CONSOLIDATED
FINANCIAL STATEMENTS
AT 31 DECEMBER 2019

Consolidated income statement

(in millions of euros)	Notes	2019 (1)	2018 (2)
Sales	7	71,317	68,546
Fuel and energy purchases	8	(35,091)	(33,056)
Other external expenses	9	(8,619)	(9,262)
Personnel expenses	10	(13,793)	(13,642)
Taxes other than income taxes	11	(3,798)	(3,690)
Other operating income and expenses	12	6,692	6,002
Operating profit before depreciation and amortisation		**16,708**	**14,898**
Net changes in fair value on energy and commodity derivatives, excluding trading activities	13	642	(224)
Net depreciation and amortisation		(9,994)	(8,775)
Net increases in provisions for replacement of property, plant and equipment operated under concessions		(8)	(50)
(Impairment)/reversals	14	(403)	(290)
Other income and expenses	15	(185)	(105)
Operating profit		**6,760**	**5,454**
Cost of gross financial indebtedness	16.1	(1,806)	(1,712)
Discount effect	16.2	(3,161)	(3,464)
Other financial income and expenses	16.3	4,606	378
Financial result	16	**(361)**	**(4,798)**
Income before taxes of consolidated companies		**6,399**	**656**
Income taxes	17	(1,581)	178
Share in net income of associates and joint ventures	26	818	569
Net income of discontinued operations	19	(454)	(212)
CONSOLIDATED NET INCOME		**5,182**	**1,191**
EDF net income		**5,155**	**1,177**
Net income of continuing operations		5,597	1,384
Net income of discontinued operations		(442)	(207)
Net income attributable to non-controlling interests		**27**	**14**
Net income of continuing operations		39	19
Net income of discontinued operations		(12)	(5)
Earnings per share (EDF share) in euros:	20		
Basic earnings per share		1.50	0.20
Diluted earnings per share		1.50	0.20
Basic earnings per share of continuing operations		1.65	0.27
Diluted earnings per share of continuing operations		1.65	0.27

(1) The financial statements at 31 December 2019 apply IFRS 16 from 1 January 2019 (using the modified retrospective approach). In accordance with the new standard's transition provisions, the comparative figures have not been restated (see note 2.1).

(2) The published figures for 2018 have been restated due to the impact of presenting the E&P operations as discontinued operations (see note 2.3).

In application of IFRS 5, the net income of discontinued operations is presented on a separate line of the income statement for the financial periods presented. The impact of application of IFRS 5 on the published figures for 2018 is presented in note 2.3.

Consolidated statement of comprehensive income

(in millions of euros)	2019 (1)			2018		
	EDF net income	Net income attributable to non-controlling interests	Total	EDF net income	Net income attributable to non-controlling interests	Total
Consolidated net income	**5,155**	**27**	**5,182**	**1,177**	**14**	**1,191**
Gross change in fair value of hedging instruments (2)	818	(55)	763	34	(19)	15
Related tax effect	(367)	2	(365)	(89)	-	(89)
Associates' and joint ventures' share of fair value of hedging instruments	2	-	2	(7)	-	(7)
Change in fair value of hedging instruments	***453***	***(53)***	***400***	***(62)***	***(19)***	***(81)***
Translation adjustments – controlled entities	732	357	1,089	(38)	(79)	(117)
Translation adjustments – associates and joint ventures	90	-	90	117	-	117
Translation adjustments	***822***	***357***	***1,179***	***79***	***(79)***	***-***
Gross change in fair value of debt instruments (2)	293	-	293	(115)	-	(115)
Related tax effect	(93)	-	(93)	42	-	42
Associates' and joint ventures' share of fair value of debt instruments	5	-	5	(1)	-	(1)
Change in fair value of debt instruments	***205***	***-***	***205***	***(74)***	***-***	***(74)***
Gains and losses recorded in equity with recycling	**1,480**	**304**	**1,784**	**(57)**	**(98)**	**(155)**
Gross change in fair value of equity instruments (2)	(22)	-	(22)	(37)	-	(37)
Related tax effect	-	-	-	-	-	-
Associates' and joint ventures' share of fair value of equity instruments	-	-	-	-	-	-
Change in fair value of equity instruments	***(22)***	***-***	***(22)***	***(37)***	***-***	***(37)***
Gross change in actuarial gains and losses on post-employment benefits (3)	(2,501)	39	(2,462)	3,141	11	3,152
Related tax effect	(62)	(7)	(69)	(309)	(1)	(310)
Associates' and joint ventures' share of change in actuarial gains and losses on post-employment benefits	(153)	-	(153)	69	-	69
Change in actuarial gains and losses on post-employment benefits	***(2,716)***	***32***	***(2,684)***	***2,901***	***10***	***2,911***
Gains and losses recorded in equity with no recycling	**(2,738)**	**32**	**(2,706)**	**2,864**	**10**	**2,874**
Total gains and losses recorded in equity	**(1,258)**	**336**	**(922)**	**2,807**	**(88)**	**2,719**
CONSOLIDATED COMPREHENSIVE INCOME	3,897	363	4,260	3,984	(74)	3,910
Comprehensive income of continuing operations	4,337	375	4,712	4,191	(69)	4,122
Comprehensive income of discontinued operations	(440)	(12)	(452)	(207)	(5)	(212)

(1) The financial statements at 31 December 2019 apply IFRS 16 from 1 January 2019 (using the modified retrospective approach). In accordance with the new standard's transition provisions, the comparative figures have not been restated (see note 2.1).

(2) Gross changes in fair value recycled to profit and loss in respect of debt and equity securities and hedging instruments are presented in notes 39.2 and 44.4 respectively.

(3) Gross changes in actuarial gains and losses are presented in note 34.1.2.

Consolidated balance sheet

ASSETS *(in millions of euros)*	Notes	31/12/2019 (1)	31/12/2018
Goodwill	21	10,623	10,195
Other intangible assets	22	9,350	9,918
Property, plant and equipment operated under French public electricity distribution concessions	23	58,413	56,515
Property, plant and equipment operated under concessions for other activities	24	6,860	7,339
Property, plant and equipment used in generation and other tangible assets owned by the Group, including right-of-use assets	25	89,099	78,252
Investments in associates and joint ventures	26	6,414	8,287
Non-current financial assets	39	46,219	37,104
Other non-current receivables	29	1,930	1,796
Deferred tax assets	17.3	557	978
Non-current assets		**229,465**	**210,384**
Inventories	27	14,049	14,227
Trade receivables	28	15,606	15,910
Current financial assets	39	29,401	31,143
Current tax assets		286	869
Other current receivables	29	6,881	7,346
Cash and cash equivalents	40	3,934	3,290
Current assets		**70,157**	**72,785**
Assets classified as held for sale	46	3,662	-
TOTAL ASSETS		**303,284**	**283,169**

EQUITY AND LIABILITIES *(in millions of euros)*	Notes	31/12/2019 (1)	31/12/2018
Capital	30	1,552	1,505
EDF net income and consolidated reserves		44,914	42,964
Equity (EDF share)		**46,466**	**44,469**
Equity (non-controlling interests)	30.5	9,324	8,177
Total equity	30	**55,790**	**52,646**
Provisions related to nuclear generation – back-end of the nuclear cycle, plant decommissioning and last cores	31	55,583	49,204
Other provisions for decommissioning	31	1,573	2,033
Provisions for employee benefits	34	20,539	17,627
Other provisions	31	3,065	2,908
Non-current provisions	31	***80,760***	***71,772***
Special French public electricity distribution concession liabilities	36	47,465	46,924
Non-current financial liabilities	41	57,002	52,129
Other non-current liabilities	38	4,928	4,896
Deferred tax liabilities	17.3	2,295	1,987
Non-current liabilities		**192,450**	**177,708**
Current provisions	31	5,556	6,010
Trade payables	37	12,867	13,421
Current financial liabilities	41	18,535	17,167
Current tax liabilities		433	205
Other current liabilities	38	16,610	16,012
Current liabilities		**54,001**	**52,815**
Liabilities related to assets classified as held for sale	46	1,043	-
TOTAL EQUITY AND LIABILITIES		**303,284**	**283,169**

(1) The financial statements at 31 December 2019 apply IFRS 16 from 1 January 2019 (using the modified retrospective approach). In accordance with the new standard's transition provisions, the comparative figures have not been restated (see note 2.1).

Consolidated cash flow statement

(in millions of euros)	Notes	2019 [1]	2018 [2]
Operating activities:			
Income before taxes		**5,983**	**473**
Income before taxes of discontinued operations		**(416)**	**(183)**
Income before taxes of consolidated companies		**6,399**	**656**
Impairment/(reversals)		403	290
Accumulated depreciation and amortisation, provisions and changes in fair value		8,328	12,957
Financial income and expenses		97	718
Dividends received from associates and joint ventures		349	387
Capital gains/losses		(508)	(1,014)
Change in working capital	47.1	452	470
Net cash flow from operations		***15,520***	***14,464***
Net financial expenses disbursed		(798)	(1,048)
Income taxes paid		(922)	(309)
Net cash flow from continuing operating activities		**13,800**	**13,107**
Net cash flow from operating activities relating to discontinued operations		**222**	**257**
Net cash flow from operating activities		**14,022**	**13,364**
Investing activities:			
Acquisitions of equity investments, net of cash acquired		(456)	(484)
Disposals of equity investments, net of cash transferred		293	1,261
Investments in intangible assets and property, plant and equipment	47.2	(16,709)	(16,016)
Net proceeds from sale of intangible assets and property, plant and equipment		94	577
Changes in financial assets		1,294	(2,367)
Net cash flow from continuing investing activities		**(15,484)**	**(17,029)**
Net cash flow from investing activities relating to discontinued operations		**(166)**	**(136)**
Net cash flow from investing activities		**(15,650)**	**(17,165)**
Financing activities:			
Transactions with non-controlling interests [3]		1,055	1,548
Dividends paid by parent company	30.3	(58)	(511)
Dividends paid to non-controlling interests		(155)	(183)
Purchases/sales of treasury shares		(14)	(3)
Cash flows with shareholders		***828***	***851***
Issuance of borrowings		9,080	5,711
Repayment of borrowings		(6,976)	(2,724)
Issuance of perpetual subordinated bonds	3.3.2	493	1,243
Redemptions of perpetual subordinated bonds	3.3.3	(1,280)	(1,329)
Payments to bearers of perpetual subordinated bonds	30.4	(589)	(584)
Funding contributions received for assets operated under concessions		143	131
Investment subsidies		543	351
Other cash flows from financing activities		***1,414***	***2,799***
Net cash flow from continuing financing activities		**2,242**	**3,650**
Net cash flow from financing activities relating to discontinued operations		**(19)**	**(120)**
Net cash flow from financing activities		**2,223**	**3,530**
Net cash flow from continuing operations		558	(272)
Net cash flow from discontinued operations		37	1
Net increase/(decrease) in cash and cash equivalents		**595**	**(271)**
CASH AND CASH EQUIVALENTS - OPENING BALANCE		3,290	3,692
Net increase/(decrease) in cash and cash equivalents		595	(271)
Effect of currency fluctuations		(5)	(95)
Financial income on cash and cash equivalents		17	13
Effect of reclassifications		37	(49)
CASH AND CASH EQUIVALENTS - CLOSING BALANCE	40	3,934	3,290

(1) The financial statements at 31 December 2019 apply IFRS 16 from 1 January 2019 (using the modified retrospective approach). In accordance with the new standard's transition provisions, the comparative figures have not been restated (see note 2.1).

(2) The published figures for 2018 have been restated due to the impact of presenting the E&P operations as discontinued operations (see note 2.3).

(3) Contributions via capital increases, or capital reductions and acquisitions of additional interests or disposals of interests in controlled companies. In 2019, this item includes an amount of €968 million relating to CGN's payment for the NNB Holding Ltd. and Sizewell C Holding Co capital increases (€743 million at 31 December 2018). In 2018 it also included an amount of €797 million relating to the sale of 49% of EDF Renewables' wind farms (see note 3.5.1).

Change in consolidated equity

Details of the change in equity between 1 January and 31 December 2019 are as follows:

(in millions of euros)	Capital	Treasury shares	Translation adjustments [1]	Fair value adjustment of financial instruments (OCI with recycling) [2]	Other consolidated reserves and net income [3]	**Equity (EDF share)**	Equity (non-controlling interests)	**Total equity**
Equity restated under IFRS 9 at 01/01/2018	**1,464**	**(40)**	**136**	**(1,720)**	**41,517**	**41,357**	**7,341**	**48,698**
Gains and losses recorded in equity	-	-	79	(136)	2,864	**2,807**	(88)	**2,719**
Net income	-	-	-	-	1,177	**1,177**	14	**1,191**
Consolidated comprehensive income			**79**	**(136)**	**4,041**	**3,984**	**(74)**	**3,910**
Payments on perpetual subordinated bonds	-	-	-	-	(584)	**(584)**	-	**(584)**
Issuance/Redemption of perpetual subordinated bonds	-	-	-	-	(86)	**(86)**	-	**(86)**
Dividends paid	-	-	-	-	(1,360)	**(1,360)**	(183)	**(1,543)**
Purchases/sales of treasury shares	-	(16)	-	-	-	**(16)**	-	**(16)**
Capital increase by EDF [4]	41	-	-	-	806	**847**	-	**847**
Other changes [5]	-	-	-	-	327	**327**	1,093	**1,420**
Equity as published at 31/12/2018	**1,505**	**(56)**	**215**	**(1,856)**	**44,661**	**44,469**	**8,177**	**52,646**
IFRIC 23 restatements (see note 2.2)	-	-	-	-	(10)	**(10)**	-	**(10)**
Equity restated at 01/01/2019	**1,505**	**(56)**	**215**	**(1,856)**	**44,651**	**44,459**	**8,177**	**52,636**
Gains and losses recorded in equity	-	-	822	658	(2,738)	**(1,258)**	336	(922)
Net income	-	-	-	-	5,155	**5,155**	27	5,182
Consolidated comprehensive income	**-**	**-**	**822**	**658**	**2,417**	**3,897**	**363**	**4,260**
Payments on perpetual subordinated bonds	-	-	-	-	(589)	**(589)**	-	(589)
Issuance/Redemption of perpetual subordinated bonds (see notes 3.3.2 and 3.3.3)	-	-	-	-	(1,125)	**(1,125)**	-	(1,125)
Dividends paid	-	-	-	-	(941)	**(941)**	(155)	(1,096)
Purchases/sales of treasury shares	-	(8)	-	-	-	**(8)**	-	(8)
Capital increase by EDF [6]	47	-	-	-	834	**881**	-	881
Other changes [7]	-	-	-	-	(108)	**(108)**	939	831
EQUITY AT 31/12/2019	**1,552**	**(64)**	**1,037**	**(1,198)**	**45,139**	**46,466**	**9,324**	**55,790**

(1) Changes in translation adjustments amount to €822 million at 31 December 2019, mainly relating to the pound sterling and the recycling of Alpiq's conversion reserves to profit and loss following the sale of 28 May 2019.

(2) Changes in reserves recorded in OCI (Other Comprehensive Income) with recycling are shown in the Statement of Comprehensive Income. They correspond to the effects of fair value adjustments of debt securities and financial instruments hedging cash flows and net foreign investments, and amounts recycled to profit and loss in respect of terminated contracts and debt instruments transferred.

(3) Fair value changes recorded in OCI with no recycling are presented in the "Other consolidated reserves and net income" column.

(4) In 2018, the changes in capital and other consolidated reserves (issue premium) relate to payment of the balance of the scrip dividend for 2017 totalling €847 million.

(5) In 2018, the changes in consolidated reserves and equity (non-controlling interests) include in particular the effect of the sale of 49% of EDF Renewables' wind farms. "Other changes" in equity (non-controlling interests) also include the capital increases funded by CGN for NNB Holding Ltd. and Sizewell C Holding Co amounting to €743 million, and the effects of the sale of Dunkerque LNG amounting to €(433) million.

(6) In 2019, the changes in capital and other consolidated reserves (issue premium) relate to payment of the balance of the scrip dividend for 2018 and the interim dividend for 2019 totalling €881 million (see note 30.1).

(7) In 2019, "Other changes" in equity (non-controlling interests) include the effect of capital increases funded by CGN for NNB Holding Ltd. and Sizewell C Holding Co. amounting to €967 million.

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Electricité de France (EDF or the "Company") is a French société anonyme governed by French law, and registered in France.

The consolidated financial statements reflect the accounting position of the Company and its subsidiaries (which together form the "Group") and the Group's interests in associates, joint arrangements classified as joint operations, and joint ventures, for the year ended 31 December 2019.

The Group is an integrated energy operator engaged in all aspects of the energy business: generation, transmission, distribution, supply, trading, energy services, production of equipment and fuel assemblies, and reactor services.

The Group's consolidated financial statements at 31 December 2019 were prepared under the responsibility of the Board of Directors and approved by the Directors at the Board meeting held on 13 February 2020. They will become final after approval at the General Shareholders' Meeting to be held on 7 May 2020.

NOTE 1 GROUP ACCOUNTING POLICIES

1.1 DECLARATION OF CONFORMITY AND GROUP ACCOUNTING POLICIES

Pursuant to European regulation 1606/2002 of 19 July 2002 on the adoption of international accounting standards, the EDF group's consolidated financial statements at 31 December 2019 are prepared under the presentation, recognition and measurement rules set out in the international accounting standards published by the IASB and approved by the European Union for application at 31 December 2019. These international standards are IAS (International Accounting Standards), IFRS (International Financial Reporting Standards), and SIC and IFRIC interpretations.

The Group has not opted for early application of standards and interpretations that were not yet mandatory in 2019.

1.2 CHANGES IN ACCOUNTING STANDARDS AT 31 DECEMBER 2019

The accounting and valuation methods applied by the Group in the consolidated financial statements at 31 December 2019 are identical to those used in the consolidated financial statements at 31 December 2018, with the exception of the following changes:

1.2.1 IFRS 16 "Leases"

IFRS 16 "Leases", which is mandatory for financial years beginning on or after 1 January 2019, was adopted by the European Union on 31 October 2017. The recognition and measurement principles that now apply to lease contracts are described in note 1.3.13, and the information required by IAS 8 and IFRS 16 about the effects of the new standard's application by the Group is provided in note 2.1.

1.2.2 IFRIC 23 "Uncertainty over income tax treatments"

This interpretation was adopted by the European Union on 23 October 2018 and is effective for financial years beginning on or after 1 January 2019.

It clarifies application of the provisions of IAS 12 "Income taxes" regarding recognition and measurement of income tax when fiscal uncertainty exists. The applicable methods are presented in note 1.3.8 and the impacts are described in note 2.2.

1.2.3 Annual improvements to IFRS, 2015 – 2017 cycle

These improvements were adopted by the European Union on 14 March 2019 and contain amendments to:

- IAS 23 "Borrowing costs": specific borrowings for a qualifying asset must be included in the general borrowings pool once construction of the qualifying asset is complete;
- IFRS 3 and IFRS 11: measurement of previously held interests in a joint operation when control or joint control is obtained;
- IAS 12 "Income taxes": recognition in profit and loss of the tax consequences of dividend distributions.

These amendments have no impact on the Group's consolidated financial statements.

1.2.4 Amendments to IAS 19 "Plan Amendment, Curtailment or Settlement"

These amendments were adopted by the European Union on 13 March 2019. They clarify that when a plan is amended, curtailed or settled during the accounting period, a company must update its actuarial assumptions at the date of the change to measure and record the current service cost and the net interest expense on the net defined benefit liability over the remainder of the reporting period, from the date of the change affecting the plan.

These amendments have been implemented by the Group for the settlement of the Framatome segment's US pension plan. They have no significant impact on the Group's consolidated financial statements (see note 34.1.1).

1.2.5 Amendments to IAS 28 "Long-term Interests in Associates and Joint Ventures"

These amendments were adopted by the European Union on 8 February 2019. They clarify that an entity should first apply IFRS 9 "Financial Instruments" for impairment of other interests in an associate or joint venture that form part of its net investment in that associate or joint venture but are not accounted for by the equity method.

These amendments have no impact on the Group's consolidated financial statements.

1.2.6 Amendments to IFRS 9 "Prepayment Features with Negative Compensation"

Under these amendments, which were adopted by the European Union on 22 March 2018, financial assets with an early redemption option that results in negative compensation qualify for measurement at amortised cost, subject to certain conditions.

These amendments have no impact on the Group's consolidated financial statements.

1.2.7 Standards, amendments and interpretations published by the IASB but not yet adopted by the European Union

Amendments to IFRS 3 "Business Combinations: Definition of a Business", published on 22 October 2018

These amendments are expected to apply to business combinations taking place from 1 January 2020. They aim to clarify the distinction between the purchase of a business and the purchase of a group of assets.

The Group does not currently anticipate that application of these amendments will have any impact.

1.2.8 Other decisions: Physical Settlement of Contracts to Buy or Sell a Non-financial Item (IFRS 9 Financial Instruments)

In March 2019 the IFRS Interpretations Committee published a decision regarding the accounting treatment of particular contracts to buy or sell a non-financial item in the future at a fixed price. This decision has no impact of the Group's current practice, nor on the presentation of its financial statements.

1.2.9 Standards, amendments and interpretations adopted by the European Union and applicable for financial years beginning on or after 1 January 2020

Interest Rate Benchmark Reform (Amendments to IFRS 9, IAS 39 and IFRS 7)

The Group has organised a progressive transition towards alternative risk-free rates (RFRs)[1], working with the finance, legal, risk and IT functions and all group entities. Meanwhile, the Group remains attentive to work by other entities and publications by official bodies, particularly IFRIC and IASB releases about the potential effects on hedge accounting.

The Group does not currently anticipate that application of these amendments will have any material impact.

1.3 SUMMARY OF THE PRINCIPAL ACCOUNTING AND VALUATION METHODS

The following accounting methods have been applied consistently through all the periods presented in the consolidated financial statements.

1.3.1 Valuation

The consolidated financial statements are prepared on a historical cost basis, with the exception of assets acquired and liabilities assumed through business combinations, and of certain financial instruments, which are stated at fair value.

1.3.2 Management judgements and estimates

The preparation of the financial statements requires the use of judgments, best estimates and assumptions in determining the value of assets and liabilities, income and expenses recorded for the period, considering positive and negative contingencies existing at year-end. The figures in the Group's future financial statements could differ significantly from current estimates due to changes in these assumptions or economic conditions.

In a context characterised by financial market volatility, the parameters used to prepare estimates are based on macro-economic assumptions appropriate to the very long-term cycle of Group assets.

The principal operations for which the Group uses estimates and judgments are the following:

1.3.2.1 Depreciation period of nuclear power plants in France

In the specific case of the depreciation period of its French nuclear power plants, the EDF group's industrial strategy is to continue operation beyond 40 years, in optimum conditions as regards safety and efficiency.

The depreciation period of 900MW series power plants was extended from 40 years to 50 years in 2016 (except for Fessenheim) since all the technical, economic and governance conditions were fulfilled. The depreciation period of other Group series in France (1300MW and 1450MW), which are more recent, is currently unchanged at 40 years, as the conditions for extension are not yet fulfilled.

These depreciation periods take into account the date of recoupling with the network after the most recent 10-year inspection.

The Tricastin plant's reactor 1 was reconnected to the grid on 23 December 2019 after the fourth 10-year inspection. This is the first 900MW series unit to pass the 40-year mark.

As explained in note 4.1, under the proposed new multi-year energy programme (PPE), two nuclear reactors would, subject to certain conditions, be shut down in 2027 and 2028, ahead of their fifth 10-year inspection. If this is confirmed in the final PPE adopted, it could lead to prospective modification of the depreciation period for the two units concerned. As this situation would bring forward the shutdown of two reactors in the Group's fleet by a few years, the potential effect on the annual depreciation expense, which will depend on the reactors selected for shutdown, is expected to be limited.

[1] *Alternative RFRs are set to become the new reference rates after the discontinuation of critical reference rates.*

1.3.2.2 Nuclear provisions

The measurement of provisions for the back-end of the nuclear cycle, decommissioning and last cores is sensitive to assumptions concerning technical processes, costs, inflation rates, long-term discount rates, the depreciation period of plants currently in operation and disbursement schedules.

As explained in note 4.1, under the proposed new PPE, two nuclear reactors would, subject to certain conditions, be shut down in 2027 and 2028, ahead of their fifth 10-year inspection. If this is confirmed in the final PPE adopted, it could lead to a change in the amount of corresponding nuclear provisions. As this situation would bring forward the shutdown of two reactors in the Group's fleet by a few years, the potential impact on nuclear provisions could be an increase of some tens of millions of euros, with an adjustment to the relevant balance sheet assets.

These parameters are therefore re-estimated at each closing date to ensure that the amounts accrued correspond to the best estimate of the costs eventually to be borne by the Group.

The Group considers that the assumptions used at 31 December 2019 are appropriate and justified. However, any future change in assumptions could have a significant impact on the Group's balance sheet and income statement.

The main assumptions and sensitivity analyses relating to nuclear provisions are presented in note 32.1.5.

The calculation of provisions incorporates a level of risks and unknowns as appropriate to the operations concerned. The valuation of costs carries uncertainty factors such as:

- changes in the regulations, particularly on safety, security and environmental protection, and financing of nuclear expenses;
- changes in the regulatory decommissioning process and the time necessary for issuance of administrative authorisation;
- future methods for storing long-lived radioactive waste and provision of storage facilities by the French agency for radioactive waste management ANDRA *(Agence nationale pour la gestion des déchets radioactifs)*;
- changes in certain financial parameters such as discount rates, notably in relation to the regulatory limit, inflation rates, or changes in the contractual terms of spent fuel management.

1.3.2.3 Pensions and other long-term and post-employment benefit obligations

The value of pensions and other long-term and post-employment benefit obligations is based on actuarial valuations that are sensitive to all the actuarial assumptions used, particularly concerning discount rates, inflation rates and wage increase rates.

The principal actuarial assumptions used to calculate these post-employment and long-term benefits at 31 December 2019 are presented in note 34. These assumptions are updated annually. The Group considers the actuarial assumptions used at 31 December 2019 appropriate and well-founded, but future changes in these assumptions could have a significant effect on the amount of the obligations and the Group's equity and net income. Sensitivity analyses are therefore presented in note 34.

1.3.2.4 Impairment of goodwill and long-term assets

Impairment tests on goodwill and long-term assets are sensitive to the macro-economic and segment assumptions used – particularly concerning energy price movements – and medium-term financial forecasts. The Group therefore revises the underlying estimates and assumptions based on regularly updated information.

These assumptions, which are specific to Group companies, are presented in note 14.

1.3.2.5 Financial instruments

In measuring the fair value of unlisted financial instruments (essentially energy contracts), the Group uses valuation models based on a certain number of assumptions subject to unforeseeable developments.

1.3.2.6 Energy supplied but not yet measured and billed

As explained in note 1.3.7, the quantities of energy supplied but not yet measured and billed are calculated at the reporting date based on consumption statistic models and selling price estimates. Determination of the unbilled portion of sales revenues at the year-end is sensitive to the assumptions used to prepare these statistics and estimates.

1.3.2.7 Obligations concerning French public distribution concession assets to be replaced

In view of the specific nature of French public electricity distribution concessions, the Group has opted to present its obligation to replace concession assets in the balance sheet at a value based on the amount of contractual commitments as calculated and disclosed to the concession-granting authorities in the annual business reports (see note 1.3.12.2.1). An alternative approach would be to value the obligations based on the present value of future payments necessary to replace these assets at the end of their industrial useful life. The impacts this alternative approach would have had on the accounts are shown in note 1.3.22 for information. Whatever valuation method is used, measurement of the concession liability concerning assets to be replaced is notably subject to unforeseeable developments in terms of costs, useful life and disbursement dates.

1.3.2.8 Deferred tax assets

The use of estimates and assumptions over recovery horizons is particularly important in the recognition of deferred tax assets.

1.3.2.9 Other judgements

- For the application of IFRS 10 and IFRS 11, the Group uses judgment to assess control or classify the type of partnership arrangement represented by a jointly-controlled entity.

  In particular, EDF has set up "reserved" investment funds for some of its funds set aside for secure financing of nuclear plant decommissioning expenses and long-term storage expenses for radioactive waste (see note 48.3). In view of the funds' characteristics, the prerogatives exercised by their managers and the procedures for defining the management strategies applicable to them, the Group considers that it does not have control, as defined by IFRS 10, over these funds. They are consequently treated as debt securities, in application of IFRS 9.

  Furthermore, through its subsidiary Edison, since 2014 the Group has held a 30% investment in Edens, with F2i. However, the governance arrangements and contractual agreements introduced for Edens in connection with this transaction give Edison exclusive control over the company. In application of IFRS 10, Edens is therefore fully consolidated (via Edison) in the Group's consolidated financial statements.
- When there is no standard or interpretation applicable to a specific transaction, the Group exercises judgment to define and apply accounting methods that supply relevant and reliable information for preparation of its financial statements.

1.3.3 Consolidation methods

A list of the main subsidiaries, associates and joint ventures is presented in note 53.

1.3.3.1 Controlled entities

Subsidiaries are companies in which the Group exercises exclusive control and are fully consolidated. The Group controls an entity when the three following conditions are fulfilled:

- it holds power over the entity;
- it is exposed, or has rights, to variable returns from its involvement with the entity;
- it has the ability to use its power to affect the amount of the investor's returns.

The Group considers all facts and circumstances when assessing control. All substantive potential voting rights exercisable, including by another party, are also taken into consideration.

1.3.3.2 Investments in associates and joint ventures

An associate is an entity in which the Group exercises significant influence on financial and operational policies without having exclusive or joint control. Significant influence is presumed to exist when the Group's investment is at least 20%.

A joint venture is a partnership in which the parties (joint venturers) that exercise joint control over the entity have rights to the entity's net assets. Joint control is the contractually agreed sharing of control of an entity operated jointly by a limited number of partners or shareholders, such that the financial and operational policies result from unanimous consent of the parties.

