2018
SUSTAINABLE DEVELOPMENT INDICATORS

The cover image of the 2018 Sustainable Indicators document are from EDF's new ad campaign "Be the energy for change", a collective appeal to speed up the energy transition movement and the eradication of CO_2 by transforming our production and consumption practices.

IN THIS DOCUMENT, "EDF" REFERS TO PARENT COMPANY ÉLECTRICITÉ DE FRANCE; "EDF GROUP" OR "THE GROUP" REFERS TO EDF AND ITS SUBSIDIARIES AND SHAREHOLDINGS.

THE CO_2 EMISSIONS REPORTED ARE DIRECT EMISSIONS EXCLUDING THE LIFE CYCLE ANALYSIS OF GENERATING PLANT AND FUEL.

THE ASSESSMENT OF EDF GROUP'S GREENHOUSE GAS EMISSIONS SHOWS ALL DIRECT AND INDIRECT EMISSIONS (SCOPES 1, 2 AND 3) AS SET OUT IN THE GREENHOUSE GAS (GHG) PROTOCOL INITIATIVE.

VALUES OF FIGURES PRESENTED IN TEXT, TABLES AND CHARTS ARE ROUNDED TO THE NEAREST ONE DECIMAL OR WHOLE NUMBER.

Analysis of sustainable development indicators

EDF's non-financial reporting complies with the legal requirements to issue a non-financial performance statement stipulated in the decree of 19 July 2017. Under article 173 of France's Energy Transition for Green Growth Law of 15 August 2015, companies must report the impact of climate change on their operations and on the use of the products and services they provide. Social indicators are reported in compliance with the 9 August 2016 law on employment, the modernisation of social dialogue and career security, modifying article L. 225-102-1 of the French Commercial Code.

The Group's reporting system content and form are subject to continuous improvement, over and beyond the requirements of French law. In 2007, the Group began the process of a gradual, voluntary check on the reliability of its social and environmental data by its Statutory Auditors. Since 2013, this work has been carried out in accordance with article L. 225-102-1 of the French Commercial Code.

Our work described below was performed in accordance with ISAE 3000 (International Standard on Assurance Engagements Other than Audits or Reviews of Historical Financial Information).

For 2018, based on its work, the independent third party issued a report indicating limited assurance on:

- the statement's compliance with article R. 225-105 of the French Commercial Code;
- the fairness of the information provided in accordance with paragraph 3 of sections I and II of article R. 225-105 of the French Commercial Code, namely the results of policies (including key performance indicators) and actions taken in respect of the main risks.

Outside the scope of accreditation, the independent third party issued an opinion indicating reasonable assurance that the information selected (by the Company and identified by a ●● in the summary tables of sustainable development indicators is presented, in all material respects, in accordance with the Guidelines.

The sustainable development information published by the Group is used for assessment purposes by investors, rating agencies and sustainable development analysis departments acting on behalf of investors and clients.

All the economic, environmental and social indicators are presented in summary tables at the end of this document.

Methodology

The reporting procedure for sustainable development indicators (economic, environmental and social) covers the entire EDF group as defined by its financial consolidation, in line with IAS-IFRS standards(1). More specifically, the scope encompasses the EDF parent company and its fully consolidated subsidiaries(2). Data relating to companies accounted for under the equity method is not included. The results presented here are from the 2018 Reference Document.

FOR FURTHER INFORMATION

For further information on the reporting methodology and the Statutory Auditors' report, see the Group's Reference Document (sections 3.9.2 "Methodology for social and environmental data" and 3.10 "Assurance report of the independent third party").

(1) Accounting standards applied by the Group, see section 6 of the 2018 Reference Document.
(2) Full consolidation covers all companies that the Group controls. Companies that EDF group does not control are accounted for under the equity method, and those jointly controlled by the Group and another party are proportionately consolidated.

Reporting scope

The scope covered by the reporting procedure is defined on the basis of:
– the consolidation scope established by the Finance Department;
– the criteria linked to relevance of the subsidiaries' activities in terms of environmental and social impact.

Entities included in the consolidation scope at 31/12/2018

Main entities included in the social and environmental data consolidation scope at 31 December 2018		Environmental KPI scope	Social KPI scope
EDF Generation and supply activities	Électricité de France (parent company)	X	X
EDF Regulated Activities	Enedis (France)	X	X
	SEI (parent company)	X	X
	EDF PEI (France)	X	X
	Électricité de Strasbourg (France)	X	X
EDF Renouvelables (France)		X	X
Dalkia (France)		X	X
Framatome (France)		X	X
Other activities	Socodei (France)	X	X
	EES (United States)	X	X
	Citelum (France)		X
	G2S (France)		X
	CHAM (France)		X
	EDF Trading (United Kingdom)		X
United Kingdom	EDF Energy	X	X
Italy	Edison	X	X
Other international	EDF Luminus (Belgium)	X	X
	EDF Belgium (Belgium)	X	
	EDF Norte Fluminense (Brazil)	X	X
	Meco (Vietnam)	X	X
	China Holding (China)		X

Changes in consolidation scope

The Polish companies were sold on 13 November 2017 and the impact of the sale on the Group's sustainable development indicators was fully absorbed over 2018. Framatome was included in the consolidation scope as of 1 January 2018.

Environmental indicators

Assessment of EDF group greenhouse gas emissions

EDF[1] publishes an Assessment of Greenhouse Gas Emissions covering the entire[2] EDF group and all the main emissions sources in the GHG Protocol[3]. Every year, it makes progress in analysing its emissions to produce information that is as accurate and exhaustive as possible. EDF goes beyond the legal requirements in France by having more than 71% of its emissions – of which 99% come under Scope 1, 85% under Scope 2 and 62% under Scope 3 – verified by a third party.

The analysis focuses on Scopes 1, 2 and 3 of the GHG Protocol, covering the seven greenhouse gases listed in the Kyoto Protocol (CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3), and ranging from fuel manufacturing to employees' office activities. The data is presented in CO_2 equivalent, with other gases converted based on their global warming potential (GWP).

Group perimeter

The Group perimeter is determined by the consolidation method applied to companies, in line with financial standards (IAS-IFRS[4]). EDF group uses the basis of full consolidation for the financial and non-financial data of its companies. The information presented here is from the 2018 Reference Document.

Full consolidation covers all companies that the Group controls. Companies that EDF group does not control are accounted for under the equity method.

However, criteria linked to relevance of the subsidiaries' activities in terms of environmental impact are also taken into account. As such, the assessment may not cover some subsidiaries included in the financial reporting scope if their business activity or size is deemed insignificant with regard to environmental issues. Conversely, some companies deemed to have a significant impact may be included in the environmental scope but do not appear in the financial reporting scope.

The scope defined for the assessment of GHG emissions covers the following companies: EDF SA, EDF PEI, Dalkia, Edison, Enedis, Électricité de Strasbourg, EDF Energy Services, EDF Energy, Framatome, EDF Renouvelables, Norte Fluminense, Meco, EDF Luminus, EDF Belgium and their subsidiaries. The subsidiaries included under the financial consolidation approach but excluded from this assessment represent less than 5% of the Group's total environmental footprint.

The companies accounted for under the equity method and factored into the assessment (Scope 3, under Investments) are: Shandong Zhonghua, Datang San Men Xia, Fuzhou, Sloe, Alpiq, Nam Theun Enercal, Sanmenxiatt, Électricité de Mayotte and Chacao. Scope 1 and Scope 2 emissions from these companies are calculated based on the Group's financial control approach prorata our share of ownership. Other companies accounted for under the equity method that are excluded from the assessment represent less than 5% of these emissions. Three companies – Chacao, Enercal and Électricité de Mayotte – are not included in the financial scope but, for the sake of completeness, are included in this assessment and accounted for under the equity method.

Breakdown of GHG protocol emissions for EDF group

Scope 1: Direct emissions

- produced by stationary combustion sources:
  - CO_2, CH_4 and N_2O emissions from fossil-fired power plants,
  - consumption of fossil fuels for heating in office buildings;
- produced by mobile combustion sources:
  - fuel consumption by fleet vehicles and worksite equipment;
- fugitive emissions:
  - fugitive emissions from hydro reservoirs,
  - fugitive emissions of SF_6 and coolant leaks.

Scope 2: Indirect emissions associated with the generation of electricity, heating or cooling consumed for own use:

- electricity consumption for own use (office buildings and data centres);
- consumption of heating and cooling systems for own use.

Scope 3: Indirect emissions from operations not included in Scopes 1 and 2:

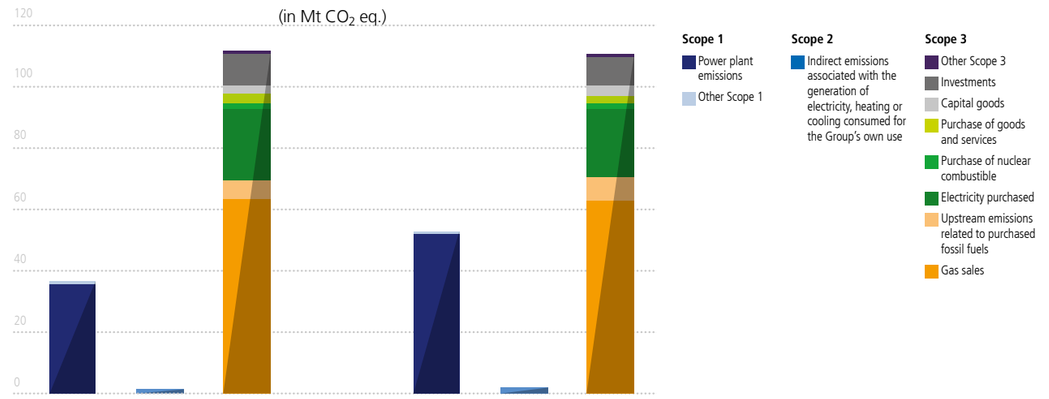
- purchases of goods and services;
- upstream operations of fuels used in power plants (nuclear and fossil-fired), for heating in office buildings and for fleet vehicles and equipment: extraction, refining, enrichment, transport;
- upstream operations and losses of electricity, heating and cooling systems consumed for own use;
- amortisation of emissions from the production of fixed assets (power plants, electricity networks, buildings, vehicles and equipment);
- generation of electricity purchased for resale to end customers;
- power transmission and distribution (upstream operations and losses);
- upstream activities and combustion of gas purchased for resale to end customers;
- other: waste management, employee work-related travel, leased assets, downstream transportation of by-products, production of consumables.

(1) The term "EDF" refers to EDF SA, the parent company. The terms "Group" or "EDF group" refer to EDF and its subsidiaries and shareholdings.
(2) See section on Group scope.
(3) The Greenhouse Gas Protocol Initiative, more commonly known as the GHG Protocol, is the most internationally recognised GHG accounting method. Introduced in 1998 by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), it was developed in partnership with companies, NGOs and governments. It provides a set of resources, tools and data for carbon footprint calculation (http://www.ghgprotocol.org/).
(4) Accounting standards applied by the Group, see section 6 of the 2017 Reference Document.

2018 results for greenhouse gas emissions

The Group's direct and indirect emissions for 2018 total about 147 million tonnes of CO_2 equivalent. Two sources of emissions account for more than 65% of the Group's total environmental footprint: direct CO_2 emissions due to electricity and heat generation (most of Scope 1) and indirect GHG emissions associated with the combustion of gas sold to end customers.

EDF group's direct and indirect CO_2 emissions in 2017[1] and 2018



Scope 1

For several years, EDF group has published data on direct CO_2 emissions due to electricity and heat generation, which represent over 98% of all Scope 1 emissions. In 2018, emissions from electricity and heat generation and total Scope 1 emissions were down 30% over the 2017 figure.

EDF group – Scope 1 – Total net direct CO_2 emissions due to electricity and heat generation	2018	2017
Direct CO_2 emissions (million tonnes of CO_2 equivalent)	**34.9**	50.5

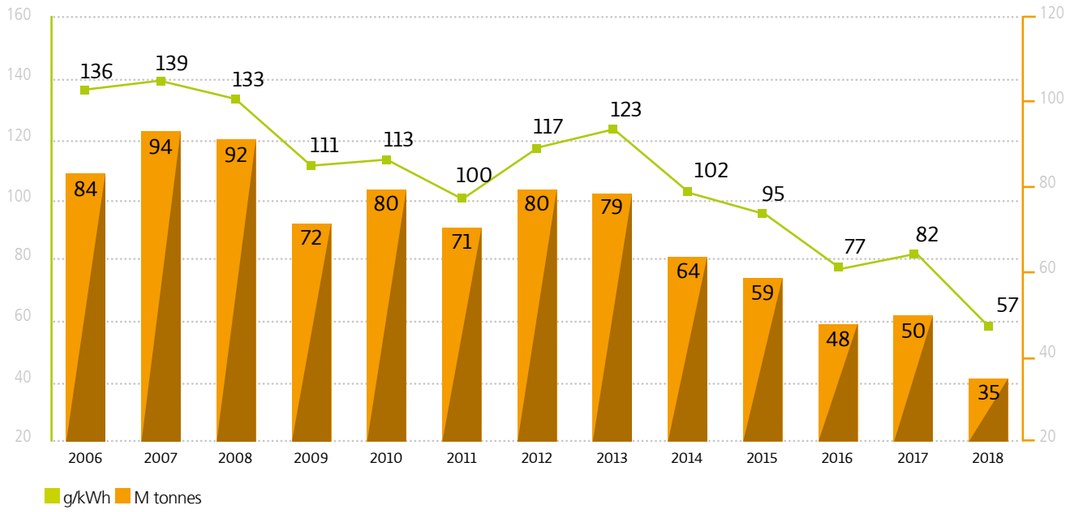
➔ This significant reduction in emissions stems from the disposal of Polish power plants that emitted high levels of CO_2, but is also due to a considerable drop in emissions from EDF SA's power generation operations. This decrease results from less use of fossil-fired plants in France, a high level of availability for nuclear power, and excellent rainfall. At other Group entities, direct emissions were relatively stable between 2017 and 2018.

➔ It is necessary to underline the high level of variability in annual emissions for EDF group, due to the very low proportion of fossil-fired electricity generation in EDF's total output. Annual variations in temperatures and rainfall, as well as the availability of the nuclear facilities, can have a significant impact on how much use is made of EDF's fossil-fired plants and lead to considerable differences in annual emissions. However, the trend towards lower emissions has been entrenched since 2007, as shown in the following graph.

(1) Scope 3 for 2017 was recalculated to include gas sales to a category of customer that was not taken into account at the time of the previous publication. These sales represent around 12 million tonnes of CO_2 equivalent. 2017 and 2018 are therefore presented here like for like.

Environmental indicators

Change in EDF group's direct CO_2 emissions in absolute and specific values from 2006 to 2018



Scope 2

EDF group – Scope 2 – Indirect CO_2 emissions	2018	2017
Indirect CO_2 emissions (million tonnes of CO_2 equivalent)	**0.47**	0.49

- Scope 2 emissions, which include electricity, heating and cooling purchased for EDF group's own use, are very limited compared with the rest of the assessment. Due to the Group's business activities as an electricity generator, most emissions connected to the Group's own use are reported under Scope 1. Furthermore, following the GHG Protocol's new Scope 2 Guidance, the Group's Scope 2 emissions are calculated based both on the average content of the network and on supplier content. Taking a conservative reporting approach, EDF decided to report Scope 2 emissions based on the average content of the network.
- Between 2017 and 2018, the Group's Scope 2 emissions were fairly stable (down 3%). This slight reduction stems from the fall in the electricity emission factor in France.

