized the first agreement signed on July 7, 2017, considered that it was in the Company's interest to conclude the agreement since it is part of the global transaction involving the acquisition of Framatome by EDF.

## AGREEMENTS AND COMMITMENTS PREVIOUSLY APPROVED BY THE SHAREHOLDERS' MEETING

### Previously approved agreements and commitments which have remained in force during the year

Pursuant to Article R. 225-30 of the French Commercial Code, we have been informed that the following agreements and commitments, previously approved by Shareholders' Meetings of prior years, have remained in force during the year.

#### Agreements with AREVA NP transferred to NEW NP (henceforth Framatome)

**Nature, purpose, terms and conditions:** these two agreements, covering the performance of the following services, were entered into with Areva NP during fiscal year 2007 and transferred to NEW NP (henceforth Framatome) as part of the partial asset transfer carried out on December 31, 2017:

- construction of the EPR Flamanville 3 nuclear steam supply system;
- maintenance and servicing of nuclear boilers to be carried out as part of the third ten-year inspections of 900MW nuclear power plants in France, authorized by the Board of Directors at its January 23, 2007 meeting.

The initial commitments under these agreements and their amendments amount to €1,465 million (of which €193 million recorded in 2017) and €122 million (of which €0.4 million recorded in 2017).

### Agreements and commitments authorized during prior years but not approved by the Shareholders' Meeting

In accordance with the terms of Article R.225-30 of the French Commercial Code, we have been informed of the following agreements and commitments, which were described in our special report on regulated agreements and commitments for fiscal year 2016 and which were not approved by the Combined Shareholders' Meeting of May 18, 2017 convened to approve the financial statements for the year ended December 31, 2016, which were continued during the period.

#### 1. Partial sale of the capital of RTE to Caisse des Dépôts and CNP Assurances, including the securing of a loan by the Joint Venture (C25, henceforth Coentreprise de Transport d'Electricité - CTE), an investment agreement and a shareholders' agreement

**Person concerned:** the French State, represented by Mr. Martin Vial on the Board of Directors, a shareholder owning more than 10% of the voting rights of EDF SA, and having a representative on the Board of Directors of CNP Assurances.

**Nature, purpose, terms and conditions:** this agreement, signed on December 14, 2016 and implemented on March 31, 2017 between EDF Caisse des Dépôts et Consignation and CNP Assurances, enabled Caisse des Dépôts et Consignation and CNP Assurances to acquire an indirect interest of 49.9% in the capital of RTE, and the set-up of the terms and conditions of a long-term partnership to encourage the development of RTE.

The external loan obtained by CTE amounted to €2.8 billion and the sale was carried out based on RTE's full value of €8.2 billion.

#### 2. Agreement entered into between the French State, EDF, the Caisse des Dépôts, CNP Assurances and CTE relating to the governance of CTE and RTE

**Person concerned:** the French State, represented by Mr. Martin Vial on the Board of Directors, a shareholder owning more than 10% of the voting rights of EDF SA, a party to the agreement and having a representative on the Board of Directors of CNP Assurances.

**Nature, purpose, terms and conditions:** the purpose of this agreement, entered into between EDF, Caisse des Dépôts and CNP Assurances, CTE and the French State, is to set forth the commitment of the French State and to limit its representatives to two on the Supervisory Board of RTE.

Paris La Défense et Neuilly-sur Seine, March 9, 2018

The Statutory Auditors

**KPMG Audit**  
*Department of KPMG S.A.*

**Deloitte & Associés**

Jay Nirsimloo

Michel Piette

Damien Leurent

Anthony Maarek

## 7.6 MATERIAL CONTRACTS

The information on the regulated agreements and commitments referred to in Article L. 225-38 of the French Commercial Code is contained in the Statutory Auditors' special report, which is reproduced in section 7.5.4 of this Reference Document, section 7.5.4 of the 2016 Reference Document and section 7.5.4 of the 2015 Reference Document.

Except for the contracts which may be described in chapters 1 and 5 of this Reference Document or in the notes to the consolidated statements for the financial year ended 31 December 2017, in chapters 1 and 5 of the 2015 and 2016 Reference Document or in the notes to the consolidated statements for the financial year ended 31 December 2015 and 2016, including the contracts described hereunder, EDF signed no material contracts other than those concluded in the normal course of business over the last two years preceding the filling of this Reference Document, the 2016 Reference Document and the Reference Document 2015.

### 7.6.1 MATERIAL CONTRACTS ENTERED INTO IN 2017

Material contracts entered into in 2017, other than those conducted in the normal course of business, by the Group, are the followings:

- On 19 May 2017, EDF signed an agreement with PGE for the disposal of the assets of EDF Polska.
- EDF signed an agreement on 31 March 2017 for the transfer of a 49.9% indirect equity interest in RTE to Caisse des Dépôts and CNP Assurances.
- In accordance with the non-binding memorandum of understanding signed between EDF and AREVA on 30 July 2015 and updated on 28 July 2016, on 31 December 2017 EDF acquired 75.5% of the capital of New NP (now Framatome), an entity of the AREVA Group and combining activities relating to nuclear reactor and equipment design and manufacturing, fuel assemblies, and installed base services. (see section 1.4.1.3 "Framatome"), authorized by the Board of Directors on 14 December 2017.