Investments in associates and joint ventures are accounted for by the equity method. They are carried in the balance sheet at historical cost, adjusted for the share in net assets generated after the acquisition, less any impairment. The share in the net income for the period is reported in "Share in net income of associates and joint ventures" in the income statement.

1.3.3.3 Investments in joint operations

A joint operation is a joint arrangement in which the parties (joint operators) that exercise joint control over the entity have direct rights to its assets, and obligations for its liabilities. The Group, as an operator in a joint operation, reports the assets and liabilities and income and expenses related to its investment line by line.

The Group's principal joint operations are the LNG optimisation activities of Jera Global Market, co-owned by EDF Trading, and the gas storage operator activity carried out by Friedeburger Speicherbetriebsgesellschaft GmbH (FSG).

1.3.4 Financial statement presentation rules

Assets and liabilities contributing to working capital used in the entity's normal operating cycle are classified as current in the consolidated balance sheet. Other assets and liabilities are classified as current if they mature within one year of the closing date, and non-current if they mature more than one year after the closing date.

The income statement presents items by nature. The heading "Other income and expenses" presented below the operating profit before depreciation and amortisation comprises items of an unusual nature or amount.

1.3.5 Translation methods

1.3.5.1 Reporting currency

The parent company's functional currency is the Euro. The Group's financial statements are presented in millions of euros.

1.3.5.2 Functional currency

An entity's functional currency is the currency of the economic environment in which it primarily operates. In most cases, the local currency is the functional currency. But for some entities, a functional currency other than the local currency may be used when it reflects the currency used in the principal transactions.

1.3.5.3 Translation of the financial statements of foreign companies whose functional currency is not the Euro

The financial statements of foreign companies whose functional currency is not the Euro are translated as follows:

- balance sheets are translated into Euros at the closing rate;
- income statements and cash flows are translated at the average rate for the period;
- resulting differences are recognised in equity under the heading "Translation adjustments".

Translation adjustments affecting a monetary item that is an integral part of the Group's net investment in a consolidated foreign company are included in consolidated equity until the disposal or liquidation of the net

investment, at which date they are recognised as income or expenses in the income statement, in the same way as other exchange differences concerning the company.

1.3.5.4 Translation of transactions in foreign currencies

In application of IAS 21, transactions expressed in foreign currencies are initially translated and recorded in the functional currency of the entity concerned, using the rate in force at the transaction date.

At each reporting date, monetary assets and liabilities expressed in foreign currencies are translated at the closing rate. The resulting foreign exchange differences are taken to the income statement.

In application of IFRIC 22, any payment or receipt of a non-monetary advance in a foreign currency must be translated at the exchange rate of the transaction date, with no subsequent adjustment.

1.3.6 Related parties

Related parties include the French State, companies in which the State holds majority ownership and certain of their subsidiaries, and companies in which the EDF group exercises joint control or significant influence. They also include members of the Group's management and governance bodies.

1.3.7 Sales

Sales essentially comprise income from energy sales (to final customers and as part of trading activities), delivery services related to use of the transmission and distribution network, and connection services. They also comprise income from other services and deliveries of goods, mainly engineering, operating and maintenance services, services related to energy sales, design, delivery and commissioning services for power plants or their major components.

Income on energy sales is recognised as deliveries are made to customers.

The quantities of energy supplied but not yet measured and billed are calculated using consumption statistics and selling price estimates, and are recognised in sales on that basis.

Some Group entities conduct optimisation operations on the wholesale gas and electricity markets, to balance supply and demand in compliance with the Group's risk management policy. The sales concerned are recorded net of purchases. When an entity has a net short position in euros, it is included in "energy sales". A net long position in euros is included in "fuel and energy purchases".

In accordance with the provisions of IFRS 15 on the principal/agent distinction, energy delivery services are recognised in sales upon delivery to the customer in the following two cases:

- when these services are not distinct from the energy supply service;
- when they are distinct from the energy supply service and the entity concerned is acting as a principal, notably because it bears the risk of execution of the service or is able to set the tariff for delivery to the final customer.

Income from connections to the French electricity network is recognised in sales at the date when the connection becomes operational.

The sales revenue from other services or deliveries of goods is recognised over time in the three following cases, based on a contractual analysis:

- When the customer simultaneously receives and consumes all the benefits generated as the service is performed by the Group (this is notably the case of operations and maintenance services);
- When the good or service to be supplied cannot be reallocated to another customer, and the Group is entitled to payment for the work done so far (this is notably the case of certain design, delivery and commissioning activities for power plants or major components designed specifically for a customer);
- When the service creates or enhances an asset (good or service) for which the customer acquires control as performance of the service progresses.

Sales revenues also include energy trading operations included in the scope of IFRS 9, which are recognised at the amount of the margin realised.

Capacity mechanism

Capacity mechanisms have been set up in France, the UK and Italy to ensure secure power supplies during peak periods.

- **French system**: French law 2010-1488 of 7 December 2010 on the new organisation of the electricity market introduced an obligation in France to contribute to power supply security from January 2017.

  Operators of electricity generation facilities and load-shedding operators must have their capacities certified by RTE, and commit to a forecast level of availability for a given year of delivery. In return, they are awarded capacity certificates. Meanwhile, electricity suppliers and purchasers of power to compensate for network losses (obligated actors) must have capacity certificates equivalent to consumption by their customers in peak periods. Suppliers pass on the cost of the capacity mechanism to final customers through their sale prices.

  The system is completed by registers for capacity trading between actors. Capacity auctions are held several times a year.

  The Group is concerned by both aspects of this system, as an operator of electricity plants (EDF SA, Dalkia, EDF Renewables) and as an electricity supplier (EDF SA, Électricité de Strasbourg) and a purchaser of power to compensate for network losses (Enedis and Électricité de Strasbourg).

  The operations are recorded as follows:

  - Sales of certificates are recognised in income when the auctions or over-the-counter sales take place;
  - The cost of the capacity mechanism passed on to final customers through regulated sales tariffs and market-price offers is recognised in sales revenues as and when the electricity is delivered. However, the ARENH price has included a capacity value since 1 January 2017 when the capacity mechanism took effect, as the terms of transfer for the capacity guarantees associated with the ARENH system were defined by the CRE;
  - Stocks of certificates are stated either at their certification value (i.e. cost of certification by RTE) or at their purchase value on the markets;
  - Decreases in the stock of certificates are valued at the weighted average unit cost. The timing of recognition depends on the actor:
    - Operators of installations: when the auction sales take place;
    - Obligated actors: spread on a straight-line basis over the 5-month peak period.
  - For obligated actors, if there is a shortfall in the stocks of capacity certificates, a provision is recorded equivalent to the best estimate of the expense necessary to extinguish the obligation;
  - At the closing date, if the realisable value of the stock of capacity certificates is lower than its net book value, impairment is recognised.

- **British system**: The British capacity mechanism, introduced in 2014, is based on a system of auctions for operators, organised by the network operator "National Grid" to procure capacity 4 years ahead of delivery; delivery years run from 1 October to 30 September. Capacity operators which have been successful at the auctions are remunerated in the year of delivery out of a fund consisting of contributions from electricity suppliers.

  The electricity suppliers' contribution to this mechanism is proportional to their sales to customers in the peak period and the cost of capacity is passed on to final customers through their sale price.

  EDF Energy is concerned by both aspects of this system, as an operator of electricity plants and a supplier.

  For accounting purposes, the remuneration received in its capacity as an operator is recognised in sales revenues in the year of delivery and the contribution paid to the mechanism in its capacity as an electricity supplier is recognised in expenses over the peak period. The cost of the capacity mechanism passed on to final customers is recognised in sales revenues as and when the electricity is delivered.

  On 15 November 2018, the UK's Capacity Market was suspended after a ruling by the European Court of Justice concluding that it did not comply with EU rules on state aid. No capacity market revenues were thus recognised for the suspension period in 2018.

  On 24 October 2019, following an in-depth investigation, the European Commission reapproved the UK capacity market scheme under EU State aid rules. The decision enabled payments that had been

suspended since November 2018 to be made. Suppliers were required to make back-payments of the capacity supplier charge in 2019 and capacity providers have recognised revenue for the whole standstill period with cash received in January and February 2020.

- Italian system: A capacity market was set up in 2019 using rules approved in a decree of 28 June 2019 issued by the Economic Development Ministry.

  This mechanism is based on an auction process organised by TERNA, the Italian transmission grid operator, for each delivery year. Operators of existing and future production or storage units can participate in the auctions. The operators of the capacities selected are paid through a fixed premium during one year for existing capacities and 15 years for future capacities. The fixed premium is paid during the delivery year.

  The selected operator must offer its capacity on the day-ahead market (*Mercato del Giorno Prima*) and the balancing market (*Mercato per il Servizio di Dispacciamento*). If the selling price on these markets reaches a level exceeding a strike price defined by the Italian Regulatory Authority for Energy, Networks and Environment (ARERA), the operator must repay the surplus to TERNA.

  Two auctions were held during 2019 for delivery dates set in 2022 and 2023, and Edison won 3.8GW for 2022 and 3.3GW for 2023 for an annual price of €75,000/MW for new capacities and €33,000/MW for existing capacities.

  The fixed premium will be recorded in income during the corresponding delivery year, and reduced by any repayments to TERNA or if the capacity is unavailable.

1.3.8 Income taxes

Income taxes include the current tax expense (income) and the deferred tax expense (income), calculated under the tax legislation in force in the countries where earnings are taxable.

In compliance with IAS 12, current and deferred taxes are generally recorded in the income statement or in equity symmetrically to the underlying operation.

Under IAS 32, income taxes on distributions to holders of equity instruments (notably dividends and the remuneration paid to holders of perpetual subordinated bonds) must be recognised in accordance with IAS 12. The Group considers that these distributions are paid out of previous years' accumulated profits and as a result the associated tax effects are included in the net income for the period.

In application of IFRIC 23, a tax asset or liability is recognised when there is uncertainty over income tax treatments. If the Group considers it likely that the tax authorities will not accept its chosen treatment, it recognises a tax liability, and if it considers it likely that the tax authorities will reimburse a tax that has already been paid, it recognises a tax asset. The tax assets and liabilities relating to these uncertainties are estimated on a case-by-case basis and stated at the most likely amount, or the weighted average of the various outcomes considered. These tax assets and liabilities are included in deferred taxes.

The current tax expense (income) is the estimated amount of tax due on the taxable income for the period, calculated using the tax rates adopted at the year-end.

Deferred taxes result from temporary differences between the book value of assets and liabilities and their tax basis. No deferred taxes are recognised for temporary differences generated by:

- goodwill which is not tax deductible;
- the initial recognition of an asset or liability in a transaction which is not a business combination and does not affect the accounting profit or taxable profit (tax loss) at the transaction date;
- investments in subsidiaries and associates, investments in branches and interests in joint arrangements, when the Group controls the timing of reversal of the temporary differences, and it is probable that the temporary differences will not reverse in the foreseeable future.

Deferred tax assets and liabilities are valued at the expected tax rate for the period in which the asset will be realised or the liability extinguished, based on tax rates adopted at the year-end. If the tax rate changes, deferred taxes are adjusted to the new rate and the adjustment is recorded in the income statement, unless it relates to an underlying for which changes in value are recorded in equity, for example in accounting for actuarial gains and losses or fair value on hedging instruments and debt or equity securities.

Deferred taxes are reviewed at each closing date, to take into account changes in tax legislation and the prospects for recovery of deductible temporary differences. Deferred tax assets are only recognised when it is

probable that the Group will have sufficient taxable profit to utilise the benefit of the asset in the foreseeable future, or beyond that horizon, if there are deferred tax liabilities with the same maturity.

Deferred tax assets and liabilities are reported on a net basis, determined at the level of a tax entity or tax group.

1.3.9 Business combinations

In application of IFRS 3 business combinations arising since 1 January 2010 are measured and recognised under the following principles.

- At the date of acquisition, the identifiable assets acquired and liabilities assumed, measured at fair value, and any non-controlling interests in the company acquired (minority interests) are recorded separately from goodwill.
- Non-controlling interests may be valued either at fair value (full goodwill method) or their share in the fair value of the net assets of the acquired company (partial goodwill method). The decision is made individually for each transaction.
- Any acquisition or disposal of an investment in a subsidiary that does not affect control is considered as a transaction between shareholders and must be recorded directly in equity.
- If additional interests are acquired in a joint venture, joint operation or associate without resulting in acquisition of control, the value of the previously-acquired assets and liabilities remains unchanged in the consolidated financial statements.
- If control is acquired in stages, the cost of the business combination includes the fair value, at the date control is acquired, of the purchaser's previously-held interest in the acquired company.
- Related costs directly attributable to an acquisition leading to control are treated as expenses for the periods in which they were incurred, except for issuance costs for debt securities or equity instruments, which must be recorded in compliance with IAS 32 and IFRS 9.
- IFRS 3 does not apply to common control business combinations, which are examined on a case-by-case basis to determine the appropriate accounting treatment.
- Commitments given by the Group to purchase minority interests in Group-controlled companies are included in liabilities. For commitments of this kind given since 1 January 2010, the date of the Group's first application of IAS 27 (amended) and IFRS 3 (revised), the differential between the value of the non-controlling interests and the liability corresponding to the commitment is recorded in equity.

1.3.10 Goodwill and other intangible assets

1.3.10.1 Goodwill

1.3.10.1.1 Determination of goodwill

In application of IFRS 3, "Business combinations", goodwill is the difference between:

- the sum of the following items:
  - the acquisition-date fair value of the price paid to acquire control;
  - the value of non-controlling interests in the entity acquired; and
  - for acquisitions achieved in stages, the acquisition-date fair value of the Group's share in the acquired entity before it acquired control; and
- the net value of the assets acquired and liabilities assumed, measured at fair value at the acquisition date.

When this difference is negative it is immediately included in net income.

The fair values of assets and liabilities and the resulting goodwill are finalised within twelve months of the acquisition.

1.3.10.1.2 Measurement and presentation of goodwill

Goodwill on acquisition of subsidiaries is disclosed separately in the balance sheet. Impairment on this goodwill is reported under the heading "Impairment" in the income statement. After initial recognition, goodwill is carried at cost less any impairment recognised.

Goodwill on acquisition of associates and joint ventures is included in the investment's net book value. Impairment on this goodwill is included under the heading "Share in income of associates and joint ventures".

Goodwill is not amortised, but impairment tests are carried out as soon as there is an indication of possible loss of value, and at least annually, as described in note 1.3.14.

1.3.10.2 Other intangible assets

1.3.10.2.1 Research and development expenses

Research expenses are recognised as expenses in the financial period incurred.

Development costs that qualify for capitalisation under IAS 38 are included in intangible assets and amortised on a straight-line basis over their foreseeable useful life.

1.3.10.2.2 Other self-produced or purchased intangible assets

Other intangible assets mainly comprise:

- software, which is amortised on a straight-line basis over its useful life;
- purchased brands with an indefinite useful life, or amortised on a straight-line basis over their useful life;
- operating or usage rights for power plants, which are amortised on a straight-line basis over the useful life of the underlying asset;
- rights or licenses relating to hydrocarbon concessions, which are amortised under the Unit Of Production (UOP) method, and exploration expenses amortised over the year (see note 1.3.10.2.3);
- intangible assets related to environmental regulations (greenhouse gas emission rights and renewable energy certificates acquired for a consideration – see note 1.3.26);
- the positive value of energy purchase/sale contracts stated at fair value as part of a business combination governed by IFRS 3: this value is amortised as the contractual deliveries take place;
- assets related to concession contracts governed by IFRIC 12, under the "intangible model" (see note 1.3.12.2.4);
- technology related to activities as designer and supplier of nuclear steam supply systems and manufacturer of control rod clusters and nuclear fuel (Framatome) including codes and methods, EPR technology, patents and manufacturing processes, all amortised over their useful life;
- purchased customer contracts and relations, amortised over their useful life.

1.3.10.2.3 Hydrocarbon prospecting, exploration and generation

The Group applies IFRS 6, "Exploration for and Evaluation of Mineral Resources".

Prospection and exploration costs and costs incurred in connection with geological surveys, exploration tests, geological and geophysical mapping and exploratory drilling are recognised as intangible assets and fully amortised in the year they are incurred.

Development costs related to commercially viable mineral wells and investments in facilities to extract and store hydrocarbons are recognised as "Property, plant and equipment used in generation and other tangible assets owned by the Group" or "Property, plant and equipment operated under concessions for other activities" as appropriate.

They are amortised under the Unit Of Production (UOP) method.

This concerns discontinued E&P operations (see note 2.3).

1.3.11 Concession assets, generation assets and other property, plant and equipment

The Group's property, plant and equipment is reported under three balance sheet headings, as appropriate to the business and contractual circumstances of their use:

- property, plant and equipment operated under French public electricity distribution concessions;
- property, plant and equipment operated under concessions for other activities;
- property, plant and equipment used in generation and other tangible assets owned by the Group.

1.3.11.1 Initial measurement

Property, plant and equipment is recorded at acquisition or production cost.

- The cost of facilities developed in-house includes all labour and materials costs, and all other production costs that can be included in the construction of the asset.
- Borrowing costs attributable to the financing of an asset incurred during the construction period are included in the value of the asset provided it is a qualifying asset as defined by IAS 23 "Borrowing costs".
- The cost of property, plant and equipment also includes the initial estimate of decommissioning costs. These assets are associated with the provisions recorded to cover decommissioning obligations. At the date of commissioning, property, plant and equipment is measured and recorded in the same way as the corresponding provision (see note 1.3.20).
- Decommissioning costs for nuclear generation installations also include last core costs (see note 1.3.20).

When some of the decommissioning costs for a plant are to be borne by a partner, the expected reimbursement is recognised as accrued income in the assets. The difference between the provision and the accrued income is recorded in Property, plant and equipment, and subsequent payments by the partner are deducted from the accrued income.

The Group capitalises safety expenses incurred as a result of legal and regulatory obligations sanctioning non-compliance by an administrative ban from operation.

Strategic safety spare parts for generation facilities are treated as property, plant and equipment, and depreciated over the residual useful life of the installations.

The costs of operations that are necessary for generation assets to remain in service, and are undertaken at the time of scheduled shutdowns, particularly during major inspections, are capitalised and amortised over a period corresponding to the time elapsing between two inspections.

When a part of an asset has a different useful life from the overall asset's useful life, it is identified as an asset component and depreciated over a specific period.

1.3.11.2 Depreciation

Items of property, plant and equipment are depreciated on a straight-line basis over their useful life, defined as the period during which the Group expects to draw future economic benefits from their use.

Depending on each country's specific regulations and contractual arrangements, the expected useful lives for the main facilities are as follows:

- hydroelectric dams 75 years
- electromechanical equipment used in hydropower plants 50 years
- fossil-fired power plants 25 to 45 years
- nuclear generation facilities:
  - in France 40 to 50 years
  - outside France 35 to 60 years
- transmission and distribution installations (lines, substations) 20 to 60 years
- wind farm and photovoltaic facilities 20 to 25 years
- other general plant and machinery 10 to 20 years

1.3.12 Concession agreements

1.3.12.1 Accounting treatment

The accounting treatment of public and private agreements depends on the nature of the agreements and their specific contractual features.

For most of its concessions, other than concessions for heat generation and distribution, the Group considers that in substance the grantors do not have the characteristic features of control over infrastructures as defined in IFRIC 12.

1.3.12.2 French concessions

In France, the Group is the operator for four types of public service concessions:

- public electricity distribution concessions granted by local authorities (municipalities or syndicated municipalities);
- hydropower concessions granted by the State;
- the public transmission network operated under concession from the State;
- concessions from public authorities for heat generation and distribution.

1.3.12.2.1 Public electricity distribution concessions

General background

Since the enactment of the French Law of 8 April 1946, EDF, and then Enedis, has been the operator of most of the public distribution networks in France.

In accordance with France's Energy Code and Local Authorities Code, the public distribution of electricity is principally operated under the public service concessions system. The authorities granting the concessions (local authorities or public establishments for cooperation acting as an Energy Distribution Organisation Authority (*Autorité Organisatrice de la Distribution d'Energie* - AODE) organise the public electricity distribution service through concession agreements with specifications that define the respective rights and obligations of the parties. Enedis distributes electricity to 95% of the population of mainland France under such concessions. The other 5% are served by Local Distribution Companies (including Electricité de Strasbourg).

Concession agreement models

Enedis' concession agreements correspond to different models depending on the date of signature.

1992 concession agreement model

The 1992 concession specifications model (updated in 2007) was negotiated with the FNCCR (National Federation of licensing authorities) and EDF, and approved by the public authorities. This model places Enedis under an obligation to record industrial depreciation and establish provisions for replacement.

2017 concession agreement model

On 21 December 2017, the FNCCR, France Urbaine, EDF and Enedis signed a framework agreement for a new concession agreement model. This new model modernises the relationship between Enedis and concession-granting authorities in the long term and reflects the parties' attachment to the principles of French concessions for electricity distribution: public service, regional solidarity and national optimisation. The FNCCR and France Urbaine represent the concession-granting authorities, particularly towns, syndicated municipalities, boroughs and major cities when they are the authorities with competence to grant public electricity distribution concessions.

As of 2018, newly-signed concession agreements apply the concession agreement model validated on 21 December 2017. At the effective date of a new agreement, the existing special concession liabilities recorded in application of the previous concession agreement to represent the concession-granting authority's rights in the concession assets remain in the accounts. Like earlier concession agreements signed since 2011, the contractual obligation to establish provisions for replacement no longer exists, and the governance of investments is different.

To provide an effective public service, the distribution network operator and the concession-granting authority now agree to jointly set up a governance system to oversee investments in the public electricity distribution network over the area covered by the concession, including replacement of infrastructures. This system mainly takes the form of a master plan taking a long-term view of developments in the network over the concession area, and multi-year investment plans (*programmes pluriannuels d'investissements* - PPIs) for 4 and 5-year periods that are medium-term applications of the master plan.

PPIs contain detailed objectives for each investment purpose, concerning a selection of quantified, localised investments with financial valuations for the duration of the plan.

PPIs are revised when necessary, after consulting with Enedis and the authority granting the concession, to take account of changes in each party's investment priorities and financial resources.

If it were observed at the end of a PPI that any investment concerned by Enedis' financial commitment had not been made, the concession-granting authority could oblige Enedis to deposit a sum equal to 7% of the investments still to be made. This deposit would then be returned or retained after a two-year period, depending on the investments made by that time.

Accounting treatment

The accounting treatment of concessions is based on the concession agreements, with particular reference to their special clauses. It takes into consideration the possibility that the EDF group, particularly Enedis, may one day lose its status as the sole authorised State concession operator.

All assets used by the EDF group in public electricity distribution concessions in France, whether they are owned by the concession-granting authority or the operator, are reported together on a specific line in the balance sheet assets at acquisition cost, or their estimated value at the transfer date when supplied by the concession-granting authority.

1.3.12.2.2 Hydropower concessions

Hydropower concessions follow standard rules approved by decree. Hydropower concession assets consist solely of hydropower generation equipment (dams, pipes, turbines, etc) for initial concessions. In other concessions, they comprise hydropower generation equipment and switching facilities (alternators, etc).

Assets used in these concessions, whether operated under the concession agreement or owned by the EDF group, are recorded under "Property, plant and equipment operated under concessions for other activities" at acquisition cost.

Hydropower concessions have an initial term of 75 years pursuant to the French Law of 16 October 1919 relating to hydropower use. Most hydropower concessions that expired before 2012 were renewed for terms of 30 to 50 years. However, the French government has not yet renewed 12 concessions that have expired. Since their expiry these concessions have thus been in the "rolling extension" situation defined by the law, which stipulates that at the expiry date of a concession, if no new concession has been established "the concession is

extended on the existing terms until such time as a new concession is granted", so as to ensure continuity of operations in the meantime (Article L. 521-16 par. 3 of the French Energy Code).

1.3.12.2.3 Public transmission concession

Under French law, assets assigned to the public transmission concession belong to Réseau de Transport d'Électricité (RTE). These assets are included in calculating the equity value of CTE, RTE's sole shareholder, in the consolidated balance sheet.

1.3.12.2.4 Heat generation and distribution concessions

Heat generation and distribution concession agreements signed by Dalkia with public authorities confer the right to operate facilities remitted by or constructed at the request of those authorities for a limited period, under the concession-granting authority's supervision.

These agreements set the terms for remuneration and transfer of the facilities to the concession-granting authority or another operator taking over at the end of the agreement.

The assets are recorded as intangible assets, in accordance with IFRIC 12 "Service concession agreements".

1.3.12.3 Foreign concessions

Foreign concessions are governed by a range of contracts and national laws. Most assets operated under foreign concessions are recorded under "Property, plant and equipment operated under concessions for other activities". Foreign concessions essentially concern Edison in Italy, which operates local gas distribution networks, hydropower generating plants and energy services under concessions. Edison owns all the assets except for some items of property, plant and equipment on the hydropower generation sites, which will be returned to the concession-granting authority for nil consideration or with an indemnity when the concession ends. In compliance with IFRIC 12, certain concession agreements are recorded as intangible assets.

Hydropower generation assets which will be returned for nil consideration at the end of the concession are depreciated over the duration of the concession.

1.3.13 Leases

The Group's accounting rules and methods were changed as follows at 1 January 2019. These accounting rules for leases only apply in 2019, and the comparative period of 2018 is still presented in accordance with IAS 17.

Under IFRS 16, a contract is, or contains, a lease if it confers the right to control the use of an identified asset for a period of time in exchange for a consideration.

Identified arrangements that do not have the legal form of a lease contract but nonetheless convey the right to control the use of an asset or group of specific assets to the purchaser are classified as leases by reference to IFRS 16.

1.3.13.1 Recognition of a lease contract as lessee under IFRS 16

The Group's lease contracts as lessee essentially concern real estate assets (office and residential properties), industrial installations (land, wind farms) and to a lesser extent vehicles and IT and industrial equipment.

IFRS 16 requires leases to be recognised in the lessee's balance sheet when the leased asset is made available, in the form of a "right-of-use" asset, presented in "Property, plant and equipment used in generation and other tangible assets owned by the Group, including right-of-use assets" with a corresponding financial liability associated with the lease commitment, presented in "Current and non-current financial liabilities".

Upon initial recognition of a lease, the right of use and the lease liability are valued by discounting the future lease payments over the term of the lease, taking into consideration assumptions regarding the renewal or termination of leases if the relevant options are reasonably certain to be exercised.

As a rule, since the implicit interest rate in a lease is difficult to determine, the lessee's incremental borrowing rate is used to discount the lease liability. This rate is based on zero-coupon EDF bond rates, adjusted for the currency risk, a country risk premium, the term of the lease contracts and the subsidiary's credit risk at the date of initial recognition of the contract. In certain cases, it is based on a subsidiary's specific incremental borrowing rate.

Subsequently, the right of use is amortised over the expected term of the lease, while the lease liability is stated at amortised cost, i.e. adding the interest recognised in the financial result, and deducting the amount of the lease payments made.

The Group has decided to apply the two exemptions allowed by IFRS 16, and as a result leases with a term of 12 months or less and leases of assets with individual value when new of less than USD 5,000 are not recognised in the balance sheet. Consequently, the payments on these leases are recognised on a straight-line basis over the lease term in the income statement.

If the Group performs a sale and leaseback operation – consisting of selling an asset to a third party and then renting it back as lessee – which is classified as a sale under IFRS 15, it measures the right-of-use asset resulting from the lease as the proportion of the asset's previous book value that corresponds to the right of use retained by the Group. Also, the gain on the sale of the asset by the Group only corresponds to the proportion of the right of use actually transferred to the third party. The lease liability is not adjusted, unless the conditions of the sale or lease do not reflect market values.

Off-balance sheet commitments presented in note 49.1.1 concern:

- Short-term leases (12 months or less);
- Leases of assets with low value (less than USD 5,000 when new);
- Leases signed for which the leased assets have not yet been made available (for example, assets under construction).

1.3.13.2 Recognition of a lease contract as lessor

The accounting treatment of a lease contract in which the Group is lessor depends on the classification of the contract. For a finance lease which transfers substantially all risks and rewards inherent to ownership of the underlying asset to the lessee, the Group recognises a financial asset in its balance sheet instead of the initial fixed asset; in this case, the receivable is equal to the discounted value of future lease payments.

1.3.14 Impairment of goodwill, intangible assets and property, plant and equipment

At the year-end and at each interim reporting date, in application of IAS 36, the Group assesses whether there is an indication that an asset could have been significantly impaired. An impairment test is also carried out at least once a year on cash-generating units (CGUs) or groups of CGUs including an intangible asset with an indefinite useful life, or to which goodwill has been partly or totally allocated.