Scope 3

EDF group – Scope 3 – Indirect CO_2 emissions	2018	2017[1]
Indirect CO_2 emissions (million tonnes of CO_2 equivalent)	**110.8**	109.6

Emissions associated with the combustion of gas sold to end customers account for the largest share of indirect emissions: 54.1 million tonnes of CO_2 equivalent[2], representing 49% of the Group's Scope 3 indirect emissions in 2018.

- On top of these emissions are emissions from upstream operations of gas sold, estimated at 10.6 million tonnes of CO_2 equivalent. Together, these two sources of emissions total 64.7 million tonnes of CO_2 equivalent, or 58% of indirect emissions.
- Indirect emissions associated with the generation of electricity purchased for resale to end customers account for 21.7 million tonnes of CO_2 equivalent, or 20% of the Group's indirect emissions.
- Scope 1 and Scope 2 emissions from power plants of companies accounted for under the equity method[2] are reported based on the Group's financial control approach prorata to our share ownership. These emissions are estimated at 9.9 million tonnes of CO_2 equivalent, i.e. about 9% of the Group's indirect emissions (emissions from organisations reported as Investments).
- Upstream emissions from fossil and nuclear fuels consumed at the Group's power plants fell considerably (down 21%), accounting for 7.3 million tonnes of CO_2 equivalent, or 7% of Group emissions.
- Other sources of emissions account for about 7% of the Group's indirect emissions.
- Between 2017 and 2018, the most significant emissions associated with the combustion of gas sold to end customers were stable (up 0.6 million tonnes of CO_2 equivalent, a 0.6% increase). This was due to two factors that offset each other: sales increased by 8.3%, while the emission factor of gas combustion fell by 9.1%. The increase in sales came mainly from the United States.
- Indirect emissions associated with electricity purchased for resale to end customers increased by 2.6 million tonnes of CO_2 equivalent, i.e. 14%.
- Lastly, emissions from companies accounted for under the equity method increased slightly, by 5%.
- EDF has therefore been able to present an exhaustive Scope 3 analysis, and is pursuing its efforts to provide an ever more accurate and exhaustive analysis of its indirect emissions.

(1) Scope 3 for 2017 was recalculated to include gas sales to a category of customer that was not taken into account at the time of the previous publication. These sales represent around 12 million tonnes of CO_2 equivalent. 2017 and 2018 are therefore presented here like for like.
(2) See Group Scope, page 4.

Details on methodology

The reporting period for the data taken into account is from 1 January of year Y to 31 December of year Y.
Unless otherwise indicated, the emission factors used are from the Base Carbone®, a database of emission factors administered by France's environment and energy management agency (Ademe), dating from January 2019. The GWP[1] data used is that set out in the fifth report of the IPCC[2].

Details on Scope 1

Direct emissions from fossil-fired power plants (CO_2, CH_4 and N_2O) are measured or calculated based on fuel measurements or standard emission factors, and cover all electricity generation phases, including unit commissioning and shutdown phases.

- CO_2 emissions also include emissions from processes, such as flue gas desulphurisation.
- CH_4 and N_2O emissions are then converted into tonnes of CO_2 equivalent.
- Emissions due to fuel consumption by back-up power systems at nuclear power plants are calculated based on amounts of fuels purchased over the year from the Group's main supplier, as they are representative of real consumption.
- Emissions associated with filling hydro reservoirs with water: these CO_2 and CH_4 emissions are calculated using an IPCC method for reservoirs of more than 1 hectare. N_2O emissions cannot be assessed using this method.

Details on Scope 2

In compliance with GHG Protocol Guidance, Scope 2 emissions are calculated based both on the average content of the network and on supplier content. Taking a conservative reporting approach, EDF decided to report Scope 2 emissions based on the average content of the network.

Electricity consumption is converted into emissions (excluding upstream operations and network losses), all uses combined, by applying the emission factor of the average mix recommended by Ademe for the first case, and the content of the company's generation mix for the second calculation method.

These emissions also include generation of electricity consumed in office buildings (heat, cooling, processes, lighting, IT systems, various equipment, etc.) and in the two main data centres.

Emissions from electricity use in office buildings are calculated by taking the average electricity use per unit of surface area from a representative sample of occupied buildings. This average use is then applied to the total surface area of office buildings.

Details on Scope 3

Emissions from upstream activities in the nuclear fuel cycle include purchases of nuclear fuel (extraction, enrichment and MOX, transportation), calculated based on the amount of nuclear fuel load over the year. An emission factor from the Ecoinvent 2.2 database is applied for MOX fuel and extraction and enrichment activities.

Assessment of EDF greenhouse gas emissions

This assessment covers all of EDF SA's activities, including mainland France as well as Corsica and Overseas France via SEI (island energy systems): Corsica, Reunion Island, French Guiana, Martinique, Guadeloupe, and St Pierre and Miquelon.

Starting with the 2017 report, EDF group chose to base consolidation rules on the financial control approach rather than the operational control approach to be consistent with the consolidation method that applies to the financial statements. However, there is no change to the manner in which buildings and vehicles under leasing contracts are consolidated in anticipation of changes to IFRS in 2019. This change in method has no effect on the assessment of EDF's greenhouse gas emissions.

The analysis focuses on Scopes 1, 2, and 3 of the GHG Protocol[3], covering the seven greenhouse gases listed in the Kyoto Protocol (CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3), and ranging from fuel manufacturing to employees' office activities. The data is presented in CO_2 equivalent, with other gases converted based on their global warming potential (GWP).

Emissions checks

The assessment helps improve knowledge of EDF's environmental impacts beyond the direct production of electricity and fine-tunes the action plan for reducing direct and indirect emissions.
EDF has made fighting climate change the main objective of its environmental policy and aims to continue to lower its CO_2 emissions, which are already at a level unequalled by any other major European corporation.
To achieve this objective, EDF zeroes in on the following three levers for action:

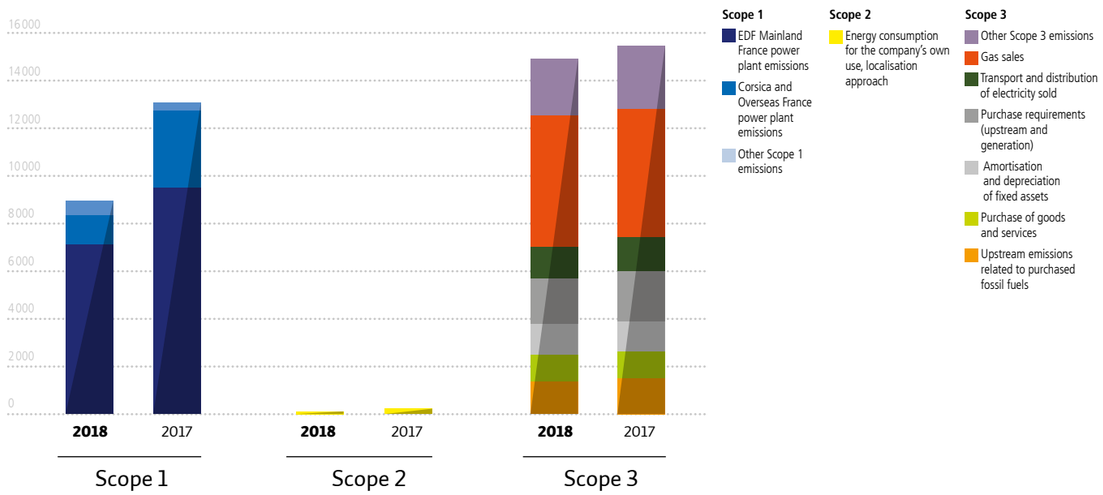
- improve the availability of its nuclear power plants;
- upgrade its fossil-fired power plants, thereby reducing its CO_2 emissions per kWh generated, and shut some plants down;
- reinforce its hydropower potential by renovating existing facilities and greatly increase the use of other renewable energies (particularly through the target of 30 GW of solar power by 2030).

EDF is also looking after its indirect emissions. For example, its efforts to reduce emissions connected with business travel include encouraging remote means of communication through an incentive scheme from 2017 to 2019. EDF also helps its customers to reduce their own emissions by offering advice on energy savings and a range of products and services suited to their needs.

(1) GWP: Global Warming Potential.
(2) IPCC: Intergovernmental Panel on Climate Change.
(3) The Greenhouse Gas Protocol Initiative, more commonly known as the GHG Protocol, is the most internationally recognised GHG accounting method. Introduced in 1998 by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), it was developed in partnership with companies, NGOs and governments. It provides a set of resources, tools and data for carbon footprint calculation.

Environmental indicators

Assessment of EDF SA greenhouse gas emissions
(in kt CO_2 equivalent)



Source: DOAAT-SoDATA-EDF.
Overseas France: French administrative departments, regions and communities outside Europe.

Main changes between 2017 and 2018

In 2018, EDF SA's aggregate direct and indirect greenhouse gas emissions fell 13%.

Scope 1

In 2018, EDF SA's direct greenhouse gas emissions (Scope 1) fell 26% compared with 2017.

In mainland France, electricity demand for 2018 was slightly lower than in 2017 due to milder temperatures, particularly in January and December. At the same time, the export balance increased by 22 TWh, especially to Germany due to low wind and to CO_2 and coal prices. In Europe, the price of CO_2 rose from €7 per tonne to €24 per tonne, with a 10-year record high of €25.2 per tonne on 10 September.

Against this backdrop, the main features of 2018 output for EDF SA were good nuclear performance (up 3.7%), and improved hydropower output (up 25.4%), especially in the first half. Less use was made of fossil-fired plants than in 2017 (down 30%), which reduced greenhouse gases by 3.2 million tonnes. Total fossil-fired generation accounted for 2.4% of EDF SA's output, with a decrease of 37% in coal-fired electricity generation and of 26% in gas-fired generation, as well as the permanent shutdown of the last fuel oil-fired plants in 2018.

In this assessment, the share of direct emissions from EDF SA's island energy systems also fell, representing a decrease of 6%, or 69 kt, mainly due to adequate rainfall in Corsica and French Guiana.

Scope 2

The 19% drop in emissions from EDF SA office buildings is due to a 2% reduction in energy use and to a fall in the average emission factor from French electricity output.

Scope 3

Total Scope 3 emissions fell 4%, representing a 580,000-tonne reduction that is mainly due to:
– lower upstream fossil-fuel operations (down 26%) because of lower output (see Scope 1);
– lower upstream nuclear fuel operations (down 19%): fuel loading is spread over several years because the fuel can be used over several cycles in a reactor, explaining the fall in emissions even though nuclear output increased.

However, some emissions increased:
– combustion of gas sold to end customers (up 2%);
– decommissioning waste from nuclear power sites (up 10%).

●● 2018 data audited for reasonable assurance:
Scope 1 greenhouse gas emissions in CO_2 equivalent related to the CO_2, CH_4 and N_2O emissions of EDF fossil-fired power plants and to the consumption of domestic fuel and kerosene by back-up power systems at nuclear power plants.
● 2018 data audited for limited assurance:
– other Scope 1: GHG emissions due to SF_6 emissions and fugitive emissions of CO_2 and CH_4 from hydro reservoirs and French island energy systems (SEI);
– Scope 2: indirect GHG emissions from electricity consumption by office buildings and heating and cooling systems in office buildings;
– Scope 3: GHG emissions due to related upstream operations in coal, gas and fuel oil for fossil-fired power plants, upstream operations of gas sold to end customers, upstream operations of nuclear fuel load, and the amortisation of fixed assets.

Breakdown of GHG Protocol emissions for EDF

Scope 1: Direct emissions
– produced by stationary combustion sources:
  – CO_2, CH_4 and N_2O emissions from fossil-fired power plants,
  – consumption of fossil fuels for heating in office buildings;
– produced by mobile combustion sources:
  – fuel consumption by fleet vehicles and worksite equipment;
– fugitive emissions:
  – fugitive emissions from hydro reservoirs,
  – fugitive emissions of SF_6 and coolant leaks.

Scope 2: Indirect emissions associated with the generation of electricity, heating or cooling consumed by EDF for own use:
– electricity consumption for own use (office buildings and data centres);
– consumption of heating and cooling systems for own use.

Scope 3: Indirect emissions from EDF's emissions that are not included in Scopes 1 and 2:
– purchases of goods and services;
– upstream operations of fuels used in power plants (nuclear and fossil-fired), for heating in office buildings and for fleet vehicles and equipment: extraction, refining, enrichment, transport;
– upstream operations and losses of electricity, heating and cooling systems consumed for own use;
– amortisation of emissions from the production of fixed assets (power plants, SEI electricity networks, buildings, vehicles and equipment);
– generation of electricity purchased for resale to end customers;
– power transmission and distribution (upstream operations and losses);
– upstream activities and combustion of gas purchased for resale to end customers;
– other: waste management, employee work-related travel, leased assets, downstream transportation of by-products, production of consumables.

Direct emissions from power plants (Scope 1) still account for most emissions, with a significant part generated by island energy systems. In addition, other than CO_2, EDF emits low quantities of CH_4 from its reservoirs and of SF_6 from its transformers.

Scope 2 emissions, which include electricity, heating and cooling purchased for EDF's own use, are very limited compared with the rest of the assessment. Due to EDF's electricity generation activities, most of these emissions are reported under Scope 1. As EDF decided to apply the general method recommended by the GHG Protocol for Scope 2 emissions, Scopes 1 and 2 show results that are higher than reality. Furthermore, following the GHG Protocol's new Scope 2 Guidance, EDF's Scope 2 emissions are calculated based both on the average content of the network and on supplier content. Taking a conservative reporting approach, EDF decided to report Scope 2 emissions based on the average content of the network.

Environmental indicators

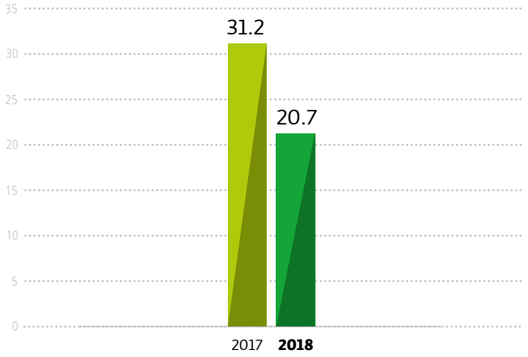
Aerosol precursor emissions

Human activities also emit other substances, including aerosols and aerosol precursors. Aerosol precursors are gaseous substances that, as a result of various physical or chemical reactions, may lead to the formation of aerosols. The values for these emissions are presented in the summary tables of environmental indicators.

Aerosol precursor emissions include:
- sulphur dioxide (SO_2), a combustion pollutant produced by the burning of any product containing sulphur, notably coal and oil;
- to a lesser extent, nitrogen oxides (NOx).

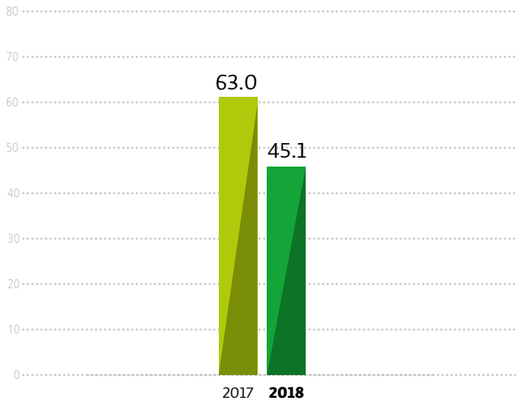
EDF's efforts in this area are in keeping with the limits set out in the EU's National Emission Ceilings Directive (NEC Directive), which established emission ceilings effective from 2010 for the following pollutants in each member state: SO_2, NOx, VOCs (volatile organic compounds) and NH_3 (ammonia). EDF's activities in mainland France, Corsica and overseas France account for less than 2% of the national ceiling for NOx (1.9% or 810 kt) and 1% for SO_2 (1.0% or 375 kt).