### 7.6.2 MATERIAL CONTRACTS ENTERED INTO IN 2016

Material contracts entered into in 2016, other than those conducted in the normal course of business, by the Group, are the followings:

- final agreements relating to the Hinkley Point C project, entered into on 29 September 2016, with the British Government and CGN following the authorisation of the final investment decision by EDF's Board of Directors on 28 July 2016;
- a share transfer agreement relating to the acquisition of AREVA NP's activities through the acquisition of an interest between 51 and 75% of the capital and voting rights in New NP, (a fully owned subsidiary of AREVA NP) entered into between EDF SA, AREVA and AREVA NP on 15 November 2016, to which is appended the draft shareholders' agreement relating to the governance of New NP, authorised by the Board of Directors on 15 November 2016;
- an investment agreement (and its appendices) entered into between EDF SA, Caisse des dépôts and CNP Assurances on 14 December 2016 providing for the indirect partial sale of the shares in Réseau de Transport d'Electricité - RTE authorised by the Board of Directors on 14 December 2016;

### 7.6.3 MATERIAL CONTRACTS ENTERED INTO IN 2015

Material contracts entered into in 2015, other than those conducted in the normal course of business, by the Group, are the followings:

- an agreement signed 30 June 2015 with EP Energy concerning the sale of 95.6% of the Hungarian company Budapesti Erőmű Zrt (BE Zrt);
- an agreement of 10 July 2015 signed with Macquarie Infrastructure and Real Assets concerning the sale by the Group of 25% of its shares in the Austrian company Energie Steiermark Holding AG (Estag);
- a non-binding memorandum of understanding signed 30 July 2015 with AREVA formalising the state of advancement of the discussions related to the partnership project between AREVA and EDF;
- a strategic investment agreement signed on 21 October 2015 with China General Nuclear Power Corporation (CGN) for the construction and operation of two EPR reactors on the Hinkley Point C site.

## **7.** GENERAL INFORMATION ABOUT THE COMPANY AND ITS CAPITAL

# 8 ■ ADDITIONAL INFORMATION

<b>8.1 PERSON RESPONSIBLE FOR THE REFERENCE DOCUMENT AND THE CERTIFICATION</b>	<b>492</b>	<b>8.3 DOCUMENTS AVAILABLE TO THE PUBLIC</b>	<b>493</b>
8.1.1 Person responsible for the Reference Document	492	<b>8.4 FINANCIAL COMMUNICATION CALENDAR</b>	<b>493</b>
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# 8.

## ADDITIONAL INFORMATION

Person responsible for the Reference Document and the Certification

### 8.1 PERSON RESPONSIBLE FOR THE REFERENCE DOCUMENT AND THE CERTIFICATION

#### 8.1.1 PERSON RESPONSIBLE FOR THE REFERENCE DOCUMENT

Jean-Bernard Lévy, Chairman and Chief Executive Officer of EDF.

#### 8.1.2 CERTIFICATION FROM THE PERSON RESPONSIBLE FOR THE 2017 REFERENCE DOCUMENT CONTAINING THE ANNUAL FINANCIAL REPORT

Having taken all reasonable care to ensure that such is the case, I certify that, to the best of my knowledge, the information contained in this Reference Document accurately reflects the facts and contains no omission likely to affect its meaning.

I certify that, to the best of my knowledge, the financial statements are prepared in accordance with accounting standards and that they give a true and fair view of the assets and liabilities, financial position and the income of the Company and of all the companies included in the consolidation, and that the management report (*Rapport de gestion*) presents a true and fair view of the business trends, income and financial position of the Company and of all the companies included in the consolidation and a description of the main risks and uncertainties they face.

I have obtained a letter from the Statutory Auditors certifying that they have verified the financial and accounting information provided in this Reference Document and that they have read the document in entirety. This letter contains no observation.

Jean-Bernard Lévy,

Chairman and Chief Executive Officer of EDF



## 8.2 AUDITORS – STATUTORY AUDITORS

### DELOITTE ET ASSOCIÉS

185, avenue Charles-de-Gaulle, 92200 Neuilly-sur-Seine, represented by Mr Damien Leurent and Mr Anthony Maarek.

### KPMG SA

Tour EQHO, 2, avenue Gambetta, CS 60055, 92066 Paris - La Défense cedex, represented by Mr Jay Nirsimloo and Mr Michel Piette.

The Statutory Auditors were initially appointed by decision of the Shareholders' Meeting of 6 June 2005 for a period of six fiscal years expiring at the end of the Shareholders' Meeting ruling on the financial statements covering the fiscal year closing 31 December 2010.

Their terms of office were renewed by a decision of the Combined Shareholders' Meeting of 24 May 2011 until the Shareholders' Meeting ruling on the financial statements for the fiscal year ended 31 December 2016 then again by the Combined Shareholders' Meeting of 18 May 2017 for a further period of six fiscal years expiring at the end of the Shareholders' Meeting ruling on the financial statements covering the fiscal year ending 31 December 2022.

The aforementioned Statutory Auditors consequently certified the financial statements reproduced in this Reference Document.

It is hereby specified that following a legislative change, it is no longer necessary to appoint alternate Statutory Auditors. The Combined Shareholders' Meeting of 18 May 2017 formally acknowledged the non-renewal of BEAS and KPMG Audit IS, alternate Statutory Auditors whose terms of office were due to expire.