Impairment tests are carried out as follows:

- the Group measures any long-term asset impairment by comparing the carrying value of these assets and goodwill, grouped into CGUs where necessary, and their recoverable amount;
- CGUs are groups of homogeneous assets that generate identifiable independent cash flows. They reflect the way activities are managed in the Group: they may be subgroups when the activity is optimised across the whole subgroup, or CGUs formed by parts of subgroups corresponding to different types of activity that are managed separately (fossil-fired generation, renewable energy production, services). Goodwill is allocated to the CGUs that benefit from synergies resulting from the acquisition;
- the recoverable value of these CGUs is the higher of fair value net of disposal costs, and value in use. When this recoverable value is lower than the carrying amount in the balance sheet, an amount equal to the difference is booked under the heading "Impairment". The loss is allocated first to goodwill, and any surplus to the other assets of the CGU concerned;
- fair value is the asset's potential sale price in a normal transaction between economic actors;
- value in use is calculated based on projected future cash flows:
  - over a horizon that is coherent with the asset's useful life and/or operating life,
    - for certain intangible assets with an indefinite useful life (such as brands), beyond the horizon that can be observed or modelled, a terminal value is determined by discounting to infinity a normative cash flow,
  - excluding development projects other than those that have been decided at the valuation date,
  - and discounted at a rate that reflects the risk profile of the asset or CGU;

- the discount rates used are based on the weighted average cost of capital (WACC) for each asset or group of assets concerned, determined by geographical area and by business segment under the CAPM. WACC is calculated after taxes;
- future cash flows are calculated on the basis of the best available information at the valuation date:
  - for the first few years, the flows correspond to the Medium-Term Plan (MTP). Over the MTP horizon, energy and commodity prices are determined based on available forward prices, taking hedges into consideration,
  - beyond the MTP horizon, cash flows are estimated based on long-term assumptions prepared for each country and each energy, using a process that is updated annually. Medium and long-term electricity prices are constructed analytically by assembling blocks of assumptions, e.g. economic growth, commodity prices (oil, gas, coal) and CO_2, demand for electricity, interconnections, and developments in the energy mix (rise of renewable energies, installed nuclear capacity, etc) with fundamental models of supply-demand balance. The Group refers in particular to external analyses for each assumption object (for example, for commodities and CO_2, which are primary factors in electricity prices, the Group compares its own scenarios with scenarios developed by organisations such as the AIE, IHS or Wood Mackenzie, bearing in mind that each of these analysts itself proposes a cone of scenarios corresponding to different macro-economic environments);
- income from capacity market mechanisms is also taken into consideration in valuing generation assets, starting from the MTP horizon where relevant, provided the countries concerned have introduced or announced the future introduction of a capacity revenue mechanism.

These calculations may be influenced by several variables:

- changes in discount rates;
- changes in market prices for energy and commodities and tariff regulations;
- changes in demand and the Group's market share, and the attrition rate on customer portfolios;
- the useful life of facilities, or the duration of concession agreements where relevant;
- the growth rates used beyond the medium-term plans and where relevant the terminal values taken into consideration.

Impairment recognised on goodwill is irreversible.

1.3.15 Financial assets and liabilities

Classification and measurement of financial instruments depend on the business model and the instruments' contractual characteristics. In application of IFRS 9, upon initial recognition, financial assets are carried at amortised cost, fair value through other comprehensive income (OCI), or fair value through profit and loss.

In the Group, financial assets comprise equity instruments (particularly non-consolidated investments), debt securities, loans and receivables at amortised cost including trade receivables, and the positive fair values of derivatives.

Financial instruments allocated to dedicated assets are presented in note 48.

Financial liabilities comprise loans and other financial liabilities, trade payables, bank credit and the negative fair value of derivatives.

Financial assets and liabilities are recorded in the balance sheet as current if they mature within one year and non-current if they mature after one year, apart from derivatives held for trading, which are all classified as current.

1.3.15.1 Valuation and classification of financial assets and liabilities

Financial instruments are stated at fair value, which corresponds to the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction on the principal or most advantageous market at the measurement date.

The valuation methods for each level are generally as follows:

- level 1 (unadjusted quoted prices): prices accessible to the entity at the measurement date on active markets, for identical assets or liabilities;
- level 2 (observable data): data concerning the asset or liability, other than the market prices included in initial level 1 input, which are directly observable (such as a price) or indirectly observable (i.e. deducted from observable prices);
- level 3 (non-observable data): data that are not observable on a market, including observable data that have been significantly adjusted.

1.3.15.1.1 Financial assets carried at fair value through OCI

Financial assets carried at fair value through OCI comprise:

- Certain non-consolidated investments for which the Group has elected the irrevocable option to recognise subsequent fair value changes in OCI, with no recycling to profit and loss in the event of sale. Only dividends received from these investments are recognised in the income statement, under "Other financial income";
- Debt securities (such as bonds) invested under a mixed "collect and sell" business model for which contractual cash flows consist entirely of principal and interest payments reflecting the time value of money and the credit risk associated with the instrument (the IFRS 9 "SPPI" test – Solely Payment of Principal and Interest). Changes in fair value are recorded directly in OCI with recycling and transferred to profit and loss when the securities are sold. For these debt securities, interest income is calculated at the effective interest rate and credited to the income statement under the heading "Other financial income".

Upon initial recognition, these financial assets are recorded at fair value plus transaction costs attributable to their acquisition. They are subsequently adjusted at each reporting date to fair value based on quoted prices where possible or using the discounted future cash flow method, or by reference to external sources otherwise.

1.3.15.1.2 Financial assets carried at fair value through profit and loss

Financial assets carried at fair value through profit and loss are classified as such at the inception of the operation when they are:

- assets acquired from inception with the intention of resale in the short term;
- derivatives not classified as hedges (derivatives held for trading);
- equity instruments (non-consolidated investments) for which the Group has not made the irrevocable option to classify them as at fair value through OCI with no recycling;
- debt securities that are not managed under the "collect and sell" business model and do not meet the requirements of the SPPI test. This chiefly concerns shares in investment funds, which are debt securities that do not pass the SPPI test regardless of the business model.

These assets are recorded at the transaction date at fair value, which is generally equal to the amount of cash paid out. Transaction costs directly attributable to the acquisition are recorded in the income statement. At each subsequent reporting date they are adjusted to fair value, based on quoted prices, or using recognised valuation techniques such as the discounted cash flow method or reference to external sources for other financial instruments.

Changes in fair value other than those concerning commodity contracts are recorded in the income statement under the heading "Other financial income and expenses".

Changes in the fair value of commodity trading contracts are recorded in the income statement under "Sales".

Changes in the fair value of certain non-trading commodity transactions are reported separately on a specific line of the income statement, "Net changes in fair value on Energy and Commodity derivatives, excluding trading activities" below the operating profit before depreciation and amortisation. These are transactions in the scope of IFRS 9, which for accounting purposes are not eligible for hedge accounting or the IFRS 9 "own use" exemption (see note 1.3.15.3).

1.3.15.1.3 Loans and financial receivables

Loans and financial receivables are carried at amortised cost if the business model involves holding the instrument in order to collect contractual cash flows which consist entirely of principal and interest.

Interest received is calculated under the effective interest rate method and recorded in "Other financial income" in the income statement.

Loans and financial receivables that do not qualify for classification at amortised cost are classified as at fair value through profit and loss, via "Other financial income and expenses" in the income statement.

1.3.15.1.4 Loans and financial liabilities

When specific hedge accounting treatments are not applied (see note 1.3.15.3.3 (A)), loans and financial liabilities are recorded at amortised cost, with separation of embedded derivatives where applicable. Interest expenses are calculated at the effective interest rate and recorded in the income statement under the heading "Cost of gross financial indebtedness" over the duration of the loan or financial liability.

1.3.15.2 Impairment of financial assets carried at fair value through OCI or at amortised cost

IFRS 9 establishes an impairment model based on expected credit loss (ECL).

For securities in the bond portfolio, the Group applies a rating-based approach for counterparties with low credit risk. In application of the risk management policy, the Group's bond portfolio consists almost entirely of instruments issued by low-risk counterparties rated "Investment Grade".

In this situation, the ECL is estimated over a 12-month horizon following the closing date.

The threshold marking a significant increase in credit risk is reached when the counterparty ceases to be rated "Investment Grade". In such situations, the significant increase in the default risk may lead to reassessment of ECLs over the instrument's residual life.

For loans and receivables, the Group has chosen an approach based on the probability of default by the counterparty and assessment of changes in the credit risk.

1.3.15.3 Derivatives

1.3.15.3.1 Scope

The scope of derivatives applied by the Group corresponds to the principles set out in IFRS 9.

In particular, forward purchases and sales for physical delivery of energy or commodities are considered to fall outside the scope of application of IFRS 9 when the contract concerned is considered to have been entered into as part of the Group's normal business activity ("own use"). This is demonstrated to be the case when all the following conditions are fulfilled:

- a physical delivery takes place under all such contracts;
- the volumes purchased or sold under the contracts correspond to the Group's operating requirements;
- the contracts cannot be considered as options as defined by the standard. In the specific case of electricity sale contracts, the contract is equivalent to a firm forward sale or can be considered as a capacity sale.

The Group considers that transactions negotiated with a view to balancing the volumes between electricity purchase and sale commitments are part of its business as an integrated electricity operator, and are outside the scope of IFRS 9.

The Group analyses all its contracts concerning financial liabilities or non-financial items, to identify any "embedded" derivatives. Any component of a contract that affects the cash flows of that contract in the same way as a stand-alone derivative corresponds to the definition of an embedded derivative and is recognised separately at fair value from the contract's inception date.

1.3.15.3.2 Measurement and recognition

Derivatives are initially recorded at fair value, based on quoted prices and market data available from external sources. If no quoted prices are available, the Group may refer to recent comparable transactions or if no such transactions exist base its valuation on internal models that are recognised by market participants, giving priority to information directly derived from observable data, such as over-the-counter listings.

Changes in the fair value of these derivatives are recorded in the income statement, unless they are designated as hedges for a cash flow or net investment (see note 1.3.15.3.3).

In the specific case of financial instruments entered into as part of the trading business, realised and unrealised gains and losses are reported net under the heading "Sales".

In application of IFRS 13, the fair value of derivatives incorporates the counterparty credit risk for derivative assets and the own credit risk for derivative liabilities.

1.3.15.3.3 Derivatives classified as hedges

The EDF group uses derivatives to hedge its foreign exchange and interest rate risks, as well as risks related to certain commodity contracts.

The Group applies the criteria defined by IFRS 9 to identify operations subject to hedge accounting:

- the hedging relationship must only concern eligible hedging instruments and hedged items;
- the hedging relationship must be formally designated as such and have structured documentation from its inception;
- the hedging relationship must meet hedging efficiency requirements, particularly respect of a hedging ratio.

In the case of cash flow hedges, the future transaction being hedged must be highly probable.

The hedging relationship ends when it ceases to satisfy the above criteria. This includes situations in which the hedging instrument expires or is sold, terminated or exercised, or when the risk management objectives initially documented are no longer met.

Only derivatives external to the Group, and internal derivatives that are matched with similar transactions external to the Group, qualify for hedge accounting.

The Group uses the following categories for hedges:

(A) Fair value hedges

These instruments hedge the exposure to changes in the fair value of an asset or liability recorded in the balance sheet, or a firm commitment to purchase or sell an asset. Changes in the fair value of the hedged item attributable to the hedged component of that item are recorded in the income statement and offset by corresponding variations in the fair value of the hedging instrument. Only the ineffective portion of the hedge has an impact on income.

Some loans and financial liabilities are covered by a fair value hedge. In application of hedge accounting, their balance sheet value is adjusted for changes in fair value attributable to the hedged risks (foreign exchange and interest rate risks).

(B) Cash flow hedges

These instruments hedge exposure to variability in cash flows associated with an asset or liability, or a highly probable future transaction, for which variations in cash flows generated by the hedged item are offset by changes in the value of the hedging instrument.

The effective portion of accumulated changes in the hedge's fair value is recorded in equity, and the ineffective portion (i.e. changes in the fair value of the hedging instrument in excess of changes in the fair value of the hedged item) is recorded in the income statement.

When the hedged cash flows materialize, the amounts previously recognised in equity are recycled to profit and loss in the same way as for the hedged item, or are treated as an adjustment to the value of the asset acquired.

(C) Hedges of a net investment

These instruments hedge exposure to the foreign exchange risk related to a net investment in an entity which does not have the same functional currency as the Group. The effective portion of accumulated changes in the hedge's fair value is recorded in equity until the disposal or liquidation of the net investment, when it is included in the gain or loss on disposal. The ineffective portion (defined in the same way as for cash flow hedges) is recorded directly in the income statement.

The change in fair value resulting from the foreign exchange effect and interest rate effect of derivatives hedging a net investment in a foreign operation is recorded in equity.

1.3.15.4 Derecognition of financial assets and liabilities

The Group derecognises a financial asset when:

- the contractual rights to the cash flows generated by the asset expire; or
- the Group transfers the rights to receive contractual cash flows related to the financial asset through the transfer of substantially all of the risks and rewards associated with ownership of the asset.

Any interest created or retained by the Group in transferred financial assets is recorded as a separate asset or liability.

- The Group derecognises a financial liability when its contractual obligations are extinguished, cancelled or expire. When a debt is renegotiated with a lender on substantially different terms, a new liability is recognised.

1.3.15.5 Assignment of receivables

When it can be demonstrated that the Group has transferred substantially all the risks and benefits related to assignment of receivables, particularly the credit risk, the items concerned are derecognised.

Otherwise, the operation is considered as a financing operation, and the receivables remain in the balance sheet assets, with recognition of a corresponding financial liability.

1.3.16 Inventories

Inventories are recognised at the lower of acquisition cost or net realisable value, except for inventories held for trading activities, which are carried at market value. Inventories consumed are generally valued by the weighted average unit cost method.

Cost includes all direct material costs, labour costs, and a share of indirect production costs.

1.3.16.1 Nuclear fuel

Inventory accounts include:

- nuclear materials, whatever their form during the fuel production cycle;
- and fuel components in the warehouse or in the reactor.

The stated value of nuclear fuel and materials and work-in-progress is determined based on direct processing costs including materials, labour and subcontracted services (e.g. fluoration, enrichment, production, etc.).

In accordance with regulatory obligations specific to each country, inventories of fuel (new or not entirely consumed) may also comprise expenses for spent fuel management and long-term radioactive waste management, with corresponding provisions or debts in the liabilities, or full and final payments made when the fuel is loaded.

In France, in application of the concept of "loaded fuel" as defined in the decree of 21 March 2007, the cost of inventories for fuel loaded in the reactors but not yet irradiated includes expenses for spent fuel management and long-term radioactive waste management. The corresponding amounts are taken into account in the relevant provisions.

In compliance with IAS 23, interest expenses incurred in financing inventories of nuclear fuels are charged to expenses for the period provided these inventories are manufactured in large quantities on a repetitive basis.

Nuclear fuel consumption is determined by component (natural uranium, fluoration, enrichment, fuel assembly production) as a proportion of the expected output when the fuel is loaded in the reactor. These quantities are valued at weighted average cost of inventories. Inventories are periodically corrected in view of forecast spent quantities based on neutronic measurements and physical inventories.

1.3.16.2 Other inventories

Other inventories comprise:

- other fuels, comprising fossil fuels required for operation of fossil-fired power plants and gas stocks;
- other operating supplies, consisting of operating materials and equipment such as spare parts supplied under a maintenance programme (excluding capitalised strategic safety spare parts);
- goods and services in progress, particularly relating to the businesses of EDF Renewables, Dalkia and Framatome;
- other inventories, mainly consisting of certificates issued under the various environmental schemes (see note 1.3.26) and capacity obligation mechanisms (capacity guarantees in France – see note 1.3.7).

Other non-trading operating inventories are generally valued at weighted average cost including direct and indirect purchasing costs.

Impairment of spare parts principally depends on the turnover of these parts.

1.3.17 Trade receivables

Trade receivables are initially recognised at the fair value of the consideration received or receivable, and subsequently carried at amortised cost or at fair value through OCI.

Trade receivables also include the value of unbilled receivables for energy already supplied, which are presented net of advances received from customers who pay in regular monthly instalments.

The Group applies IFRS 9's simplified approach to measure expected credit losses on trade receivables, using provision matrices established on the basis of credit loss histories.

1.3.18 Cash and cash equivalents

Cash and cash equivalents comprise immediately available liquidities and very short-term investments that are readily convertible into a known amount of cash, usually maturing within three months or less of the acquisition date, and with negligible risk of fluctuation in value.

Securities held short-term and classified as "Cash equivalents" are recorded at fair value, with changes in fair value included in the heading "Other financial income and expenses".

1.3.19 Equity

1.3.19.1 Fair value adjustment of financial instruments

The fair value adjustment of financial instruments results from the restatement to fair value of debt and equity securities and certain hedging instruments.

1.3.19.2 Share issue expenses

Share issue expenses correspond exclusively to external costs expressly related to the capital increase. They are charged against the issue premium at their net-of-tax value.

Other expenses are classified as expenses of the period.

1.3.19.3 Treasury shares

Treasury shares are shares issued by EDF and held either by that company or by other entities in the consolidated Group. They are valued at acquisition cost and deducted from equity until the date of disposal. Net gains or losses on disposals of treasury shares are directly included in equity and do not affect net income.

1.3.19.4 Perpetual subordinated bonds

The perpetual subordinated bonds issued by the Group ("hybrid" bond issue) incorporate options for redemption at the initiative of EDF. These options may be exercised after a minimum period that depends on the specific terms of each issue, and subsequently at each coupon date or in the event of highly specific circumstances (such as a change in IFRS or tax regime). The annual yield is fixed and reviewable based on contractual clauses that vary according to the specific terms of the issuance. There is no obligation for EDF to make any payment, due to the existence of contractual clauses entitling it to defer payment indefinitely. However, those clauses stipulate that any deferred payments must be made in the event of a dividend distribution. All these features give EDF an unconditional right to avoid paying out cash or another financial asset for the principal or interest. Consequently, in compliance with IAS 32, these bonds are recorded as equity instruments and any payment made is treated in the same way as dividends (see notes 3.3.2, 3.3.3 and 30.4).

1.3.20 Provisions other than employee benefit provisions

The Group recognises provisions when it has a present obligation (legal or constructive) arising from a past event, an outflow of resources will probably be required to settle the obligation, and the obligation amount can be estimated reliably.

If it is anticipated that all or part of the expenses covered by a provision will be reimbursed, the reimbursement is recognised under receivables if and only if the Group is virtually certain of receiving it.

Provisions are determined based on the Group's expectation of the cost necessary to settle the obligation. Estimates are based on management data from the information system, assumptions adopted by the Group, and if necessary, experience of similar transactions, or in some cases based on independent expert reports or contractor quotes. The various assumptions are reviewed for each closing of the accounts.

The expected costs are estimated based on year-end economic conditions and spread over a forecast disbursement schedule. They are then adjusted to Euros of the year of payment through application of a forecast long-term inflation rate and discounted to present value using a nominal discount rate. The provisions are based on these discounted future cash flows.

The rate of inflation and the discount rate are based on the economic and regulatory parameters of the country where the economic entity is located, considering the long operating cycle of the Group's assets and the maturities of commitments.

The discount effect generated at each closing to reflect the passage of time is recorded under "Discount effect" in financial expenses.

In extremely rare situations, a provision cannot be booked due to lack of a reliable estimate. In such cases, the obligation is mentioned in the notes as a contingent liability, unless there is little likelihood of an outflow of resources.

1.3.20.1 Provisions related to nuclear generation

Provisions related to nuclear generation mainly cover the following:

- back-end nuclear cycle expenses: provisions for spent fuel management, for waste removal and conditioning and long-term radioactive waste management are established in accordance with the obligations and final contributions specific to each country;
- costs for decommissioning power plants and losses relating to fuel in the reactor when the reactor is shut down (provision for last cores).

  Last core expenses correspond to the loss on fuel in the reactor that is not totally spent at the time of final reactor shutdown and cannot be reused due to technical and regulatory constraints, and the cost of fuel processing, and removal and storage of the resulting waste.

Changes in provisions resulting from a change in discount rates, a change in the disbursement schedule or a change in contractor quote are recorded:

- as an increase or decrease in the corresponding assets, up to the net book value, if the provision was initially covered by balance sheet assets (decommissioning of plants still in operation, long-term management of the radioactive waste resulting from such decommissioning, and last cores);
- in the income statement in all other cases.

Detailed information on the principles for determining provisions related to nuclear generation in France and the United Kingdom is given in note 32.

1.3.20.2 Other provisions

Other provisions primarily concern:

- contingencies related to subsidiaries and investments;
- tax liabilities excluding income taxes;
- litigation;
- onerous contracts and losses on completion;
- environmental schemes.

Provisions for onerous contracts primarily relate to multi-year agreements for the purchase or sale of energy and services:

- losses on energy purchase agreements are measured by comparing the acquisition cost under the contractual terms with the forecast market price;
- losses on energy sale agreements are measured by comparing the estimated income under the contractual terms with the cost of the energy to be supplier;
- losses on gas-related service agreements are measured by comparing the costs of fulfilling a contract with the resulting economic benefits, based on market and sales assumptions.

The revenues and margin on Framatome's long-term contracts are recorded under the percentage-of-completion method. When the estimated result upon completion is negative, the loss is immediately recorded in profit and loss, after deducting the loss already recognised under the percentage-of-completion method, and a provision is booked.

Provisions for environmental schemes may be established to cover the shortfall in greenhouse gas emission quotas, renewable energy certificates, and energy savings certificates, compared to the assigned targets (see note 1.3.26).

In extremely rare cases, description of a specific litigation covered by a provision may be omitted from the notes to the financial statements if such disclosure could cause serious prejudice to the Group.

1.3.21 Provisions for employee benefits

The Group grants its employees post-employment benefits (pension plans, retirement indemnities, etc) and other long-term benefits (e.g. long-service awards) in compliance with the specific laws and measures in force in each country where it does business.

1.3.21.1 Calculation and recognition of employee benefits

Obligations under defined-benefit plans are calculated by the projected unit credit method, which determines the present value of entitlements earned by employees at year-end under all types of plan, taking into consideration the prospects for wage increases and each country's specific economic conditions.

Post-employment benefit obligations are valued mainly using the following methods and assumptions:

- retirement age, determined on the basis of the applicable rules for each plan, and the requirements to qualify for a full pension;
- career-end salary levels, with reference to employee seniority, projected salary levels at the time of retirement based on the expected effects of career advancement, and estimated trends in pension levels;
- forecast numbers of pensioners, determined based on employee turnover rates and mortality data available in each country;
- reversion pensions where relevant, taking into account both the life expectancy of the employee and his/her spouse and the marriage rate;

- a discount rate that depends on the geographical zone and the duration of the obligations, determined at the year-end date by reference to the market yield on high-quality corporate bonds or the rate on government bonds whose duration is coherent with EDF group's commitments to employees.

The amount of the provision corresponds to the value of obligations less the fair value of the fund assets that cover those obligations.

The net expense booked during the year for employee benefit obligations includes:

- in the income statement:
  - the current service cost, corresponding to additional benefit entitlements earned during the year,
  - the net interest expense, corresponding to interest on obligations net of the return on fund assets, which is calculated using the same discount rate as for the obligations,
  - the past service cost, including the income or expense related to amendments or settlements of benefit plans or introduction of new plans,
  - the actuarial gains and losses relating to other long-term benefits;
- in other components of consolidated comprehensive income:
  - the actuarial gains and losses relating to post-employment benefits and any return on hedging assets in excess of the discount rates used,
  - the effect of the limitation to the asset ceiling if any.

1.3.21.2 Post-employment benefit obligations

When they retire, Group employees benefit from pensions determined under local rules. They may also be entitled to benefits directly paid by the companies, and additional benefits prescribed by the relevant regulations.

1.3.21.2.1 French entities covered by the IEG system

Entities belonging to the specific IEG (electricity and gas) sector system, namely EDF, Enedis, the CTE subgroup, Électricité de Strasbourg, EDF PEI and certain subsidiaries of the Dalkia subgroup, are Group companies where almost all employees benefit from the IEG statutes, including the special pension system and other statutory benefits.

Since the financing reform for the IEG sector system took effect on 1 January 2005, the CNIEG (Caisse Nationale des IEG, the sector's specific pension body) has managed not only the special IEG pension system, but also the industrial accident, invalidity and death insurance system for the sector.

The CNIEG is a social security body governed by private law, formed by the Law of 9 August 2004. It has legal entity status and reports to the French government, operating under the joint supervision of France's ministers for the Budget, Social Security and Energy.

Under the funding arrangements introduced by the Law, IEG sector companies establish pension provisions to cover entitlements not funded by France's standard systems (CNAV, AGIRC and ARRCO), to which the IEG system is affiliated, or by the CTA (*Contribution Tarifaire d'Acheminement*) levy on gas and electricity transmission and distribution services.

As a result of this funding mechanism, any change (whether favourable or unfavourable to employees) in the standard French pension system that is not passed on to the IEG pension system is likely to cause a variation in the amount of the provisions recorded by the Group to cover its obligations.

The obligations concerned by the pensions and for which a provision is recorded thus include:

- specific benefits of employees in the deregulated or competitive activities;
- specific benefits earned by employees from 1 January 2005 for the regulated activities (transmission and distribution) (benefits earned prior to that date are financed by the CTA levy).

In addition to pensions, other benefits are granted to IEG status former employees (not currently in active service), as detailed below:

- benefits in kind: Article 28 of the IEG national statutes entitles such employees and current employees to benefits in kind in the form of supplies of electricity or gas at preferential prices. The obligation for

supplies of energy to employees of the EDF and Engie (formerly GDF-Suez) groups corresponds to the probable present value of kWh to be supplied to beneficiaries or their dependants during their retirement, valued on the basis of the unit cost. It also includes the payment made under the energy exchange agreement with Engie;

- retirement gratuities: these are paid upon retirement to employees due to receive the statutory old-age pension, or to their dependants if the employee dies before reaching retirement. These obligations are almost totally covered by an insurance policy;
- bereavement benefit: this is paid out upon the death of an inactive or disabled employee, in order to provide financial assistance for the expenses incurred at such a time (Article 26 - § 5 of the National Statutes). It is paid to the deceased's principal dependants (statutory indemnity equal to three months' pension, subject to a ceiling) or to a third party that has paid funeral costs (discretionary indemnity equal to the costs incurred);
- bonus pre-retirement paid leave: all employees eligible to benefit immediately from the statutory old-age pension and aged at least 55 at their retirement date are entitled to 18 days of bonus paid leave during the last twelve months of their employment;
- other benefits include help with the cost of studies, time banking for pre-retirement leave, and pensions for personnel sent on secondment to subsidiaries not covered by the IEG system.

1.3.21.2.2 French and foreign subsidiaries not covered by the special IEG system

Pension obligations principally relate to the British companies and are mostly covered by defined-benefit plans.

In the United Kingdom, EDF Energy has three principal defined-benefit pension plans:

- the British Energy Generation Group (BEGG) plan affiliated to the Electricity Supply Pension Scheme (ESPS), of which the majority of members are employees in Nuclear Generation. The BEGG plan was closed to new members in August 2012;
- the EDF Energy Generation and Supply Group (EEGSG) plan, also affiliated to the ESPS, which was established in December 2010 for the employees remaining with EDF Energy following the transfer of the former Group plan to UK Power Networks as part of the sale of the Networks. The EEGSG plan has not accepted any new members since then;
- the EDF Energy Pension Scheme (EEPS). This scheme was established in March 2004 and membership remains open to new employees.

In 2016 EDF Energy introduced a new defined-benefit section of the EEPS pension plan named EEPS CARE (Career Average Revalued Earnings). Under EEPS CARE, pensions are based on a pensionable salary corresponding to the average salary over the beneficiary's entire career, adjusted for inflation. In 2017 a CARE section was also introduced in the BEGG pension plan, open to new employees in Nuclear Generation on equivalent terms to the corresponding section of the EEPS pension plan. Pensions for the other sections continue to be based on the beneficiary's most recent pensionable salary.

Each pension plan is financially independent of the others. The BEGG and EEGSG plans are part of the industry-wide ESPS which is one of the largest private-sector pension schemes in the United Kingdom.

The plans are externally managed by separate trusts whose trustees are appointed by the firm and the plan participants to manage the funds in their exclusive interests. The trustees carry out an actuarial review of the plan every three years, defining the funding level, the necessary employer and employee contributions and the payment schedules. The trustees are responsible for defining the plans' investment strategy, in agreement with the firm.

1.3.21.3 Other long-term benefit obligations

These benefits concern employees currently in service, and are earned according to local regulations, particularly the statutory regulations for the electricity and gas sector for EDF and French subsidiaries covered by the IEG regime. They include:

- annuities following incapacity, invalidity, industrial accident or work-related illness; like their counterparts in the general national system, IEG employees are entitled to financial support in the event of industrial accident or work-related illness, and invalidity and incapacity annuities and benefits. The obligation is measured as the probable present value of future benefits payable to current beneficiaries, including any possible reversions;

- long-service awards;
- specific benefits for employees who have been in contact with asbestos.

1.3.22 Special concession liabilities

These liabilities represent the contractual obligations specific to the concession rules for public electricity distribution concessions in France, and comprise the following:

- the concession-granting authority's rights in existing assets (its right to recover all the concession assets), consisting of the value in kind of the facilities (the net book value of assets operated under concessions), less any as yet unamortised financing provided by the operator;
- the concession-granting authority's rights in assets to be replaced (the operator's obligations relating to assets due for replacement). These non-financial liabilities comprise:
    - depreciation recorded on the portion of assets deemed financed by the concession-granting authority,
    - the provision for replacement, exclusively for assets due for replacement before the end of the concession, (the 1992 concession agreement model). This is accrued over the asset's useful life, based on the difference between the asset's replacement value for identical capacity and functions, and the original value. The replacement value is adjusted at each year-end based on indexes from official publications, and the impact of the adjustment is spread over the residual useful life of the assets concerned.

When assets are replaced, amortisation recognised on the portion of assets considered to be financed by the concession-granting authority, and the provision for replacement established for the relevant asset, are cancelled and transferred to rights in existing assets. Any excess provision is taken to income.

During the concession, the concession-granting authority's rights in assets to be replaced are thus transferred upon the asset's replacement to become the concession-granting authority's rights in existing assets, with no outflow of cash to the benefit of the concession-granting authority.

In general, the value of special concession liabilities is determined as follows:

- the concession-granting authority's rights in existing assets, representing the share deemed to be held by the concession-granting authority in the concession assets, are valued on the basis of the assets recorded in the balance sheet;
- the obligations relating to assets to be replaced are valued on the basis of the estimated value of the relevant assets, measured at each year-end taking into consideration wear and tear on the asset at that date:
    - based on the difference between the asset's replacement value as assessed at year-end and the historical cost for calculation of the provision for replacement. Annual allocations to the provision are based on this difference, less any existing provisions, with the net amount spread over the residual useful life of the assets. Consequently, the expenses recognised for a given item increase over time,
    - based on the share of the asset's historical cost financed by the concession-granting authority for amortisation of the concession-granting authority's financing.