EDF group – SO_2 emissions from electricity and heat generation (in kt)



The 34% decrease in SO_2 emissions reflects lower fossil-fired production, due partly to the sale of Polish assets but also to a decline observed at all other Group entities except Meco (Vietnam), where SO_2 rose 15% as a result of higher gas-fired production (up 23%).

EDF group – NOx emissions from electricity and heat generation (in kt)



NOx emissions also declined significantly, by 28%, for the same reasons as for SO_2.

Water resource management

Water is needed for generating electricity. The force of water is a raw material used to generate hydropower, the Group's most important renewable energy, with an installed capacity of 23 GW and 301[(1)] large dams in the world. Water is also needed for cooling fossil-fired plants and for extracting and refining oil and gas products.

Hydroelectricity, i.e. water, also plays an important role in electric systems. Reservoirs and pumped storage power plants are used to store water that can be rapidly transformed into electric energy. Reservoirs are thus a form of large-scale electricity storage (14 GW available in around 10 minutes in France), which is essential for covering peak consumption periods, developing intermittent renewable energies and responding to incidents in order to avoid blackouts.

In France, EDF manages 7.5 billion cubic metres of water stored in its reservoirs, representing around 75% of the country's artificial water reserves. At Group level, some 50 billion cubic metres of water are drawn for cooling thermal generation plants, with 99% discharged back into the environment almost immediately. EDF, therefore, draws significant amounts of water but consumes very little.

Managing water withdrawal and consumption

The Group is committed to improving its performance in terms of water drawn and consumed for existing power plants, and to more efficient use of water at regional and water basin level. All production sites benefit from a water management plan.

The breakdown of water used in 2018 to cool EDF group's thermal generation plants and by EDF is presented in the following charts and the table of environmental indicators.

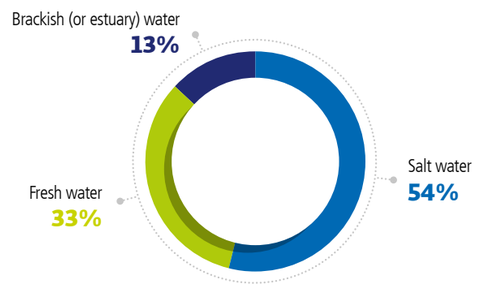
Overall, 67% of the water used by the Group for cooling purposes is drawn from the sea or estuaries, where there is no risk of water shortage. These sources account for almost 60% in France, more than 99% in the United Kingdom and almost 93% in Italy.

It should be noted that the amount of fresh water drawn from the ground is minimal, about 0.01% of the fresh water drawn on the surface.

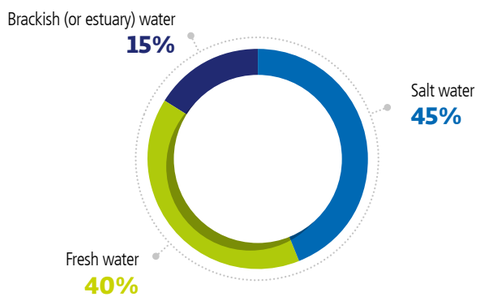
The figure for water drawn is virtually flat (slight decline) compared with previous years, and the amount of fresh water drawn is down by around 4% due mainly to the sharp fall in coal-fired production.

Geographical breakdown of water drawn to cool EDF group thermal generation plants

EDF group



France



The heat sensitivity of fossil-fired power plants is diminishing in France with the closure of old coal- or oil-fired facilities located near rivers. The Aramon power plant, for example, was closed in 2016. New thermal generation facilities are located near the sea (e.g. the Martigues CCGT) or equipped with air cooling systems (Blénod 5 and industrial commissioning of the very high performance Bouchain CCGT), which reduces water dependency. Water evaporated, which is comparable to the consumption of water necessary for cooling certain fossil-fired generation plants (closed circuit), accounts for only 1% of water drawn.

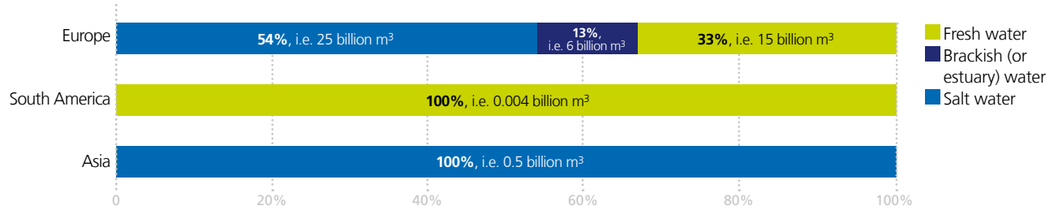
On that basis, almost 99% of all water drawn is returned to the environment. In accordance with local regulations governing discharges, Group companies implement measures to ensure that quality and temperature criteria are met, and they take corrective measures immediately if thresholds are exceeded.

EDF monitors indicator parameters on the quality of terrestrial and aquatic ecosystems around its sites. No major environmental issue involving water occurred in 2018.

(1) Number of large dams in gross data (270 dams net), regardless of EDF group's equity interest in these dams, and based on the French classification system (Decree no. 2015-526) relating to class A and B dams (over 10 metres high).

Environmental indicators

Breakdown of type of water drawn by continent
(as a % and in billions of cubic metres)



The exposure of the Group's generation assets to water stress has been assessed and remains low as its facilities are located mainly in Europe (almost 99% of the total water drawn by the Group, of which over 81% in France and over 18% in the United Kingdom) and the majority of its nuclear and thermal generation plants are located near the sea.

	EDF group	France	UK	Italy	Vietnam	Other
Cooling water drawn (10^9 m³)	47.2	38.0	8.2	0.4	0.5	0.1
Proportion of fresh water	15.9	15.2	0.0	0.0	0.5	0.1
Proportion of brackish and salt water	31.3	22.8	8.1	0.4	0.0	0.0
Proportion of brackish (or estuary) water	6.2	5.8	0.0	0.4	0.0	0.0
Proportion of salt water	25.1	17.0	8.1	0.0	0.0	0.0

Cooling water evaporated

The specific consumption of water evaporated per kilowatt hour of electricity generated by the Group's fossil-fired, gas-fired and nuclear power plants came to 0.97 l/kWh, compared with 1.03 l/kWh in 2017 and 2016. These values are lower than the averages for the sector published in specialist literature because open circuits and salt water are used for certain plants, 1.8 l/kWh to 2.8 l/kWh according to the International Atomic Energy Agency(1). Accounting for energy produced by renewables, which do not use water, specific consumption is even lower, at 0.86 l/kWh in 2018. Based on the planned changes to generation facilities, freshwater drawn and used at Group level is expected to fall in coming years.

Specific consumption
(in litres/kWh)

	2018	2017	2016
Water consumed/thermal generation	**0.97**	1.03	1.03
Water consumed/total generation	**0.86**	0.94	0.92

	EDF group	France	UK	Italy	Vietnam	Other
Evaporated fresh water (hm³)	500.5	482.0	11.8	3.0	0.0	3.7

(1) Efficient Water Management in Water Cooled Reactors, International Atomic Energy Agency, 2012.

Biodiversity

The Group has been actively involved in addressing biodiversity issues for decades as most of its industrial facilities are located in or near protected sites. In 2016, the Group made protecting biodiversity one of its Corporate Social Responsibility Goals with a view to achieving its long-term strategy. CSRG 6, which covers the Group scope, concerns the life cycle of facilities, from project design to construction and operation, through to the end of their useful life. It extends to the entire value chain. This illustrates the Group's determination to develop a positive approach to biodiversity by improving its practices and endeavouring to avoid causing irreversible harm to the environment, going beyond an approach that focuses solely on reducing the impacts of its industrial activities on ecosystems.

The CSRG works towards Sustainable Development Goals 14 (conservation of life below water) and 15 (protection of life on land) set by the United Nations in 2015. In 2018, the Group's commitment in the Act4nature initiative sets out how it will be deployed and breaks it down into five major objectives: get all Group business activities involved, understand biodiversity issues and implement concrete actions, innovate for biodiversity, enter into an open, participative process, and contribute to public policy.

The Group **applies the principles of the mitigation hierarchy(1)** or the specific regulations of the country in which it is operating, which may set even higher standards, particularly in Europe. **In France,** for example, Group companies apply the avoid-reduce-offset principle to all projects and existing facilities, which aims to avoid a net loss, and, preferably, even make a net gain in biodiversity, in line with article 69 of France's Biodiversity Act. The Group's practices have been compared with the international recommendations promoted by the BBOP(2). Meanwhile, in the United Kingdom, EDF Energy targets a net positive impact before 2030.

Environmental issues, including biodiversity, are taken into account right from the design stage of a project to operation with a view to avoiding or reducing its impact. EDF seeks to reduce the land take to a minimum for all new projects. For deconstruction and dismantling projects, it aims to restore the natural environment. Biodiversity programmes are also implemented for facilities in operation. Their environmental and biodiversity impacts are monitored by public bodies (such as, in France, Ifremer, IRSN, Irstea, AFB/Onema). The results are reported and publicly available.

The avoid-reduce-offset sequence or hierarchy is the basis for regulations in France and the rest of Europe to limit the impacts of projects and programmes on the environment. By following this sequence, EDF:
– avoids impacts by taking account of biodiversity as early as possible in project design and by carefully choosing the site;
– reduces impacts (if they cannot be avoided) by adjusting the works schedule, for example;
– as a last resort, it offsets significant impacts (which could not be avoided or reduced) by aiming for "no net loss" (totally offsetting losses) or even a net gain in biodiversity, ultimately achieving a positive impact. Offset measures are monitored over time.

Number of Red List species in municipalities where EDF sites are located (G4-EN14)
Data collected in 2018

	IUCN CATEGORIES OF RED LIST SPECIES					
	World Red List			National Red List		
	CR	EN	VU	CR	EN	VU
Metropolitan France	5	24	53	32	93	253
Overseas France	18	23	47	45	102	179

CR: critically endangered;
EN: endangered;
VU: vulnerable.

(1) IFC's PS6 principle: performance standard 6 of the International Finance Corporation (a World Bank entity) framework focused on biodiversity and the sustainable management of living natural resources.
(2) Business and Biodiversity Programme is an initiative that ran from 2004 to 2018. It promotes the use of best standardised practices through a network of experts and publications.

Environmental indicators

The Group aims to pay particular attention to sites presenting the strongest issues in terms of biodiversity, in particular:
– sites located in or near protected areas and areas of high biodiversity value (indicator G_4-EN_{11});
– sites located near a Red List species (indicator G_4-EN_{14})[1].

Number of sites located in or near protected areas (G_4-EN11)[1]

	Protected area under international conventions			National-level protected area (IUCN Categories)						
	Ramsar sites (a)	MAB sites (b)	International World Heritage Site (c)	Category Ia	Category Ib	Category II	Category III	Category IV	Category V	Category VI
Belgium	1							41	8	19
France	20	1	2	10		34	7	266	113	
French Guiana*	1							3		
Germany									1	
Greece				1				1		
Guadeloupe*	1	2				2		7	1	
India								1		
Israel								7		
Italy	6		2	2		10	7	61	22	
Laos										1
Martinique*				1				3		
Netherlands	1							1		
Réunion Island*			15	7		15		13	9	
Spain	1			1	1			1		
Saint-Pierre-et-Miquelon*								1		
United Kingdom	13						3	46	10	
United States							1	4	14	
Vietnam		1								
Total	**44**	**4**	**19**	**22**	**1**	**61**	**18**	**456**	**178**	**20**

* Overseas France

(1) Disclosure 304-1: protected zones selected are national or under international conventions/agreements.
(a) International Ramsar Site, Wetland of International Importance.
(b) International UNESO-MAB biosphere Reserve.
(c) List of sites of exceptional interest to the common heritage of humankind (updated each year by UNESCO).

Conventional waste

Conventional waste includes all waste produced by site development, operation and service activities and discharged over the year to an outside treatment facility. It does not include radioactive waste, which is reported separately, as it is subject to special regulations and treatment processes. Coal ash and gypsum from processes are also reported separately, given the amounts produced and their recycling potential (mainly in cement manufacturing). This category only covers waste discharged by sites and does not include waste that remains stored at the site pending discharge or any substances reused on site (e.g. soil and construction debris), or equipment that is reused (sold or donated). Waste from construction and decommissioning is included in the reporting if EDF group is responsible for managing it, but not if waste management comes under the responsibility of service providers.

Recycling rate for conventional waste

The indicator "Conventional waste" includes two types of waste:
– hazardous waste, defined by regulations as being explosive/combustible/flammable, irritant/harmful/toxic, carcinogenic, corrosive, infectious, reprotoxic/mutagenic, ecotoxic;
– non-hazardous waste, which refers to inert waste and non-hazardous industrial waste (with collection and treatment processes similar to household waste).

Waste is recycled in two different ways:
– materials recovery: scrap iron and other metals, gravel and other aggregates;
– energy recovery: incineration of waste to produce energy (electricity or steam).

Amounts of waste and recycling for 2016 to 2018 are presented in the table of environmental indicators (page 34). The overall amount of waste for the Group fell 22%, with a 12% increase in hazardous waste and a 25% decrease in non-hazardous waste.

The sharp decrease in conventional waste in 2018 is due mainly to non-hazardous waste produced by projects finalised in France in 2017: reinforcement of safety standards in nuclear power plants by the ASN; refurbishment of the Group's Property Division assets. Of subsidiaries in France, Dalkia posted a 22% increase in waste due to higher digestate production in biogas plants.

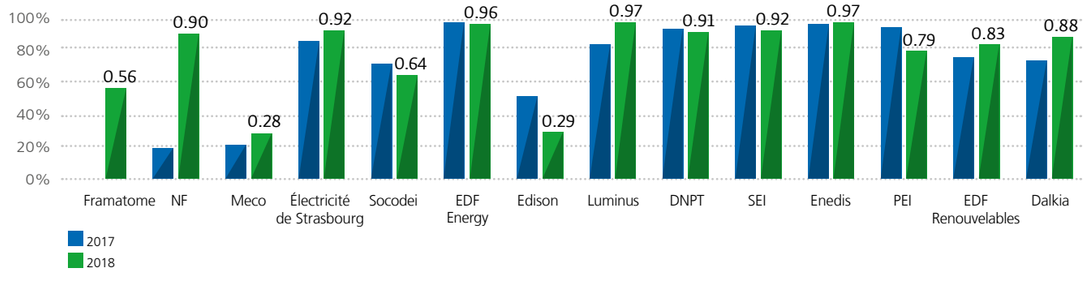
Elsewhere, Edison recorded a 65% decrease following the end of works to repair the damage caused by flooding in a hydro plant, the works having generated a high amount of waste in 2017.

Fluctuations in tonnage from one year to the next are significantly impacted by investments and decommissioning programmes under way. The Group's objective is to manage the end of the life cycle of its facilities efficiently and ensure that waste is recycled properly, rather than set any specific target as to the volume of waste produced.

Hazardous waste is harder to recycle. The Group therefore strives to reduce the amount of this type of waste it produces through concrete action to mitigate the characteristics that make it hazardous, for example by minimising the use of chemical products or by separating out the dangerous substances from concrete left over after building demolition to ensure a maximum amount of materials can be reused. EDF has also set up a project to encourage reuse throughout the Group and its subsidiaries. The target for total savings over a three-year period (2018-2020) has been set at €100 million. By the end of 2018, €15 million had been saved.

EDF's sustainable development policy set a target to recycle 90% of all waste from across the Group by 2021. The recycling rate for all conventional waste (excluding fly ash and gypsum, which are fully recycled) rose from 85% to 87.1%.