## 8.3 DOCUMENTS AVAILABLE TO THE PUBLIC

The Company's press releases, annual reports, including historical financial information relating to the Company and any related updates filed with the AMF, are available on the Company's website: <http://finance.edf.com/finance-41326.html>, and a copy may also be obtained at the Company's registered office at 22-30, avenue de Wagram in Paris, France.

All of the regulated information published by the Company, pursuant to Article 221-1 *et seq.*, in the AMF's General Regulation, is available at the following address:

<http://finance.edf.com/actualites-et-publications/publications/information-reglementee/sommaire-44493.html>.

Finally, the documents and information referred to in Article R. 225-73-1 of the French Energy Code, are available on EDF web site in the section dedicated to Shareholders' Meetings.

## 8.4 FINANCIAL COMMUNICATION CALENDAR

<b>2017 Annual Results</b>	<b>16 February 2018</b>
First quarter 2018 revenue	9 May 2018
Shareholders' Meeting	15 May 2018
Half year 2018 Results	31 July 2018

The Company has imposed a 15 days embargo period prior to the announcement of the annual and half-year results and before the quarterly results ("quiet period") during which no new information regarding the business development and EDF's

results have to be issued to financial analysts and investors so as to avoid the release of incomplete financial information enabling the recipients to anticipate EDF's results prior to their official publication.

## 8.5 CONCORDANCE TABLES

### 8.5.1 CONCORDANCE TABLE WITH THE ANNEX I OF REGULATION (CE) N°. 809/2004

Concordance table with the information required by the appendix I of regulation (CE) n°. 809/2004 of 29 April 2004:

	<b>Reference Document sections</b>
<b>1. Persons responsible</b>	<b>Section 8.1</b>
1.1. Name and positions of the persons responsible	Section 8.1.1
1.2. Declaration by the persons responsible	Section 8.1.2
<b>2. Statutory Auditors</b>	<b>Section 8.2</b>
2.1. Names and addresses of the issuer's auditors	Section 8.2
2.2. Change in auditors, where applicable	n/a
<b>3. Selected financial information</b>	<b>Introduction: Key figures</b>
3.1. Historical financial information	Section 6.5
3.2. Interim financial information	n/a
<b>4. Risk factors</b>	<b>Section 2.1</b>
<b>5. Information about the issuer</b>	<b>Chapters 1 and 7</b>
5.1. Selected history and development of the issuer	Section 1.1
5.1.1. Legal and commercial name of the issuer	Section 7.1.1
5.1.2. Place of registration of the issuer and its registration number	Section 7.1.2
5.1.3. Date of incorporation and the length of life of the issue	Section 7.1.3
5.1.4. Domicile and legal form of the issuer, legislation under which the issuer operates, its country of incorporation, and the address and telephone number of its registered office	Section 7.1.4
5.1.5. Important events in the development of the issuer's business	Section 5.1.2 / 5.1.3
5.2. Investments	Section 1.3.3
5.2.1. Past principal investments	Section 1.1.3.1
5.2.2. Principal investments in progress	Section 1.3.3.2
5.2.3. Future principal investments for which commitments have been taken by governing bodies	Sections 1.3.3.2 / 5.1.3.5
<b>6. Business overview</b>	<b>Section 1.4</b>
6.1. Principal activities	Section 1.4
6.2. Principal markets	Section 1.4
6.3. Exceptional factors	n/a
6.4. Extent to which the issuer is dependent	Section 2.3
6.5. Competitive position	Sections 1.4.2.1.2 / 1.4.5.1.2.4
<b>7. Organisational structure</b>	<b>Section 1.2.1</b>
7.1. Brief description of the Group	Section 1.2.1
7.2. List of significant subsidiaries	Section 1.2.1
<b>8. Property, plant and equipment</b>	<b>Section 1.7</b>
8.1. Material property, plant and equipment	Section 1.7
8.2. Environmental issues	Sections 1.7 / 3.2 / 3.4.2
<b>9. Operating and financial review</b>	<b>Chapter 6</b>
9.1. Financial position	Chapter 6
9.2. Operating results	Chapter 6.1
9.2.1. Significant factors materially affecting the issuer's income from operations	Section 5.1.2 / 5.1.3
9.2.2. Explanation of material changes in net sales or revenue	Section 6.7
9.2.3. Strategy or factor of governmental, economical, budgetary, monetary or political nature, that has influenced or which may significantly influence, directly or indirectly, the issuer's operations	Sections 1.3.1 / 1.3.2
<b>10. Capital resources</b>	<b>Chapters 6 and 7</b>
10.1. Issuer's capital resources	Sections 7.2 / 7.3
10.2. Cash flows	Chapter 6.1 – Note 43
10.3. Borrowing requirements and the funding structure of the issuer	Chapter 6.1 – Note 38
10.4. Restrictions on the use of capital resources	n/a
10.5. Information regarding the anticipated sources of funds	n/a