The Group considers that the obligations related to assets to be replaced are to be valued on the basis of the special clauses contained in the concession agreements. Under this approach, these obligations are stated at the value of the contractual obligations as calculated and reported annually in the reports to the concession-granting authorities. This contractual value also reflects the possibility that the EDF group may one day lose its status as the concession operator.

If no such clauses existed, an alternative approach would be to state contractual obligations at the present value of future payments required for replacement of assets operated under concession at the end of their industrial useful life.

For information, the Group reports below the impacts of this alternative approach, i.e. the discounting of the future obligation to contribute to financing of assets to be replaced.

The principal assumptions used in preparing this simulation are as follows:

- the basis for calculation of the provision for replacement is the estimated replacement value at the end of the asset's useful life, applying a forecast annual inflation rate of 1.4%, less the asset's historical value. This amount is based on the wear and tear on the asset and discounted at a rate of 3.7% (inflation rate of 1.6% and discount rate of 4.00% at 31 December 2018);
- amortisation of the concession-granting authority's financing is also discounted at the rate of 3.7%.

The following table shows the impacts of this simulation for Enedis in 2019:

- Impacts on the income statement

(in millions of euros, before taxes)	2019
Operating profit	2,388
Financial result	(637)
Income before taxes of consolidated companies	1,751

- Impacts on the balance sheet – equity

(in millions of euros, before taxes)	2019
At opening date	1,251
At closing date	3,003

Valuation of concession liabilities under this method is subject to uncertainty over costs and disbursements, and is also sensitive to inflation and discount rates.

1.3.23 Investment subsidies

Investment subsidies received by Group companies are included in liabilities under the heading "Other liabilities" and transferred to income as and when the economic benefits of the corresponding assets are utilised.

1.3.24 Assets classified as held for sale and related liabilities, and discontinued operations

Assets that qualify as held for sale and related liabilities are disclosed separately from other assets and liabilities in the balance sheet.

When assets or groups of assets are classified as discontinued operations, income and expenses relating to these discontinued operations are disclosed in a single net amount after taxes in the income statement and net changes in cash and cash equivalents of discontinued operations are also reported separately in the cash flow statement.

Impairment is booked when the realisable value is lower than the net book value.

1.3.25 Nature and extent of restrictions on the Group's ability to access and use assets or settle liabilities

The main restrictions that may limit the Group's ability to access or use its assets or settle its liabilities concern the following items:

- assets held to fund employee benefits (principally in France and the United Kingdom – see note 1.3.21) and expenses related to nuclear liabilities (principally in France – see note 48 – and the United Kingdom – see note 32.2);
- tangible and intangible assets and the related liabilities associated with concession agreements, whether or not they are subject to regulatory mechanisms (obligations to supply energy or energy-related services, rules governing investments, an obligation to return concession facilities at the end of the contract, amounts payable at the end of the contract, tariff constraints, etc). These restrictions mainly apply to assets of this type in France (EDF, Enedis, Electricité de Strasbourg and Dalkia), and to a lesser extent Italy (see notes 1.3.12 and 1.3.22);

- the sale of Group investments in certain subsidiaries requires authorisations from State bodies, particularly when they exercise a regulated activity or operate nuclear power plants (this is the case for EDF Nuclear Generation Ltd. in the United Kingdom, Taishan (TNPJVC) in China and CENG in the United States);
- prudential reserves established and measures taken as regards distribution capacity, so that the insurance subsidiaries will meet their prudential ratio requirements;
- the cash of certain entities that use financing arrangements stipulating that dividend distribution is subject to conditions concerning repayment of bank debt (or qualification for loans) and shareholders, or are subject to regulatory limitations in certain countries.

Certain shareholder agreements concerning companies controlled by the Group include clauses to protect minority shareholders, requiring approval from minority shareholders for certain particularly important decisions.

Finally, certain financing loans granted to Group entities contain early repayment clauses (see note 41.2.6), and certain items of cash and cash equivalents are subject to restrictions (see note 40).

1.3.26 Environment

1.3.26.1 Greenhouse gas emission rights

In ratifying the Kyoto Protocol, Europe made a commitment to reduce its greenhouse gas emissions. EU Directive 2003/87/EC set up a greenhouse gas emission quota system for the European Union which has been in operation since 1 January 2005.

This system was incorporated into national laws. Among other things it requires obligated actors, which is the case of EDF, to surrender to the State a number of greenhouse gas emission credits each year, corresponding to their emissions for the year. The rights and obligations associated with this system are periodically reviewed.

One of the main features of the third phase, running from 1 January 2013 to 31 December 2020, is the discontinuation of free allocation of emission rights in certain countries, including France and United Kingdom.

In the EDF group, the entities subject to this Directive are EDF, EDF Energy, Edison, Dalkia, and Luminus (formerly EDF Luminus).

The accounting treatment of emission rights depends on the holding intention. Two economic models coexist in the Group:

- Rights held under the "Trading" model are included in "Other inventories" at fair value. The change in fair value observed over the year is recorded in the income statement.
- Rights held to comply with regulatory requirements on greenhouse gas emissions (the "Generation" model) are recorded in "Greenhouse gas emission rights – green certificates":
    - at acquisition cost when purchased on the market;
    - at nil value when allocated free of charge (in countries that still have a free allocation system).

When the estimated emissions by a Group entity over a given period are higher than the rights allocated for no consideration for the period less any allocated rights sold on the spot or forward market, a provision is established to cover the excess emissions. This provision is equal to the shortfall in rights held (difference between actual emissions and allocated rights held at the closing date).

If no emission rights are allocated free of charge, a provision is systematically recorded equivalent to the actual emissions at the closing date.

In either case, the provision is measured on the basis of the acquisition cost up to the amount of rights acquired on the spot or forward markets, and on market prices for the balance. It is cancelled when the rights are surrendered to the State.

At the closing date, the portfolio of emission rights and the obligation to surrender rights for the emissions of the year are presented gross, without netting.

If the number of purchased emission rights recorded as intangible assets at the end of the year and not subject to forward sale is higher than the number of purchased rights that will be surrendered to the State for the year's emissions, an impairment test must be applied to the excess. If the realisable value is lower than the net book value, impairment is booked.

1.3.26.2 Renewable energy certificates

In application of EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources, every EU member state has set national targets for consumption of electricity from renewable sources.

There are two ways for States to meet these targets:

- incorporating the costs of generating such electricity into the sale price for electricity (this is the approach taken in France);
- introducing a renewable energy certificate system (as is the case in the United Kingdom, Italy and Belgium).

The renewable energy certificate system may apply to:

- non-obligated electricity producers when the obligation applies to energy sales (EDF Renewables);
- obligated electricity producers when the obligation applies to generation;
- producers who are also sellers of electricity when the obligation applies to energy sales (EDF Energy, Edison and Luminus).

The EDF group applies the following accounting treatments:

- for non-obligated electricity producers, certificates obtained based on generation output are recorded in "Other inventories" until they are sold on to suppliers;
- for obligated producers and an entity that both produces and supplies energy and is under an obligation to sell a specified quantity of renewable energy, the Group uses the following accounting treatments for certificates obtained based on generation output:
    - up to the level of the obligation, these certificates are not recognised,
    - certificates in excess of the obligation are recorded in "Other inventories",
    - in the specific situation when an entity is not in a position to meet its obligation at the year-end, the Group applies the following accounting treatment:
        - certificates acquired for a consideration in order to meet the obligation are recorded in intangible assets at acquisition cost, and
        - a provision is established equivalent to the shortfall in certificates compared to the obligation at the year-end. The value of this provision is based on the acquisition price of certificates already purchased on the spot or forward market, and market prices or penalty prices for the balance. The provision is cancelled when the certificates are surrendered to the State.

Forward purchases/sales of certificates related to trading activities are recorded in accordance with IFRS 9, stated at fair value in the balance sheet date. The change in fair value is recorded in the income statement.

1.3.26.3 Energy savings certificates

In all its subsidiaries, the Group is engaged in a process to control energy consumption through various measures developed by national legislation, in application of European Union Directives.

In France, the Law of 13 July 2005 introduced a system of energy savings certificates. Suppliers of energy (electricity, gas, heat, cold, domestic fuel oil and fuel for vehicles) with sales above a certain level became subject to energy savings obligations, initially for a three-year period.

To meet this obligation, three sources are available to the EDF group: supporting consumers in their energy efficiency operations, funding ministry-approved energy savings certificate schemes, and purchasing certificates from eligible actors.

Expenses incurred for this purpose are recorded in expenses of the year concerned, in "Other operating income and expenses". Expenses in excess of the accumulated obligation at year-end are included in inventories and may be used to cover the obligation in later years.

A provision is recognised if the energy savings achieved are lower than the cumulative energy savings obligation at the year-end. The amount of the provision is equal to the cost of actions still to be taken to meet the obligations related to the energy sales made. If these actions cannot be taken, the provision is assessed using the cost of the applicable penalties.

1.3.26.4 Environmental expenses

Environmental expenses are identifiable expenses incurred to prevent, reduce or repair damage to the environment that has been or may be caused by the Group as a result of its activities. These expenses are treated as follows:

- they are capitalised if they are incurred to prevent or reduce future damage or protect resources (e.g. expenses for structures to facilitate the passage of migrating fish, effluent treatment installations, etc);
- they are booked as environmental liabilities and increases to provisions for environmental risks if they correspond to an obligation that exists at the year-end and it is probable or certain at the reporting date that they will lead to an outflow of resources;
- they are recognised as expenses if they are operating expenses for the units in charge of environmental concerns, environmental supervision, environmental duties and taxes, processing of liquid and gas effluents and non-radioactive waste, or research unrelated to an investment.

NOTE 2 COMPARABILITY

2.1 IFRS 16 – LEASES

IFRS 16 "Leases" was adopted by the European Union on 31 October 2017 and is mandatory for financial years beginning on or after 1 January 2019.

The Group decided to apply the modified retrospective approach, in which the cumulative impact of first application of the standard is recognised as an adjustment to retained earnings at the date of first application, i.e. 1 January 2019. This approach involves recognition of a liability equal to the discounted value of residual lease payments and a corresponding right-of-use asset adjusted for the amount of prepaid or accrued payments on the lease. The Group has opted to value the right-of-use asset at an amount equal to the lease payment liability.

Restatement of comparative figures in the main financial statements and the accompanying notes for the impacts of application of IFRS 16 is not required.

The weighted average discount rate applied by the Group to calculate the lease liability at 1 January 2019 over the residual term of its lease contracts is 1.61% (see note 1.3.13).

The Group also decided to apply the exemptions allowed by IFRS 16 as indicated in note 1.3.13.1, and not to reassess agreements previously classified as leases or service contracts under IFRIC 4 at the date of first application.

2.1.1 Impact of the transition at 1 January 2019

Under the modified retrospective approach, application of IFRS 16 at the transition date has an impact on net indebtedness, and results in recognition of a €4,492 million right-of-use asset.

The differences between the operating lease commitments under IAS 17 reported at 31 December 2018 and the estimated lease liability under IFRS 16 relating to the same contracts at 1 January 2019 are explained in the following table:

(in millions of euros)	01/01/2019
Operating lease commitments as lessee at 31/12/2018 (note 49.1.1.3)	4,375
Unrecognised contracts (IFRS 16 exemptions) and other	(105)
Differences in the durations applied for termination and extension options that are reasonably certain to be exercised	1,125
Leases signed in 2018 for an asset available after 1 January 2019	(329)
Non-discounted lease liability under IFRS 16 at 01/01/2019	5,066
Discount effect	(574)
Discounted lease liability under IFRS 16 at 01/01/2019	4,492

This amount for the right-of-use asset and the lease liability is recognised in addition to finance-leased assets at 31 December 2018, amounting to €96 million (see note 25), and the finance lease liability amounting to €324 million (see note 41.2.1).

2.1.2 Impacts on the Group's consolidated financial statements at 31 December 2019

At 31 December 2019, the net value of the right-of-use asset amounts to €4,333 million and the lease liability amounts to €4,510 million. In 2019, the amortisation expense for the right-of-use asset amounts to €(660) million and the interest on the lease liability amounts to €(85) million.

For information, based on the Group's calculations, application of IFRS 16 under the modified retrospective approach would have had a positive impact of some €517 million on operating profit before depreciation and amortisation for 2018 (including a partial cancellation of realised gains on sale amounting to €(166) million). The consolidated net income would not have been significantly different.

2.2 IFRIC 23 – UNCERTAINTY OVER INCOME TAX TREATMENTS

In application of the modified retrospective method, implementation of IFRIC 23 at the transition date has a non-significant impact on tax liabilities (€10 million) that is recognised via equity, with no restatement of the comparative figures.

Following the IFRIC's decision of September 2019 regarding presentation of uncertain tax positions, the Group has reclassified the amounts previously reported as provisions for tax liabilities as deferred tax liabilities.

2.3 IFRS 5 - PLANNED SALE OF E&P OPERATIONS

EDF's Board of Directors (on 28 June 2019) and Edison's Board of Directors (on 3 July 2019) approved the purchase offer made for the Group's investment in Edison's Exploration and Production (E&P) operations. On 4 July 2019, Edison therefore announced the signature of the agreement with Energean Oil and Gas to sell 100% of Edison's E&P operations and its subsidiaries specialising in the hydrocarbon exploration and production business (oil and natural gas).

The sale price stated in the agreement is based on an enterprise value of $750 million, with an additional consideration of $100 million contingent on commissioning of the Cassiopea gas project in Italy. Additionally, Edison will be entitled to royalties from further developments in Egypt that could bring the aggregate value close to $1 billion. All of Edison's future decommissioning obligations will be transferred to the buyer under the sale agreement.

Edison Exploration and Production manages all of Edison's activities, mining titles and corporate shareholdings in the hydrocarbons business in Italy and abroad. In particular, Edison E&P owns a portfolio of approximately 90 licences in 9 countries in the Mediterranean and Northern Europe, corresponding to a production quota of approximately 49,000 barrels per day at 31 December 2018.

On 23 December 2019, Edison disclosed that the sale to Energean Oil and Gas announced on 4 July 2019 was still awaiting government authorisations. Edison also stated that it had been invited by the Algerian authorities to discuss an agreement with Sonatrach regarding its E&P assets in Algeria.

Edison and Energean are collaborating and confirm the objective of completing the transaction as soon as possible in 2020.

2.3.1 Presentation of the E&P operations in the consolidated financial statements

As Edison is the only Group entity with E&P operations, which account for a large portion of the "Italy" operating segment, the sale of the E&P operations is classified as a discontinued operation as defined by IFRS 5 from 1 January 2019.

As a result, the net income of discontinued operations is reported on a specific line of the income statement for the periods published. Similarly, in the cash flow statement, the net change in cash from discontinued operations is reported on a specific line for the periods published.

Following application of IFRS 5, based on the terms of the purchase offer, the amounts of Edison's E&P assets and liabilities at 31 December 2019 are reported in specific lines of the consolidated balance sheet. Details of the assets and liabilities of these discontinued operations are given in note 46. The impacts of application of IFRS 5 on the Group's income statement and cash flow statement at 31 December 2018 are presented below.

Based on the consolidated net value of these E&P operations at 31 December 2019 and the sale price as stated in the indicative purchase offer, impairment of €(513) million was booked during the year (see note 19), included in the line "net income of discontinued operations".

2.3.2 Impacts on the 2018 income statement

(in millions of euros)	2018 as published	Impact of IFRS 5	2018 restated
Sales	68,976	(430)	68,546
Fuel and energy purchases	(33,012)	(44)	(33,056)
Other external expenses	(9,364)	102	(9,262)
Personnel expenses	(13,690)	48	(13,642)
Taxes other than income taxes	(3,697)	7	(3,690)
Other operating income and expenses	6,052	(50)	6,002
Operating profit before depreciation and amortisation	**15,265**	**(367)**	**14,898**
Net changes in fair value on energy and commodity derivatives, excluding trading activities	(224)	-	(224)
Net depreciation and amortisation	(9,006)	231	(8,775)
Net increases in provisions for replacement of property, plant and equipment operated under concessions	(50)	-	(50)
(Impairment)/reversals	(598)	308	(290)
Other income and expenses	(105)	-	(105)
Operating profit	**5,282**	**172**	**5,454**
Cost of gross financial indebtedness	(1,716)	4	(1,712)
Discount effect	(3,486)	22	(3,464)
Other financial income and expenses	393	(15)	378
Financial result	**(4,809)**	**11**	**(4,798)**
Income before taxes of consolidated companies	**473**	**183**	**656**
Income taxes	149	29	178
Share in net income of associates and joint ventures	569	-	569
Net income of discontinued operations	-	(212)	(212)
CONSOLIDATED NET INCOME	1,191	-	1,191
EDF net income	**1,177**	**-**	**1,177**
Net income of continuing operations	1,177	207	1,384
Net income of discontinued operations	-	(207)	(207)
Net income attributable to non-controlling interests	**14**	**-**	**14**
Net income of continuing operations	14	5	19
Net income of discontinued operations	-	(5)	(5)

2.3.3 Impacts on the 2018 consolidated cash flow statement

(in millions of euros)	2018 as published	Impact of IFRS 5	2018 restated
Operating activities:			
Income before taxes	**473**	**-**	**473**
Income before taxes of discontinued operations	**-**	**(183)**	**(183)**
Income before taxes of consolidated companies	**473**	**183**	**656**
Impairment/(reversals)	598	(308)	290
Accumulated depreciation and amortisation, provisions and changes in fair value	13,180	(223)	12,957
Financial income and expenses	729	(11)	718
Dividends received from associates and joint ventures	387	-	387
Capital gains/losses	(1,014)	-	(1,014)
Change in working capital	462	8	470
Net cash flow from continuing operations	***14,815***	***(351)***	***14,464***
Net cash flow relating to discontinued operations	***-***	***351***	***351***
Net cash flow from operations	***14,815***	***-***	***14,815***
Net financial expenses disbursed	(1,062)	14	(1,048)
Income taxes paid	(389)	80	(309)
Net cash flow from continuing operating activities	**13,364**	**(257)**	**13,107**
Net cash flow from operating activities relating to discontinued operations	**-**	**257**	**257**
Net cash flow from operating activities	**13,364**	**-**	**13,364**
Investing activities:			
Acquisitions of equity investments, net of cash acquired	(484)	-	(484)
Disposals of equity investments, net of cash transferred	1,261	-	1,261
Investments in intangible assets and property, plant and equipment	(16,186)	170	(16,016)
Net proceeds from sale of intangible assets and property, plant and equipment	611	(34)	577
Changes in financial assets	(2,367)	-	(2,367)
Net cash flow from continuing investing activities	**(17,165)**	**136**	**(17,029)**
Net cash flow from investing activities relating to discontinued operations	**-**	**(136)**	**(136)**
Net cash flow from investing activities	**(17,165)**	**-**	**(17,165)**
Financing activities:			
EDF capital increase	-	-	-
Transactions with non-controlling interests	1,548	-	1,548
Dividends paid by parent company	(511)	-	(511)
Dividends paid to non-controlling interests	(183)	-	(183)
Purchases/sales of treasury shares	(3)	-	(3)
Cash flows with shareholders	***851***	***-***	***851***
Issuance of borrowings	5,711	-	5,711
Repayment of borrowings	(2,844)	120	(2,724)
Issuance of perpetual subordinated bonds	1,243	-	1,243
Redemptions of perpetual subordinated bonds	(1,329)	-	(1,329)
Payments to bearers of perpetual subordinated bonds	(584)	-	(584)
Funding contributions received for assets operated under concessions	131	-	131
Investment subsidies	351	-	351
Other cash flows from financing activities	***2,679***	***120***	***2,799***
Net cash flow from continuing financing activities	**3,530**	**120**	**3,650**
Net cash flow from financing activities relating to discontinued operations	**-**	**(120)**	**(120)**
Net cash flow from financing activities	**3,530**	**-**	**3,530**
Net increase/(decrease) in cash and cash equivalents from continuing operations	(271)	(1)	(272)
Net increase/(decrease) in cash and cash equivalents from discontinued operations	-	1	1
Net increase/(decrease) in cash and cash equivalents	**(271)**	**-**	**(271)**
CASH AND CASH EQUIVALENTS - OPENING BALANCE	3,692	-	3,692
Net increase/(decrease) in cash and cash equivalents	(271)	-	(271)
Effect of currency fluctuations	(95)	-	(95)
Financial income on cash and cash equivalents	13	-	13
Effect of reclassifications	(49)	-	(49)
CASH AND CASH EQUIVALENTS - CLOSING BALANCE	3,290	-	3,290

NOTE 3 SIGNIFICANT EVENTS AND TRANSACTIONS

In addition to the planned disposal of E&P operations presented in note 2.3, the main significant events and transactions of 2019 are the following:

3.1 NUCLEAR DEVELOPMENTS

3.1.1 Flamanville 3 EPR

NB: The following information should be read in conjunction with the reminders of the key points of 2018 presented in note 3.5.3.

On 11 April 2019[1], EDF announced that it was aware of the opinion of the Permanent Group of experts for nuclear pressure equipment (GP ESPN), made public on 11 April 2019, regarding the quality deviations affecting the welds located on the main steam transfer pipes covered by the break preclusion principle[2] at the Flamanville 3 EPR.

The Nuclear Safety Authority (ASN) had held a meeting of the GP ESPN on 9 April 2019 as part of its investigation into these quality deviations:

- On 3 December 2018, EDF submitted a technical file to the ASN presenting the procedures for repairing and upgrading the main secondary circuit welds, which had shown deficiencies with respect to the break preclusion requirements, as well as for the specific justification method for the 8 welds located in the reactor containment building structure.
- The file was examined by the ASN, with technical support from the Institute for Radiation Protection and Nuclear Safety (IRSN).
- Based on this examination, discussions took place at a GP ESPN meeting attended by EDF, which presented the background facts, their analysis and the methods for dealing with the issue. EDF answered all the Permanent Group of experts' questions for the technical examination of this file.

EDF indicated at the time that the recommendations and solution avenues suggested by the Permanent Group of experts could have an impact on the commissioning schedule and construction cost, and that the Group would continue its discussions with the ASN, which was to issue its decision regarding action to be taken on this matter a few weeks later.

Consequently, the Group stated that a detailed update of the schedule and construction cost for the Flamanville 3 EPR will be given after the ASN's decision had been published.

On 20 June 2019[3], EDF announced that it was aware of the decision issued by the ASN in its letter of 19 June 2019 regarding the quality deviations affecting the welds located on the main steam transfer pipes covered by the break preclusion principle of at the Flamanville 3 EPR.

In that letter, the ASN asked EDF to repair the eight containment penetration welds at the Flamanville EPR that were not compliant with the break preclusion principle.

On 26 July 2019[4], EDF announced that three scenarios for upgrading the penetration welds were under consideration, and that after a detailed examination of the three scenarios and discussions with the ASN, the Group would communicate the schedule and cost implications of the selected scenario in the next few months. The Group also stated that commissioning could not be expected before the end of 2022.

This work resulted in discussions with the ASN, which sent EDF[5] a letter on 4 October concerning the technical feasibility of these three scenarios.

[1] *Cf. press release of 11 April 2019.*
[2] *The break preclusion principle is a very high standard of quality with stricter requirements than nuclear pressure equipment regulations for the design, manufacturing and in-service monitoring of certain items of equipment. These stricter requirements must be sufficient to consider that rupture of this equipment is highly unlikely. (When this standard is applied, a comprehensive study of the consequences of breaks in this piping is not required in the plant safety case).*
[3] *Cf. press release of 20 June 2019.*
[4] *Cf. press release of 26 July 2019.*
[5] *Cf. press release of 9 October 2019.*

The penetration weld repair scenario preferred by EDF involves the use of remote-operated robots, designed to conduct high-precision operations inside the piping concerned. This technology has been developed for nuclear power plants in operation and must be qualified for penetration weld repairs. The aim is to qualify this scenario with validation by the ASN by the end of 2020, at which date EDF will be able to initiate the repair work. A second scenario involving extraction and realignment work in the Safeguard Auxiliary Buildings is held at this stage as a fall-back solution.

Based on this penetration weld repair strategy, the EDF Board of Directors approved continuation of the Flamanville EPR construction at a meeting held on 8 October 2019.

This led the Group to adjust the schedule and the estimated construction cost for the Flamanville EPR[1].

The provisional schedule for implementation of the preferred penetration weld repair scenario, if the objective of ASN validation is achieved, sets the date of fuel loading in late 2022 and the revised construction cost at €12.4 billion[2], an increase of €1.5 billion. Most of these additional costs will be treated as operating profit[3], rather than being capitalised. These costs will affect the financial years 2020, 2021 and 2022. For 2020, the impact on EDF net income is estimated at €(0.4) billion, all other things being equal, with no impact on net income excluding non-recurring items.

The process of realignment of the 58 welds on the secondary system with quality deviations or not in compliance with the break preclusion principle requirements defined by EDF is being continued on site. At the same time, the second hot functional test phase was started on 21 September 2019. Hot functional testing checks plant performance under simulated normal operating conditions.

3.1.2 Deviation from technical standards governing the manufacture of nuclear reactor components by Framatome

Framatome has informed EDF[4] of a deviation from technical standards governing the manufacture of nuclear reactor components. The deviation relates to the performance of the manufacturing process used, which did not respect temperature ranges in certain areas during manufacturing operations involving stress-relieving heat treatment on some steam generator welds. It concerns in-service components as well as new components which have not yet been put into operation or installed on any sites.

On 9 September 2019, EDF informed the ASN of its initial investigations concerning the deviation in a post-weld stress-relieving heat-treatment process applied to certain nuclear reactor components.

Work conducted since then by EDF and Framatome[5] to make an inventory of the equipment and reactors concerned and confirm that they are fit for operation has identified 18 steam generators installed on six reactors currently in operation: reactors no. 3 and 4 at Blayais, reactor no. 3 at Bugey, reactor no. 2 at Fessenheim, reactor no. 4 at Dampierre-en-Burly and reactor no. 2 at Paluel.

The components that are not yet in service are the four steam generators and the pressuriser at the Flamanville 3 EPR, as well as 3 new steam generators that have not yet been installed and were made to replace the steam generators on reactors no. 5 and 6 at Gravelines.

Following publication by the ASN on 24 October 2019 of the information notice entitled "Manufacturing deviation at Framatome stress-relieving heat treatment of welds", EDF[6] took note that the reactors involved can continue to function as they are, with no need to be shut down for the checks required to address the discrepancies. Physical checks were carried out on the relevant welds in the new steam generators when they were installed at Gravelines 5, the relevant welds of in-service steam generators when they were shut down for fuel reloading (Blayais 4, Paluel 2 and Dampierre 4) and the weld on the Fessenheim 2 steam generator. For the other steam generators in operation the same checks will be carried out on the relevant welds during their next scheduled shutdown for fuel reloading, before the end of the first half-year of 2020 (Bugey 3 and Blayais 3). It is not anticipated at this stage that these shutdowns will need to be extended.

[1] *The issue of deviation from the technical manufacturing standards for Framatome reactor components (stress-relieving heat treatment process for the welds with electrical resistance) which concerns the four steam generators and pressuriser at Flamanville 3 EPR is explained in note 3.1.2.*
[2] *In 2015 Euros, excluding interim interest.*
[3] *IAS 16.22 concerning abnormal costs incurred in connection with self-constructed assets.*
[4] *Cf. press release of 10 September 2019.*
[5] *Cf. press release of 18 September 2019.*
[6] *Cf. press release of 25 October 2019.*

3.1.3 Hinkley Point C

The Hinkley Point C project delivered J-0, the completion of the nuclear island "common raft" for its first unit in June 2019, in line with the schedule announced in September 2016.

Following this major milestone a detailed review of the project's costs, schedule and organisation was performed. The review has concluded that:

- The next milestone of completing the common raft for Unit 2 in June 2020, which was announced earlier in 2019, is confirmed;
- The previously communicated risk of delay in the Commercial Operation Date (COD) for units one and two (of 15 months and nine months respectively) has increased[1];
- The project completion cost[2] is now estimated at between £21.5 billion and £22.5 billion, an increase of £1.9-£2.9 billion[3] compared to the previous estimate. The range depends on the effectiveness of action plans to be delivered in partnership with contractors.

Cost increases reflect challenging ground conditions which made earthworks more expensive than anticipated, revised action plan targets and extra costs needed to implement the completed functional design, which has been adapted for a first-of-a-kind application in the UK regulatory context.

Under the terms of the Contract for Difference, this new cost estimate has no impact for UK consumers or taxpayers. EDF's rate of return for Hinkley Point C (IRR)[4] is now estimated at between 7.6% and 7.8%.

The management of the project remains mobilised to begin generating power from Unit 1 at the end of 2025. To achieve this, operational action plans overseen by the project management are being put in place. These involve the EDF Group's engineering teams in Great Britain and France, buildings and ancillary works contractors, and suppliers of equipment and systems throughout the supply chain.

3.1.4 Taishan

On 14 December 2018, CGN and EDF announced that Taishan nuclear power plant's unit 1 had become the world's first EPR to begin commercial operation. This last milestone was reached on 13 December 2018 after successful completion of the final statutory test of continuous operation at full power for 168 hours.

Unit 2 began commercial operation on 7 September 2019. All the requirements for the reactor's safe operation were met barely nine months after Unit 1 was commissioned.

Comprising two 1750-MW EPR reactors, Taishan nuclear power plant is the biggest cooperation project between China and France in the energy sector. Taishan's two reactors are capable of supplying the Chinese power grid with up to 24TWh of carbon-free electricity a year, tantamount to the annual electricity consumption of 5 million Chinese users, whilst at the same time preventing the emission of 21 million tonnes of CO_2 a year.

The Taishan project is led by TNPJVC, a joint venture founded by CGN (51%), EDF (30%) and the Chinese utility Guangdong Energy Group (19%). The EDF Group and its subsidiary Framatome supplied the EPR technology for the plant. The project capitalised on 35 years of strategic cooperation between EDF and CGN, as well as operating experience from the Flamanville 3 EPR and the complementarity between the French and Chinese nuclear sectors.