Recycling rate for conventional waste



Environmental indicators

Waste associated with oil and gas activities

Waste generated by oil and gas activities includes:
– residual sludge from drilling operations;
– aqueous solution produced by drilling operations.

Relative to other Group activities, gas activities generate very little waste apart from residual water from gas extraction, which is classified as non-hazardous waste.

At the San Giorgio Mare operations site, and in line with Italian regulations, residue is treated on site at the Santa Maria a Mare field. Under applicable guidelines, this waste would not be reported. However, this waste is included here as non-hazardous conventional waste to remain consistent with figures reported by Edison. For information purposes, these amounts were 14,169 t in 2015, 12,378 t in 2016, 10,979 t in 2017 and 3,204 t in 2018.

Amounts of waste for 2016 to 2018 are presented in the table of environmental indicators. The total amount of waste fell 56% between 2017 and 2018, driven by the reduction in extraction activity at Santa Maria a Mare (down 71%). Excluding the Santa Maria à Mare figure, non-hazardous waste increased 83%. This in turn impacted recycled waste, which increased 10% (amount varying depending on the nature of hazardous and non-hazardous waste that could be recycled).

Radioactive waste

Radioactive waste is classified into different categories in accordance with regulations in specific countries depending on its nature, level of radioactivity and the lifespan of the radionuclides it contains. The Group operates nuclear power plants in four countries: France, the United Kingdom, the United States and, more recently, China. Radioactive waste indicators for 2016 to 2018 are presented by country in the table of environmental indicators. China is not shown as commercial activity started there in 2018 and did not therefore produce any waste.

France

Radioactive waste is classified into four categories (VLLW, LLW, ILW and HLW) and is said to be "long-lived" if it has a half-life greater than 31 years.

WASTE PRODUCED BY EDF:	
Very low-level radioactive waste (VLLW)	• Waste with a radioactivity level close to naturally occurring radioactivity. It results primarily from the decommissioning of nuclear facilities and consists mostly of construction debris (concrete, scrap metal, thermal insulation, piping, etc.).
Low- and intermediate-level short-lived radioactive waste (LILW-SL)	• Waste from nuclear plants (gloves, filters, resins, etc.).
Low-level long-lived radioactive waste (LLW-LL)	• Waste from the decommissioning of obsolete natural uranium graphite gas reactors (graphite, waste from processes).
Intermediate-level long-lived radioactive waste (ILW-LL)	• Mainly waste from spent fuel assemblies (hulls, fragments of cladding, endcaps, etc.) separated during the processing of spent fuel. Currently, such waste is compacted and encapsulated in stainless steel canisters. • Other ILW-LL results from research and the fuel cycle industry.
High-level long-lived radioactive waste (HLW-LL)	• Waste resulting from processing, by vitrification, spent fuel, corresponding to the operation of the now obsolete natural uranium graphite gas plants and to operation of the current PWR plants.

EDF and Socodei	Unit	2018	2017	2016
Fuel				
Nuclear fuel load ●	t	**1,095**	1,104	1,042
Disposed spent nuclear fuel	t	**1,086**	1,161	1,170
Nuclear waste from decommissioning & industrial operations*				
Very low-level radioactive waste (VLLW)(2) ●	m^3	**2,724**	1,186	2,171
Low- and intermediate-level radioactive waste (LILW)(1) ●	m^3	**337**	410	443
Waste sent to Centraco processing plant	t	**442**	479	453
Operational nuclear waste				
Solid very low-level radioactive waste(2) ●	m^3	**3,289.3**	3,535.9	3,472.1
	m^3/TWh	**–**	–	8.849
Solid low- and intermediate-level short-lived radioactive waste(2) ●	m^3	**5,827.4**	5,603.4	5,687.0
	m^3/TWh	**–**	–	14.764
Solid high- and intermediate-level long-lived radioactive waste ●	m^3	**315.4**	300	300
	m^3/TWh	**–**	–	0.873
Waste sent to Centraco processing plant	t	**442**	479	453

● 2018 indicator audited for limited assurance by KPMG SA.
(1) The nuclear waste methodology was updated in 2017 (see section 3.9.2.2 "Methodology for social and environmental data" of the 2018 Reference Document).
(2) The methodology for nuclear waste from decommissioning and operations was updated in 2016 (see section 3.9.2.2 "Methodology for social and environmental data"). In 2018, the methodology for waste from decommissioning and industrial operations was updated as part of the consolidation of Framatome. Framatome accounted for 1,383 m^3 of Very low-level radioactive waste (VLLW) from decommissioning and industrial operations in 2018.
* Further information on this nuclear waste from decommissioning: the total projected amount of nuclear waste from decommissioning (VLLW + LILW) for 2018 was 3,100 m^3 (the actual figure in 2018 was 3,061 m^3). The total projected amount for 2019 is 1,200 m^3 for VLLW and 900 m^3 for LILW. Year-on-year changes are due to the different decommissioning phases.

Environmental indicators

United Kingdom

Radioactive waste is classified as high-, intermediate- or low-level waste (HLW, ILW and LLW respectively) with each type processed differently.

WASTE PRODUCED BY EDF ENERGY:

Low-level radioactive waste (LLW)

- Waste stored at the nuclear plants in dedicated facilities until being prepared for shipment (for processing or disposal). These facilities are inspected and monitored on a regular basis.
- EDF Energy created a programme for recycling metals with surface radioactive contamination. The metals are sent to a specialist centre where they are decontaminated safely and then reused (over 95% are available for normal use). The remainder is sent out for final disposal.
- EDF Energy uses approved treatment facilities and methods for other non-metallic waste. Incineration, compacting and storage of low-level radioactive waste minimises the quantity of waste sent out for final disposal.

Intermediate-level radioactive waste (ILW)

- Waste stored at the nuclear plants in dedicated facilities, which are inspected regularly as part of the site's safety requirements. Radioactive waste is monitored through planned inspections as part of the plant's routine operations.
- EDF Energy has set up a suite of Baseline Decommissioning Plans (BDP) covering all existing power plants. The plans define the strategy and estimated costs for decommissioning and are updated every three years. In 2016, greater emphasis was placed on preparing decommissioning, developing more detailed programmes for evacuating fuel and decommissioning in anticipation of 2023, when the first plants are scheduled to reach the end of their useful life.
- This work continued in 2017 and 2018 with the financial contribution from the United Kingdom's Nuclear Liabilities Fund (into which EDF Energy has been paying contributions for many years) to support the decommissioning scheduling and decommissioning plan.
- The BDP will ensure that intermediate-level radioactive waste is recovered, packaged and stored during decommissioning.

High-level radioactive waste (HLW)

- Waste from the reprocessing of nuclear fuel, stored in purpose-built facilities at the Sellafield site. Although reprocessed fuel contributes to high-level radioactive waste, no fuel of that type is used in the power plants.
- EDF Energy is working with the British government, non-governmental organisations and other stakeholders to establish a geological repository (long-term solution for treating radioactive waste) in the United Kingdom.

EDF Energy	Unit	2018	2017	2016
Fuel				
Disposed uranium ●	t	**194**	197	180
Nuclear waste				
Disposed low-level radioactive waste ●	m^3	**474**	453	774
Intermediate-level radioactive waste generated ●	m^3	**161**	161	161

● 2018 indicator audited for limited assurance by KPMG SA.

United States

The radioactive waste indicators of Constellation Energy Nuclear Group (CENG) are given in a separate table and are based on regulations applied in the United States. CENG is 49.99% owned by the Group.

CONSTELLATION ENERGY NUCLEAR GROUP	Unit	2018	2017	2016
Fuel				
Uranium delivered	t	**112**	82.5	98.3
Unloaded uranium	t	**111**	84.2	96.8
Nuclear waste				
Disposed low- and intermediate-level radioactive waste	m^3	**1,290**	820	1,418

Radioactive emissions

Nuclear power plants do not produce any direct CO_2, SO_2 or NOx emissions. However, they do release radioactive effluents into the air and water.

For EDF in France, the environmental control systems monitoring radioactive emissions on a regular basis involve between 5,000 and 20,000 annual measurements for each nuclear power plant. Measurements are made in the terrestrial ecosystem and in the ambient air, as well as in surface and ground water receiving liquid effluents.
This monitoring programme meets regulatory requirements and is subject to the prior approval of the ASN. In order to become a member of the French national network of environmental radioactivity measurement (RNM) set up by the Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France's national institute for radiation protection and nuclear safety, EDF requested accreditation for its laboratories. This was obtained by decision of the ASN in June 2009.
To further minimise its environmental impact, EDF has put in place an active approach to treating its radioactive effluents to continue reducing them down as low as reasonably achievable.

EDF group has been obtaining results for liquid effluent emissions from its nuclear power plants that have remained well below regulatory limits for over 15 years.

Liquid effluent and atmospheric emissions of Carbon-14 and Tritium(1) are monitored for emitting companies. Indicators for radioactive emissions for 2016 to 2018 are presented by country in the table of environmental indicators.

The radioactivity of a substance is measured in becquerels (Bq, the SI unit of radioactivity). This unit represents levels that are so low that multiples are normally used: GBq (gigabecquerels) or TBq (terabecquerels).

EDF and Socodei	Unit	2018	2017	2016	GRI Ref.
Radioactive effluents released into water(2)					
Carbon-14 ●	GBq/oper. unit	**9.314**	9.539	12.853 (11.712)*	306-1
Tritium ●	TBq/oper. unit	**17.169**	15.592	17.423 (17.105)*	306-1
Radioactive atmospheric emissions(2)					
Carbon-14 ●	TBq/oper. unit	**0.163**	0.148	0.161 (0.156)*	305-7
Tritium ●	TBq/oper. unit	**0.419**	0.447	0.640 (0.455)*	305-7

● 2018 indicator audited for limited assurance by KPMG SA.
(1) Tritium, a hydrogen isotope, has a low level of radioactivity and is produced in the primary circuit coolant of nuclear reactors. It exists naturally in small doses in seawater and rainwater.
(2) The nuclear waste methodology was updated in 2017 (see section 3.9.2.2 "Methodology for social and environmental data").
* The values calculated using the new methodology are shown in brackets.

Environmental indicators

EDF Energy	Unit	2018	2017	2016	GRI Ref.
Radioactive effluents released into water					
Tritium – AGR ●	TBq/reactor	**142.973**	154.770	156.154	306-1
Tritium – PWR ●	TBq/reactor	**11.309**	31.928	23.374	306-1
Radioactive atmospheric emissions					
Carbon-14 – AGR(1) ●	TBq/reactor	**0.764**	0.889	0.762	305-7
Carbon-14 – PWR(2) ●	TBq/reactor	**0.206**	0.221	0.231	305-7
Tritium – AGR	TBq/reactor	**0.578**	0.614	0.674	305-7
Tritium – PWR	TBq/reactor	**0.341**	0.697	0.557	305-7

Constellation Energy Nuclear Group	Unit	2018	2017	2016	GRI Ref.
Radioactive effluents released into water					
Tritium	TBq/reactor	**14.17**	13.11	9.96	306-1
Radioactive atmospheric emissions					
Tritium	TBq/reactor	**1.38**	2.21	2.89	305-7
Carbon-14	TBq/reactor	**0.32**	0.40	0.40	305.7

Environmental protection expenditure

Environmental protection expenditure is the additional identifiable expenditure aimed at preventing, reducing or repairing the potential or effective damage caused by the company's activities. This definition is based on the recommendation issued by the Conseil National de la Comptabilité (the French national accounting council) on 21 October 2003, which, in turn, is based on the European recommendation of 30 May 2001.

1 Protection of ambient air
2 Limiting of greenhouse gas emissions
3 Wastewater management
4 Waste management
5 Protection and decontamination of soil, groundwater and surface water
6 Noise and vibration abatement
7 Protection of biodiversity and the natural environment
8 Radiation protection
9 Research & Development
10 Demand-side management
11 Other environmental protection activities

Environmental protection expenditure is distributed across the 11 budget areas of the Eurostat classification (the European Commission's Directorate General for the Environment):

These indicators can show significant fluctuations from year to year, depending on the Group's commitments on projects, investments and studies in progress.

Results for 2016 to 2018 are presented in the table of environmental indicators. In 2018, environmental protection expenditure remained stable compared with 2017, with a slight decrease due to the amount of provisions set aside.

	Unit	2018	2017	2016	GRI Ref.(5)
Economic indicators – EDF					
Compensation paid or to be paid following legal decisions on environmental matters(3)	€k	**1,941**	0	21	307–1
Environmental protection expenditure	€M	**3,047**	2,647	2,688	
of which provisions	€M	**1,891**	1,756	1,848	
Environmental management – Group					
Percentage of consolidated Group revenue covered by ISO 14001 certification(4)	%	**95.6**	98.4	98.0	

● 2018 indicator audited for limited assurance by KPMG SA.
(1) Boiling water reactor: power reactors used in some American power plants.
(2) Pressurised water reactor: the most commonly used nuclear reactors worldwide.
(3) Excluding legal fees for final court decisions.
(4) Including companies covered by the Group's ISO 14001 certification and excluding companies managed independently.
(5) GRI: Global Reporting Initiative – version G4.

Labour indicators

Employment

Group employees totalled 165,790 at 31 December 2018, including five companies with more than 10,000 employees.

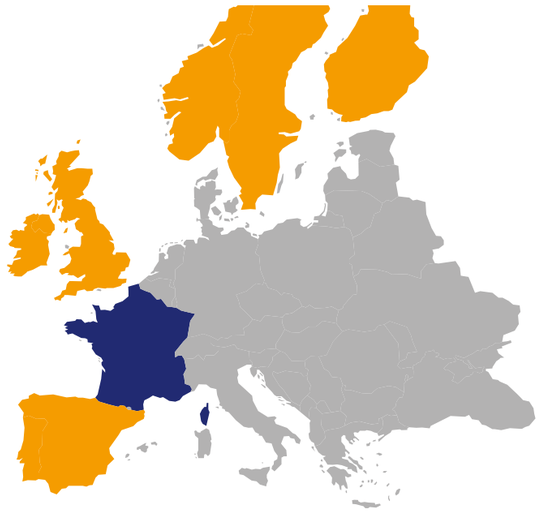
– EDF (65,163)
– Enedis (38,691)
– Framatome (14,545)
– Dalkia (16,017)
– EDF Energy (13,460)

Breakdown and change in number of Group employees

	2018	% change
France	**131,409**	**–0.4%**
Europe excluding France	**26,911**	**+9.86%**
Rest of the world (excluding Europe and excluding France)	**7,470**	**–2.24%**
Total EDF group worldwide	**165,790**	**–0.26%**

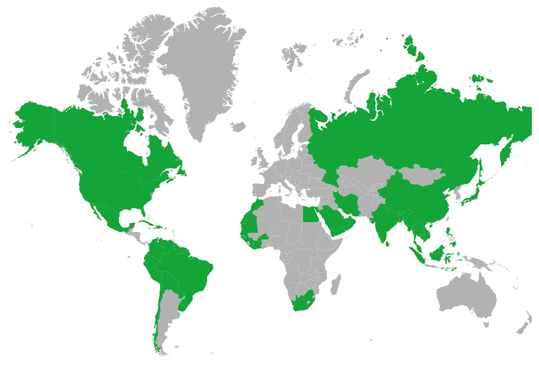
Employees by geographical area

(international subsidiaries and shareholdings included in the Group's consolidation scope)



France	2018	% change
EDF SA	65,163	–2.43%
Enedis	38,691	–0.51%
Dalkia	13,745	+6.12%
Framatome	8,872	+4.12%
EDF Renouvelables	1,541	+9.91%
Électricité de Strasbourg	1,107	–0.54%
Cham	890	+3.85%
Citelum	554	+10.80%
Groupe PEI	431	+0.94%
Socodei	287	+3.99%
G2S	58	–6.45%
Others	70	+6.06%
Total	**131,409**	**–0.43%**

Europe (excluding France)	2018	% change
EDF Energy	13,440	–3.70%
Edison	4,637	+9.86%
Framatome	3,259	+1.18%
EDF Luminus	2,048	+5.57%
Dalkia	1,649	+6.94%
EDF Renouvelables	842	+11.97%
Citelum	572	+4.00%
EDF Trading	396	–4.81%
EDF SA	68	–
Total	**26,911**	**+1.17%**

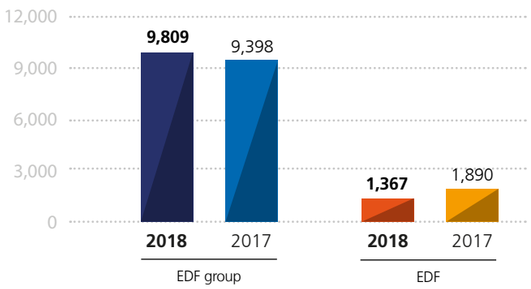


Rest of the world	Americas	Africa	Asia	2018	% change
EDF Renouvelables	1,268	98	104	1,470	+10.69%
Citelum	1,190	6	152	1,348	–8.96%
Framatome	2,312		102	2,414	–0.58%
Edison		735		735	–22.06%
Dalkia	521		102*	623	–25.66%
EDF Trading	414*		9	423	+25.89%
China Holding Co.			140	140	+5.26%
EDF SA	28	32	77	137	+137%
EDF Norte Fluminense	101*			101	–3.81%
Meco			77*	77	
EDF Luminus			2	2	
Total	**5,834**	**871**	**765**	**7,470**	**–2.24%**

* Dalkia: 102 employees in Russia; EDF Trading: 414 employees in the United States; EDF Norte Fluminense: 101 employees in Brazil; Meco: 77 employees in Vietnam.