	<b>Reference Document sections</b>
<b>11. Research &amp; development, patents and licenses</b>	<b>Section 1.6</b>
<b>12. Trend information</b>	<b>Sections 5.2 / 5.3 / 5.4</b>
12.1. Most significant trends since the end of the last fiscal year	Section 5.2
12.2. Information on events that are reasonably likely to have a material effect on the issuer's prospects	Section 5.4
<b>13. Profit forecasts or estimates</b>	<b>Section 5.4</b>
<b>14. Administrative, management, and supervisory bodies and Executive Management</b>	<b>Chapter 4</b>
14.1. Members of the administrative and management bodies	Sections 4.2.1 / 4.3.1
Name, professional address and functions	Sections 4.2.1 / 4.3.1
Nature of any family relationship	Section 4.4
Expertise and experience	Sections 4.2.1 / 4.3.1
Absence of conviction	Section 4.4.2
14.2. Conflict of interest	Section 4.4.1
<b>15. Compensation and benefits</b>	<b>Section 4.6</b>
15.1. Compensation paid and benefits in kind	Sections 4.6.1 / 4.6.2
15.2. Amounts set aside or accrued to provide pension, retirement	Section 4.6.1.1.3
<b>16. Board practices</b>	<b>Section 4.2.2</b>
16.1. Date of expiration of the current terms of office	Section 4.2.2.1
16.2. Members of the administrative or management bodies' services contracts	Section 4.4.3
16.3. Information about Audit and Remuneration Committees	Section 4.2.3
16.4. Statement of compliance with the corporate governance regime in force	Section 4.1
<b>17. Employee</b>	<b>Section 3.6</b>
17.1. Number of employees	Section 3.6.1
17.2. Shareholdings and stock options	n/a
17.3. Arrangements for involving the employees in the capital of the issuer	n/a
<b>18. Major shareholders</b>	<b>Section 7.3</b>
18.1. Major shareholders holding more than 5% of the share capital	Section 7.3.8
18.2. Breakdown of voting rights	Section 7.2.4
18.3. Controlling shareholder	Section 7.3
18.4. Agreement whose implementation could lead to a change of control	Section 7.3.9
<b>19. Related-party transactions</b>	<b>Section 7.5</b>
<b>20. Financial information concerning the issuer's assets and liabilities, financial position and profits and losses</b>	<b>Chapters 5 and 6</b>
20.1. Historical financial information	Section 6.5
20.2. Pro forma financial information	n/a
20.3. Financial statements	Chapter 6
20.4. Auditing of historical annual financial information	Chapter 6
20.5. Date of the latest financial information	n/a
20.6. Interim and other financial information	Chapter 6
20.7. Dividend policy	Section 6.6
20.8. Disputes and litigation	Section 2.4
20.9. Significant change in the issuer's financial or trading position	Section 6.7
<b>21. Additional information</b>	<b>Chapters 6 and 7</b>
21.1. Share capital	Chapter 6.1 - Note 27 – Section 7.3
Amount of subscribed share capital, number of fully paid issued shares and par value per share	Section 7.3.1
Number of shares authorised	Section 7.3.3
Information on shares not representing the share capital	n/a
Number, book value and nominal value of the shares held by the issuer	Section 7.3.2
Information on convertible or exchangeable securities or securities with subscription warrants	n/a
Information on conditions governing any right of acquisition and/or obligation right attached to authorised but unissued share capital or any endeavour to increase the share capital	Sections 7.2.4 / 7.2.5 / 7.3.3
Information about the share capital owned by any member of the Group which is under option or subject to a conditional or unconditional agreement to be put under option and characteristics of such options	Section 7.3.6
History of the Company's share capital	Section 7.3.1
21.2. Incorporation documents and articles of association	Section 7.2

	<b>Reference Document sections</b>
<b>22. Material contracts</b>	<b>Section 7.6</b>
<b>23. Third party information, statements by experts and declarations of interest</b>	<b>n/a</b>
23.1. Identity	n/a
23.2. Certificate	n/a
<b>24. Documents on display</b>	<b>Section 8.3</b>
<b>25. Information on investments</b>	<b>Section 4.5.1</b>

## 8.5.2 CONCORDANCE TABLE WITH THE MANAGEMENT REPORT

This Reference Document includes the elements of the Board of Directors' management report relating to the 2017 fiscal year as provided for in Articles L. 225-100 *et seq.* of the French Commercial Code. The management report is composed of the sections of the Reference Document referred to in the following table:

<b>Required topics</b>	<b>Reference texts</b>	<b>Reference Document sections</b>
<b>Situation and activity of the Group</b>		
Objective and exhaustive analysis of the Company's and Group's business, results and financial situation	L.225-100-1, L.232-1 and L.233-26 of the French Commercial Code	Chapter 5
Key events arising between the end of the fiscal year and the date the management report was written	L.232-1 and L.233-26 of the French Commercial Code	Section 5.2
Foreseeable development and future prospects of the situation of the Company and the Group	L.232-1 and L.233-26 of the French Commercial Code	Sections 5.4 and 5.5 Section 2.4.3
Key indicators of financial and non-financial performance relevant to the particular business of the Company and the Group	L.225-100 of the French Commercial Code	Section 3.7.3
Description of the major risks and uncertainties and indication on the use of financial instruments for the Company and the Group	L.225-100-1 of the French Commercial Code	Section 2.1 Section 4.7
Acquisition of significant equity holdings during the reporting period in Companies having their registered office on the French territory	L.233-6 al.1 of the French Commercial Code	Section 5.1.3 Note 5 to the consolidated statements
Internal control and risk management procedures implemented by the Group relating to the preparation and processing of accounting and financial information	L.225-100-1 of the French Commercial Code	Section 2.2
Financial risks associated with the effects of climate change and the Group's low-carbon strategy.	L.225-100-1 of the French Commercial Code	Section 2.1.4 Section 3.3.1
Research and development activities	L.232-1 and L.233-26 of the French Commercial Code	Section 1.6
<b>Corporate governance/Corporate Officers</b>		
<b>Section including elements contained in the report on corporate governance</b>		
Reference to the Corporate Governance Code	L.225-37 of the French Commercial Code	Section 4.1
List of all mandates and positions held in all group's companies by each executive officer during financial year	L.225-37-4 of the French Commercial Code	Section 4.2 Section 4.3
Composition of the Board of Directors and conditions of preparation and organisation of the Board's work	L.225-37-4 of the French Commercial Code	Section 4.2
Composition of the Board of Directors, application of the balanced representation between women and men principle in the Board and conditions of preparation and organisation of the Board's work	L.225-37-4 of the French Commercial Code	Section 4.2
Remuneration and benefits of all kinds paid by the Company during the financial year to each executive officer	L.225-37-3 of the French Commercial Code	Section 4.6
Guidelines and rules approved by the Board of Directors for the determination of the executives officers' compensation and benefits	L.225-37-4 of the French Commercial Code	Section 4.6
Agreements concluded between a manager or a major shareholder and a subsidiary	L.225-37-4 of the French Commercial Code	Section 7.5 Section 7.6 Notes 23 and 48 to the consolidated statements