Experience acquired through the commissioning of the first reactor on 13 December 2018 made it possible to shorten the period between fuel loading and the start of commercial operation by three months, with identical safety conditions.

The Taishan project is contributing experience in project management and technological expertise to EPR reactors around the world. The first reactors to benefit from this experience are the two Hinkley Point C units currently being built in the UK. EDF and CGN are also partners in two other British projects: the Sizewell C two-EPR project, and the Bradwell B project which is based on Hualong technology.

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[1] *If this risk were to materialise, it would entail an additional cost of around £0.7 billion in 2015 sterling. Under this assumption the IRR for EDF would be lower by 0.3%.*

[2] *In 2015 sterling, excluding interim interest and excluding foreign exchange effect versus the reference exchange rate for the project of £1 = €1.23.*

[3] *Additional costs net of action plans.*

[4] *EDF's forecast IRR calculated at the exchange rate £1 = €1.15 and including the capped compensation mechanism between shareholders for surplus costs or delays.*

3.1.5 NUWARD, a joint Small Modular Reactor (SMR) project

On 17 September 2019, during the IAEA General Conference in Vienna, the French Alternative Energies and Atomic Energy Commission (CEA), EDF, Naval Group and TechnicAtome unveiled "NUWARD"™, their jointly-developed small modular reactor (SMR) project. NUWARD is a PWR (pressurised water reactor)-based solution to meet the growing world demand for decarbonised, safe and competitive electricity generation in the 300-400 MWe range.

The CEA and EDF have also initiated discussions with Westinghouse Electric Company to explore potential cooperation on SMR development.

3.1.6 Closure of Fessenheim nuclear power plant

EDF has submitted an application to the ASN and France's Ministry for the Ecological and Inclusive Transition for the termination of operations and a declaration of the permanent shutdown of both reactors at Fessenheim nuclear power plant. The shutdown of reactor no. 1 is planned for 22 February 2020, whilst the shutdown of reactor no. 2 is planned for 30 June 2020.

This submission followed the signature by the French State and EDF on 27 September 2019 of a protocol agreement whereby the State will compensate EDF for the early closure of Fessenheim, which results from the cap on nuclear power output set by the "energy transition for green growth" law of 17 August 2015.

The compensation paid under the terms of this protocol will comprise:

- Initial instalments to compensate for expenses incurred after the closure of the plant (end-of-operations expenditure, BNI taxes, dismantling costs and staff redeployment costs), which will be paid over a 4-year period following the closure. These payments are expected to amount to a total of nearly €400 million.

  This compensation will be recognised as income in profit and loss as and when the associated costs are incurred.

- Subsequent payments corresponding to the lost income that would have been generated by future power generation up until 2041, based on Fessenheim's previous output figures and calculated "ex post" on the basis of nuclear power sale prices, particularly observed market prices.

3.2 DISPOSALS

3.2.1 Disposal of EDF's 25% stake in Alpiq

On 4 April 2019, following the approval given by their respective governance bodies, EDF, EBM (*Coopérative Elektra Birseck*) and EOS (EOS Holding SA) signed an agreement on EDF's disposal of its stake in Swiss power producer Alpiq (25.04% of the company's capital and voting rights) to EBM and EOS (each entity acquiring half of this stake).

This operation valued EDF's stake in Alpiq at approximately CHF489 million (around €434 million), based on a purchase price of CHF70 per Alpiq share. It reduced the Group's net indebtedness by €434 million. The Shares Purchase Agreement includes potential earn-out mechanisms. The sale was completed on 28 May 2019 after it received clearance from the German competition authority.

The impact on the consolidated net income is not significant.

3.2.2 EDF notifies the exercise of its put option on its investment in CENG

Pursuant to the agreements concluded with Exelon in 2014[1], EDF notified Exelon on 20 November 2019 the exercise of its put option on 49.99% of the shares of CENG.

CENG owns five nuclear reactors across three nuclear power plants located in the states of New York and Maryland, with total capacity of 4041MW (company-owned capacity).

[1] *EDF Press Release of 1 April 2014 "EDF and Exelon finalize agreement on CENG".*

This put option was exercisable by EDF from 1 January 2016 to 30 June 2022. The transaction price will be based on the fair market value of CENG shares, determined pursuant to the contractual provisions of the put option agreement.

Completion of the transaction will be conditional upon obtaining the required regulatory approvals.

This sale of CENG shares is part of the disposal plan concerning non-core assets announced by EDF Group.

The Group has reclassified its investment in CENG as assets held for sale (see note 46).

3.3 FINANCING OPERATIONS

3.3.1 Signature of three credit lines indexed on ESG criteria

Through these new agreements, which form a continuity with two other credit lines indexed on the Group's sustainability performance signed in 2017 and 2018, EDF is reaffirming the central role of sustainable financing instruments in its finance strategy. ESG-indexed renewable credit lines total more than €5 billion at 31 December 2019, accounting for around 48% of the EDF group's credit lines.

On 22 March 2019 EDF and BBVA signed a €300 million revolving credit facility.

On 22 July 2019 EDF signed two €300 million revolving credit facilities. One is with the Crédit Agricole Group, led by Crédit Agricole CIB and including LCL and Crédit Agricole d'Ile-de-France, and the other is with Société Générale CIB.

These three credit facilities incorporate an adjustment mechanism that links their cost to three of the Group's sustainability KPIs: direct CO_2 emissions, use of online consumption monitoring tools by its French residential customers (as a proxy for EDF's success in getting French residential customers actively engaged with their energy consumption), and electrification of its light vehicle fleet.

3.3.2 Issuance of perpetual subordinated bonds

On 26 November 2019, EDF issued a Euro-denominated 500 million hybrid bond, with a 3.00% coupon and an 8-year first call date.

This offering shows the Company's strong commitment to financing through hybrid securities, which are a permanent part of its capital structure. The Company pro-actively manages its stock of hybrid bonds: the funds resulting from this issue were mainly used to finance the partial repurchase of several outstanding series of hybrid bonds, and for general corporate purposes of the Company and the EDF Group, as the case may be.

In compliance with IAS 32, the issuance of perpetual subordinated bonds (see note 1.3.19.4) was recorded in equity upon receipt of the funds, at the amounts of €493 million net of expenses.

3.3.3 Redemption of certain series of hybrid bonds

On 26 November 2019, EDF issued a cash tender offer for redemption of the following hybrid bonds:

- €1,000 million Reset Perpetual Subordinated Notes with a first redemption at the option of the Company on 22 January 2022, which are admitted to trading on Euronext Paris, of which €661.8 million was outstanding. The amount redeemed amounted to €394.9 million and settlement took place on 13 December 2019
- $3,000 million Reset Perpetual Subordinated Notes with a first redemption at the option of the Company on 29 January 2023, which are admitted to trading on the regulated market of the Luxembourg Stock Exchange, of which $3 billion was outstanding. The amount redeemed amounted to $902.4 million and settlement took place on 31 December 2019.

EDF also exercised its option to fully redeem the €1.25 billion Reset Perpetual Subordinated Notes, of which €338.2 million was outstanding, on 29 January 2020. As the redemption was certain, EDF reclassified these equity instruments as financial liabilities at 31 December 2019 in the amount of €338.2 million (see note 30.4)

Consequently, taking into account the issuance on 26 November 2019 of a €500 million hybrid bond with 3.00% coupon and an 8-year first call date (see note 3.3.2), these transactions reduced the total stock of hybrid

instruments in EDF's balance sheet by approximately 8% to €9.8 billion while generating a saving net of interest estimated at around €44 million in 2020 and around €58 million from 2021.

In compliance with IAS 32, this redemption of perpetual subordinated bonds (see note 1.3.19.4) was recorded in equity upon disbursement of the funds or when the redemption commitment was made, at the amount of €1,618 million net of expenses.

3.3.4 Senior bond issues: EDF raises $2 billion and €1.25 billion

On 27 November 2019, EDF raised $2 billion through issuance of a senior bond with 50-year maturity and a fixed coupon of 4.50%. This transaction demonstrates the Group's capacity to attract a highly diversified investor base at the long end of the credit curve.

In addition, on 2 December 2019, EDF raised €1.25 billion through issuance of a senior bond, with 30-year maturity and a fixed coupon of 2.00%. This is the largest amount raised by a corporate issuer on this maturity in the Euro market.

3.4 RENEWABLE ENERGIES

3.4.1 Offshore wind power: France

- In early June 2019, the French Council of State validated the plan to build a 480MW 80-turbine wind farm off the west coast of France near Saint-Nazaire, dismissing the appeals filed by environmental associations. After examining the merits of the appeal proceedings, France's highest administrative court rejected the applications by the *Groupement des résidents pour la sauvegarde environnementale de La Baule* and the *Association pour la protection du site et de l'environnement de Sainte-Marguerite*. The Council of State's decision allows EDF Renewables and its Canadian partner Enbridge to continue development of the project. Construction of this first French offshore wind farm began in September 2019.
- Following a public tender procedure, France's Ministry for the Ecological and Inclusive Transition selected the EDF group, via its subsidiary EDF Renewables, in partnership with Innogy and Enbridge, to design, build, operate and maintain the future Dunkirk offshore wind farm off France's north coast.

  This is the fourth offshore project that the Group has won through French government tender procedures, after its successful bids for three projects in 2012 at Saint-Nazaire, Fécamp and Courseulles-sur-Mer. The future Dunkirk wind farm will be more than 10km off the coast and will have installed capacity of almost 600MW. It will supply the equivalent of around 40% of the *Nord département's* electricity needs.

These projects are being undertaken with industrial partners, and are accounted for under the equity method in the Group's consolidated financial statements.

3.4.2 Acquisition of the Luxel Group

On 28 March 2019, EDF Renewables acquired the Luxel Group, an independent photovoltaic energy operator in France which holds a portfolio of 1 GWc of projects already in operation, ready to build or under development. This acquisition significantly reinforces EDF Renewables' position in solar power in France, with a view to achieving the ambitious objectives in EDF's Solar Plan.

3.4.3 Signature of agreements in China for two offshore wind farms and heat network optimisation

On 25 March 2019 EDF signed two agreements for low-carbon projects in China.

- The cooperation agreement signed with China Energy Investment, a leading industrial player on China's electricity market, concerns EDF's acquisition of a stake in the Dongtai IV and V offshore wind power projects, located off the coast of Jiangsu Province north of Shanghai.

The Dongtai IV and Dongtai V projects are currently being built. Subject to execution of the final contracts, both partners will build and operate total installed capacity of 500MW which will be gradually commissioned up until 2021.

- EDF and the electricity utility Huadian have signed a cooperation agreement to enhance the performance of a heating and air-conditioning network for one of the districts of the city of Wuhan in central China. The network will eventually provide heating for 100,000 customers and air-conditioning for 500,000 m2 of office space. The signatories will jointly examine the feasibility of incorporating all the smart energy management tools that are already being used by the EDF Group for the heating network in the city of Sanmenxia.

3.4.4 Noor Midelt I solar project in Morocco

After a competitive international bidding process, the Moroccan Agency for Sustainable Energy (MASEN) announced in 2019 that it had chosen the consortium formed by EDF (through its subsidiary EDF Renewables), Masdar (also known as the Abu Dhabi Future Energy Company), and Green of Africa (a Moroccan developer of renewable energies) for the design, construction, operation and maintenance of the first phase of the Noor Midelt I multi-technologies solar power plant.

With an installed capacity of 800MW, this hybrid solar project will use an innovative combination of concentrated solar power (CSP) and photovoltaic (PV) technologies.

3.4.5 Offshore wind power: EDF launches the Neart na Gaoithe offshore wind farm with ESB

On 28 November 2019 the EDF Group announced the construction of the Scottish Neart na Gaoithe (NnG) offshore wind farm project and a new partnership with the Irish electricity company ESB, which is taking a 50% stake in the project, acquired in May 2018 from Mainstream Renewable Power (see note 5.2 to the financial statements at 31 December 2018). ESB operates across the electricity market on the island of Ireland, from generation, through transmission and distribution to the supply of customers with an expanding presence across Great Britain. In 2017, ESB opened an office in Scotland and is spearheading further development of renewable energy projects, in particular onshore and offshore wind power.

The 450MW NnG project is part of EDF's offshore wind power development strategy and confirms its position in carbon-free energy production in the United Kingdom, a country where EDF already has a strong footprint in both nuclear and renewable power.

Neart na Gaoithe[1] will consist of 54 turbines and will be located in the North Sea approximately 15km off the coast of Fife in south-east Scotland. When fully operational, the NnG offshore wind farm will generate electricity equivalent to the annual needs of over 375,000 households each year, corresponding to 4% of Scotland's electricity consumption. This fully consented offshore wind project has a 15-year Contract for Difference (CfD) at £114.39/MWh in 2012 sterling, and grid connection agreements are in place.

Onshore construction of components is now underway. Offshore construction should start in June 2020 and full commissioning is expected in 2023.

This sale operation was completed on 4 December 2019 and accounts for a large share of EDF Renewables' gains on sales of generation assets in 2019 (a total €560 million, recorded in other operating income and expenses, compared to €192 million in 2018 – see note 12.2) and contributed a €1.2 billion reduction in the EDF group's net indebtedness, due to the debt-reducing effect of loss of control over NnG.

Following this sale, the 50% holding in NnG, stated at fair value, is accounted for by the equity method.

3.4.6 Acquisition of a significant pipeline of 300MW wind projects under development in Germany

On 12 September 2019 EDF Renewables announced the acquisition of a significant wind projects pipeline of around 300MW under development across Germany from Altus AG. Altus AG will pursue the local development of these projects closely with EDF Renewables up to the construction of the future wind farms.

Located in 10 different federal states, the projects are at various stages of the development process. The land lease contracts have been secured and environmental studies are ongoing.

[1] *Gaelic for 'strength of the wind'.*

Once fully authorised, the projects will participate in the onshore wind power auctions organized by the German Federal Government in order to secure 20-year Power Purchase Agreements.

These wind farms should be commissioned during the next five years.

3.4.7 Acquisition of Pivot Power

On 4 November 2019 the EDF group announced the acquisition of a British start-up called Pivot Power, specialising in battery storage and electric vehicle charging infrastructures. This move will enable EDF, already the largest low-carbon electricity producer in the UK, to become a leader in battery storage there.

Pivot Power has an extensive portfolio of battery storage projects across more than 40 locations throughout the UK, with a total capacity of close to 2GW. There are plans to install batteries connected directly to the high-voltage transmission system. The first two storage projects at Kemsley (Kent) and Cowley (Oxford) have land, planning and grid connection agreements in place and are expected to be commissioned in 2020.

As part of EDF's Electricity Storage Plan, this acquisition contributes to the Group's target of being the leader in Europe with 10GW of additional storage by 2035. The acquisition is also in line with the EDF Electric Mobility Plan to become the leading electric mobility company by 2022 in the UK, France, Italy and Belgium. Beyond that date, the Group's goal is to provide power for 600,000 electric vehicles and install 75,000 charging points.

3.5 SIGNIFICANT EVENTS AND TRANSACTIONS OF 2018

3.5.1 A new partner for EDF Renewables in twenty-four UK wind farms

On 29 June 2018, EDF Renewables sold a 49% minority stake in twenty-four of its UK wind farms (around 550MW), for the price of £701 million.

The new partnership with Dalmore Capital Limited and Pensions Infrastructure Platform, with investments from large UK local authority pension schemes, will enable EDF Renewables to continue to expand the renewable energy business.

EDF Renewables retained a 51% share in this portfolio of wind farms. It also continues to run the sites and to provide operations and maintenance and asset management services.

EDF Energy also continues to purchase all of the electricity and ROCs (Renewables Obligation Certificates) generated by the wind farms, on market-standard terms.

The sale of this investment, which was considered as a transaction between shareholders with no change of control, was recognised in equity and had no impact on the Group's income statement (see the statement of Change in consolidated equity).

3.5.2 Completion of the sale of EDF's stake in Dunkerque LNG

Following a competitive auction process launched in early 2018, the EDF group announced on 29 June 2018 that it had entered into exclusive negotiations with two groups of investors for the disposal of its 65.01% interest in the share capital of Dunkerque LNG, owner and operator of the liquefied natural gas (LNG) terminal in Dunkirk.

Based on the prices paid by the two consortia, the average enterprise value for 100% of Dunkerque LNG amounted to €2.4 billion.

This transaction allowed Fluxys, already a 25% shareholder of Dunkerque LNG, to take control of and consolidate Dunkerque LNG with the support of Axa Investment Managers – Real Assets and Crédit Agricole Assurances.

EDF, as a customer of Dunkerque LNG, is still committed in the long term to the terminal, which will continue serving the Group's gas strategy.

Once the required regulatory approvals had been given, the EDF group completed the sale of its stake in the Dunkerque LNG terminal on 30 October 2018.

Following this sale, valuation of the long-term agreement between EDF and Dunkerque LNG for reservation of LNG regasification capacities led to recognition of a €737 million increase in provisions for onerous contracts. Due to the gain of €755 million generated, this operation had a net impact of €18 million on other income and expenses. It also contributed a €1.5 billion reduction in the EDF Group's net financial indebtedness, based on a sale price of approximately €1 billion net of cash transferred.

3.5.3 Flamanville 3 EPR Project

NB: This summary of the key points of 2018, which were included in the financial statements at 31 December 2018 published on 15 February 2019, should be read in conjunction with the summary of developments in 2019 presented in note 3.1.1.

Major milestones were reached during 2018:

- Completion of cold functional testing, consisting of a large number of test operations including the leak performance test on the primary system at a pressure greater than 240 bar – higher than the pressure of this system once in operation;
- Successful testing of the reactor containment building in April 2018. This is an in-air test that checks the concrete structure's mechanical behaviour and airtightness by raising pressure inside the building to six times the outside air pressure;
- Integration of an instrumentation and control (I&C) configuration involving around 250 modifications, completed in early September 2018, so that hot functional testing can take place in a stable, coherent I&C configuration.

Equipment manufacturing and quality

At 31 December 2018, almost all the equipment for the nuclear section and the conventional island, had been delivered and assembled on site. The situation at that date as regards the quality of equipment manufactured by Framatome for the primary system is described in the following paragraphs.

Vessel

The issue of the higher-than expected carbon content in the vessel head and bottom was examined by the French Nuclear Safety Authority ASN (Agence de Sécurité Nucléaire) during the first half of 2017 on the basis of documentation submitted by Framatome under the supervision of EDF. Based on the opinion of a group of ASN-appointed experts, the ASN issued an opinion on 11 October 2017 concluding that the mechanical properties of the vessel head and bottom head were adequate for their uses, including in the event of an accident.

On 9 October 2018, the ASN authorised:

- the commissioning of the vessel bottom, subject to functional checks;
- the commissioning of the vessel head, for a limited operating life until 2024 unless the technical feasibility of checks comparable to the vessel bottom checks can be demonstrated.

EDF worked on development of in-service vessel head checks, in order to go back to the ASN later in 2019 for permission to retain the current vessel head if such checks were industrially feasible. If permission were not given, EDF could remain liable for some or all of the costs incurred to manufacture a replacement vessel head. These costs are not included in the target construction cost, since if they arise they would do so after the plant's commissioning. EDF SA initiated arbitration proceedings against AREVA SA on this matter.

Break preclusion and quality deviations in the welds of the main secondary system

On 30 November 2017, EDF declared a significant event to the ASN regarding the detection of a quality deviation in the welding of the secondary system that conducts the steam from the steam generators to the turbine of the Flamanville 3 EPR.

This system (main steam lines) was designed and manufactured according to the "break preclusion" concept, with stricter requirements for design, manufacture and in-service monitoring. These stricter requirements, requested by EDF, are backed up by a "high quality" requirement for the building of these systems.

Although these requirements were applied during the design phase, they were not properly incorporated into the welding work. Failure to meet these requirements does not necessarily entail non-compliance with the nuclear pressure equipment regulations.

From 21 March 2018, during an initial comprehensive inspection, EDF detected other quality deviations in welds on the pipes in the main secondary system of the Flamanville 3 EPR. The initial comprehensive inspection is a mandatory by law before commissioning plant, and mainly involves examination of the welds on the primary and secondary systems. It gives rise to an initial benchmark report on the state of plant before it begins operation.

In accordance with industrial procedures, the welds had been checked by the consortium of contractors in charge of manufacturing the system and each one had been declared compliant as the work was done.

On 10 April 2018 (see EDF's press release of the same date), EDF notified the ASN of a significant event relating to the detection of deviations in the performance checks on these welds (part of the main secondary system was already concerned by the insufficient application of the "break preclusion" requirements).

EDF therefore began a further inspection during the second quarter of 2018 of all 150 welds concerned in the main secondary system. Of these 150 welds:

- 87 welds were compliant with requirements;
- 33 welds had quality deficiencies and had to be repaired. The work on site to repair these welds began in late July 2018;
- EDF also decided to rework a further 20 welds which, although they had no defects, did not meet the break preclusion requirements defined by EDF during the EPR design phase. The files for adjustments to the first welds was sent to the ASN, and on-site welding work began in November 2018;
- for 10 other welds, EDF submitted a proposal to the ASN detailing a specific justification method to confirm the high level of safety at the plant throughout its operating life. After a final analysis this number was reduced to eight. It also became clear from checks that one of these eight welds had a small quality defect. The ASN was due to closely examine EDF's specific justification method in the following few months.

Commissioning schedule and construction costs

On 25 July 2018 (see EDF's press release of the same date), the Group presented an update concerning these inspections, and adjusted the Flamanville EPR schedule and target construction costs.

- The target date for loading the nuclear fuel was scheduled for the end of the fourth quarter of 2019, with start-up and hot functional testing planned for late 2018;
- The target construction costs were revised from €10.5 billion to €10.9 billion (in 2015 euros, excluding borrowing costs).

On 21 January 2019 (see EDF's press release of the same date) EDF announced that the schedule for hot functional testing had been revised, and was now expected to commence during the second half of February 2019.

The schedule and estimated construction costs remained tight. They included a timetable for receiving authorisations from the ASN as explained above, which among other factors was contingent on the ASN completing its examination of the methods proposed by EDF for repairing the welds in the main secondary system, as stated in the Group's press release of 31 January 2019.

On 29 January 2019 the Chairman of the ASN announced that the ASN would issue a statement in May 2019 concerning the validation programme for the welds in the main secondary system, saying "if it turns out that the eight welds in the reactor containment building structure also need reworking then it will not be possible to meet the deadline." A detailed update on progress on the Flamanville EPR, particularly the schedule and construction cost, would be issued after the ASN's statement had been published. EDF was not in a position at that date to assess the impact in the event the ASN did not validate the proposed approach.

NOTE 4 REGULATORY CHANGES IN FRANCE

4.1 FRANCE'S MULTI-YEAR ENERGY PROGRAMME (PPE) AND THE ENERGY AND CLIMATE LAW

The multi-year energy programme (PPE) is a tool for the energy policy introduced by the French law on the energy transition for green growth adopted in 2015.

In principle, the PPE covers two successive five-year periods. The first PPE published in October 2016 departed from this rule by setting out two successive periods of three and five years respectively, 2016-2018 and 2019-2023. The revised PPE, which is not yet finalised, will cover the periods 2019-2023 and 2024-2028.

An initial draft PPE published on 25 January 2019 by the Ministry for the Ecological and Inclusive Transition

For nuclear electricity generation, the French government has now set the deadline of 2035 for reaching the objective of a 50% nuclear share in the national electricity mix.

To achieve this, 12 nuclear reactors will have to be shut down by 2035, in addition to the closure of the two Fessenheim reactors in the spring of 2020. The reactors concerned will be shut down when their fifth 10-year inspection is due, except for 2 reactors which will be shut down earlier in 2027 and 2028, provided the criterion of secure supply is respected. Two additional reactors could also be shut down in 2025-2026 if certain conditions relating to electricity prices, secure supply and European electricity market trends are fulfilled.

The draft PPE states that the French government will propose the terms of a new regulation system for existing nuclear plants that will protect consumers against rising market prices after 2025, while giving EDF the financial capacity to ensure economic sustainability of generation facilities and meet the requirements of the PPE in low-price scenarios.

It also states that "the Government, together with the industry, will conduct a programme of work by mid-2021 to examine the questions of the cost of new nuclear energy production and its advantages and disadvantages in relation to other low-carbon generation methods, the possible financing models, the project management modalities for new reactor projects and public consultation, and matters relating to the management of waste generated by the potential new nuclear fleet […]. Based on this information and depending on developments in the energy situation, the Government will make a decision regarding the suitability of launching a renewal programme for nuclear installations".

For fossil-fired electricity generation, the objective is to close down the last entirely coal-fired plants by 2022, and stop granting authorisations for new power plants that produce electricity exclusively from fossil fuels.

This draft PPE also sets the objective of a significant step-up in the pace of development of renewable energies.

The draft went through various consultation processes in 2019 and 2020.

The Energy and Climate law

France's Energy and Climate law of 8 November 2019 was published in the *Journal Officiel* on 9 November 2019. Its principal measures affecting the Group's business are the following:

Article 1 revises the objectives of France's energy policy in the light of results of preparatory work for the national low-carbon strategy and the Multi-Year Energy Programme (PPE):

- The objective of "dividing greenhouse gas emissions by four between 1990 and 2050" is replaced by the objective of "achieving carbon neutrality by 2050, by reducing greenhouse gas emissions by a factor of more than six between 1990 and 2050";
- The objective of "reducing primary fossil fuel energy consumption by 30%, compared to the reference year of 2012, by 2030" is replaced by the objective of "reducing primary fossil fuel energy consumption by 40% by 2030";
- And finally, the time horizon for reducing the nuclear share of France's electricity output to 50% is set at 2035.

Article 12 introduces a cap on greenhouse gas emissions, applicable from 1 January 2022 to installations generating energy from fossil fuel. This cap was set by decree 2019-1467 of 26 December 2019, and will lead to the closure of entirely coal-fired plants by 1 January 2022. State support measures will be provided for the

employees and subcontractors concerned, and local projects are planned, as indicated in the press file on the closure of coal-fired power plants by 2022 released by the Ministry for the Ecological and Inclusive Transition.

Based on the proposed version of this law, the Group had previously announced that it intended to close down the Le Havre plant by the spring of 2021, and was still examining the possibilities of converting the Cordemais plant to a biomass plant. After a meeting held on 24 January 2019, EDF and the Ministry for the Ecological and Inclusive Transition approved a programme of work prior to making a decision about the Ecocombust project for production of an innovative, ecological fuel that could be used by heating facilities or electricity plants that currently run on coal. To guarantee a secure electricity supply, if the studies by RTE commissioned by the French government confirm the need, some or all of the biomass produced could be used to provide 80% of the fuel for the current Cordemais units until 2026, to keep the electricity network in the west of France secure at the highest peak consumption times.

As a result, the ends of the depreciation periods for the Le Havre and Cordemais plants were changed in the first half of 2019 and set at 2021 for Le Havre and 2026 for Cordemais. The closure date for Le Havre has been confirmed as 1 April 2021, but the dates for Cordemais could still change depending on final decisions yet to be made, particularly concerning the Ecocombust project.

The principal consequence of this prospective modification of the depreciation periods in the Group's financial statements at 31 December 2019 is an increase of some €141 million in the depreciation expense.

Article 62 of the Energy and Climate law aims to modify the calculation of the price supplements in the ARENH mechanism for Regulated access to historic nuclear power, to take account of the effect of the ceiling defined in article L.336-1 of the Energy Code. A key objective of these price supplements is to ensure that demand from suppliers for ARENH is commensurate with their requirements, and thus avoid effects that are detrimental to the public interest.

The ARENH ceiling was raised to 150TWh from 1 January 2020. However, the volume limit that determines the maximum total volume of ARENH deliveries allowed per year (up to the ceiling) has not been changed for 2020, and thus remains at 100TWh.

The Energy and Climate law also contains four articles concerning regulated sales tariffs, following the rejection of provisions initially proposed in the draft "PACTE" law for business growth and transformation:

- Article 63 sets out the terms for the discontinuation of regulated gas sales tariffs for all consumers, to bring French law into line with European Union law. Sales of regulated-tariff gas contracts were discontinued in the month following enactment of the law, and it is now impossible to subscribe or modify a new natural gas contract on regulated sales tariffs. The regulated tariffs will be discontinued for small businesses from 1 December 2020, and for all consumers from 1 July 2023. The necessary support measures for these tariff discontinuations are defined in the law.
- Articles 64 and following set out the terms for the discontinuation of regulated electricity sales tariffs for non-residential customers with more than 10 employees or annual sales, total income or balance sheet total of more than €2 million.

A new draft PPE taking account of comments and opinions expressed was published on 20 January 2020 by the Ministry for the Ecological and Inclusive Transition and is subject to a consultation process until 19 February 2020

Concerning nuclear electricity and the objective of having 50% nuclear power in France's energy mix by 2035, which is now part of the Energy Code as a result of the Energy and Climate law of 8 November 2019, this revised draft PPE specifies the details and conditions for the reactor shutdowns. Priority will be given to shutdowns that minimise the economic and social impact, have lowest impact on the electricity network, and do not entail closure of an entire site. At the request of the French government, based on these criteria, on 20 January 2020 EDF proposed to examine the possibility of shutting down pairs of reactors at the sites of Blayais, Bugey, Chinon, Cruas, Dampierre, Gravelines and Tricastin.

It is also now stipulated that early reactor shutdowns will be confirmed 3 years prior to implementation.

Finalisation and adoption of this PPE would result in reflection in the Group's financial statements of the two early reactor shutdowns in 2027 and 2028, ahead of their fifth 10-year inspection. The change to their operating life would lead to prospective modification of the depreciation period, and a change in estimate for the nuclear provisions. As this situation would bring forward the shutdown of two reactors in the fleet by a few years, the various scenarios examined indicate that the potential effect on nuclear provisions, particularly the decommissioning provision, could be an increase of some tens of millions of euros, which would be recognised via an adjustment to the relevant balance sheet assets.