Labour indicators

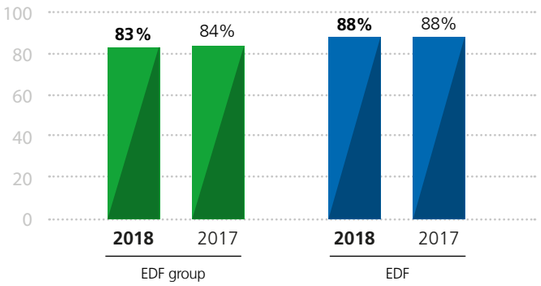
New hires (number)



The Group hired 9,809 new employees in 2018. EDF group employee turnover[1] was 5.4 in 2018, compared with 6.13 in 2017, 5.89 in 2016, 5.3 in 2015 and 5.6 in 2014.

Training and work-study programmes

Employees having benefited from training (%)



EDF group invests heavily in the development of its employees' skills. In 2018, the Group once again achieved its target to ensure 75% of employees take part in at least one training programme each year – indeed, 83% received training last year for an average duration of 55 hours.

The Vocational Academies, in charge of adapting and optimising the Group's training opportunities, continued to expand. A new charter was introduced in 2018. It points out areas where the Academies need to ramp up their efforts. The most important focus is to encourage workplace skills development and adjust courses to more smoothly accommodate employees shifting career paths.
The Saclay campus, which was opened in August 2016, continued to expand during 2018, with almost 1,500 training programmes and over 1,800 internal and external visitors.

The Group Management University, created in 2010, rounds out the other training services. Designed for managers, executives and potential managers, it is one of the top 19 corporate training facilities worldwide, benefiting from international CLIP (corporate learning improvement process) accreditation. The University offers professional skills training in virtually all the Group's geographical areas: Asia, United Kingdom, Italy, France, Central Europe and America.
In 2018, project management meetings were held at Saclay, bringing together more than 200 project managers and directors from EDF and other companies (Thales, Orange, Renault) and leading to the certification of over 40 of them.
In addition, the range of project management programmes was broadened with the launch of new courses for junior and senior project managers. The energy and Group strategy training programmes were updated in 2018. Working with Group business activity specialists, the University has constructed a top quality training offer of around 50 programmes, more than half of which are entirely digital.

Work-study programmes
EDF group has been promoting work-study programmes for many years, considering them a means of achieving training excellence for and the social integration of young and marginalised people.
The 2018 results reflect this momentum: 6,958 work-study programme trainees within EDF group, including 3,461 at EDF and 1,775 at Enedis. Of the trainees who completed their contract, 97% obtained their diploma and 92% were given a job or training at the end of their contract. Reflecting the Group's commitment to work-study programmes, in the autumn of 2016, Jean-Bernard Lévy became Chairman of the Fondation Innovations pour les Apprentissages, an apprenticeship innovation foundation in which many major groups in France invest.

Absenteeism

In number of days	2018	2017	2016	2015	2014
EDF group	**9.1**	9.2	9.55	9.2	9.1
EDF	**9.5**	9.4	9.57	9.2	8.8

In 2018, a method was developed for assessing the psychosocial risks found across the entire Group. The method improves the detection of populations potentially in difficulty and the definition of more suitable prevention measures.

(1) Turnover is calculated on the basis of the number of hires and departures (dismissals, retirements, early retirements, resignations, redundancies). They represent the "entries + exits" divided by two out of the total physical workforce at the end of the period and multiplied by 100.

People with disabilities

The Group's goal in this area is driven by the new global CSR agreement signed in 2018, which covers disability issues.

The Chairman of EDF group signed the ILO Global Business and Disability Network Charter in 2017 to implement and share actions relating to the Charter's 10 principles with all Group entities and demonstrate the Group's commitment in this field since 1989.

On 13 December 2018, EDF SA signed its eleventh agreement to hire and train people with disabilities.

Number of employees with disabilities

	2018	2017	2016	2015	2014
EDF group	**5,640**	5,279	5,211	5,232	5,086
EDF	**2,247**	2,215	2,150	2,157	2,093
Enedis	**1,566**	1,527	1,465	1,437	1,351

Number of new hires with disabilities

	2018	2017	2016	2015	2014
EDF group	**151**	161	152	237	221
EDF	**66**	93	76	91	112
Enedis	**18**	26	32	93	74

Gender diversity

EDF ensures diversity at every level of the company's management and is actively determined to bring more women leaders into top positions. This commitment is based on making technical jobs more attractive to young women and guaranteeing to respect gender equality in the Group throughout their career. Article 6 of the Global CSR Agreement signed on 19 June 2018 addresses the issues of gender equality and highlights the Group's determination to improve the gender mix in work teams and throughout the organisation. At Group level, there is a gender equality indicator for the management committees, with a target set to have the same percentage of women represented on management committees (26.3% at end-2018) as in management (27.6% at end-2018, 28.3% at end-2017, 27.6% at end-2016 at Group level and 29.5% for EDF at end-2019).

At EDF SA, the percentage of women on management committees came to 20% at end-2011, to reach 25.3%[1] at end-2018 (26.7% in 2015, 27.7% in 2016 and 28.3% in 2017).

EDF SA's gender equality index was 80/100 in 2018.

Safety indicators

The Group's new health and safety policy, adopted in April 2018, sets out a joint framework for the policies of the different subsidiaries and their action plans. The Group policy is applied in every company controlled by EDF group, wherever it is located, and concerns all its own employees, as well as those of subcontractors working at EDF facilities or in its offices.

(1) The methods of calculation were changed in 2018 to reflect the Group definitions. The previous method of calculation would have given a rate of 28.5%, the difference being attributable to the inclusion or exclusion of support department Management committees.
(2) Lost days are included in the year in which they occur even if the accident happened the previous year.

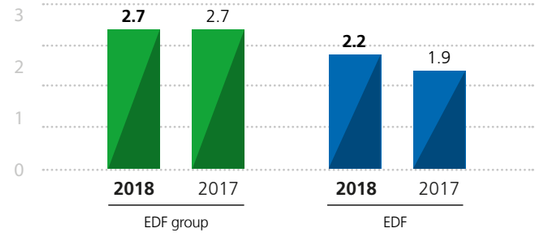
The new policy is based on a commitment signed by the Chairman and all the members of the Executive Committee. The commitment is accompanied by a roadmap mobilising Group entities towards achieving the objectives set.

Health and safety is an integral part of the Group's CSR Goal no. 2, under which it will apply the best practices of industrial groups in terms of human resource development.

The Group employee accident frequency rate (number of workplace accidents involving at least one lost day, counted during the current year, per million hours worked) has been stable since 2016. (Number of workplace accidents involving at least one lost day, counted during the current year, per million hours worked).

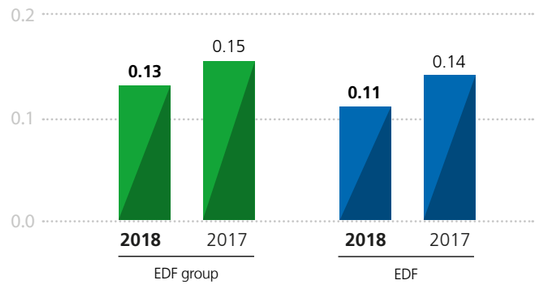
The Group is aiming to improve the frequency rate among employees from 3.1 in 2014 to below 1.4 in 2020. So far, the rates recorded were 2.7 in 2018, 2.7 in 2017, 2.7 in 2016 and 3.2 in 2015. This ambitious target is pursued in all companies throughout the Group.

Employee accident frequency rate



The accident frequency rate has fallen from 4.5 in 2010 to 2.7 in 2018. The accident frequency rate of subcontractors (number of workplace accidents involving at least one lost day, counted during the current year, per million hours worked) was 4.6 in 2018, 3.99 in 2017, 3.69 in 2016, and 4.1 in 2015.

Accident severity rate



The accident severity rate corresponds to the number of calendar days lost due to workplace accidents per thousand hours worked[2].

Number of workplace accidents involving at least one lost day

	2018	2017	2016	2015	2014
EDF group	**667**	613	645	757	694
EDF	**209**	181	228	261	284

Labour indicators

Eradicating work-related fatal accidents

This is the Group's top priority for employees and subcontractors, a target firmly set in 2015.

In 2018, continuing the actions initiated since 2015, the Group focused its commitment on the 10 Essential Rules, selected after analysis of fatal accidents that have occurred in EDF group over the past 30 years. All employees must observe these rules when carrying out their daily work in order to avoid severe accidents and protect themselves and their colleagues.

Group data	**2018**	2017	2016	2015	2014
Total number of EDF group employee and subcontractor fatalities	**9**	15	10	16	15
of which Group employee fatalities	**6**	6	1	3	4
— of which directly work-related	**0**	2	1	3	2
of which subcontractor employee fatalities	**3**	9	9	13	11
— of which directly work-related	**1**	5	5	9	9

Since 2014, all fatal accidents are reported immediately to the Chairman and Chief Executive Officer and an in-depth analysis systematically presented to the Executive Committee.

Radiation protection and occupational dosimetry

EDF

By mobilising all local players, EDF has achieved continuous improvement in the protection of employees against ionising radiation.

In France, the average annual individual dose for all site workers, whether EDF or external company employees, has been halved in less than 10 years.

In France, between 2003 and 2018, no site worker (EDF or subcontractor employee) in France registered an individual dose in excess of the regulatory threshold (individual dose over a rolling 12-month period).

EDF continues to apply its ALARA (as low as reasonably achievable) approach to controlling ionising radiation in view of the volumes of work planned for the modernisation of its power plants in France.

	Unit	**2018**	2017	2016
Dosimetry				
Average collective dose	mSv/reactor	**0.67**	0.61	0.76
Individual dose (no. of workers exposed to more than 20 mSv)	Number	**0**	0	0
Individual dose (no. of workers exposed to more than 16 mSv)	Number	**0**	0	0

EDF Energy

In the United Kingdom, dosimetry has been reduced, mainly as a result of optimised oversight of maintenance and repair work. EDF Energy applies strict procedures to minimise and control ionising radiation received by its employees and subcontractors in nuclear power plants. In addition, anyone that has to enter a controlled area is given a personal electronic dosimeter. This emits a warning when the person's dose exceeds the predefined limit and enables EDF Energy to record any long-term exposure accurately. The company's Advanced Gas-cooled Reactors continue to produce the lowest exposure to radiation of all nuclear power plants worldwide. The Thier Pressurised Water Reactor at Sizewell is also in the first quartile of the most efficient reactors worldwide over a period of three years, helping EDF Energy to outperform expectations in 2018. EDF Energy defines its collective radiation exposure annually on the basis of planned unit shutdowns, and continues to apply its ALARP (as low as reasonably practicable) approach to controlling ionising radiation. In 2018, it achieved 576 mSv, beating its target of 714 mSv.

	Unit	**2018**	2017	2016
Dosimetry				
Average collective dose – AGR[1]	mSv/reactor	**0.05**	0.02	0.021
Average collective dose – PWR[2]	mSv/reactor	**0.1**	0.296	0.554
Individual dose (no. of workers exposed to more than 20 mSv)	Number	**0**	0	0
Individual dose (no. of workers exposed to more than 16 mSv)	Number	**0**	0	0

(1) Advanced gas-cooled reactor: reactor developed in the United Kingdom.
(2) Pressurised water reactor: the most commonly used nuclear reactors worldwide.

Social responsibility indicators

The Group's commitment to professional integration

In addition to its work-study programme (see page 22), the Group promotes professional integration by sourcing from organisations specialised in re-integrating the long-term unemployed into the workforce, and by working with the Fonds Agir pour l'Emploi EDF (FAPE EDF), EDF's employment foundation, on projects supported by community development organisations, integration schemes and more.

Sourcing from professional integration structures

	2018	2017
EDF's sourcing from professional integration structures (in thousands of euros)	**767**	905

Fonds Agir Pour l'Emploi EDF (FAPE EDF)

The FAPE EDF foundation actively supports professional integration and job creation for the long-term unemployed. Managed collectively with labour unions, the FAPE EDF builds strong ties with the community by encouraging current and retired EDF employees to make donations, which the Group then matches and doubles in an additional contribution. The FAPE EDF supports more than 300 projects a year. This organisation unites the Group in its commitment to working towards the public interest and combating social and professional exclusion.

	2018	2017	2016
Number of jobs created or subsidised	**3,473**	3,483	3,479
Subsidies granted (in millions of euros)	**2.2**	2.3	2.4

Responsible purchasing

Supplier assessments

The Group's Purchasing Department has tightened its supplier ethics and compliance controls to protect EDF from potential sanctions and damage to its reputation due to any illegal practices on the part of suppliers. In 2018, the Purchasing Department carried out more than 3,100 controls (over 1,200 in 2017).

Its Sustainable Development – Corporate Social Responsibility assessment process includes supplier audits, performed on site by external auditors, and monitored self-assessments. This process is implemented in line with the map of CSR risks by purchasing segment. Under the terms of their purchasing agreement, suppliers must introduce corrective action plans if any cases of non-compliance or serious violations of legal requirements are reported.

The Group's Purchasing Department conducts audits throughout the world. In 2018, 60% of audits were performed at supplier sites located in Europe (of which 72% in France), 25% in Asia and 15% in North Africa and the Middle East.

	2018	2017
Number of Sustainable Development – Corporate Social Responsibility supplier audits	**53**	51

The Group's Purchasing Department uses the Acesia online assessment platform developed by Afnor to manage the self-assessment questionnaires. At end-2018, nearly 1,700 suppliers had been surveyed using this tool, and over 770 of them were subject to controls and reviewed.

The assessments conducted found supplier performance to be "satisfactory" or "acceptable with observations" for over 80% of the audits and almost 40% of the questionnaires.