<b>Required topics</b>	<b>Reference texts</b>	<b>Reference Document sections</b>
Limitation of powers of the Chairman and Chief Executive Officer	L.225-37-4 of the French Commercial Code	Section 4.2.2 Section 7.2.9
Information likely to impact a public offer	L.225-37-5 of the French Commercial Code	Section 7.2.8 Section 7.3.2
Specific procedures relating to the participation of shareholders in General Meeting	L.225-37-4 of the French Commercial Code	Section 7.2
Summary table of the outstanding delegations given by the Annual General Meeting to perform capital increases	L.225-37-4 of the French Commercial Code	Section 7.3.3
<b>Share ownership and capital stock</b>		
Structure and change of the Company's share capital	L.233-13 of the French Commercial Code	Section 7.3
Acquisition and disposal by the Company of its own shares	L.225-211 of the French Commercial Code	Section 7.3.2.
Status of employees participation in the share capital	L.225-102 al 1 of the French Commercial Code	Section 3.3.3.1 Section 7.3.8
Shares acquired by employees in the context of employees buyout	L.225-102 al 2 of the French Commercial Code	N/A
References to potential adjustments for the securities giving access to the share capital in the case of share repurchases or financial operations	R.228-90 and R.228-91 of the French Commercial Code	N/A
Amount of dividend paid out over the past three fiscal years	243 bis of the French General Tax Code	Section 6.6.1
<b>Environmental, labour and social information</b>		
Environmental, labour and social information	L.225-102-1 al 5 et 6 and R.225-105 of the French Commercial Code	Chapter 3
Specifics Information concerning companies using at least one site filed as Seveso "high threshold".	L.225-102-2 of the French Commercial Code	Section 3.1.8
Vigilance plan	Article L. 225-102-4 I paragraph 1 of the French Commercial Code	Section 3.1.6
<b>Other information</b>		
Additional tax information	223 quater and 223 quinquies of the French General Tax Code	N/A
Injunctions or fines as a result of anti-competitive practices	L.464-2 of the French Commercial Code	N/A
Information concerning supplier and customer payment periods	D.441-6-1 of the French Commercial Code	Section 5.1.7
Table showing the Company's results over each of the last five financial periods	R.225-102 of the French Commercial Code	Section 6.5
List of the existing subsidiaries	L.232-1 of the French Commercial Code	Section 5.1.8
Amount of intercompany loans granted	L.511-6 of the French Commercial Code	Section 1.2.2
Information on operations made on the Company's shares by managers' transactions and related persons	L.621-18-2 of the French Monetary and Financial Code	Section 4.5.2
Attribution and conservation of stock-options by the executive officers	L.225-185 of the French Commercial Code	N/A
Attribution and conservation of free shares to executive officers	L.225-197-1 of the French Commercial Code	Section 4.6.2

### 8.5.3 CONCORDANCE TABLE WITH THE ELEMENTS CONTAINED IN THE EDF BOARD OF DIRECTORS' REPORT ON CORPORATE GOVERNANCE

This Reference Document includes all the elements of the Company's Board of Directors' report pursuant to Article L. 225-37 of the French Commercial Code. The Board's report on corporate governance is composed of the sections of the Reference Document referred to in the following table and is included in the management report in a section on corporate governance:

Required topics	Reference texts	Reference Document sections
Reference to the Corporate Governance Code	L.225-37-4 of the French Commercial Code	Section 4.1
List of all mandates and positions held in all group's companies by each executive officer during financial year	L.225-37-4 of the French Commercial Code	Section 4.2 Section 4.3
Composition of the Board of Directors and conditions of preparation and organisation of the Board's work	L.225-37-4 of the French Commercial Code	Section 4.2
Composition of the Board of Directors, application of the balanced representation between women and men principle in the Board and conditions of preparation and organisation of the Board's work	L.225-37-4 of the French Commercial Code	Section 4.2
Remuneration and benefits of all kinds paid by the Company during the financial year to each executive officer	L.225-37-3 of the French Commercial Code	Section 4.6
Guidelines and rules approved by the Board of Directors for the determination of the executives officers' compensation and benefits	L.225-37-4 of the French Commercial Code	Section 4.6
Agreements concluded between a manager or a major shareholder and a subsidiary	L.225-37-4 of the French Commercial Code	Section 7.5 Section 7.6 Note 48 to the consolidated statements
Limitation of powers of the Chairman and Chief Executive Officer	L.225-37-4 of the French Commercial Code	Section 4.2.2 Section 7.2.9
Information likely to impact a public offer	L.225-37-5 of the French Commercial Code	Section 7.2.8 Section 7.3.2
Specific procedures relating to the participation of shareholders in General Meeting	L.225-37-4 of the French Commercial Code	Section 7.2
Summary table of the outstanding delegations given by the Annual General Meeting to perform capital increases	L.225-37-4 of the French Commercial Code	Section 7.3.3