Public consultation on regulation of existing nuclear facilities

In January 2020, the French government launched a consultation process, to have the opinions of actors from the world of energy on the reform of regulation of existing nuclear facilities (ARENH).

This consultation has been undertaken in application of the draft Multi-Year Energy Programme (PPE), which states that "the Government will propose the terms of a new regulation system for existing nuclear plants that will protect consumers against rising market prices after 2025 by allowing them to benefit from the competitive advantage of investments made in the historical nuclear power plant fleet, while giving EDF the financial capacity to ensure economic sustainability of generation facilities and meet the requirements of the PPE in low-price scenarios".

To achieve this objective, the French government intends to introduce economic regulations obliging EDF to provide a service of general economic interest (SGEI) to the benefit of all French consumers, in a transparent and non-discriminatory manner, with a focus on protection of the consumer and the climate.

This SGEI would be supported by economic regulation of the existing nuclear fleet, to reconcile and contribute to the following aims:

- long-term protection of all consumers located on French territory, regardless of their supplier and with respect to some of their non-peak power supplies, by enabling them to benefit from stable conditions for carbon-free, manageable production of electricity by the existing nuclear fleet they helped to finance,
- achievement of the climate targets France has set itself, and also of its objectives for a secure power supply and energy independence, by safeguarding the carbon-free electricity supply in France and more broadly in Europe, through secure long-term financing for operation of the existing nuclear installations that are necessary for that supply.

Like many other actors in the sector, the EDF group will take part in this consultation, which is to continue until 17 March 2020.

4.2 REGULATED ELECTRICITY SALES TARIFFS IN FRANCE – "BLUE" TARIFFS

Modification of the legislative and regulatory framework

In response to matters submitted by ANODE (the national association of retail energy operators) and Engie, France's Council of State ruled in decisions of 18 May and 3 October 2018 that the principle of regulated electricity sales tariffs is compatible with European Union law when such tariffs serve the objective of guaranteeing consumers an electricity price that is more stable than market prices. The Council of State confirmed that this objective cannot be achieved by softer State intervention and that regulation of sales tariffs guarantees electricity firms equal access to consumers and is not discriminatory.

However, the Council of State considered that the tariff regulation was disproportionate in its duration, which is permanent, and its scope of application, which covers large business sites with subscribed power levels below 36kVA. These facts were cited as justification for partial cancellation of the tariff decisions of 28 July 2016 and 27 July 2017.

Directive (EU) 2019/944 of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU was published in the OJEU on 14 June 2019. This directive requires continuation of regulated sales tariffs for residential customers and very small businesses.

France's Energy and Climate law sets out the terms of the discontinuation of regulated electricity sales tariffs for non-residential customers, in compliance with this directive and the Council of State's decision. These tariffs are now reserved for all consumers, whether residential or business customers, with subscribed power levels of 36kVA provided they have fewer than 10 employees and their annual sales, income or balance sheet total is below €2 million.

The discontinuation of regulated electricity sales tariffs for customers who are no longer eligible will take effect at 1 January 2021. In the meantime, the Energy and Climate law and the official decisions[1] made for application of

[1] ***Decision of 12 December 2019*** *concerning identification and provision of the lost of non-domestic customers no longer eligible for regulated electricity sales tariffs;*
Decision of 12 December 2019 *concerning information of consumers on regulated electricity sales tariffs, by their supplier, about the discontinuation of their regulated-tariff contracts;*
Decision of 26 December 2019 *listing the data suppliers offering regulated-tariff electricity sales contracts must make available to other electricity suppliers upon request.*

that law define a process to be led by the historical suppliers. The steps in this process include identifying and informing the customers concerned, and making their data available to alternative suppliers, in compliance with the rules governing management of personal data. Consumers affected by discontinuation of the regulated sales tariffs will no longer be able to subscribe or modify a regulated-tariff contract from 1 January 2020. From 1 January 2021, any such consumers who have not subscribed a new contract will automatically be switched to a market-rate contract with their previous supplier.

Tariff changes

Since 8 December 2015, in accordance with the NOME Law on organisation of the French electricity market (articles L. 337-4 and L. 337-13 of the French Energy Code), the French Energy Regulatory Commission (*Commission de Régulation de l'Énergie* or CRE) has been responsible for sending the Ministers for the Economy and Energy its reasoned proposals for regulated sales tariffs for electricity. If no objections are made within three months, the proposals are deemed to have been approved.

In a decision of 7 February 2019 published on 12 February 2019, the CRE proposed an increase of 7.7% (excluding taxes) in the "blue" regulated tariffs for residential and non-residential customers, or 5.9% including taxes. The government had announced in late 2018 that electricity tariffs would not increase during the winter period, and only approved the CRE's proposal in early May 2019, within the three-month period allowed under the Energy Code. The tariff decisions of 28 May 2019 were published in the *Journal Officiel* of 30 May 2019 and took effect on 1 June 2019.

The consumer associations *UFC Que Choisir and Consommation Cadre de Vie Logement* (CLCV) challenged these decisions through an ultra vires application to the Council of State requesting their cancellation, together with an urgent petition for suspension of execution of the decisions until a ruling on the merits of the case could be issued. In an ordinance of 12 July 2019, the urgent applications judge refused to grant the suspension since there was no urgency. The Council of State subsequently rejected the merits of the challenge in a decision of 6 November 2019, thus validating the tariff structure implemented by the CRE on the grounds of the Energy Code.

Also, given the change in the "TURPE" network access tariff applicable from 1 August 2019, and in application of the Energy Code, in a decision of 25 June 2019 published on 2 July 2019 the CRE proposed an increase of 1.47% excluding taxes (1.26% including taxes) in "blue" tariffs for residential customers and 1.34% excluding taxes (1.10% including taxes) in "blue" tariffs for non-residential customers. The CRE's proposal was confirmed in a tariff decision of 30 July 2019, published in the *Journal Officiel* of 31 July 2019, and implemented on 1 August 2019.

Finally, in a decision of 16 January 2020 the CRE proposed an increase of 2.4% (including taxes) in the "blue" tariffs for residential and non-residential customers (3.0% excluding taxes for residential customers and 3.1% excluding taxes for non-residential customers). This proposed increase takes account of the rise in prices on the wholesale energy markets, the level of ARENH curtailments for 2020, higher selling costs including the costs of purchasing energy savings certificates, and the adjustments made to narrow the gap between costs and revenues observed on regulated electricity sales tariffs during 2019, notably following application from 1 June 2019 of the CRE's tariff proposal of 7 February 2019. This latest CRE proposal was confirmed by tariff decisions of 29 January 2020 that were published in the *Journal Officiel* of 31 January 2020, and applied from 1 February 2020.

4.3 "TURPE" NETWORK ACCESS TARIFFS

On 17 November 2016, the CRE published its decisions for the TURPE 5 Transmission (high voltage) and TURPE 5 Distribution (medium voltage and low voltage) tariffs for the period 2017-2020. The new TURPE 5 tariff frame took effect on 1 August 2017.

TURPE 5 Transmission tariffs

The TURPE 5 Transmission tariff came into force with a 6.76% tariff increase effective from 1 August 2017, to be followed by subsequent estimated rises on 1 August in the years 2018 to 2020, based on average inflation observed over the previous calendar year, adjusted by a correcting factor to balance the income and expenses

adjustment account (CRCP)[1]. The TURPE 5 Transmission tariff sets the weighted average cost of capital (WACC) at 6.125% for the return on RTE's asset base versus 7.25% for TURPE 4.

On 6 June 2019 the CRE adopted a decision concerning the TURPE 5 tariff for the high voltage network and its revision at 1 August 2019, following the +3% increase on 1 August 2018. The tariff scale increased by an average +2.16% from 1 August 2019, comprising +1.61% for inflation and +0.55% to balance the CRCP.

TURPE 5 and TURPE 5 bis Distribution tariffs

TURPE 5

The TURPE 5 Distribution tariff came into force with a 2.71% tariff increase, which took effect on 1 August 2017, to be followed by subsequent estimated rises on 1 August in the years 2018 to 2020, based on average inflation observed over the previous calendar year, adjusted by a correcting factor to balance the CRCP. The TURPE 5 continues to use the previous method for calculating cost of capital, setting the margin on assets at 2.6% and the return on regulated equity at 4.1%.

Action against the TURPE 5 HTA/BT (medium/low voltage) tariffs

- By a decision of 12 January 2017 published in the *Journal Officiel* of 17 January 2017, the French Minister for Energy, acting within the two-month response period, requested a new decision from the CRE as in her opinion the decision of 17 November 2016 had not taken national energy policy orientations into consideration. In a new decision of 19 January 2017, the CRE reiterated its initial decision of 17 November 2016. Both decisions were published in the *Journal Officiel* of 28 January 2017.
- On 2 February 2017, Enedis filed an application before the Council of State for cancellation of these two CRE decisions.
- On 3 February 2017, EDF, in its capacity as the shareholder of Enedis, also filed an application before the Council of State for cancellation of the same CRE decisions.
- By a decision of 9 March 2018, the Council of State partly cancelled the TURPE 5 decisions since the regulator "did not, in determining the cost of capital invested, apply, in addition to the 'risk premium', the 'risk-free rate' to the assets corresponding to items funded, at the time of replacement of installations, by recovery of the remaining portion of the provisions established during the tariff period covered by the 'TURPE 2' tariffs, and the corresponding portion of the installations handed over by the concessionary authorities to the network operator during the same period".

Second TURPE 5 HTA/BT (medium/low voltage) tariffs

On 28 June 2018, the CRE adopted a decision regarding the TURPE 5 HTA-BT (medium voltage – low voltage) tariff and the change from 1 August 2018 to that tariff, known as the "second TURPE 5 HTA-BT". This decision included an adjustment of an average -0.21% to the TURPE 5 from 1 August 2018, following a combination of factors:

- Implementation of the Council of State's partial cancellation decision on 9 March 2018, and the concurrent application of a lower corporate income tax rate: these two effects almost totally offset each other over the period 2018-2020 (combined effect of +0.06%);
- The standard inflation-based adjustment at 1 August (+1%) and balancing of the CRCP (-1.27%);
- The -0.21% reduction is modulated according to the tariff structure: on average -1.16% for users of the medium voltage networks (HTA), -0.59% for low voltage networks (BT) above 36kVA, and +0.14% for low voltage networks (BT) below 36kVA.

This decision had no impact on the tariff preparation method, the operating expense trajectory, the principle of regulation for incentive purposes, or the regulations applicable to Linky meters. The change in the corporate income tax rate is equivalent to adjusting the return on regulated equity to 4% and the margin on assets to 2.5% (previously 4.1% and 2.6% respectively).

The decision also reiterated previous CRE decisions about expenses relating to customer management under a single contract (decision of 26 October 2017), via the management component, and collective auto consumption (decision of 7 June 2018), via the energy withdrawal component. It was published in the *Journal Officiel* on 29 July 2018.

[1] *A mechanism to measure and offset differences between the actual figures and the forecasts on which tariffs are based.*

In particular, to implement the Council of State's decision of 9 March 2018, the CRE added back an annual amount of around €1.6 billion (and will add back declining amounts until 2073) to regulated equity. The CRE considers that this will lead to Enedis receiving additional remuneration equivalent to €750 million (in 2018 euros) expressed in the present value of pre-tax cash flows. This add-back to regulated equity results in remuneration of some €60 million per year in the first few years, on a basis that will reduce progressively until 2073 at a (nominal pre-tax) rate that may, under the present method, be revised by the CRE at each tariff period.

On 25 June 2019 the CRE adopted a decision concerning revision of the TURPE 5 tariff for the medium and low voltage network at 1 August 2019. The tariff scale increased by an average +3.04% from 1 August 2019, comprising +1.61% for inflation, +1.45% to balance the CRCP, and -0.02% in application of the Council of State's decision of 9 March 2018.

Supplier commissioning

After Law 2017-1839 of 30 December 2017 confirmed the CRE's competence for supplier commissioning, the CRE issued a new decision on 18 January 2018, published in the *Journal Officiel* of 25 January 2018. This decision reiterated the principles adopted in its previous decision of 26 October 2017 regarding remuneration payable by distribution network operators to suppliers for the service of managing single-contract customers on their behalf.

The content of these decisions upheld the principle of identical commissions for all suppliers selling single-contract market-price offers. Only regulated electricity tariffs were to give rise to slightly lower commissions (€4.50 instead of €6.80 per point of delivery until 1 August 2019), with progressive reduction of this difference to zero by 1 August 2022.

For remuneration of past customer management charges (prior to 1 January 2018), the CRE's decision set an amount it considered as a cap that can be passed on through the TURPE tariff.

However, Law 2017-1839 of 30 December 2017 introduced a measure intended to rule out the possibility of suppliers receiving remuneration from network managers for past customer management services.

On 23 December 2016, Engie brought an action against Enedis before the Paris Commercial Court claiming such remuneration. In the course of this litigation, Engie filed an application for a preliminary ruling on constitutionality (*question prioritaire de constitutionnalité*) concerning the arrangements introduced by the French "Hydrocarbons" law which ended the possibility of obtaining supplier commissioning for past services. These arrangements were validated by the Constitutional Council in its decision 2019-776 of 19 April 2019. The proceedings are still ongoing.

Electricity Equalisation Fund

On 22 March 2018, the CRE published its consultation on the levels of contribution due to the Electricity Equalisation Fund for EDF SEI and Électricité de Mayotte for the years 2018 to 2021. The annual average contribution to the Electricity Equalisation Fund for EDF SEI, including the planned smart metering system, is €185 million for the period 2018-2021.

The draft amended decisions for the period 2012-2017 and the proposed decisions for the years 2018 and 2019 were published in the *Journal Officiel* on 21 June 2019 and 19 October 2019. Their implications are as follows:

- for Enedis, an additional retroactive contribution to the Electricity Equalisation Fund amounting to €188 million (€159 million for 2012-2017 and €29 million for 2018), and a contribution of €28 million for 2019. All of these charges will be covered by the tariff, through the CRCP mechanism.
- A system to spread payment of the arrears for 2012-2017 over 2019 and 2020 has been decided, allowing Enedis to distribute the effect of the €159 million contribution between 2019 and 2020. A provision of €140 million had been established at 31 December 2018, and was fully reversed in 2019.
- for Electricité de Strasbourg, an additional retroactive contribution to the Electricity Equalisation Fund amounting to €22.3 million (€18.7 million for 2012-2017 and €1.9 million for 2018), and a contribution of €1.7 million for 2019.

4.4 COMPENSATION FOR PUBLIC ENERGY SERVICE CHARGES (CSPE)

Legal and regulatory framework

The compensation mechanism for public energy service charges (*compensation des Charges de Service Public de l'Energie*) results from a reform introduced by France's amended finance law for 2015, published in the *Journal Officiel* on 30 December 2015. Under the legislative and regulatory framework, the public energy service charges (electricity and gas) were to be compensated via two State budget items included in France's finance laws from 2016 onwards. The initial finance law for 2020 marks a continuation from 2019, defining the following measures for compensation of charges for 2020:

- a special "energy transition" budget item of €6.3 billion, principally to compensate for the additional costs associated with all contracts obliging the operators to purchase renewable energies and (to a much smaller degree) biogas, and covering the last annual contribution to repayment of the accumulated shortfall in compensation due to EDF;
- a "Public Energy Service" item of €2.7 billion in the general budget, notably to cover solidarity charges borne by gas and electricity suppliers, costs associated with purchase obligations excluding renewable energies (essentially cogeneration), and the cost of applying the standard national tariffs to zones that are not connected to France's mainland network. The interest on the accumulated shortfall to be repaid to EDF is also funded through the general budget.

Since 1 January 2018, the "basic necessity" rates for electricity and the "special solidarity" rates for gas have been replaced by an energy voucher system. The cost of this system is not borne by EDF, but has been budgeted by the State in the "Public Energy Service" programme. However, EDF bore solidarity charges in 2019 and will bear such charges in 2020 for the national housing solidarity fund and services for vulnerable customers.

In 2020, this mechanism of compensation for public service charges will be funded as follows:

- the costs linked to the energy transition, which correspond to the subsidy mechanisms for renewable energies, and the reimbursement of the past accumulated shortfall in compensation borne by EDF as measured at 31 December 2015, are registered in a special "energy transition" budget item created by the amended finance law for 2015. Law no. 2016-1917 of 29 December 2016 (the finance law for 2017) stipulated that the two sources of additional funding for this special budget item would be a portion of the domestic tax on coal, lignite and coke (TICC), and a portion of the domestic tax on energy products (TICPE), the latter providing most of the funding. The finance law for 2020 replaces the percentages of the TICC and TICPE by a set amount, to avoid the uncertainties of forecast income from these taxes, and broadens the sources of funding for the "energy transition" budget item by including the proceeds of auctions of Guarantees of Origin as allowed by Article L. 314-14-1 of the Energy Code. The initial French finance law for 2020 also proposes to discontinue this "energy transition" budget item in 2021, with the costs concerned subsequently covered directly by the general budget.
- other public service charges excluding costs associated with the subsidy mechanisms for renewable energies (i.e. costs relating to fuel poverty, tariff equalisation in zones that are not connected to France's mainland network, cogeneration, the budget for the energy ombudsman, etc.) are registered directly in the general budget.
- income generated by the domestic tax on the final consumption of electricity, now renamed the Compensation for Public Electricity Charges (CSPE) goes directly into the general budget. The CSPE tax is collected directly from final consumers of electricity in the form of an additional levy on the electricity sale price (and collected from electricity suppliers), or directly from electricity producers that produce electricity for their own uses.

The level of the CSPE tax was set in 2016 at a full rate of €22.5/MWh, and eight reduced rates ranging from €12/MWh to €0.5/MWh depending on criteria of electro-intensiveness, business category and the risk of carbon leakage from installations (the risk of industries relocating to countries where greenhouse gas emissions are higher due to their electricity mix). The level remains unchanged in 2020.

The amended finance law for 2019 applied a downward adjustment to the amounts of compensation payable by the State for public service charges borne in 2019, which had decreased due to the smaller differential between the market price for electricity and the purchase obligation tariff payable to producers. For the same reason, the State had adjusted the reduction in compensation levels paid in 2019, since the final expenses for 2018 were lower than the reforecasts on which compensation paid in 2018 had been based.

Public service charges borne by EDF

The amount of expenses (excluding the annual contribution to repayment and associated interest) to be compensated to EDF for 2019 is €7,662 million.

The amounts received in the year 2019 (excluding the annual contribution to repayment and associated interest) totalled €6,800 million (including €4,458 million for the dedicated "energy transition" budget account and €2,342 million for the general budget). EDF also paid the CRE an amount of €12.5 million in December 2019 as a first instalment of reimbursement of residual amounts from the former CSPE mechanism prior to 2016.

A repayment schedule for EDF's receivable corresponding to the accumulated shortfall in compensation, which amounted to €5,780 million at 31 December 2015, was set out in the ministerial decision of 13 May 2016, amended on 2 December 2016. Under this schedule the receivable will be fully repaid by 2020. On 22 December 2016 EDF securitised a portion of this receivable (€1.5 billion) through a State-approved "Dailly law" assignment. Consequently, since 1 January 2017 EDF has received 73.6% of payments made by the State in reimbursement of the receivable as set out in the repayment schedule. The remainder is paid directly to the assignees.

During 2019, the State paid EDF €1,353 million of the principal amount of the financial receivable, equal to the annual contribution for 2019 as set out in the repayment schedule. At 31 December 2019, EDF's share of the outstanding financial receivable amounted to €660 million which is due to be paid to EDF by the State.

The operating receivable owed by the State to EDF still amounts to €1,647 million at 31 December 2019. The situation will be closely monitored in view of the Finance Law for 2020 adopted by vote in late 2019, which provides for discontinuation of the special "energy transition" budget item from 2021.

Finally, in accordance with decree 2016-158 of 18 February 2016 concerning compensation for public energy service charges, on 11 July 2019 the CRE published its decision 2019-172 recording the public service charges for 2018 (€6,656 million) and providing a revised forecast of charges for 2019 (€7,123 million) and a forecast of charges for 2020 (€7,206 million).

4.5 FRENCH CAPACITY MECHANISM

The French capacity mechanism took effect on 1 January 2017. It was introduced by France's Energy Code to ensure secure national power supplies.

The market reference prices for 2017, 2018 and 2019 were established respectively at €10.00/kWh €9.34/kW and €17.37/kW. The first "rebalancing" auction for 2019 held on 16 May 2019 resulted in a price of €0.00/kW.

Six auctions held in 2019 for energy deliveries in 2020 resulted in the following prices: €20/kW, €20/kW, €22.4/kW, €20/kW, €17.8/kW and €16.6/kW.

4.6 ENERGY SAVINGS CERTIFICATES

Decree 2017-690 of 2 May 2017 issued by the French Ministry for the Environment, Energy and the Sea substantially raised the obligation levels for the fourth period of energy savings obligations running from 1 January 2018 to 31 December 2020, to 1,200TWhc for the "standard" obligations and 400TWhc for the obligations that are intended to benefit households in situations of energy poverty, compared to 700TWhc and 150TWhc respectively for the previous period.

This significant increase, combined with a shallow market for energy savings certificates and doubts over that market's future liquidity, exposed the Group in 2018 to the risk of a fine payable to the Treasury (under Article L221-4 of the Energy Code) of €15 per MWhc of shortfall in respect of its obligation, due to insufficient certificates for the fourth period of the scheme.

In order to meet these requirements, the Group is making every effort to gradually increase its number of energy savings certificates, taking advantage of the "*Coup de pouce*" operations launched in France early in 2019 (financial aid for replacing oil heating by heat pumps, 50% additional energy savings subsidy for heat pump users, special offers for heat pump maintenance contracts…). The volume of certificates earned doubled between 2017 and 2019, with a particularly notable increase of 44% between 2018 and 2019.

The law no. 2019-1147 of 8 November 2019 relating to Energy and the Climate, as well as prolonging the fourth period of the energy savings certificates scheme, includes a chapter on measures against fraud concerning these certificates designed to make controls and sanctions more efficient.

Subsequently, decree 2019-1320 of 9 December 2019, published in the *Journal Officiel* on 11 December 2019, extended the fourth period by one year to 31 December 2021 under identical annual obligations. Also, article 143 of the "PACTE" law for business growth and transformation broadens the scope of energy savings certificates to include facilities classified for environmental protection that are subject to greenhouse gas emission trading systems, by modifying article L.221-7 of the Energy Code.

The Group currently considers that due to the combined effect of the increase in certificates held and the extension of the fourth period, there is no risk of a shortfall in energy savings certificates at 31 December 2021.

4.7 ARENH

For the ARENH applications of November 2018, demand from alternative suppliers totalled 132.98TWh excluding EDF subsidiaries, more than the maximum total volume of 100TWh. EDF thus delivered 100TWh in 2019 under the ARENH system for supply to competitors' final customers. Subscriptions to cover network losses amounted to 20.4TWh.

These applications were made at a time when the ARENH price (which includes a capacity guarantee in its €42/MWh) was competitive in comparison to forward baseload prices for 2019.

No modifications were made to ARENH applications during the May 2019 session, and consequently no changes were made to the ARENH deliveries for 2019 after that session.

In decisions no. 2018-222 of 25 October 2018, no. 2019-090 of 9 May 2019 and no. 2019-237 of 30 October 2019, as required by the Energy Code the CRE set out the method for allocating ARENH volumes when applications exceed the maximum total volume defined for the year concerned (2018 or 2019). These decisions stipulated that if the ARENH was oversubscribed in November 2018, May 2019 or November 2019, curtailment would only apply to new ARENH applications made in the session that exceeded the maximum, and that EDF-controlled subsidiaries' excess applications would be fully curtailed (this does not apply to network operators). Finally, the decisions stated that EDF-controlled subsidiaries could enter into contracts with the parent company replicating the ARENH system and the terms of supply, particularly the curtailment rate for alternative suppliers. In the method proposed by the CRE in decision no. 2019-028 on the calculation of regulated sales tariffs for electricity, this curtailment mechanism, when applied, makes reference to market prices more influential in determining regulated sales tariffs.

The Energy and Climate law introduced new measures. It raised the ceiling for the ARENH system, initially set at 100TWh, to 150TWh from 1 January 2020, allowing the French government to raise the maximum total volume above 100TWh, and to revise the ARENH price by ministerial decision during a transition period. However, the Ministry for the Ecological and Inclusive Transition announced that no change would be made to the ARENH price or volume for 2020.

Against this background, ARENH applications during the November 2019 session for delivery in 2020 totalled 147TWh (excluding applications from EDF subsidiaries). Since the maximum total volume has not been modified, only 100TWh will be supplied and as in the previous year the CRE will determine the curtailment of each supplier's application.

In January 2020, the French government launched a consultation process concerning the reform of regulation of existing nuclear facilities (ARENH), involving actors from the world of energy (ARENH) (see note 4.1).

NOTE 5 CHANGES IN THE SCOPE OF CONSOLIDATION

There was no significant change in the Group's scope of consolidation during 2019, apart from the operations presented in notes 3.2.1, 3.4.2, 3.4.5 and 3.4.7.

NOTE 6 SEGMENT REPORTING

6.1 REPORTING BY OPERATING SEGMENT

Segment reporting presentation complies with IFRS 8, "Operating segments".

Segment reporting is presented before inter-segment eliminations. Inter-segment transactions take place at market prices.

In accordance with IFRS 8, the breakdown used by the EDF group corresponds to the operating segments as regularly reviewed by the Management Committee (the Group's chief operating decision-maker).

The Group's segments are:

- "**France – Generation and Supply**": EDF's energy production and sales activities, commodity trading, and other activities;
- "**France – Regulated activities**": distribution, transmission, EDF's island activities and the activities of Electricité de Strasbourg;
- "**Framatome**": the entities of the Framatome subgroup;
- "**United Kingdom**": the entities of the EDF Energy subgroup;
- "**Italy**": Edison entities and TdE SpA;
- "**Other international**": EDF International and the other gas and electricity entities located in continental Europe, the US, Latin America and Asia;
- "**EDF Renewables**": the entities of the EDF Renewables subgroup;
- "**Dalkia**": the entities of the Dalkia subgroup;
- **"Other activities"**: comprising in particular EDF Trading and EDF Investissements Groupe.

No segments have been merged.

6.1.1 At 31 December 2019

(in millions of euros)	France – Generation and Supply	France – Regulated activities	Framatome	United Kingdom	Italy	Other international	EDF Renewables	Dalkia	Other activities	Inter-segment eliminations	**Total**
Income statements:											
External sales	26,658	16,072	1,895	9,570	7,535	2,507	1,043	3,732	2,305	-	**71,317**
Inter-segment sales	1,212	15	1,482	4	32	183	522	549	423	(4,422)	**-**
TOTAL SALES	**27,870**	**16,087**	**3,377**	**9,574**	**7,567**	**2,690**	**1,565**	**4,281**	**2,728**	**(4,422)**	**71,317**
OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION	**7,615**	**5,101**	**527**	**772**	**578**	**339**	**1,193**	**349**	**505**	**(271)**	**16,708**
OPERATING PROFIT	**3,483**	**1,892**	**230**	**(349)**	**72**	**42**	**670**	**(18)**	**1,009**	**(271)**	**6,760**
Balance sheet:											
Goodwill	72	223	1,341	7,965	103	33	199	544	143	-	**10,623**
Intangible assets and property, plant and equipment	58,275	63,499	2,591	19,034	5,410	2,226	9,773	2,288	626	-	**163,722**
Investments in associates and joint ventures [(1)]	2,593	-	90	127	104	2,058	1,063	75	304	-	**6,414**
Other segment assets [(2)]	19,190	4,473	1,912	5,268	1,788	620	659	1,911	2,645	-	**38,466**
Assets classified as held for sale	-	-	-	-	1,737	1,925	-	-	-	-	**3,662**
Other non-allocated assets	-	-	-	-	-	-	-	-	-	-	**80,397**
TOTAL ASSETS	**80,130**	**68,195**	**5,934**	**32,394**	**9,142**	**6,862**	**11,694**	**4,818**	**3,718**	**-**	**303,284**
Other information:											
Net depreciation and amortisation	(4,047)	(3,192)	(263)	(1,009)	(409)	(269)	(474)	(259)	(72)	-	**(9,994)**
Impairment	(29)	-	(10)	(127)	(60)	-	(49)	(105)	(23)	-	**(403)**
Equity (non-controlling interests)	117	42	163	6,622	262	398	922	279	519	-	**9,324**
Investments in intangible assets and property, plant and equipment	6,091	4,610	210	3,352	288	227	1,608	275	48	-	**16,709**

(1) At 31 December 2019, investments in associates and joint ventures include 50.1% of CTE (the joint venture holding RTE's shares) which is part of the France – Generation and Supply segment.

(2) Other segment assets include inventories, trade receivables and other receivables. By convention, the CSPE receivable is totally allocated to the France-Regulated Activities segment, in the amount of €1,667 million (see note 29).