The Purchasing Department has set a target to send the questionnaire to all suppliers engaged in a contract worth over €400,000 incurring high risk.

EDF's programmes to simplify access to products and services available from SMEs and mid-market companies

Percentage of purchases	**2018**	2017
SMEs	**23.7%**	23.5%
Mid-market companies	**23.5%**	25%

Ethics and compliance

EDF group's commitment

(See section 3.5.1 of the 2018 Reference Document)

Reporting to the Group's General Secretary, the Group Ethics and Compliance Division (DECG) is responsible for dissemination of information about and compliance with the Group's ethics, as well as for compliance with the regulations governing its business activity in France and around the world. It brings together and verifies the implementation of these rules through a single, consistent ethics and compliance programme that applies to the entire Group. The objective is to defend and promote the Group's culture of integrity for the benefit of its image and reputation, and to prevent the risks of sanction. It presents an annual report of its activities to the Executive Committee and the Board of Directors' Governance and Corporate Social Responsibility Committee.

The Group Ethics and Compliance Programme, initiated by the Group's Chairman on 16 December 2015, was developed and complemented by the following guidelines:

- the Group Ethics and Compliance Policy (GECP), validated by the Executive Committee on 17 May 2016, which brings together the main rules that all senior managers must know, comply with and ensure compliance by their entities, in strict accordance with the risks faced by those entities. The GECP is accompanied by instruction notes and guidelines aimed at supporting its deployment. Topics covered include integrity checks on business relations, financial ethics, personal data protection, anti-fraud policy, gifts and hospitality. The GECP is the overarching reference for the Group Code of Ethics and the Group Ethics and Compliance Code of Conduct, which are updated as new regulations become applicable, and is subject to audit;
- the Group Code of Ethics, which is built around the Group's three core values – Respect, Solidarity and Responsibility – defines the requirements that must guide the conduct of Group employees every day. Work to update the 2013 version of the Group Code of Ethics was started in the second half of 2018 to take account of the Group's strategy, new policies and new regulatory environment. It will be rolled out in several languages in 2019;
- the Group Ethics and Compliance Code of Conduct, published on 1 June 2017 and written into entities' internal rules, which is the reference document for preventing corruption risk, in accordance with the Sapin 2 law and applies to all employees;
- the EDF group's ethics and compliance whistleblowing system, which enables Group employees and contractor employees (temporary staff, service provider employees, those working under fixed-term contracts, apprentices, trainees, etc.), as well as external stakeholders, to report a breach, in accordance with the Sapin 2 law of 9 December 2016, on transparency, the fight against corruption and the modernisation of the economy, and the Duty of Care Law of 27 March 2017 relating to the duty of vigilance of parent companies and purchasing officers;
- the body of Group policies, which apply the cross-business requirements over the whole Group and cover all functional topics.

The DECG sets up, organises and provides training and awareness courses for all levels of management and employees. It supports the entity Ethics and Compliance Officers (ECO) in their tasks.

EDF is a member of several institutions and non-profits that combat corruption. It was included in the Transparency International France ranking in 2016 and participates in that organisation's Forum des Entreprises Engagées (FEE), which brings together companies seeking to achieve the highest standards in terms of transparency and integrity.

Anti-corruption compliance programme

(See section 3.5.1.2 of the 2018 Reference Document)

The Sapin 2 law of 9 December 2016 on transparency, the fight against corruption and the modernisation of the economy strengthens French legislation aimed at achieving the highest international standards in terms of preventing corruption and other forms of misconduct.

In 2017, the DECG and its ECO network developed and rolled out an anti-corruption programme throughout EDF group aimed at meeting the eight pillars set out in article 17 of the Sapin 2 law.

EDF was not the subject of any fine, penalty or conviction for corruption in France or elsewhere in 2018.

The Group Ethics and Compliance Code of Conduct

EDF group has had a code of conduct since the summer of 2017. It defines and illustrates behaviour that is prohibited as it could be interpreted as acts of corruption or influence peddling. The Group Ethics and Compliance Code of Conduct was strongly supported by senior management and its integration into EDF and subsidiary internal rules is virtually completed. The code is available in French and English on EDF's website.

The Group Ethics and Compliance Code of Conduct defines the rules to be respected (sections "We must" and "We must not") in the areas of preventing corruption, integrity checks on business relations, gifts and hospitality, preventing conflicts of interest, ant-fraud policy, preventing market abuse, preventing money laundering and the financing of terrorism, preventing violations of competition law, compliance with international sanctions and controls on international trade. It prohibits facilitating payments and expressly mentions that donations must not be made to a corporate foundation or non-profit for the purposes of corruption.

To meet its teaching aims, it also illustrates risk situations and best practices.

Internal whistleblowing system

In 2018, EDF group updated its internal whistleblowing system, managed by the DECG, to bring it into line with all regulatory requirements and receive reports, submitted in good faith, on a secure and confidential platform:

- In accordance with the Sapin 2 law, the whistleblowing system is available to all Group employees in France and elsewhere (excluding subsidiaries operating in the regulated sector), as well as to any other temporary employee, to report breaches that could be considered:
  - a crime or offence;
  - a serious and patent violation of the law or regulations;
  - a serious and patent violation of an international commitment approved or ratified by France;
  - a serious violation of a unilateral action of an international organisation taken on the basis of an international commitment approved or ratified by France;
  - a serious threat or harm to the public interest;
  - a breach of the Ethics and Compliance Code of Conduct.
- To meet the requirements of the Duty of Care Law, EDF group's whistleblowing system is also available to third-parties wishing to report the existence of risks or serious violations of human rights, fundamental freedoms, health and safety, the environment, which may be attributable to activities of the company or companies under its control, as well as the activities of EDF group subcontractors or suppliers.
- Lastly, the Group's whistleblowing system also takes account of the requirements of Europe's General Data Protection Regulation (GDPR): security and confidentiality have been strengthened.

To meet all these requirements, EDF issued a tender and acquired a system that enables all employees and third parties to report cases within a completely secure environment, and guarantees the confidential processing of their data internally. The system is totally disconnected from the Group's information systems.

The input interface is a page of EDF's website[1], available 24/7 in several languages (French, English, Italian, Portuguese, Dutch and Mandarin Chinese) in France and elsewhere. Individuals wishing to report a breach can do so in the language of their choice. This system complies with local regulations in all countries where EDF group operates. The external whistleblowing system is ISO 27001 certified and has received the European Privacy Seal. It was audited by EDF's IT departments prior to being brought into service and is subject to regular intrusion testing.

To help people reporting breaches understand the process, the topics covered by legislation have been grouped together in the following categories: corruption, conflicts of interest, fraud, financial ethics, violations of competition law, international sanctions and controls on international trade, harassment and discrimination, human rights[2], serious damage to the environment, and personal data protection. The whistleblowing system also has a feature "Ask for advice/Exercise your personal data protection rights".

The whistleblowing system supports other channels for reporting breaches and is purely voluntary. The admissibility of a breach report is assessed based on the system's scope and the whistleblower's relationship with the Group. Admissibility is independent of the reality of the alleged facts and can only be confirmed once the report has been processed.

As part of the zero-tolerance policy, each report that is deemed to be valid is processed within the secure platform. The whistleblower may remain anonymous if the facts are found to be serious and the report is adequately detailed and accurate to confirm the facts described. The DECG provides regular reporting on the procedure. Whistleblowers in 2018 received a message within two working days acknowledging the alert reported. On average, reports were processed and closed within a 48-day period. A total of 81% of alerts were dealt with in the same year that they were reported. An action plan was drawn up by the management team of the entity concerned for every report deemed to be valid. This may involve corrective measures such as restructuring the team or imposing disciplinary sanctions, which can range from a warning through to the dismissal of an employee.

In 2018, the DECG identified 76 reports submitted to the Group whistleblowing system: 12 requests for advice and 64 breach reports. Forty-four of these breach reports were deemed to be valid, of which 11 were made anonymously.

The 44 alerts broke down by topic as follows:

Topic	**2018**	2017*	2016*
Fraud	**14**	21	23
Harassment and discrimination	**21**	26	25
Other	**9**	13	27

* The methodology changed in 2018.

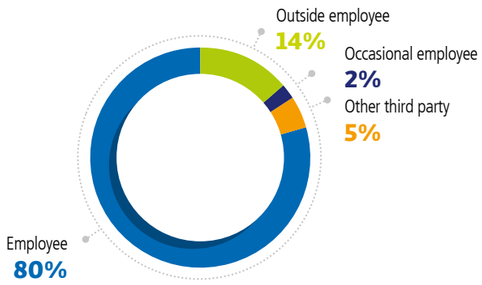
In the "Other" category in 2018, alerts included two reports of data protection breaches, one report of serious harm to the environment and no reports concerning personal safety and human rights.

(1) https://www.edf.fr/en/the-edf-group/our-commitments/ethics-compliance/whistleblowing-system
(2) These are violations of human rights (child labour, forced labour, freedom of association and collective bargaining, use of force, local community rights and decent work).

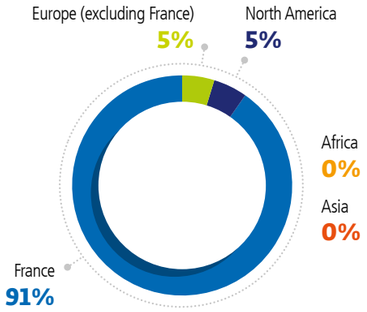
Ethics and compliance

Validity of reports in 2018

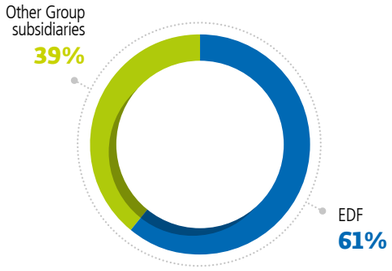
Whistleblower's relationship to the Group



Geographical breakdown in 2018



Breakdown in 2018 by entity



Risk mapping

As part of the annual self-assessment of internal control, the DECG consolidates entities' responses in order to map ethics and compliance risks at Group level. The entities define a risk prevention and mitigation plan suited to their operating environment. In addition to that mapping, the DECG defined a special corruption risk map in order to comply with the Sapin 2 law. This map identifies and ranks the risks of exposure to corruption by business sector and by country.
The Code of Conduct will be updated regularly in line with the Group's risk map.

Integrity checks on business relations

Integrity checks on business relations are the subject of a memorandum of instructions, which defines the third-party assessment procedures to be implemented before and throughout business relations. The type of controls is based on the level of risk presented by the third party.
Entities are required to check the integrity of partners by assessing their intrinsic quality and the integrity of the business relations based on legal, economic and material factors. Entities must also check that partners meet compliance requirements throughout the duration of business relations.
A tutorial on this issue is available to all employees on the Group's intranet.

Accounting controls

The Group Accounting and Taxation Department carries out numerous controls in application of the anti-fraud memorandum of instructions and guide published in 2017. The control procedures defined for the various processes (purchasing, sales, treasury, HR, inventory assets, accounting, etc.) meet the objectives of the Sapin 2 law. These procedures include 70 random or automatic checks, of which 23 on accounting processes.
No known fraud relating to corruption has been reported in recent years by the accounting department following controls or voluntary reports.

Anti-corruption training

The Group Ethics and Compliance Division develops prevention and training programmes and provides programme implementation tools for all employees, including awareness videos. It coordinates a network of professionals in the various entities and has a dedicated community on the Group intranet. DECG training includes a Corruption Risk Prevention programme, which meets the requirements of the Sapin 2 law. Initially for senior managers in 2016, it was extended to all potentially exposed managers and employees in 2017 and 2018.
At the end of 2018, 8,556 employees had successfully completed the anti-corruption training programme.

The DECG also provides general classroom training for some potentially exposed employees (e.g. subsidiary management and contract managers), along with special training programmes on, for instance, the whistleblowing system and how reports are processed with its Ethics and Compliance Officers.

Disciplinary sanctions

In accordance with the Sapin 2 law, any violation by employees of rules set out in Chapter 3 of the Group Ethics and Compliance Code of Conduct could lead to disciplinary sanctions. The sanctions are defined in article 6 of the Statut des Industries Électriques et Gazières (Statutes for Electricity and Gas Industry employees) and the French Labour Code.

Internal control and assessment measures

To ensure that the measures implemented to prevent or detect any breach of ethics or compliance are both appropriate and effective, the DECG uses results from the annual internal control self-assessment to determine how much of the GECP and anti-fraud compliance programme have been rolled out.
The control and assessment measures are strengthened by regular internal audits of entities and subsidiaries, creating a continuous improvement loop.

Other compliance programmes

(See section 3.5.1.3 of the 2018 Reference Document)

Further information is available in the 2018 Reference Document, particularly on developments in:
– conflicts of interest;
– interest representatives;
– non-financing of political parties;
– preventing harassment and discrimination;
– anti-fraud policy;
– financial ethics;
– preventing breaches of competition law;
– personal data protection;
– compliance with industry regulations;
– compliance with international sanctions.

Main lobbying efforts in 2018[1]

Intense discussions continued throughout 2018 on the eight texts making up the Clean Energy Package legislative framework, which will determine the future of Europe's electricity industry. Following the actions taken in 2017, a number of meetings and events were organised with the aim of raising awareness and informing stakeholders in Brussels about the Group's priorities. These included the importance of better coordinating European policies on renewable energy, energy efficiency and combating climate change, as well as long-term solutions that would safeguard the security of electricity supply in Europe, ensuring visibility of its future investments in low-carbon solutions and setting a fair price for CO_2. After long negotiations, the final two texts of the Clean Energy Package on market design were structured into a policy agreement at the end of December 2018, concluding a four-year legislative process. The Package sets a new European framework for electricity markets and reflects the goal of the European Union in its energy and climate policies for the period 2021-2030. Within the context of the European Commission's preparation of its strategy to reduce greenhouse gas emissions over the long term, published in November 2018, but to remain on the agenda for discussion in 2019, the Group pointed out the need to maintain a clear focus on the CO_2 reduction emissions reduction target, and to combine a cost-efficient transition to low-carbon electricity with the substantial electrification of the economy. The Group also emphasised the role of nuclear in that shift, as the pace to combat climate change picks up, recommended by the latest IPCC report.

In addition, EDF played an active role in the debates that accompanied the discussions on the Clean Mobility Package legislative framework, which includes a number of texts published in 2017 and 2018. It emphasised the opportunity offered by the development of electric mobility to combat air pollution more effectively and limit the carbon footprint of the transport industry, together with measures taken by companies within the energy sector, highlighting the characteristics that make electric mobility a credible solution for the industry's energy transition.

In spring 2018, the European Commission initiated work on sustainable finance aimed at redirecting capital flows towards sustainable investment, managing the financial risks caused by climate change, promoting transparency and a long-term view in financial and economic activity. This work led the Group, which believes that long-term investors should contribute to the objectives of the Paris Agreement, to advocate greater transparency of durability criteria in the portfolios of asset managers. During the legislative process, through a large number of meetings with co-legislators, EDF emphasised particularly the urgency of climate change, making it imperative that low-carbon resources be taken rapidly into account, in line with the Paris Agreement, and supported the idea that all existing low-carbon solutions be taken into account, not just renewables.

Lastly, the regulation on screening foreign investments was monitored closely with a view to protecting legal guarantees, screening proportionality, complementarity and European added value.

EDF signed up to the transparency register of the European Parliament and European Commission and applies its code of conduct. An amount of between €2,000,000 and €2,249,999 has been declared on the register for 2018 (compared with €2.276 million in 2017 and €2.308 million in 2016). The largest contributions were paid to the following think tanks: Centre on Regulation in Europe (€55,000), Centre for European Policy Studies (€45,000), Confrontations Europe (€30,000) and the Cercle de l'Industrie (€30,000)

In France, after the Sapin 2 law was passed, EDF registered as an interest representative with France's High Authority for the Transparency of Public Life (HATVP) and must therefore declare, before 31 March each year, its interest representative activities for the previous year, as well as the amount spent on them. This information is made public on the High Authority's website (for EDF: https://www.hatvp.fr/fiche-organisation/?organisation=552081317).