### 8.5.4 CONCORDANCE TABLE WITH THE ANNUAL FINANCIAL REPORT

This Reference Document includes the 2017 annual financial report prepared pursuant to Articles L. 451-1-2 of the French Monetary and Financial Code (*Code monétaire et financier*) and 222-3 of the AMF general regulations. The annual

financial report is composed of the sections of the Reference Document referred to in the following table:

Topics	Reference Document sections
Certification from the person responsible of the annual financial report	Section 8.1.2
EDF annual financial statements	Section 6.3
Statutory Auditors' report on the EDF annual financial statements	Section 6.4
EDF group consolidated financial statements	Section 6.1
Statutory Auditors' report on the EDF group's consolidated financial statements	Section 6.2
Management report	Section 8.5.2
Fees paid to Statutory Auditors	Note 52 to the consolidated accounts

**Glossary**

<b>ANDRA</b> <i>(Agence nationale pour la gestion des déchets radioactifs)</i>	In France, radioactive waste is managed by the National Agency for Radioactive Waste Management (ANDRA), a public industrial and commercial institution created under the French law of 30 December 1991.
<b>ASN</b> <i>(Autorité de sûreté nucléaire)</i>	On behalf of the Government, the Nuclear Safety Authority (ASN) supervises nuclear safety and radiation protection in France to protect workers, patients, the public and the environment from the risks related to the use of nuclear power. It is responsible in particular for the external oversight of nuclear facilities in France. The ASN is an independent administrative authority comprised of over 300 people. At the national level, the ASN is represented by the Directorate-General for Nuclear Safety and Radiation Protection (DGSNR).
<b>Assembly/Fuel</b>	Nuclear fuel is in the form of an assembly made up of an array of 264 fuel rods, bound together by a rigid structure made of tubes and grids. Each fuel rod consists of a water-tight zirconium tube into which uranium oxide pellets are piled, constituting the fuel. The assemblies are loaded side by side into the reactor vessel – 205 assemblies are required for a 1,500MW reactor – to make up the core of the reactor. During operation, these assemblies are crossed by bottom to top with primary water which heats on contact and carries this energy to the steam generators.
<b>Balancing Mechanism</b>	Created by RTE on 1 April 2003, the balancing mechanism allows it to use power reserves that can be mobilised in the event of an imbalance between supply and demand.
<b>Becquerel (Bq)</b>	International legal unit for measuring radioactivity. The Becquerel (Bq) is equal to one disintegration per second. The activity represented by this unit is so low that multiples of it are used: the MBq (megabecquerel or million Becquerels) and the GBq (gigabecquerel or billion Becquerels).
<b>Cogeneration</b>	Generation technique for combined electricity and heat production. The advantage of cogeneration is the ability to capture the heat produced by the fuel whereas in traditional electricity generation this heat is lost. This process also allows the same facility to meet the heating (hot water or steam) and electricity needs of both industrial and local authority customers. This system improves the energy efficiency of the generation process and reduces fuel use by an average of 20%.
<b>Combined-Cycle Gas</b>	The most recent technology for generating electricity in a natural gas-fired plant. A combined cycle is made up of one or more combustion turbines and a steam turbine allowing for an improved yield. The syngas is routed to the combustion turbine, which generates electricity and very hot exhaust gases (effluents). The heat from the exhaust gases is recovered by a boiler, thus producing steam. Part of the steam is then recovered by the steam turbine to generate electricity.
<b>Congestion</b>	Situation in which an interconnection linking the national transmission grids cannot absorb all of the physical flows resulting from international exchanges required by market operators due to a shortage of capacity in the interconnection and/or the national transmission grids involved.
<b>CRE</b> <i>(Commission de Régulation de l'Énergie)</i>	The French Energy Regulatory Commission (CRE) was created on 30 March 2000 to ensure the proper functioning of the electricity and gas market. The CRE, an independent body, regulates the opening of the French energy market. It ensures that all of the generators and eligible customers have non-discriminatory access to the network. Within its jurisdiction, this body supervises and authorises, settles any disputes and, if required, imposes sanctions. For a detailed description of its powers, see section 1.5.3.2 ("French legislation: Energy Code").
<b>Disruption</b>	Voluntary reduction of electrical power by a customer, in exchange for compensation. It is called "diffused" when it is due to the aggregation of small consumption sites.
<b>Distribution network</b>	Downstream of the transmission network, medium- and low-voltage distribution networks serve end-users (residential, local authorities, SMEs, SMIs, etc.).
<b>Electricity supply</b>	Electricity demand can be broken down into four types of consumption: <ul style="list-style-type: none"> <li>■ the "basic" (or "ribbon") supply of electricity, which is generated and consumed throughout the year;</li> <li>■ "semi-basic" supply is the electricity generated and consumed over the winter period;</li> <li>■ "peak" supply corresponds to periods of the year when electricity generation or supply is in heavy demand;</li> <li>■ "lace" supply is a complement to "ribbon" supply.</li> </ul>
<b>Enrichment</b>	Process to increase the fissile content of an element. In its natural state uranium is 0.7% uranium 235 (fissile) and 99.3% uranium 238 (non fissile). To enable its efficient use in a pressurised water reactor, it is enriched with uranium 235 whose proportion is increased to around 4%.
<b>Enriched uranium</b>	Uranium, whose isotope 235 content, the only fissile material, has been increased from its low natural level (0.7%) to approximately 4% for pressurised water reactor fuel.
<b>Entity Responsible for Balance</b>	Entities with which RTE signs a contract for the financing of shortfalls between forecast and actual consumption and the production of a portfolio of users brought together by the balance responsible entity which plays a role of insurer covering the potential losses arising from the many differences between over- and under-supply.
<b>ERU</b> <i>(enriched reprocessed uranium)</i>	To be used in a reactor, reprocessed uranium (RepU), even if containing more fissile uranium than in its natural state, must be further enriched. It is therefore called re-enriched uranium (ERU).
<b>EPR</b>	European Pressurised Reactor. The latest generation of reactors currently under construction (known as generation 3), it is the result of Franco-German cooperation, and offers advanced safety, environmental and technical performance.
<b>Fluorination (conversion)</b>	Also called "conversion", fluorination allows for the purification of uranium compounds and their transformation into uranium hexafluoride (UF <sub>6</sub> ), allowing their enrichment using current techniques.