6.1.2 At 31 December 2018

(in millions of euros)	France – Generation and Supply	France – Regulated activities	Framatome	United Kingdom	Italy [1]	Other international	EDF Renewables	Dalkia	Other activities	Inter-segment eliminations	Total
Income statements:											
External sales	24,937	16,007	1,904	8,965	8,047	2,227	1,089	3,633	1,737	-	**68,546**
Inter-segment sales	1,159	41	1,409	5	30	184	416	556	864	(4,664)	**-**
TOTAL SALES	**26,096**	**16,048**	**3,313**	**8,970**	**8,077**	**2,411**	**1,505**	**4,189**	**2,601**	**(4,664)**	**68,546**
OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION	**6,327**	**4,916**	**465**	**783**	**424**	**240**	**856**	**292**	**858**	**(263)**	**14,898**
OPERATING PROFIT	**2,963**	**1,914**	**240**	**(397)**	**45**	**(10)**	**316**	**72**	**574**	**(263)**	**5,454**
Balance sheet:											
Goodwill	53	223	1,317	7,578	108	20	206	548	142	-	**10,195**
Intangible assets and property, plant and equipment	53,219	60,802	2,392	15,467	6,197	2,119	8,856	2,283	689	-	**152,024**
Investments in associates and joint ventures [2]	2,394	-	87	79	73	4,053	1,307	29	265	-	**8,287**
Other segment assets [3]	19,313	3,583	1,965	4,604	2,541	647	824	1,909	3,893	-	**39,279**
Assets classified as held for sale	-	-	-	-	-	-	-	-	-	-	**-**
Other non-allocated assets	-	-	-	-	-	-	-	-	-	-	**73,384**
TOTAL ASSETS	**74,979**	**64,608**	**5,761**	**27,728**	**8,919**	**6,839**	**11,193**	**4,769**	**4,989**	**-**	**283,169**
Other information:											
Net depreciation and amortisation	(3,307)	(2,942)	(211)	(982)	(343)	(249)	(437)	(205)	(99)	-	**(8,775)**
Impairment	(2)	-	(12)	(163)	(6)	-	(103)	-	(4)	-	**(290)**
Equity (non-controlling interests)	109	42	194	5,425	336	401	848	304	518	-	**8,177**
Investments in intangible assets and property, plant and equipment	5,526	4,334	261	2,983	277	216	1,919	388	112	-	**16,016**

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations.

(2) At 31 December 2018, investments in associates and joint ventures include 50.1% of CTE (the joint venture holding RTE's shares) which is part of the France – Generation and Supply segment.

(3) Other segment assets include inventories, trade receivables and other receivables. By convention, the CSPE receivable is totally allocated to the France-Regulated Activities segment, in the amount of €799 million (see note 29).

6.2 SALES TO EXTERNAL CUSTOMERS, BY PRODUCT AND SERVICE GROUP

The Group's sales are broken down by product and service group as follows:

- **"Generation/Supply":** energy generation and energy sales to industry, local authorities, small businesses and residential consumers. This segment also includes EDF Trading;
- **"Distribution":** management of the low and medium-voltage public electricity distribution networks;
- **"Other":** services and production of equipment and fuel for reactors, energy services (district heating, thermal energy services, etc.) for industry and local authorities, and new businesses mainly aimed at boosting electricity generation through cogeneration and renewable energy sources (e.g. wind turbines, photovoltaic panels, etc.).

(in millions of euros)	Generation - Supply	Distribution	Other [1]	**Total**
2019 :				
External sales:				
- France [2]	26,834	15,607	289	42,730
- International and Other activities	21,854	-	6,733	28,587
SALES	**48,688**	**15,607**	**7,022**	**71,317**

(in millions of euros)	Generation - Supply	Distribution	Other	**Total**
2018 :				
External sales:				
- France [2]	25,217	15,555	172	40,944
- International and Other activities [3]	20,962	-	6,640	27,602
SALES	**46,179**	**15,555**	**6,812**	**68,546**

(1) "Other" groups of services include Framatome, which was acquired on 31 December 2017.
(2) "France" comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 6.1).
(3) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations.

NOTE 7 SALES

Sales are comprised of:

(in millions of euros)	2019	2018 [1]
Sales of energy and energy-related services	65,760	63,283
– energy [2]	*46,590*	*44,473*
– energy-related services (including delivery [3])	*19,170*	*18,810*
Other sales of goods and services	4,531	4,387
Trading	1,026	876
SALES	71,317	68,546

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

(2) Sales of energy include €1,548 million of sales related to optimisation operations on the wholesale gas and electricity markets in 2019 (€1,432 million in 2018). These operations are carried out by certain Group entities to balance supply and demand, in compliance with the group's risk management policy (see note 1.3.7). In 2019, the principal operating segments with a net short position in euros on the markets are France – Generation and supply (gas), Italy (electricity) and the United Kingdom (electricity). In 2018, the principal operating segments were Italy (electricity) and the United Kingdom (electricity).

(3) Delivery services included in this item concern the distribution network operators Enedis, Electricité de Strasbourg and EDF SA for non-interconnected zones. However, delivery services concerning EDF Energy and Edison are included in Sales of energy, because those entities are classified as the principal under IFRS 15 for both supply and delivery (see note 1.3.7). The delivery services by EDF Energy and Edison have no impact on net income because they are included in "Transmission and delivery expenses" in note 8.

Excluding the effects of exchange rates and changes in the scope of consolidation, sales for 2019 were up by 3.5% or €2.4 billion, principally in the France – Generation and supply segment (+6.6% or +€1.6 billion), the United Kingdom (+5.9% or +€0.5 billion) and Other activities (+35.6% or +€0.6 billion), with a decrease in Italy (-€0.7 billion or -8.1%).

The increase in sales in the France – Generation and supply segment in 2019 is mainly due to rising price effects amounting to an estimated €2.1 billion, mainly reflecting the positive price movements on market-price offers and the +7.7% (excluding taxes) rise in regulated sales tariffs on 1 June 2019.

The rise in sales in the United Kingdom is primarily explained by a favourable price effect for electricity and an increase in capacity revenue after the capacity market resumed (see note 1.3.7), despite a decrease in sales volumes on the wholesale markets, while the decrease in sales in Italy mainly results from gas activities due to lower prices, and, to a lesser degree, a decline in volumes sold.

The increase in sales by the Other activities segment essentially relates to the LNG activities, which saw good business levels in 2019 thanks to the competitivity of gas facilities in Europe and better use of the Group's capacities.

NOTE 8 FUEL AND ENERGY PURCHASES

Fuel and energy purchases comprise:

(in millions of euros)	2019	2018 [1]
Fuel purchases used – power generation [2]	(11,700)	(12,404)
Energy purchases [2]	(15,041)	(13,351)
Transmission and delivery expenses	(8,325)	(7,701)
Gain/loss on hedge accounting	(7)	(18)
(Increase)/decrease in provisions related to nuclear fuels and energy purchases	(18)	418
FUEL AND ENERGY PURCHASES	(35,091)	(33,056)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

(2) Fuel purchases used and Energy purchases include respectively €417 million and €3,117 million for optimisation operations on the wholesale gas and electricity markets in 2019 (€271 million and €2,694 million in 2018). In 2019 the principal operating segments with net long positions in euros on the markets are France – Generation and Supply (electricity), the United Kingdom (gas), Other international (Luminus – gas and electricity) and Dalkia (gas). In 2018, the segments were the same.

Fuel purchases used include costs relating to raw materials for energy generation (coal, biomass, oil, propane, fissile materials, nuclear fuels and gas), purchases of services related to the nuclear fuel cycle, and costs associated with environmental schemes (mainly greenhouse gas emission rights and renewable energy certificates).

Energy purchases include energy generated by third parties, incorporating energy derived from cogeneration intended for resale.

NOTE 9 OTHER EXTERNAL EXPENSES

Other external expenses comprise:

(in millions of euros)	2019	2018 [1]
External services	(13,120)	(13,089)
Other purchases (excluding external services, fuel and energy)	(3,598)	(3,494)
Change in inventories and capitalised production	7,932	7,139
(Increase)/decrease in provisions on other external expenses	167	182
OTHER EXTERNAL EXPENSES	(8,619)	(9,262)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

After elimination of changes in foreign exchange rates, the scope of consolidation and the standards applied (IFRS 16), other external expenses decreased by 1.2% compared to 2018.

NOTE 10 PERSONNEL EXPENSES

10.1 PERSONNEL EXPENSES

Personnel expenses comprise:

(in millions of euros)	2019	2018 [1]
Wages and salaries	(8,911)	(8,736)
Social contributions	(1,951)	(1,957)
Employee profit sharing	(277)	(278)
Other contributions related to personnel	(360)	(388)
Other expenses linked to short-term benefits	(250)	(231)
Short-term benefits	**(11,749)**	**(11,590)**
Expenses under defined-contribution plans	(988)	(1,033)
Expenses under defined-benefit plans	(801)	(1,017)
Post-employment benefits	**(1,789)**	**(2,050)**
Other long-term expenses	(222)	-
Termination payments	(33)	(2)
Other personnel expenses	**(255)**	**(2)**
PERSONNEL EXPENSES	(13,793)	(13,642)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

Excluding foreign exchange effects and changes in the scope of consolidation, personnel expenses increased by 0.6% from 2018, mainly in the Other activities, EDF Renewables segments and Dalkia.

10.2 AVERAGE WORKFORCE

	2019	2018
IEG status	96,818	98,358
Other	64,704	63,850
AVERAGE WORKFORCE	161,522	162,208

Average workforce numbers for the controlled entities and joint operations are reported on a full-time equivalent basis.

A more detailed presentation of workforce categories can be found in the "Environmental and Societal Information – Human Resources" section of the Universal Registration Document (formerly Reference Document) in section 3.4.1, "Indicators".

NOTE 11 TAXES OTHER THAN INCOME TAXES

Taxes other than income taxes break down as follows:

(in millions of euros)	2019	2018 (1)
Payroll taxes	(250)	(297)
Energy taxes	(1,674)	(1,561)
Other non-income taxes	(1,874)	(1,832)
TAXES OTHER THAN INCOME TAXES	(3,798)	(3,690)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

Taxes other than income taxes mainly concern France and essentially comprise land tax and the French business taxes on land and value added.

NOTE 12 OTHER OPERATING INCOME AND EXPENSES

Other operating income and expenses comprise:

(in millions of euros)	Notes	2019	2018 (1)
Operating subsidies	12.1	7,834	6,846
Net income on deconsolidation	12.2	576	194
Gains on disposal of fixed assets	12.2	(188)	54
Net increase in provisions on current assets		(107)	76
Net increase in provisions for operating contingencies and losses		(41)	(132)
Other items	12.3	(1,382)	(1,036)
OTHER OPERATING INCOME AND EXPENSES		6,692	6,002

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

12.1 OPERATING SUBSIDIES

This item mainly comprises the subsidy received or receivable by EDF in respect of the CSPE, reflected in the financial statements through recognition of income of €7,662 million for 2019 (€6,554 million for 2018).

12.2 NET INCOME ON DECONSOLIDATION AND GAINS ON DISPOSAL OF FIXED ASSETS

In 2019, net income on deconsolidation and gains on disposal of property, plant and equipment mainly includes:

- gains on sales of EDF Renewables' generation assets as part of the Development and Sale of Structured Assets (DSSA) activities, amounting to €560 million (€192 million in 2018), notably including the sale of NnG (see note 3.4.5);
- gains on sales real estate assets in France, amounting to €22 million (€262 million in France for 2018).

12.3 OTHER ITEMS

Other items mainly include costs relating to Energy Savings Certificates used or consumed during the year, and losses consisting of non-recoverable operating receivables. The unfavourable change in other items in 2019 is principally explained by the rising costs related to Energy Savings Certificates, and changes in compensation payable for power cuts associated with weather events of 2019.

NOTE 13 NET CHANGES IN FAIR VALUE ON ENERGY AND COMMODITY DERIVATIVES, EXCLUDING TRADING ACTIVITIES

(en millions d'euros)	2019	2018
NET CHANGES IN FAIR VALUE ON ENERGY AND COMMODITY DERIVATIVES, EXCLUDING TRADING ACTIVITIES	642	(224)

This item essentially consists of changes over the period in the fair value of derivatives used for economic hedging of commodity purchases or sales that are not eligiblle for hedge accounting as defined in IFRS 9, and are therefore included directly in profit and loss. The Group report these changes in a specific line of the income statement, "Net changes in fair value on Energy and Commodity derivatives, excluding trading activities" below the operating profit before depreciation and amortisation.

Net changes in fair value on Energy and Commodity derivatives, excluding trading activities, increased from €(224) million in 2018 to €642 million in 2019, principally as a result of Edison's gas positions and high price volatility on the markets for other commodities, particularly electricity in 2019 (mostly a price effect rather than a volume effect).

NOTE 14 IMPAIRMENT/REVERSALS

14.1 IMPAIRMENT BY CATEGORY OF ASSET

Details of impairment recognised and reversed are as follows:

(in millions of euros)	Notes	2019	2018 [1]
Impairment of goodwill	21	(57)	-
Impairment of other intangible assets	22	(47)	(52)
Impairment of tangible assets	24-25	(299)	(238)
IMPAIRMENT NET OF REVERSALS		(403)	(290)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

In 2018, the €(290) million of impairment recorded concerned:

- thermal assets: €(122) million in the United Kingdom;
- various CGUs of EDF Renewables (particularly a wind farm and a biomass technology company in the United States): €(103) million;
- intangible assets other than goodwill: €(52) million, notably including impairment of €(34) million in respect of the British Energy brand.

Impairment of €(39) million was also booked at 31 December 2018 in respect of associates (see note 26).

Impairment recognised in 2019 amounts to €(403) million. Details are given below.

14.2 IMPAIRMENT TESTS ON GOODWILL, INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT

The following tables present the results of impairment tests carried out on the main goodwill, intangible assets with indefinite useful lives and other Group assets in 2019, and some of the key assumptions used.

For application of IFRS 16 at 1 January 2019, where relevant the Group adapted the impairment test methodology as appropriate to the specific features of each CGU.

Impairment of goodwill and intangible assets with indefinite useful lives

Operating segment	Cash-Generating Unit or asset	Net book value *(in millions of euros)*	WACC after tax	Growth rate to infinity	**Impairment 2019** *(in millions of euros)*
United Kingdom	EDF Energy goodwill	7,653	6.0%	-	-
Italy	Edison brand Zephyro goodwill (energy services)	945 17	6.1% 6.1%	2.0% -	- (17)
Framatome	Framatome goodwill	1,326	5.7%	0.5%	-
Dalkia	Dalkia goodwill Poland CGU goodwill Dalkia Wastenergy goodwill Dalkia brand	555 8 5 137	4.3% 6.3% - 4.8%	1.7% 1.7% - 1.7%	- (8) (5) -
EDF Renewables	Futuren goodwill (Germany)	17	4.25 %	1.5%	(17)
Other impairment					(10)
IMPAIRMENT OF GOODWILL AND INTANGIBLE ASSETS WITH INDEFINITE USEFUL LIVES					**(57)**

Impairment of other intangible assets and property, plant and equipment

Operating segment	Cash-Generating Unit or asset	Impairment indicators	WACC after tax	**Impairment 2019** *(in millions of euros)*
United Kingdom	CCGT	Decline in spark spreads and long-term capacity revenue prospects	6.0%	(118)
	Other thermal assets	Plants in the process of shutting down	5.4% - 6.0%	(9)
Italy	Hydropower assets	Unfavourable change in regulations on hydropower concessions	6.1%	(33)
	Energy services	Lower profitability on certain contracts	6.1% - 7.2%	(5)
France		Discontinued projects	-	(24)
Dalkia	Poland CGU	Less favourable market prospects	6.3%	(48)
	Other Dalkia CGUs		4.9%	(44)
EDF Renewables	Some CGUs	Unfavourable tariff prospects	3.4% - 6.5%	(29)
Other impairment				(36)
IMPAIRMENT OF OTHER INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT				**(346)**

General assumptions

Note 1.3.14 explains the methodology used by the Group for impairment testing.

The weighted average costs of capital (WACC) in reference European countries are down slightly compared to 31 December 2018, as current market conditions led to a decline in the risk-free rate. The other parameters used to calculate WACC remained stable overall compared to 31 December 2018. The test results are subjected to discount rate sensitivity analyses.

The market environment in 2019 showed a slight improvement from 2018, with small rises in market prices in France and Belgium. In Italy, the situation was stable compared to the previous year. However, electricity prices in the United Kingdom retreated slightly.

On the market horizon, the forward prices used were in line with these developments.

On the long-term horizon, visibility of fundamentals was stable year-on-year, as the benchmark scenario used for impairment testing at the 2018 year-end anticipated lower commodity price trajectories for gas and coal. The

upward trajectory for CO_2 quota prices under the ETS (EU Emissions Trading System) was retained since Phase 3 of the system is working well towards achieving the objectives of the European decarbonisation policy. Nonetheless, a slight dip in the curve is observed at the beginning of the horizon, reflecting the higher energy efficiency assumptions, and to a lesser degree the lower prices for gas delivered in Europe. This is followed at the end of the horizon by a slight recovery, due to higher assumptions concerning electric vehicles and hydrogen. As these assumptions are crucial in determining recoverable value, sensitivity analyses are applied to long-term price curves when impairment tests are undertaken.

In addition, although some uncertainties remain, the capacity mechanisms progressively being introduced under different approaches in different countries are generating income that contributes to the profitability of certain generation assets, confirming the assumptions used in impairment testing. After the suspension in late 2018 of the United Kingdom's Capacity Market, on 24 October 2019 the European Commission confirmed its initial decision to grant a State aid authorisation allowing the British government to resume its mechanism. In Italy, the country's first capacity auctions took place in November for deliveries in 2022 and 2023.

At 31 December 2019, the macro-economic context presented above does not introduce any new major risk for the Group in addition to the risks already noted in previous years' financial statements; the impairment booked reflects the risks of certain CGUs or specific assets.

United Kingdom – EDF Energy

Thermal assets

Significant amounts of impairment have been booked in recent years in respect of the Group's thermal assets in England, notably reducing the net book value of coal-fired plants and gas storage facilities practically to zero. At 31 December 2019, the necessary investments made in the Cottam and West Burton A coal-fired plants are fully depreciated for an amount of €(6) million, consistent with the decisions to close these plants early: on 7 February 2019 EDF Energy announced its decision to close the Cottam coal-fired plant in September 2019, and closure of the West Burton A plant will be dependent on the capacity contracts. Concerning gas facilities, the investments made during 2019 in the Hole House gas storage assets are fully depreciated for an amount of €(3) million.

At 31 December 2019, despite the resumption of the Capacity Market, the lower long-term prospects compared to 2018 for spark spreads and capacity revenue, combined with the expectation that network expenses will be higher than anticipated at the previous year-end, led to recognition of additional impairment of €(118) million related to the West Burton B CCGT plant. The value of this plant is sensitive to price variations, such that a 5% change in spark spreads would have an impact of approximately 6% on its recoverable value.

Nuclear assets (plants in operation and the Hinkley Point C project) and goodwill

The recoverable value of existing nuclear assets (8 power plants) is estimated by discounting future cash flows over the assets' useful life, assuming a 20-year extension for the Sizewell B PWR plant (other, Advanced Gas-cooled Reactor (AGR) plants have already had their useful life extended by the British Nuclear Authority, the most recent decisions dating from February 2016). As the generation difficulties experienced by Hunterston and Dungeness in 2018 carried over into 2019, a conservative approach was taken in impairment testing, with downward revision of the assumed generation output. Updating these generation assumptions has an unfavourable effect on the recoverable value of EDF Energy's nuclear power plants, which is lower than in 2018, but still well above the book value. A 5% decrease in electricity prices compared to the trajectory assumed for the test would have a 15% impact on the assets' recoverable value, but they would still be higher than their net book value.

EDF Energy's goodwill amounted to €8 billion (or £6.7 billion) at 31 December 2019 and mainly resulted from the takeover of British Energy in 2009.

The recoverable value of EDF Energy is estimated by discounting future cash flows over the assets' expected useful life, taking into consideration the plan to construct two EPRs with a 60-year useful life at the Hinkley Point site, a project for which the final contracts were signed on 29 September 2016. Future cash flows relating to these plants are determined by reference to the Contract for Difference (CfD) between the Group and the UK government. The CfD sets stable, predictable prices for EDF Energy for a period of 35 years from the date the two EPRs are first commissioned: if market prices fall below the CfD exercise price, EDF Energy will receive an additional payment.

The 2019 impairment test incorporates the latest estimates of the revised HPC project costs (see note 3.1.3) i.e. total project completion costs (excluding borrowing costs and exchange rate effects compared to the project's benchmark rate of £1=€1.23) of £21.5-22.5 billion (in 2015 sterling), £1.9-2.9 billion more than the previous estimate, still assuming delivery of Unit 1 by the end of 2025. The range will depend on the effectiveness of

operational action plans to be undertaken in partnership with contractors. The additional costs essentially result from challenging ground conditions that made earthworks more expensive than anticipated, revised action plan targets, and extra costs needed to implement the completed functional design, which has been adapted for a first-of-a-kind application in the UK context. EDF's projected rate of return (IRR) is now estimated at 7.6-7.9% (compared to about 9% initially).

On these revised bases, taking into consideration the unfavourable effects for existing nuclear assets described above, the positive difference between the recoverable value and the book value of EDF Energy remains significant at 31 December 2019. Sensitivity analyses of the WACC show that a 50 base point increase in WACC would not entail any risk of impairment.

For HPC, the most recent project review identified a greater risk of deferral of the Commercial Operation Date (COD), estimated at 15 months for Unit 1 and 9 months for Unit 2, entailing a potential additional cost of around £0.7 billion (in 2015 sterling) which would reduce the IRR for EDF by around 0.3%. This risk of deferral and the associated additional cost would reduce the margin resulting from the EDF Energy impairment test by approximately 20%.

Sensitivity analyses were also conducted for information purposes, using extremely pessimistic assumptions, for example a 4-year deferral of the COD and an associated additional cost of £4 billion. The results suggest a risk of impairment, all other things being equal.

The recoverable value of EDF Energy also, as in 2018, reflects conservative assumptions for the Sales and Supply segment, in line with the competitive and regulatory situation on the British market, particularly considering the cap on the Standard Variable Tariff. Sensitivity analyses were conducted on the assumptions for margin rate and loss of market share: a 25 base point decline in the long-term margin rate would reduce the margin resulting from the EDF Energy impairment test by around 6%, while market share losses of 10% on the B2C segment and 2% on the B2B segment would have an unfavourable impact of some 10% on the test margin.

Finally, although Brexit has no immediate impact on impairment tests of EDF Energy's assets since most cash flows (income, costs, investments) and assets are stated in pounds sterling, the longer-term consequences are still hard to predict in view of the uncertainties over the timing and concrete terms of the UK's departure from the European Union. The Group will monitor movements in the rates of return demanded by investors and changes in fuel prices, CO_2 prices and macro-economic data such as GDP growth, which could affect price curves.

Italy – Edison

As an intangible asset with an indefinite useful life, the Edison brand, first recognised at the value of €945 million when Edison was taken over in 2012, was subjected to an impairment test that did not identify any risk of impairment. The brand's value excluding discontinued E&P operations (see note 2.3) remains justified. This test used the royalty relief method. In late 2018, an external study of the brand value was conducted and concluded that the brand's value in use was higher than its net book value, even when E&P operations are excluded.

At 31 December 2019, the recoverable value of certain hydropower assets located in the Autonomous province of Trento was significantly affected by changes in local hydropower concession regulation, leading to recognition of impairment of €(33) million. More generally, including the measures of the "*Simplificazione 2019*" decree, concerning the terms of concession renewals in Italy, in impairment tests of the Edison hydropower CGU significantly reduces the margin resulting from the test. The margin's sensitivity to a 10% decline in prices would lead to recognition of impairment of around €(50) million.

Concerning energy services, impairment of €(27) million was recognised on specific assets, including €(17) million in respect of the goodwill on a recent acquisition (Zephyro) whose recoverable value was affected by delayed implementation of a significant contract.

The recoverable value of wind power assets is improving, in line with the investments made in high-profitability projects.

Thermal assets benefited from high-profitability investments due to construction of the new Marghera CCGT plant. Good long-term prospects for clean spark spreads and capacity revenue also have a favourable influence on the margin resulting from the test. Sensitivity tests were conducted in respect of these assets, and the results show that a 10% decline in electricity prices or a 50 base point increase in WACC does not entail any risk of impairment.

Framatome

At 31 December 2019, the goodwill of Framatome amounts to €1,326 million, resulting from EDF's acquisition of 75.5% of the capital of Framatome in late 2017. The Group finalised recognition of the business combination in its financial statements at 31 December 2018.

The recoverable value of Framatome is determined on the basis of a 10-year business plan and a terminal value. This business plan is sensitive to assumptions concerning the completion of major construction projects that are incorporated into the reactor scenario, and market share assumptions used in assessing services to the installed base and fuel deliveries to customers' reactors. The WACC applied in discounting future cash flows is weighted according to a conservative view of the allocation of Framatome's EBITDA between its businesses according to their risk profile. The test conducted at 31 December 2019 shows that the CGU's recoverable value is significantly higher than its book value.

Sensitivity analyses were conducted using a 50 base point increase in WACC and a 0% growth rate to infinity. The test conclusions were not affected.

EDF Renewables

In 2019, impairment of €(49) million was recognised in respect of EDF Renewables' CGUs. This includes €(17) million of impairment of the goodwill on a recently acquired German entity (Futuren) in response to less favourable prospects on that market. Other impairment concerns specific assets and notably results from downward tariff trends driven by contractual terms or regulatory changes (particularly in China).

Dalkia

At 31 December 2019, Dalkia's goodwill amounts to €555 million, principally resulting from acquisition of the Dalkia group in France under the agreement of 25 March 2014 with Veolia Environnement.

The recoverable value of the Dalkia group is based on future cash flows projected over a medium-term horizon, and a terminal value that represents cash flow projections to infinity. According to revised assumptions for 2019, the recoverable value remains higher than the book value. The key parameters of the test are the calculation method for the terminal value, and the discount rate: both were subjected to sensitivity analyses and the results did not affect the positive difference between the recoverable value and the book value.

The Dalkia brand, which was recognised as an asset when the Group took control of Dalkia in 2014 at the value of €130 million, is estimated by the royalty relief method. An updated test at 31 December 2019 shows that this book value is justified.

Impairment was also recognised on various CGUs of the Dalkia group. In Poland for example, the recoverable value of Dalkia entities was significantly affected by lower income prospects than forecast in previous years, masking the impact of higher compliance investments. Impairment of €(55) million was therefore recognised in respect of these assets, including €(8) million on goodwill.

Impairment on other CGUs during 2019 resulted from specific situations, for example:

- the sudden collapse of paper prices in Canada and the resulting business conditions, which led to recognition of €(11) million of impairment in respect of Dalkia Wastenergy, including €(5) million concerning goodwill;
- the placing of Arjowiggins in receivership on 29 March 2019, leading to losses of the cogeneration heat customer CCB and recognition of €(12) million of impairment on the corresponding assets.

Impairment has also been recognised on other individual assets, for the combined total of €(27) million.

France – Generation and supply

Due to the integrated management and interdependence of the different generation facilities that make up the French fleet (nuclear, thermal and hydropower plants), independently of their maximum technical capacities, the Group considers the entire fleet as a single CGU. This CGU does not include any goodwill.

Even when there is no indication of any loss of value, an impairment test is performed due to the highly significant value of this CGU in the Group's financial statements and its substantial exposure to market prices since the "yellow" and "green" regulated tariffs were discontinued on 1 January 2016.

The recoverable value of the generation fleet is estimated by discounting future cash flows under the Group's usual methodology, described in note 1.3.14, over the assets' useful life, using an after-tax WACC of 5.1% at 31 December 2019. For nuclear assets currently in operation (except for Fessenheim), the Group's benchmark model assumes that the useful life is extended to 50 years, in line with its industrial strategy. The nuclear capacity remains subject to a ceiling of 63.2GW in the test, consistent with France's energy transition law.

The capacity revenue assumptions used in the test are higher than the previous year, in line with the system fundamentals analysis in the benchmark scenario. The average auction price achieved in 2019 was €19.5/KW.

The impairment test takes into consideration the latest forecasts concerning Flamanville 3 (see note 3.1.1) which adjusted the schedule, setting the fuel loading date in late 2022, and revised the estimated cost of construction at €12.4 billion in 2015 euros, excluding borrowing costs, an increase of €1.5 billion from the previous estimate. The test takes into consideration the fact that most of these additional costs will be included in other operating income and expenses.

The test results indicated a significant positive difference between the recoverable value and the book value of the generation fleet in France. The margin resulting from the test is higher than at 31 December 2018, as the higher costs and deferred commissioning of Flamanville 3 were outweighed by favourable effects, essentially concerning the lower discount rate and the positive effect of cash outflows in 2019.

The key assumptions used in the test include the useful life of nuclear assets, the long-term price scenario, the discount rate, developments in costs and investments, and the assumed capacity revenue. Each of these assumptions has been subjected to a sensitivity analysis, which does not call into question the existence of a positive difference between the recoverable value and book value. The test conducted at 31 December 2019 also takes into consideration the sensitivity associated with early closure proposals for certain nuclear units, as set out in the proposed multi-year energy programme. This did not affect the conclusions of the test.

France – Impairment of specific assets

The Group also booked €(24) million of impairment in respect of the decision to discontinue two projects, one hydropower project and one IT development project.

Other International – Belgium

The impairment test applied to Luminus did not indicate any risk of impairment. However, the margin resulting from the test is adversely affected by the Tihange 2 and 3 and Doel 3 and 4 nuclear assets, in which Luminus owns a 10.2% share.

Finally, impairment of €(73) million was booked in respect of associates at 31 December 2019. Details are given in note 26.

NOTE 15 OTHER INCOME AND EXPENSES

Other income and expenses amount to €(185) million for 2019. They include the €(30) million cost of the ERO 2019 employee shareholding offer undertaken during the first half of 2019 (see below), restructuring expenses in certain Group entities, and other items which are operating income and expenses by nature but of non-significant amounts individually.

Other income and expenses amounted to €(105) million for 2018, mainly including a gain of €755 million on the sale of Dunkerque LNG and an allocation of €(737) million to provisions for onerous contracts associated with the long-term contract with Dunkerque LNG, giving a net impact of €18 million. Other income and expenses also included €(36) million of exceptional solidarity bonuses in France, and €(15) million resulting from the adjustment of EDF Energy's guaranteed minimum pension scheme.

The Employee Reserved Offer (ERO) followed a decision by the Board of Directors of EDF on 4 April 2019 concerning the principle of an employee shareholding operation. This was carried out by the sale of 7,704,974 existing shares by the State to EDF which immediately sold them to eligible employees, former employees and retired employees. This operation does not constitute a capital increase for the Group.