In 2017, EDF reported spending on interest representation between €500,000 and €600,000 (€300,000 in 2016). In 2018, EDF carried out interest representation activities, as defined by the Sapin 2 law, with the office of the President of France, members of the government and their offices, members of parliament, their colleagues or administrators, members of the assembly, the director and secretary-general of independent administrative authorities as well as civil servants sitting on the Council of Ministers. The annual declaration will be transmitted to the High Authority and posted on its website. Related spending was between €1 million and €1.25 million.

In 2016, under a different regulation that only covered parliamentary assemblies, EDF declared expenditure of €300,000 on the register of interest representatives of the French National Assembly and Senate.

(1) See the Annual Report published by the Department of European Affairs on edf.fr

Summary of indicators

Inputs and outputs of EDF's generation operations

This information is collected on the basis of the main inputs (raw materials, consumables, energy and water) and outputs (waste, by-products and emissions) of EDF's electricity generation process in France (nuclear, fossil-fired and hydro). It is a complement to the Group's environmental indicators. This information takes into account some updates to indicators collected in January 2019, which may therefore differ from the data published in the 2018 Reference Document.

Raw materials, consumables, energy and cooling water linked to EDF's electricity generation activities

INPUT	Unit	**2018**	2017	2016
Primary materials				
Nuclear reactor fuel	t	**1,130**	1,104	1,042
Coal	t	**1,546,757**	2,342,287	1,586,399
Heavy fuel oil	t	**237,530**	365,877	319,743
Domestic fuel oil	t	**205,947**	219,742	233,371
Non industrial gas	MWh PCI	**12,619,805**	17,417,793	14,182,596
Operating media				
DeSOx				
Limestone for desulphurisation plants(1)	t	**30,380**	41,168	22,952
DeNOx				
Ammoniac of DeNOx	t	**7,356**	17,820	7,202
Consumption of reagents as pure products				
Boric acid (H_3BO_3)	t	**285**	247	298
Chlorhydric acid (HCl)	t	**495**	493	2,142
Sulfuric acid (H_2SO_4)	t	**43,566**	38,366	34,218
Floccalating agents ($FeCl_3$, WAC)	t	**264**	281	299
Lime ($Ca(OH)_2$)	t	**1,322**	1,442	1,222
Hydrazine (N_2H_4)	t	**106**	97	102
Soda (NaOH)	t	**1,608**	1,622	1,590
Others				
Oil	t	**2,758**	3,796	3,633
Energy				
Electricity pumping internal consumption	TWh	**7.33**	7.03	6.65
Electricity internal consumption(2)	TWh	**24.16**	20.58	20.33
Total thermal energy of fuel(3)	TWh LHV	**1,219**	1,189.0	1,189.4
Water				
Cooling water drawn	10^6 m³	**38,019**	37,616	36,761
of which fresh water	10^6 m³	**15,209**	15,166	15,120
of which brackish water	10^6 m³	**5,777**	6,038	5,667
Industrial usage water(4)	10^6 m³	**16.58**	22.08	25.04

(1) Desulphurisation equipment.
(2) 22.7% of electricity consumed in 2018 came from renewable sources compared with 18.7% in 2017 (electricity report page 4).
(3) Thermal energy in TWh LHV. 2015, 2014 and 2013 data was recalculated using the 2016 method.
(4) Indicators for which 2015 and 2014 data was recalculated using the 2016 method.

Waste, by-products and emissions linked to EDF's electricity generation activities

OUTPUT	Unit	**2018**	2017	2016
Products				
Gross Energy	TWh	**474.8**	455.53	461.58
Net Energy	TWh	**450.7**	434.95	441.25
By-products				
Ashes				
Produced ashes	t	**127,858**	188,560	131,305
Recycled ashes	t	**177,551**	245,837	258,438
DeSOx by-products				
Gypsum	t	**51,467**	57,934	35,793
DeSOx sludges	t	**1,952**	2,456	1,300
Other				
Disposed spent nuclear fuel	t	**1,086**	1,161	1,170
Water				
Cold water	10^6 m³	**37,536.8**	37,309	36,282
of which fresh water	10^6 m³	**14,727.9**	14,858	14,641
of which brackish water	10^6 m³	**5,776.7**	6,038	5,667
Evaporation water	10^6 m³	**482.0**	490	478
of which fresh water	10^6 m³	**481.5**	490	478
of which brackish water	10^6 m³	**0.0**	0	0
Gas emissions				
CO_2 quotas	kt	**7,505**	10,712	8,230
CO_2 total	kt	**7,541**	10,741	8,264
SO_2	t	**4,288**	6,138	4,617
N_2O	kt CO_2 eq.	**32**	45.63	35.80
NOx	t	**17,021**	17,867	14,620
CH_4 (methane in air)	kt CO_2 eq.	**8**	10.94	9.26
SF_6(1)	t CO_2 eq.	**48,817**	39,555	52,178
COV	t	**29.16**	44.11	32.02
Air				
Dust	t	**220.7**	337	322.5
Particulates PM10	t	**219**	337	315
Particulates PM2.5	t	**29**	66	65
Mercury	kg	**15.7**	22.4	17.5

(1) Indicators for which 2015 and 2014 data was recalculated using the 2016 method.

Summary of indicators

OUTPUT (CONTINUED)	Unit	2018	2017	2016
Radioactive emissions				
Emissions into air				
Noble gases	TBq/reactor	**0.52**	0.586	0.324
Tritium	TBq/reactor	**0.42**	0.446	0.455
Carbon-14	TBq/reactor	**0.17**	0.150	0.159
Iodines	GBq/reactor	**0.01**	0.017	0.014
Other fission and activation products	GBq/reactor	**0.1**	0.002	0.002
Emissions into water				
Tritium	TBq/reactor	**17.46**	15.861	17.511
Carbon-14	GBq/reactor	**9.44**	9.673	11.897
Iodines	GBq/reactor	**0.00**	0.004	0.005
Others Radioelements	GBq/reactor	**0.29**	0.172	0.189
Wastes				
Conventional waste				
Total wastes	t	**273,801**	344,957	466,316
recycled wastes	t	**250,294**	320,690	444,536
Non-hazardous conventional industrial waste	t	**246,829**	320,498	437,260
Special wastes	t	**26,972**	24,459	29,057
Radioactive waste				
Solid high- and intermediate-level long-lived radioactive waste(1)	m^3	**315.38**	300,18	299.72
Solid low- and intermediate-level short-lived radioactive waste	m^3	**5,827.41**	5,627.07	5,686.95
Solid VLLW waste	m^3	**3,289.33**	3,685.16	3,472.13
VLLW* from decommissioning	m^3	**2,727.78**	1,186.09	2,171.91
LILW* from decommissioning	m^3	**320.73**	409.95	440.94
Other waste				
Copper (in water)	kg	**41,813**	26,867	31,719
Zinc (in water)	kg	**12,446**	12,327	12,178

(1) Indicators for which 2015 and 2014 data was recalculated according to the 2016 method.
* VLLW: Very Low Level radioactive Waste; LILW: Low- and Intermediate Level radioactive Waste.

Economic indicators

	Unit	2018	2017	2016	GRI Ref.(1)
Economic indicators – EDF					
Compensation paid or to be paid following legal decisions on environmental matters(2)	€k	**1,941**	0	21	307-1
Environmental protection expenditure	€M	**3,047**	2,647	2,688	
of which provisions	€M	**1,891**	1,756	1,848	
Environmental management – Group					
% of consolidated Group revenue covered by ISO 14001 certification(3)	%	**95.6**	98.4	98.0	

Environmental indicators

	Unit	2018	2017	2016	GRI Ref.(1)
Fuel and raw materials – fuel consumed					
Nuclear fuel load – EDF ●	t	**1,095**	1,104	1,042	301-1
Coal ●	kt	**3,818**	9,902	9,306	301-1
Heavy fuel oil	kt	**753**	931	885	301-1
Domestic fuel oil	kt	**324**	375	371	301-1
Natural gas	GWh LHV	**103,390**	106,125	110,720	301-1
Industrial gas	GWh LHV	**298**	371	335	301-1
Biomass	kt	**2,233**	2,254	2,676	301-1
Water – raw materials from sources outside the company					
Cooling water drawn	10^9 m^3	**47.2**	47.6	47.3	303-3
of which fresh water	10^9 m^3	**15.4**	16.0	16.2	303-3
of which brackish (or estuary) water	10^9 m^3	**6.2**	6.4	6.1	303-3
Cooling water discharged	10^9 m^3	**46.7**	47.0	46.8	303-4
of which fresh water	10^9 m^3	**14.9**	15.5	15.7	303-4
of which brackish (or estuary) water	10^9 m^3	**6.2**	6.4	6.1	303-4
Specific consumption of water in total energy generation	l/kWh	**0.86**	0.94	0.92	
Air – gas emissions					
Direct greenhouse gas emissions(4) due to electricity and heating generation (including facilities not subject to quotas) ● ●	Mt	**34.9**	50.5	47.7	305-1
of which CO_2 emissions(4) from coal-fired power plants	Mt	**8.8**	21.7	19.7	305-1
CO_2 emissions due to oil and gas exploration and production	kt	**117.4**	134.9	57.2	305-1

● 2018 indicator audited for limited assurance by KPMG SA.
● ● 2017 indicator audited for limited assurance by KPMG SA.
(1) Global Reporting Initiative.
(2) Excluding legal fees for final court decisions.
(3) Including companies covered by the Group's ISO 14001 certification and excluding companies managed independently.
(4) The emission factor for the combustion of gas changed, applicable as of 2018, from 0.205 kg CO_2/kWh LVH to 0.187 kg CO_2/kWh. he 2018 figure includes the sale of commercial and industrial segments in the United States (10 Mt CO_2 eq).

Summary of indicators

CONTINUED	Unit	2018	2017	2016	GRI Ref.(1)
Direct greenhouse gas emissions (Scope 1 of the Group's GHG assessment)	Mt CO_2 eq.	**35.7**	51.3	48.5	305-3
Indirect greenhouse gas emissions (Scope 2 of the Group's GHG assessment)	Mt CO_2 eq.	**0.47**	0.5	0.6	305-3
Indirect greenhouse gas emissions (Scope 3 of the Group's GHG assessment)	Mt CO_2 eq.	**110.8**	109.6	94.0	305-3
Indirect greenhouse gas emissions from the combustion of gas purchased for sale to end-customers(2) – Scope 3 ●	Mt CO_2 eq.	**54.0**	48.8	47.5	305-3
Indirect greenhouse gas emissions from electricity purchased to serve our end customers – Scope 3	Mt CO_2 eq.	**18.9**	15.4	14.0	305-3
CH_4 emissions	kt CO_2 eq.	**37.0**	45.8	44.4	
N_2O emissions	kt CO_2 eq.	**172.0**	186.9	267.1	
SF_6 emissions – EDF ●	kt CO_2 eq.	**48.8**	38.5	52.1	
SF_6 emissions ●	kt CO_2 eq.	**65.1**	53.0	67.5	
SO_2 emissions ●	kt	**20.7**	31.2	37.3	305-7
NOx emissions ●	kt	**45.1**	63.0	59.5	305-7
Dust ●	t	**3,291**	4,170	2,783	305-7
PM10 particulate matter – EDF	t	**219**	337	315	
PM10 particulate matter – EDF, EDF Energy, PEI and the Polish companies (until 13 November 2017)	t	**456**	762	1,449	305-7
PM2.5 particulate matter – EDF	t	**29**	66	65	
PM2.5 particulate matter – EDF, EDF Energy, PEI and the Polish companies (until 13 November 2017)	t	**226**	267	217	305-7
VOCs*	t	**1,001**	1,184	1,356	305-7
VOCs – EDF	t	**29.16**	44.11	32.02	305-7
Mercury – EDF	t	**0.015**	0.023	0.02	305-7
Mercury(3)	t	**0.43**	0.10	0.21	305-7
CH_4 emissions from gas network leaks resulting from Edison's gas production/distribution activity	kt CO_2 eq.	**1.2**	2.8	2.1	305-1
Conventional waste					
Hazardous waste	t	**58,833**	52,659	51,643	306-2
Non-hazardous waste	t	**417,151**	557,454	623,957	306-2
Conventional industrial waste recycled or transported for recycling	t	**414,627**	518,591	607,171	306-2
Ash produced	kt	**487**	1,105	1,205	306-2
Recycling rate for conventional waste	%	**87.1**	85.0	89.9	
Recycling rate for conventional waste – EDF	%	**92.4**	92.9	95.3	
Recycling rate for conventional waste – EDF Energy	%	**95.7**	96.8	99.1	

● 2018 indicator audited for limited assurance by KPMG SA.
(1) Global Reporting Initiative.
(2) The emission factor for gas combustion has been reduced from 0.205 kg CO_2/kWh PCI to 0.187 kg CO_2/kWh. The new factor will be applied from 2018 onwards.
(3) The 2018 Group value now include the emission from Dalkia plants (0.36 tonnes in 2018). Excluding Dalkia, the 2018 Group value would be 0.07 tonnes lower than in 2017.
* For Group entities other than EDF DPIT and SEI, this estimate is calculated based on consumption of fuels (coal, HFO, LFO, NG, biomass) and default emission factors defined by the EEA.

CONTINUED	Unit	2018	2017	2016	GRI Ref.(1)
Waste associated with oil and gas activities – Edison					
Hazardous waste	t	**493**	411	520	
Non-hazardous waste(2)	t	**4,991**	11,957	13,476	
Total conventional waste	t	**5,484**	12,368	13,996	
Recycled conventional industrial waste	t	**112**	102	206	
Energy					
Renewable energy: electricity generated from hydro sources (including marine) ●	TWh	**51.6**	40.9	46.6	
Renewable energy: electricity and heating generated from renewable resources (excluding hydro) ●	TWh	**26.1**	22.6	20.9	
Direct energy consumption, by primary source					
Internal consumption, pumping electricity	TWh	**7.3**	7.1	7.0	302-1
Internal consumption, pumping electricity (excluding pumping)	TWh	**22.3**	22.3	20.4	302-1
Average power plant efficiency					
Gas		**0.60**	0.66	0.61	
Coal		**0.37**	0.47	0.45	

● 2018 indicator audited for limited assurance by KPMG SA.
(1) Global Reporting Initiative.
(2) The methodology for nuclear waste from decommissioning and operations was updated in 2016 (see section 3.9.2.2 "Methodology for social and environmental data"). In 2018, the methodology for waste from decommissioning and industrial operations was updated as part of the consolidation of Framatome. Framatome accounted for 1,383 m³ of Very low-level radioactive waste (VLLW) from decommissioning and industrial operations.