<b>Fuel Cycle</b>	<p>The nuclear fuel cycle encompasses all industrial operations in France and abroad which enable the supply of the fuel to generate energy in a reactor, then to unload and process it. The cycle can be broken down into three stages:</p> <ul style="list-style-type: none"> <li>■ upstream: the processing of concentrates from uranium ore, the conversion, enrichment and production of fuel (which takes more than two years);</li> <li>■ the core of the cycle corresponding to the use of fuel in the reactor: receipt, loading, operation and discharging (which takes three to five years);</li> <li>■ downstream: pool storage, reprocessing of spent fuel in reactors of recoverable material, vitrification of highly radioactive waste, then temporary storage of the waste before storage.</li> </ul>
<b>Greenhouse gases</b>	Gas that retains a portion of the solar radiation in the atmosphere and for which an increase in emissions due to human activity (man-made emissions) causes an increase in the earth's average temperature and plays an important role in climate change. The Kyoto Protocol covers the seven following principal greenhouse gases: carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrogen protoxide (N <sub>2</sub> O), hydrofluorocarbons (HFC), perfluorated hydrocarbons (PFC), sulfurhexafluoride (SF <sub>6</sub> ) and, since 2013, nitrogen trifluoride (NF <sub>3</sub> ).
<b>IAEA</b>	International Atomic Energy Agency based in Vienna (Austria).
<b>Interconnection</b>	Electricity transmission infrastructure that allows for exchanges of energy between different countries, by connecting the transmission network of one country to that of a neighbouring country.
<b>Intermediate Storage</b>	Intermediate stage in the process of managing nuclear waste. It involves placing waste packages in a facility to ensure, for a given period of time, their isolation from contact with man and the environment with the intention of retrieving them for a further stage in the waste management process. Intermediate storage facilities are designed, built and managed by the producers of such waste (EDF, AREVA NC (ex-COGEMA) and CEA) and are close to areas where waste is conditioned.
<b>LDC</b>	French Local Distribution Companies. Local Distribution Companies sell and deliver electrical energy to end users located in their exclusive service area.
<b>LNG (Liquefied Natural Gas)</b>	Natural gas turned into liquid form by reducing its temperature to -162°C allowing for a reduction by 600 in its volume.
<b>Man-sievert</b>	Unit expressing the collective equivalent dose. A man-sievert is the collective dose from exposure of 1,000 men to 1mSv (millisievert).
<b>Metering</b>	A system allowing for the recording, at a given network connection point, of the volumes of electricity transmitted or distributed (power, frequency, active and reactive energy).
<b>MW/MWh</b>	<p>The MWh is the energy unit generated by a facility and is equal to the facilities' power, expressed in MW, multiplied by the duration of operations in hours.</p> <p>1MW = 1,000 kilowatts = 1 million watts</p> <p>1MWh = 1MW generated in one hour = 1 megawatthour</p> <p>1GW = 1,000MW = 1 billion watts</p> <p>1TW = 1,000GW</p>
<b>MWh cumac</b>	The MWh cumac is the certificate energy unit of counting which corresponds to the cumulative energy savings aggregated on the operations' lifetime.
<b>Non-interconnected zones</b>	Zones in France which are not connected to metropolitan France (Corsica and overseas departments).
<b>Nuclear safety</b>	Nuclear safety includes all of the technical, organisational and human measures which are intended to prevent accident risks and to limit the effects of an accident, and which are taken at every stage of the life of a nuclear power plant (from design to operation and finally to decommissioning).
<b>Nuclear tranche</b>	Electrical production unit consisting of a nuclear boiler and a turbo-alternator generator. A nuclear tranche essentially consists of its reactor type and the power of its turbo-alternator generator. EDF nuclear plants include two or four tranches, and occasionally six.
<b>Plant availability</b>	Fraction of power available, out of theoretical maximum energy, counting only technical non-availability. The availability coefficient (Kd) is defined as the ratio between annual actual generation capacity (or amount producible annually) and maximum theoretical generation capacity, where maximum theoretical generation capacity = installed capacity × 8,760h. The Kd, which counts only technical non-availability, i.e., scheduled shutdowns, unplanned outages and testing periods, characterises a plant's industrial performance. For EDF's nuclear fleet in France, the maximum theoretical generation capacity is of 553TWh (63.1GW × 8,760h).
<b>Plutonium (Pu)</b>	Element with the atomic number of 94 (number of neutrons) and no naturally occurring isotopes (elements whose atoms possess the same number of electrons and protons – thus the same chemical properties – but a different number of neutrons). Plutonium 239, a fissile isotope, is produced in nuclear reactors from uranium 238.
<b>Producible hydropower generation</b>	Maximum energy that hydropower facilities may produce using contributions under normal hydraulicity conditions. However, generation from hydroelectric facilities does vary, sometimes markedly, from one year to the next depending on hydraulicity (rainfall and snowfall). In dry years, the generation index may vary by 20% or more from the standard level.



<b>Radiation protection</b>	At a power plant, ionising radiation sources are numerous: the fuel itself, equipment activated by neutron flux (particularly that which is close to the core, such as tanks or lids) and particles from corrosion of the primary circuit of reactors and carried by the primary fluid. The level of exposure of a person is quantified by the dose equivalent in Sieverts (Sv). The total dose equivalents, called dosimetry and expressed in man-sieverts, is used as an indicator of dose received by all participating persons. The mobilisation of ground players has allowed a continuous improvement of performance on the protection of employees against the effects of ionising radiation.
<b>Renewable energies</b>	Energies for which production does not require extinction of the initial resource. They include hydro, wind, solar, marine (the energy produced by marine waves and currents), geothermal (energy derived from the heat below the earth's magma) energies, and bio-mass (energy derived from living matter, particularly wood and organic waste). They often include energy from the incineration of household or industrial waste.
<b>Reprocessing</b>	Reactor burnt fuel reprocessing aimed at separating materials that can be recycled (uranium and plutonium) from final waste.
<b>RepU (reprocessed uranium)</b>	Reprocessed uranium ("RepU"), uranium derived from spent fuel reprocessing, differs from natural uranium as it contains slightly more uranium 235 and more uranium isotopes. It is recyclable and RepU fuel assembly refuelling is commonly used in reactors.
<b>Series</b>	In the nuclear field, a series of plants means a set of nuclear plants with identical generation capacity. EDF's PWR model is divided into three series of available electrical power: the 900-MW series (34 tranches of approximately 900MW each), the 1,300-MW series (20 tranches) and the 1,450-MW series (4 tranches).
<b>STEP</b>	An energy transfer pumping station (STEP) is a plant with two reservoirs, one higher and one lower, connected via pumps to push the water up and turbines to produce energy.
<b>Storage</b>	Storage consists in placing packages of radioactive waste in a facility, ensuring their long-term management, i.e., under safe conditions allowing for long-term risk control.
<b>Systems services</b>	Systems Services are services provided to users (consumers or electricity producers) through the joint action of the electricity transmission network operator RTE and the producers. They are intended to regulate frequency and voltage in order to maintain the balance between electric consumption and production at all times. They are created by RTE from elementary contributions from producers, i.e. primary and secondary reserves provided to RTE. RTE remunerates the producers for these auxiliary services before re-invoicing these services via the tariff to use the network under the rules defined by the Union for the Coordination of Transmission of Electricity (UCTE).
<b>Therms (th)</b>	One therm is equivalent to 1,163kWh or 4,186 million joules.
<b>Transmission network</b>	Network providing for the transmission of electrical power at high and very high voltages from the generating sites to the distribution networks or industrial sites directly connected to it; this includes the major interconnection transmission network (400,000 volts and 225,000 volts) and the regional distribution networks (225,000 volts, 150,000 volts, 90,000 volts and 63,000 volts).
<b>Uranium</b>	In its natural state, uranium is a mix containing three main isotopes (elements whose atoms have the same number of electrons and protons, thus the same chemical properties, but a different number of neutrons): <ul style="list-style-type: none"> <li>■ uranium 238, 99.3% fertile;</li> <li>■ uranium 235, 0.7% fissile;</li> <li>■ uranium 234.</li> </ul> Uranium 235 is the only natural fissile isotope, a quality which justifies its use as an energy source.
<b>Vitrification</b>	Process of immobilisation in a glass structure concentrated solutions of high-level waste by mixing at high temperature with glass paste.
<b>Waste</b>	The nuclear generation of 1MWh of electricity (equivalent to the monthly consumption of two households) produces around 11g of total waste across all categories. <p>Short-lived waste represents more than 90% of the total, but contains only 0.1% of the radioactivity of waste. Accordingly, based on their level of radioactivity, they are separated into two sub-categories: low-level waste and very-low-level waste.</p> <p>Long-lived medium and high-level waste are produced in low quantity (less than 10% of the total quantity), but they contain almost all of the radioactivity of the waste (99.9%).</p>

## **8.** **ADDITIONAL INFORMATION**



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