Summary of indicators

Group nuclear indicators in France[1]

	Unit	2018	2017	2016	GRI Ref.[1]
Shutdowns and events					
Automatic shutdowns	Nb. of reactors/ 7,000 h	**0.31**	0.41	0.48	
Events and incidents (INES scale level 1)	Number	**74**	66	55	
Events and incidents (INES scale level 2)	Number	**0**	4	0	
Events and incidents (INES scale level 3 and higher)	Number	**0**	0	0	
Dosimetry					
Average collective dose	m-Sv/reactor	**0.67**	0.61	0.76	
Individual dose (no. of workers exposed to more than 20 mSv)	Number	**0**	0	0	
Individual dose (no. of workers exposed to more than 16 mSv)	Number	**0**	0	0	
Dose to the most exposed member of the public[2]	mSv/year	**0.001**	0.001	0.001	
Radioactive effluents released into water[3]					
Carbon-14 ●	GBq/oper. unit	**9.314**	9.539	12.853 (11.712)*	306-1
Tritium ●	TBq/oper. unit	**17.169**	15.592	17.423 (17.105)*	306-1
Radioactive atmospheric emissions[3]					
Carbon-14 ●	TBq/oper. unit	**0.163**	0.148	0.161 (0.156)*	305-7
Tritium ●	TBq/oper. unit	**0.419**	0.447	0.640 (0.455)*	305-7
Fuel					
Nuclear fuel load ●	t	**1,095**	1,104	1,042	
Disposed spent nuclear fuel	t	**1,086**	1,161	1,170	
Nuclear waste from decommissioning & industrial operations					
Very low-level radioactive waste (VLLW)[4] ●	m³	**4,111**	1,186	2,171	
Low- and intermediate-level radioactive waste (LILW)[3] ●	m³	**321**	410	443	
Waste sent to Centraco processing plant	t	**442**	479	453	
Operational nuclear waste					
Solid very low-level radioactive waste[4] ●	m³	**3,289.3**	3,535.9	3,472.1	
	m³/TWh		–	8.849	
Solid low- and intermediate-level short-lived radioactive waste[4] ●	m³	**5,827.4**	5,603.4	5,687.0	
	m³/TWh		–	14.764	
Solid high- and intermediate-level long-lived radioactive waste ●	m³	**315.4**	300	300	
	m³/TWh		–	0.873	
Waste sent to Centraco processing plant	t	**442**	479	453	

● 2018 indicator audited for limited assurance by KPMG SA.
NB. To ensure consistency of measurement units, radioactive waste is converted into m³. The previous m³/TWh values are shown for information purposes. Radioactive waste is shown by reactor and operational unit.
(1) The Group scope in France includes EDF and Socodei.
(2) Based on analyses conducted by the ISRN, the dosimetry of the public near EDF nuclear power plants in France is less than 0.001 mSv per year (1,000 times less than the dosage limit for the public). See the Radiology Report France dated 30 January 2019. https://www.irsn.fr/FR/expertise/rapports_expertise/Documents/environnement/IRSN-ENV_Bilan-Radiologique-France-2015-2017.pdf
(3) The nuclear waste methodology was updated in 2017 (see section 3.9.2.2 "Methodology for social and environmental data").
(4) The methodology for nuclear waste from decommissioning and operations was updated in 2016 (see section 3.9.2.2 "Methodology for social and environmental data"). In 2018, the methodology for waste from decommissioning and industrial operations was updated as part of the consolidation of Framatome. Framatome accounted for 1,383 m³ of Very low-level radioactive waste (VLLW) from decommissioning and industrial operations in 2018.
* The values calculated using the new methodology are shown in brackets.

Nuclear indicators – Framatome

	Unit	2018	2017	2016	GRI Ref.
Events					
Events and incidents (INES scale level 1)	Number	**4**	–	–	
Events and incidents (INES scale level 2)	Number	**0**	–	–	
Events and incidents (INES scale level 3 and higher)	Number	**0**	–	–	
Dosimetry – Annual individual dose					
France	m-Sv/hour	**25.7**	–	–	
Germany	m-Sv/hour	**584.7**	–	–	
United States	m-Sv/hour	**2,270.1**	–	–	
Belgium	m-Sv/hour	**-**	–	–	
Spain	m-Sv/hour	**71.8**			

Group nuclear indicators in the United Kingdom

	Unit	2018	2017	2016	GRI Ref.
Shutdowns and events					
Automatic shutdowns	Nb. of reactors/ 7,000 h	**0.89**	0.49	0.33	
Events and incidents (INES scale level 1)	Number	**7**	6	4	
Events and incidents (INES scale level 2)	Number	**1**	0	0	
Events and incidents (level 3 and higher on the INES scale)	Number	**0**	0	0	
Dosimetry					
Average collective dose – AGR[1]	m-Sv/reactor	**0.05**	0.02	0.021	
Average collective dose – PWR[2]	m-Sv/reactor	**0.1**	0.296	0.554	
Individual dose (no. of workers exposed to more than 20 mSv)	Number	**0**	0	0	
Individual dose (no. of workers exposed to more than 16 mSv)	Number	**0**	0	0	
Dose to the most exposed member of the public	mSv/year	**0.006**	0.0080	0.0066	
Radioactive effluents released into water					
Tritium – AGR ●	TBq/reactor	**142.973**	154.770	156.154	306-1
Tritium – PWR ●	TBq/reactor	**11.309**	31.928	23.374	306-1
Radioactive atmospheric emissions					
Carbon-14 – AGR[1] ●	TBq/reactor	**0.764**	0.889	0.762	305-7
Carbon-14 – PWR[2] ●	TBq/reactor	**0.206**	0.221	0.231	305-7
Fuel					
Disposed uranium ●	t	**194**	197	180	
Nuclear waste					
Disposed low-level radioactive waste ●	m³	**474**	453	774	
Intermediate-level radioactive waste generated ●	m³	**161**	161	161	

● 2018 indicator audited for limited assurance by KPMG.
(1) Advanced gas-cooled reactor: reactor developed in the United Kingdom.
(2) Pressurised Water Reactor – the most commonly used nuclear reactors worldwide.

Summary of indicators

Group nuclear indicators in the United States

	Unit	2018	2017	2016	GRI Ref.
Shutdowns and events					
Automatic shutdowns	Nb. of reactors/ 7,000 h	**0.2**	0.4	0.8	
Events and incidents (level ≥ 1)	Nb. of reactors/year	**0.2**	0.6	0.2	
Dosimetry					
Average collective dose – BWR(1)	m-Sv/reactor	**1.97**	0.745	1.310	
Average collective dose – PWR(2)	m-Sv/reactor	**0.286**	0.494	0.299	
Individual dose (no. of workers exposed to more than 20 mSv)	Number	**0**	0	0	
Individual dose (no. of workers exposed to more than 16 mSv)	Number	**0**	0	10	
Dose to the most exposed member of the public	mSv/year	**na**	0.14	0.15	
Radioactive effluents released into water					
Tritium	TBq/reactor	**14.17**	13.11	9.96	306-1
Radioactive atmospheric emissions					
Tritium	TBq/reactor	**1.38**	2.21	2.89	305-7
Carbon-14	TBq/reactor	**0.32**	0.40	0.40	305-7
Fuel					
Uranium delivered	t	**112**	82.5	98.3	
Unloaded uranium	t	**111**	84.2	96.8	
Nuclear waste					
Disposed low- and intermediate-level radioactive waste	m^3	**1,290**	820	1,418	

● 2018 indicator audited for limited assurance by KPMG SA.
NB. All data is presented in raw values without taking account of EDF's holding in the company (49.99%). Measurements from previous years have been converted into raw values.
(1) Boiling water reactor: power reactors used in some American power plants.
(2) Pressurised water reactor: the most commonly used nuclear reactors worldwide.
na: not available at the date of publication.

Social indicators

EDF group	Unit	2018	2017	2016	GRI Ref.
Workforce at 31 December and breakdown					
EDF	Number	**65,368**	66,789	68,464	102-8
Enedis	Number	**38,691**	38,888	38,742	102-8
TOTAL EDF group ●●	Number	**165,790**	152,033	154,845	102-8
Total workforce in full-time equivalents (FTE)	Number	**162,209**	148,785	154,808	102-8
Managers	Number	**52,366**	45,517	45,474	102-8
Non-management employees	Number	**113,424**	106,515	109,372	102-8
Employees by age					
Under 25 ●●	%	**7**	7	7	102-8
25 to 35 ●●	%	**29**	30	29	102-8
36 to 45 ●●	%	**26**	26	26	102-8
46 to 55 ●●	%	**26**	26	27	102-8
56 and over ●●	%	**12**	11	11	102-8
Gender equality					
Male workforce ●●	Number	**124,889**	112,504	114,503	102-8
Female workforce ●●	Number	**40,901**	39,529	40,342	102-8
Male managers ●	Number	**37,888**	32,654	32,941	102-8
Female managers ●	Number	**14,478**	12,863	12,533	102-8
Women at managerial level(1)	%	**35**	32.5	31.06	102-8
Women managers(2)	%	**27.6**	28.3	27.6	102-8
Women in Management committees(3) ●	%	**26.3**	–	–	405-1
Hires/departures					
Hires	Number	**9,809**	9,398	7,724	401-1
Retirements/inactive employees	Number	**3,775**	5,031	6,591	401-1
Resignations(4)	Number	**3,141**	2,397	2,062	401-1
Redundancies, dismissals, employees made inactive	Number	**1,114**	2,140	1,882	401-1
Turnover(5)	%	**5.4**	6.13	5.89	401-1
Change in scope					
Other arrivals(6)	Number	**6,739**	9,999	8,270	401-1
Other departures(6)	Number	**8,562**	7,825	8,152	401-1
Remuneration					
Total gross remuneration	Millions of euros	**See note 10.1 "Personnel expenses" in the 2018 Reference Document**	See note 10.1 "Personnel expenses" in the 2018 Reference Document	See note 10.1 "Personnel expenses" in the 2018 Reference Document	
Part-time employees	Number	**10,406**	9,264	10,061	102-8

● 2018 indicator audited for limited assurance by KPMG SA.
●● 2018 indicator audited for reasonable assurance by KPMG SA.
(1) This percentage represents the number of women in managerial positions/the number of female employees.
(2) This percentage represents the number of women in managerial positions/the number of managers (male managers + female managers).
(3) Reported since 2018, this percentage represents the number of women on Management Committees compared with the total number Management Committee members.
(4) 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".
(5) Turnover is calculated as follows: entries (number of hires) + exits from the workforce (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.
(6) Entries and exits from the scope are accounted for under "Other arrivals" and "Other departures" respectively. Entries of work-study employees are accounted for under "Other entries".

Summary of indicators

(CONTINUED)	Unit	2018	2017	2016	GRI Ref.
Absenteeism					
Average number of days lost through illness or accidents ●	Number	**9.12**	9.19	9.55	403-2
Health and safety					
Employee fatal accidents* ●	Number	**6**	6	1	403-2
Fatal accidents of service provider employees* ●	Number	**3**	9	9	403-2
Employee accident frequency rate(1) ●		**2.7**	2.7	2.7	403-2
Employee workplace accidents involving at least one lost day ●	Number	**667**	613	645	403-2
Accident severity rate(2) ●		**0.13**	0.15	0.16	
Employee relations					102-41
Employees covered by collective bargaining agreements	%	**88**	89	91	
Training					404-1
Total hours of training provided ●	Number	**7,629,101**	7,830,735	8,306,479	
Employees benefiting from training ●	Number	**138,131**	129,479	133,130	404-1
Employees who took training(3)	%	**83**	83.7	85.9	404-1
Training budget	€M	**620**	617	663	
Employment and integration of employees with disabilities					
Employees with disabilities(4) ●	Number	**5,640**	5,279	5,211	102-8

● 2018 indicator audited for reasonable assurance by KPMG SA.
* For fatalities that are directly work-related, see page 23.
(1) The frequency rate represents the number of workplace accidents involving at least one lost day for every million hours worked.
(2) The accident severity rate represents the number of days lost for every thousand hours worked.
(3) The percentage of employees benefiting from training represents the number of employees who took training out of the physical headcount at the end of the period.
(4) In certain subsidiaries, this data is declarative.

EDF SA	Unit	2018	2017	2016	GRI Ref.
Workforce at 31/12 and breakdown					
Employees covered by collective bargaining agreements (at 31/12)	Number	**61,064**	62,501	64,300	102-8
Employees under unlimited-term contracts not covered by collective bargaining agreements	Number	**535**	505	487	102-8
Employees under fixed-term contracts not covered by collective bargaining agreements	Number	**3,769**	3,783	3,677	102-8
Total employees not covered by collective bargaining agreements	Number	**4,304**	4,288	4,164	102-8
Total workforce	Number	**65,368**	66,789	68,464	102-8
Managers	Number	**29,466**	29,728	30,404	102-8
Non-management employees	Number	**35,902**	37,061	38,060	102-8
Technicians and supervisory staff	Number	**29,811**	30,551	31,354	102-8
Operatives	Number	**6,091**	6,510	6,705	102-8
Gender equality					
Male workforce	Number	**45,364**	47,260	47,490	102-8
Female workforce	Number	**20,004**	20,604	20,974	102-8
Male managers	Number	**20,698**	20,996	21,718	102-8
Female managers	Number	**8,768**	8,732	8,686	102-8
Women at managerial level	%	**29.7**	29.4	28.6	102-8
Hires/departures					
New hires	Number	**1,367**	1,890	1,889	401-1
Integration and reintegration	Number	**272**	284	278	401-1
Retirements/inactive employees	Number	**1,633**	2,775	3,696	401-1
Resignations	Number	**246**	158	146	401-1
Redundancies, dismissals, employees made inactive	Number	**21**	18	27	401-1
Deaths	Number	**74**	53	69	401-1
Change of scope					
Other arrivals(1)	Number	**2,861**	2,689	2,589	401-1
Other departures(2)	Number	**3,666**	3,536	3,935	401-1
Overtime					
Overtime worked	In Thousands	**3,286**	3,161	2,887	
Outside contractors					
Monthly average of temporary employees	Number	**1,067**	1,120	1,315	
Organisation of working time					
Full-time employees	Number	**60,570**	61,821	62,641	
Part-time employees	Number	**4,797**	4,967	5,822	
Employees working shifts	Number	**6,451**	6,530	6,597	
Absenteeism					
Absenteeism	%	**3.8**	3.8	3.8	403-2
Hours of maternity or paternity leave/hours worked	%	**0.9**	0.9	0.90	403-2

(1) Excluding arrivals and departures on seasonal short-term contracts.
(2) Excluding arrivals and departures on seasonal short-term contracts.

CONTINUED	Unit	2018	2017	2016	GRI Ref.
Health and safety					
Work-related illnesses reported[1] ●	Number	**19**	27	29	403-2
Fatal accidents	Number	**3**	2	0	403-2
Employee accident frequency rate		**2.2**	1.9	2.28	403-2
Accident severity rate		**0.11**	0.14	0.127	403-2
Workplace accidents involving at least one lost day	Number	**209**	181	228	403-2
Remuneration – Personnel expenses – Profit-sharing					
Main monthly remuneration					
Managers	€	**4,591**	4,546	4,518	
Technicians and supervisory staff	€	**2,624**	2,605	2,618	
Operatives	€	**1,913**	1,888	1,889	
Personnel expenses	€M	**6,595**	6,428	6,597	
Average amount of profit-sharing per employee	€	**1,468**	1,419	2,000	
Employee relations					
Number of collective agreements signed (France)	Number	**6**	7	19	102-41
Percentage of employees covered by collective agreements[2]	%	**93**	91	93.5	
Training					
Employees benefiting from training	Number	**57,674**	59,000	61,056	401
Employment and integration of employees with disabilities					
Employees with disabilities	Number	**2,247**	2,215	2,150	102-8
Employees with disabilities hired	Number	**66**	93	76	102-8
Welfare protection					
Committee budgets (fulfilling 1% requirement)	€M	**183**	187	183	

●2018 indicator audited for reasonable assurance by KPMG SA.
(1) See section "Further information on labour data" p. 226.
(2) EDF SA employees are not covered by a collective bargaining agreement in the French legal sense but by the Statut des Industries Électriques et Gazières (Statutes for Electricity and Gas Industry employees).

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EDF
22-30, avenue de Wagram
75382 Paris Cedex 08 – France
SA share capital €1,505,133,838
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edf.fr

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