The sale price for these shares was fixed on 20 June 2019. It included a discount of 20% on the reference price based on the volume-weighted average price of EDF shares traded on Euronext Paris for the twenty trading days preceding the day when the price was set.

The shares were delivered on 16 July 2019.

NOTE 16 FINANCIAL RESULT

16.1 COST OF GROSS FINANCIAL INDEBTEDNESS

Details of the components of the cost of gross financial indebtedness are as follows:

(in millions of euros)	2019	2018 [1]
Interest expenses on financing operations [2]	(1,801)	(1,765)
Change in the fair value of derivatives and hedges of liabilities	(14)	(93)
Transfer to income of changes in the fair value of cash flow hedges	(40)	102
Net foreign exchange gain on indebtedness	49	44
COST OF GROSS FINANCIAL INDEBTEDNESS	(1,806)	(1,712)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).
(2) In 2019, interest expenses on financing operations include interest on the lease liability (IFRS 16) amounting to €(85) million at 31 December 2019.

16.2 DISCOUNT EFFECT

The effect of unwinding the discount primarily concerns provisions for the back-end of the nuclear cycle, decommissioning and last cores, and long-term and post-employment employee benefits.

Details of the final discount effect are as follows:

(in millions of euros)	2019	2018 [1]
Provisions for long-term and post-employment employee benefits	(931)	(875)
Provisions for the back-end of the nuclear cycle, decommissioning and last cores [2]	(2,116)	(2,480)
Other provisions and advances	(114)	(109)
DISCOUNT EFFECT	(3,161)	(3,464)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).
(2) Including the effect of discounting the receivable corresponding to amounts reimbursable by the NLF (see note 39.3).

The lower discount effect on nuclear provisions is explained by a 10 base point decrease in the real interest rate applied to nuclear provisions in France in 2019, compared to a 20 base point decrease in 2018.

16.3 OTHER FINANCIAL INCOME AND EXPENSES

Other financial income and expenses comprise:

(in millions of euros)	2019	2018 (1)
Financial income on cash and cash equivalents	17	13
Gains/(losses) on other financial assets (including loans and financial receivables)	248	254
Gains/(losses) on debt and equity securities	878	496
Changes in financial instruments carried at fair value through profit and loss	2,338	(995)
Other financial expenses	(129)	(274)
Foreign exchange gain/loss on financial items other than debts	(9)	(93)
Return on fund assets	523	475
Capitalised borrowing costs	740	502
OTHER FINANCIAL INCOME AND EXPENSES	4,606	378

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

"Gains/(losses) on debt and equity securities" in 2019 principally include:

- €740 million of dividends and interest income on debt securities (€494 million in 2018);
- €138 million of net gains and losses on sales of debt securities carried at fair value through OCI with recycling (including €136 million on dedicated assets), compared to €2 million in 2018 (including €(12) million on dedicated assets).

Other financial income and expenses include changes in fair value on financial instruments, amounting to €2,338 million. This favourable development, in a context of rising markets, is explained by the €2,586 million change in the fair value of debt and equity securities (including €2,545 million on dedicated assets) and changes in the fair value of derivatives (€(248) million). In 2018, changes in financial instruments carried at fair value through profit and loss amounted to €(995) million, including €(989) million relating to dedicated assets.

The increase in capitalised borrowing costs relates to the increase in work in progress for Flamanville 3 and HPC.

NOTE 17 INCOME TAXES

17.1 BREAKDOWN OF TAX EXPENSE

Details are as follows:

(in millions of euros)	2019	2018 (1)
Current tax expense	(1,609)	(266)
Deferred taxes	28	444
TOTAL	(1,581)	178

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

In 2019, €(1,519) million of the current tax expense relates to French companies, and €(90) million relates to other subsidiaries (€(168) million and €(98) million respectively in 2018).

17.2 RECONCILIATION OF THE THEORETICAL AND EFFECTIVE TAX EXPENSE (TAX PROOF)

(in millions of euros)	2019	2018 [1]
Income of consolidated companies before tax	**6,399**	**656**
Income tax rate applicable to the parent company	34.43%	34.43%
Theoretical tax expense	**(2,203)**	**(226)**
Differences in tax rate [2]	185	1
Permanent differences [3]	162	30
Taxes without basis [4]	118	239
Unrecognised deferred tax assets	156	132
Other	1	2
ACTUAL TAX EXPENSE	(1,581)	178
EFFECTIVE TAX RATE	24.71%	- 27.13%

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

The income tax expense amounts to €(1,581) million in 2019, corresponding to an effective tax rate of 24.71% (compared to an income tax receivable of €178 million in 2018, corresponding to an effective tax rate of -27.13%). The €1,759 million increase in the Group's tax expense between 2018 and 2019 essentially reflects the €5,743 million increase in net income before tax (notably resulting from changes in unrealised gains and losses on EDF SA's portfolio of financial assets), which generated an additional tax charge of €1,977 million in application of the French income tax rate of 34.43%.

After elimination of these non-recurring items (mainly changes in unrealised gains and losses on EDF SA's portfolio of financial assets, impairment and disposals), the effective current tax rate for 2019 is 19.1%, compared to 22.6% in 2018.

The main factors explaining the difference between the theoretical tax rate and this effective rate are:

- 2019:
  - [2] the favourable impact of differences in tax rates between the French rate of 34.43%, the Italian rate of 24% and the British rate of 19%, amounting to €185 million;
  - [3] the favourable impact of disposals of investments and assets subject to a reduced tax rate, amounting to €160 million (principally Alpiq and NnG);
  - [4] the impact of deduction of payments made to bearers of perpetual subordinated bonds, amounting to €204 million.
- 2018:
  - [3] the favourable impact of sales of investments and assets subject to a reduced tax rate, amounting to €199 million (principally Dunkerque LNG);
  - [4] the impact of deduction of payments made to bearers of perpetual subordinated bonds, amounting to €203 million.

17.3 CHANGE IN DEFERRED TAX ASSETS AND LIABILITIES

(in millions of euros)	2019	2018
Deferred tax assets	978	1,220
Deferred tax liabilities	(1,987)	(2,362)
Net deferred taxes at 1 January	**(1,009)**	**(1,142)**
Change in net income	28	508
Change in equity	(402)	(354)
Translation adjustments	(66)	23
Changes in scope of consolidation (1)	(275)	(28)
Other movements (2)	(14)	(16)
NET DEFERRED TAXES AT 31 DECEMBER	(1,738)	(1,009)
Deferred tax assets	557	978
Deferred tax liabilities	(2,295)	(1,987)

(1) Changes in the scope of consolidation essentially concern the reclassification of E&P concession assets as assets held for sale.
(2) This includes the reclassification of the provision for tax litigation as deferred tax liabilities in the amount of €235 million, in compliance with IFRIC 23 (see note 35) and a deferred tax asset relating to the tax inspections of EDF International (see note 50.1).

In 2019, €(69) million of the change in deferred tax assets included in equity results from actuarial gains and losses on post-employment benefits (€(309) million in 2018), and €(233) million corresponds to changes in the fair value of commodity hedges (€(11) million in 2018).

17.4 BREAKDOWN OF DEFERRED TAX ASSETS AND LIABILITIES BY NATURE

(in millions of euros)	31/12/2019	31/12/2018
Deferred taxes:		
Fixed assets	(6,141)	(5,627)
Provisions for employee benefits	5,018	4,493
Other provisions and impairment	561	557
Financial instruments	74	172
Tax loss carryforwards and unused tax credits	1,292	1,448
Other	333	187
Total deferred tax assets and liabilities	**1,137**	**1,230**
Unrecognised deferred tax assets	(2,875)	(2,239)
NET DEFERRED TAXES	(1,738)	(1,009)

At 31 December 2019, unrecognised deferred tax assets represent a potential tax saving of €2,875 million (€2,239 million at 31 December 2018), mainly relating to France and the United States.

In France, this potential tax saving, which amounts to €2,091 million (€1,449 million at 31 December 2018), essentially concerns deferred tax assets on employee benefits. These deferred tax assets have no expiry date.

In the United States, this potential tax saving amounts to €473 million (€485 million in 2018) and relates to negative taxable earnings generating losses which can be carried forward until dates between 2030 and 2037.

Recognised deferred tax assets on tax loss carryforwards amount to €395 million (€662 million in 2018) and principally concern the United States (€197 million in 2019, €230 million in 2018), France (€37 million in 2019, €214 million in 2018). They have been recognised due to the existence of deferred tax liabilities on the same tax entities that will reverse over the same time horizon, or because there are prospects of taxable profits.

NOTE 18 LEASES

The main impacts of recognition in the income statement of lease contracts as lessor, in accordance with IFRS 16, are as follows:

(in millions of euros)	2019
Income from subleases	73
Variable lease expenses	(45)
Expenses on short-term leases or leases of low-value assets	(167)
Income from sale and leaseback operations	-
Operating profit before depreciation and amortisation	**(139)**
Depreciation on right-of-use assets	(660)
Operating profit	**(799)**
Interest expense on the lease liability	(85)
Income before taxes of consolidated companies	**(884)**

NOTE 19 NET INCOME OF DISCONTINUED OPERATIONS

The line "Net income of discontinued operations" comprises income statement items for the E&P operations for 2018 and 2019, and impairment recognised in respect of these assets in both these periods. In 2019, this includes €(513) million of impairment on the assets and liabilities concerned, determined as the difference between the book value and the fair value net of costs to sell (see note 2.3.1).

The principal profit and loss indicators for the E&P operations in these periods are as follows:

(in millions of euros)	2019	2018
Sales	407	430
Operating profit before depreciation and amortisation	252	367
Operating profit	122	136
Financial result	(25)	(11)
Income taxes	(38)	(103)
NET INCOME	59	22
Impairment of discontinued operations, net of income taxes	(513)	(234)
NET INCOME OF DISCONTINUED OPERATIONS	(454)	(212)

NOTE 20 BASIC EARNINGS PER SHARE AND DILUTED EARNINGS PER SHARE

The diluted earnings per share is calculated by dividing the Group's share of net income, corrected for dilutive instruments and the payments made during the year to bearers of perpetual subordinated bonds, by the weighted average number of potential shares outstanding over the period after elimination of treasury shares.

The following table shows the reconciliation of the basic and diluted earnings used to calculate earnings per share (basic and diluted), and the variation in the weighted average number of shares used in calculating basic and diluted earnings per share:

(in millions of euros)	**2019**	2018
Net income attributable to ordinary shares	5,155	1,177
- EDF net income from continuing operations	*5,597*	*1,384*
- EDF net income from discontinued operations	*(442)*	*(207)*
Payments on perpetual subordinated bonds	(589)	(584)
Effect of dilutive instruments	-	-
Net income used to calculate earnings per share	**4,566**	**593**
- from continuing operations	*5,008*	*800*
- from discontinued operations	*(442)*	*(207)*
Average weighted number of ordinary shares outstanding during the year	**3,029,504,511**	**2,968,327,473**
Average weighted number of diluted shares outstanding during the year	**3,029,504,511**	**2,968,327,473**
Earnings per share (in euros):		
BASIC EARNINGS PER SHARE	1.50	0.20
DILUTED EARNINGS PER SHARE	1.50	0.20
BASIC EARNINGS PER SHARE OF CONTINUING OPERATIONS	1.65	0.27
DILUTED EARNINGS PER SHARE OF CONTINUING OPERATIONS	1.65	0.27
BASIC EARNINGS PER SHARE OF DISCONTINUED OPERATIONS	(0.15)	(0.07)
DILUTED EARNINGS PER SHARE OF DISCONTINUED OPERATIONS	(0.15)	(0.07)

In 2019, payment of the outstanding scrip dividend for 2018 and the interim dividend for 2019 led to an increase in the share capital and an issue premium totalling €881 million, corresponding to the issuance of 93,353,410 shares.

NOTE 21 GOODWILL

21.1 CHANGES IN GOODWILL

Goodwill on consolidated entities comprises the following:

(in millions of euros)	31/12/2019	31/12/2018
Net book value at opening date	**10,195**	**10,036**
Acquisitions	66	116
Disposals	-	-
Impairment (note 14)	(57)	-
Translation adjustments	392	(61)
Other changes	27	104
NET BOOK VALUE AT CLOSING DATE	10,623	10,195
Gross value at closing date	11,418	10,960
Accumulated impairment at closing date	(795)	(765)

The changes in goodwill in 2019 primarily related to:

- the acquisition of Foxguard by Framatome, acquisition of service entities in Belgium, and the first consolidation of the Cyclife subsidiaries in the United Kingdom and Sweden;
- translation adjustments of €392 million, principally due to the pound sterling's rise against the euro.

The changes in goodwill in 2018 primarily related to the revised goodwill following finalisation of the business combination accounts for the acquisition of Framatome at 31 December 2017 (€58 million), Edison's acquisition of Edison Energie (formerly GNVI) and Attiva in Italy (for €80 million and €13 million respectively), and translation adjustments of €(61) million, largely reflecting the pound sterling's rise against the Euro.

21.2 GOODWILL BY OPERATING SEGMENT

The breakdown of goodwill between the new segments as presented in note 6.1 is as follows:

(in millions of euros)	31/12/2019	31/12/2018
France – Generation and supply	72	53
France – Regulated activities	223	223
Framatome	1,341	1,317
United Kingdom (EDF Energy)	7,965	7,578
Italy	104	108
Other international	33	20
Dalkia	544	548
EDF Renewables	199	206
Other activities	142	142
GROUP TOTAL	10,623	10,195

NOTE 22 OTHER INTANGIBLE ASSETS

The net value of other intangible assets breaks down as follows:

(in millions of euros)	31/12/2018	Acquisitions	Disposals	Translation adjustments	Changes in scope [2]	Other movements	31/12/2019
Software	4,664	726	(93)	50	(42)	(10)	5,295
Positive fair value of commodity contracts acquired in a business combination	581	-	-	-	-	(77)	504
Greenhouse gas emission rights – green certificates	501	1,400	(1,436)	11	-	(2)	474
Other intangible assets	8,720	460	(15)	37	(1,195)	(88)	7 919
Intangible assets in development [1]	1,233	183	(10)	8	(10)	11	1 415
Gross value	**15,699**	**2,769**	**(1,554)**	**106**	**(1,247)**	**(166)**	**15,607**
Software	(2,417)	(656)	92	(36)	41	13	(2,963)
Positive fair value of commodity contracts acquired in a business combination	(233)	(35)	-	-	-	77	(191)
Other intangible assets	(3,131)	(446)	11	(18)	475	6	(3,103)
Accumulated amortisation and impairment	**(5,781)**	**(1,137)**	**103**	**(54)**	**516**	**96**	**(6,257)**
Net value	9,918	1,632	(1,451)	52	(731)	(70)	9,350

(1) Increases in intangible assets in development are presented net of the effect of commissioning new assets.
(2) Changes in scope essentially concern the reclassification of E&P concession assets as assets held for sale, and the sale of NnG (see note 3.4.5).

The gross value of other intangible assets at 31 December 2019 includes:

- the Edison brand and intangible assets related to Edison's hydropower concessions, amounting to €945 million and €729 million respectively;
- the Dalkia brand and intangible assets related to Dalkia's concession agreements in France, amounting to €130 million and €1,120 million respectively;
- the Framatome brand, Framatome's nuclear technology-related intangible assets and Framatome's customer contracts, amounting to €151 million, €777 million and €344 million respectively.

Intangible assets in development include studies currently in process for the EPR 2 project, amounting to €414 million.

Impairment of €(47) million was recorded in respect of other intangible assets in 2019 (€(52) million in 2018).

EDF's research and development expenses recorded in the income statement total €523 million for 2019 (€510 million in 2018).

NOTE 23 PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

23.1 NET VALUE OF PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

(in millions of euros)	31/12/2019	31/12/2018
Property, plant and equipment	56,533	54,677
Property, plant and equipment in progress	1,880	1,838
PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS	58,413	56,515

23.2 MOVEMENTS IN PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS (EXCLUDING ASSETS IN PROGRESS)

(in millions of euros)	Land and buildings	Networks	Other installations, plant, machinery, equipment & other	Total
Gross value at 31/12/2018	**2,895**	**93,279**	**4,378**	**100,552**
Increases [1]	178	4,232	422	**4,832**
Decreases	(12)	(541)	(176)	**(729)**
Gross value at 31/12/2019	3,061	96,970	4,624	104,655
Depreciation and impairment at 31/12/2018	**(1,458)**	**(41,694)**	**(2,723)**	**(45,875)**
Net depreciation	(69)	(235)	(199)	**(503)**
Disposals	16	447	162	**625**
Other movements [2]	(12)	(2,242)	(115)	**(2,369)**
Depreciation and impairment at 31/12/2019	(1,523)	(43,724)	(2,875)	(48,122)
Net value at 31/12/2018	**1,437**	**51,585**	**1,655**	**54,677**
NET VALUE AT 31/12/2019	1,538	53,246	1,749	56,533

(1) Increases also include facilities provided by the concession-granting authorities.
(2) Other movements mainly concern depreciation of assets operated under concessions, booked against amortization recorded in the special concession liability accounts.

NOTE 24 PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES

24.1 NET VALUE OF PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES

The net value of property, plant and equipment operated under concessions for other activities breaks down as follows:

(in millions of euros)	31/12/2019	31/12/2018
Property, plant and equipment	5,705	6,026
Property, plant and equipment in progress	1,155	1,313
PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES	6,860	7,339

24.2 MOVEMENTS IN PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS FOR OTHER ACTIVITIES (EXCLUDING ASSETS IN PROGRESS)

(in millions of euros)	Land and buildings	Fossil-fired & hydropower plants	Networks	Other installations, plant, machinery, equipment & other	Total
Gross value at 31/12/2018	**1,510**	**12,902**	**24**	**609**	**15,045**
Increases	23	259	8	33	**323**
Decreases	(6)	(33)	(6)	(11)	**(56)**
Translation adjustments	-	7	-	1	**8**
Changes in the scope of consolidation [(1)]	-	(2,131)	-	(8)	**(2,139)**
Other movements	1	17	1	-	**19**
Gross value at 31/12/2019	1,528	11,021	27	624	13,200
Depreciation and impairment at 31/12/2018	**(929)**	**(7,653)**	**(15)**	**(422)**	**(9,019)**
Net depreciation	(32)	(264)	(6)	(31)	**(333)**
Impairment net of reversals	-	-	-	-	-
Disposals	5	29	1	10	**45**
Translation adjustments	-	(5)	-	-	**(5)**
Changes in the scope of consolidation [(1)]	-	1,805	-	14	**1,819**
Other movements	-	7	-	(9)	**(2)**
Depreciation and impairment at 31/12/2019	(956)	(6,081)	(20)	(438)	(7,495)
Net value at 31/12/2018	**581**	**5,249**	**9**	**187**	**6,026**
NET VALUE AT 31/12/2019	572	4,940	7	186	5,705

(1) Changes in the scope of consolidation essentially concern the reclassification of E&P concession assets as assets held for sale.

Property, plant and equipment operated under concessions for other activities comprise concession facilities mainly located in France (hydropower, excluding public electricity distribution) and take account of the presentation of Edison's E&P concessions as assets held for sale.

In 2019, impairment of property, plant and equipment in progress amount to €(14) million.

The change in 2019 in assets operated under concessions principally concerns the reclassification of Edison's E&P operations as assets held for sale, at the amount of €(546) million.

NOTE 25 PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP, INCLUDING RIGHT-OF-USE ASSETS

25.1 NET VALUE OF PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP, INCLUDING RIGHT-OF-USE ASSETS

The net value of property, plant and equipment used in generation and other tangible assets owned by the Group, including right-of-use assets, breaks down as follows:

(in millions of euros)	31/12/2019	31/12/2018
Property, plant and equipment	50,011	47,779
Property, plant and equipment in progress	34,755	30,377
Finance-leased property, plant and equipment (1)	n/a	96
Right-of-use assets (1)	4,333	n/a
PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP, INCLUDING RIGHT-OF-USE ASSETS	89,099	78,252

(1) At 31 December 2018, these assets consisted only of finance-leased assets (€96 million).
At 31 December 2019, they also include all assets leased as lessee by all Group subsidiaries (IFRS 16).

At 31 December 2019, property, plant and equipment in progress owned by the Group mainly concerns investments for the EPR reactors at Flamanville 3 (€13,653 million including capitalised borrowing costs of €3,028 million), and Hinkley Point C (€10,942 million including capitalised borrowing costs of €318 million).

The capitalised value of the Flamanville 3 EPR project in the financial statements at 31 December 2019 is €10,833 million excluding borrowing costs (€10,645 million in property, plant and equipment in progress and €188 million (2) in property, plant and equipment in operation). This includes the following, in addition to the construction cost:

- an inventory of spare parts and capitalised amounts totalling €422 million for related projects (notably the initial comprehensive inspection and North Area development);
- €611 million of pre-operating expenses and other property, plant and equipment related to the Flamanville project;
- and the elimination of internal balances on balance sheet items and margins between Framatome and EDF SA in connection with the Flamanville 3 EPR project (€476 million, essentially consisting of advances and progress payments),

giving a construction cost at historical value of €9,800 million in the consolidated financial statements at 31 December 2019, and a construction cost at completion (excluding borrowing costs) of £12.4 billion (in 2015 euros), as announced on 9 October 2019.

(2) €252 million gross, less €64 million of depreciation.

Property, plant and equipment in progress increased by €4,378 million as the level of investment in 2019 was significantly higher than the amount of assets brought into service during the year (see note 25.2). Investments in property, plant and equipment and intangible assets during 2019 mainly concern:

- the France – Generation and Supply segment for €5,689 million, primarily investments made under the "*Grand Carénage*" programme, investments for Flamanville 3, and investments in hydropower generation;
- the United Kingdom segment for €3,381 million, where investments principally related to nuclear power generation;
- the EDF Renewables segment for €1,721 million, which saw a significant rise in wind and solar capacities under construction in France and North America, and in emerging countries.

25.2 MOVEMENTS IN PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP (EXCLUDING ASSETS IN PROGRESS AND RIGHT-OF-USE ASSETS)

(in millions of euros)	Land and buildings	Nuclear power plants	Fossil-fired & hydropower plants	Other installations, plant, machinery, equipment & other	Total
Gross value at 31/12/2018	**12,968**	**71,390**	**19,445**	**19,354**	**123,157**
Increases	824	3,999	394	2,375	**7,592**
Decreases	(76)	(1,225)	(127)	(447)	**(1,875)**
Translation adjustments	52	563	162	293	**1,070**
Changes in the scope of consolidation [(1)]	26	-	(1,419)	(178)	**(1,571)**
Other movements [(2)]	3	486	31	(81)	**439**
Gross value at 31/12/2019	**13,797**	**75,213**	**18,486**	**21,316**	**128,812**
Depreciation and impairment at 31/12/2018	**(7,191)**	**(47,224)**	**(12,599)**	**(8,364)**	**(75,378)**
Net depreciation	(350)	(3,115)	(609)	(1,286)	**(5,360)**
Impairment net of reversals	(23)	-	(131)	(110)	**(264)**
Disposals	59	1,129	122	403	**1,713**
Translation adjustments	(7)	(290)	(151)	(106)	**(554)**
Changes in the scope of consolidation [(1)]	(8)	-	630	149	**771**
Other movements [(2)]	2	155	(27)	141	**271**
Depreciation and impairment at 31/12/2019	**(7,518)**	**(49,345)**	**(12,765)**	**(9,173)**	**(78,801)**
Net value at 31/12/2018	**5,777**	**24,166**	**6,846**	**10,990**	**47,779**
NET VALUE AT 31/12/2019	**6,279**	**25,868**	**5,721**	**12,143**	**50,011**

(1) Changes in the scope of consolidation essentially relate to reclassification of the E&P operations as assets held for sale.
(2) Other movements include the effect on assets associated with provisions and underlying assets of the €336 million change in the real discount rate used to calculate provisions related to EDF's nuclear generation (see note 32.1).

25.3 RIGHT-OF-USE ASSETS

(in millions of euros)	Land and buildings	Installations, plant, machinery, equipment & other	Total
Gross value at 31/12/2018	**10**	**469**	**479**
Restatement under IFRS 16 (see note 2.1)	4,199	293	4,492
Restated gross value at 01/01/2019	**4,209**	**762**	**4,971**
Increases [1]	462	82	544
Decreases	-	-	-
Translation adjustments	27	1	28
Changes in the scope of consolidation	(7)	6	(1)
Other movements [2]	(171)	(16)	(187)
Gross value at 31/12/2019	**4,520**	**835**	**5,355**
Depreciation and impairment at 31/12/2018	**(5)**	**(378)**	**(383)**
Net depreciation	(542)	(118)	(660)
Disposals	-	-	-
Translation adjustments	(1)	-	(1)
Changes in the scope of consolidation	5	(3)	2
Other movements	2	18	20
Depreciation and impairment at 31/12/2019	**(541)**	**(481)**	**(1,022)**
Net value at 31/12/2018	**5**	**91**	**96**
Restated net value at 01/01/2019	**4,204**	**384**	**4,588**
NET VALUE AT 31/12/2019	**3,979**	**354**	**4,333**

(1) Increases concern right-of-use assets recognised in respect of new leases.
(2) Other movements include the effect of contract revisions on right-of-use assets.

NOTE 26 INVESTMENTS IN ASSOCIATES AND JOINT VENTURES

Investments in associates and joint ventures are as follows:

(in millions of euros)	Principal activity [1]	31/12/2019 Ownership%	31/12/2019 Share of net equity	31/12/2019 Share of net income	31/12/2018 Share of net equity	31/12/2018 Share of net income
Principal investments in associates						
CTE	O	50.10	1,417	308	1,406	283
Taishan (TNPJVC) [2]	G	30.00	n.c.	n.c.	984	(2)
Other investments held by EDF SA			1,448	59	1,216	110
Investments held by EDF Renewables			1,063	77	1,307	79
Other investments in associates and joint ventures			n.c.	n.c.	1,085	38
Subtotal			6,414	519	5,998	508
CENG (reclassified as assets held for sale - see note 46)	G	49.99	n/a	288	1,667	102
Alpiq (sold on 28 May 2019)	G, D, O, T	n/a	n/a	11	622	(41)
Subtotal				299	2,289	61
TOTAL				818	8,287	569

n/a = not applicable
n.c. = not communicated
(1) G= generation, D= distribution, T = transmission, O = other.
(2) The financial data for Taishan at 31 December 2019 are not reported in this table as CGN (Taishan's parent company) publishes its consolidated financial statements later than the Group.

The other investments held by EDF SA are dedicated assets (see note 48.3).

Other investments in associates and joint ventures principally concern Compagnie Énergétique de Sinop (CES) (whose first turbine began operation on 16 September 2019 and the second on 18 October 2019), Jiangxi Datang International Fuzhou Power Generation Company Ltd, Nachtigal (for which construction began in March 2019, with commissioning expected in late 2023) and certain companies owned by EDF Renewables.

The CENG shares have been reclassified under IFRS 5 following the Group's notification of its intention to exercise the put option related to its investment (see notes 3.2.2 and 46).

The investment in Alpiq was sold on 28 May 2019 (see note 3.2.1).

In 2019, €(73) million of impairment was booked in respect of investments in associates and joint ventures and a number of specific assets. This impairment is not detailed below due to its low materiality for the Group's financial statements.

In 2018, €(39) million of impairment was booked in respect of investments in associates and joint ventures and a number of specific assets.

26.1 COENTREPRISE DE TRANSPORT D'ÉLECTRICITÉ (CTE)

26.1.1 CTE – financial indicators

The key financial indicators for the CTE subgroup (on a 100% basis) are as follows:

(in millions of euros)	**31/12/2019**	31/12/2018
Non-current assets	18,568	17,740
Current assets	3,120	2,854
Total assets	**21,688**	**20,593**
Equity	2,829	2,807
Non-current liabilities	15,059	13,225
Current liabilities	3,800	4,561
Total equity and liabilities	**21,688**	**20,593**
Sales	4,856	4,817
Operating profit before depreciation and amortisation	2,181	2,058
Net income	615	566
Net indebtedness	12,256	11,799
Gains and losses recorded directly in equity	(279)	78
Dividends paid	313	313

CTE's affiliate, RTE (Réseau de Transport d'Électricité), is responsible for managing the high voltage and very high voltage public electricity transmission network. Enedis uses RTE's network to convey energy to the distribution network.

26.2 TAISHAN

26.2.1 Taishan – financial indicators

The key financial indicators published for Taishan (on a 100% basis) are as follows:

(in millions of euros)	**31/12/2018**	31/12/2017
Non-current assets	11,595	11,030
Current assets	451	350
Total assets	**12,046**	**11,380**
Equity	3,279	3,316
Non-current liabilities	7,777	6,864
Current liabilities	990	1,200
Total equity and liabilities	**12,046**	**11,380**
Sales	32	-
Net income	(8)	(56)
Dividends paid	-	-

26.2.2 Transactions between the EDF group and Taishan

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

Framatome has two contracts with TNPJVC:

- supply of two EPR nuclear islands in a consortium with CNPDC and CNPEC;
- delivery of fuels (initial core and first refuelling for each unit).

Following the start of commercial operation by the first reactor on 13 December 2018, the second reactor began commercial operation on 7 September 2019 (see note 3.1.4).

On 20 March 2019, the NDRC (National Development and Reform Commission) attributed regulated tariffs to the first three 3rd-generation nuclear projects in China, one of which is Taishan.

The tariff attributed to Taishan is set at RMB435/MWh until the end of 2021, with retroactive effect to the date the first unit was commissioned (13 December 2018).

Indexing mechanisms and the post-2021 tariff levels were not set out in this decision.

The business plan was updated to incorporate this temporary tariff decision. This did not lead to recognition of any impairment on these assets in the financial statements at 31 December 2019.

NOTE 27 INVENTORIES

The carrying value of inventories, broken down by nature, is as follows:

	31/12/2019			31/12/2018		
(in millions of euros)	Gross value	Provision	Net value	Gross value	Provision	Net value
Nuclear fuel	10,649	(4)	10,645	10,671	(6)	10,665
Other fuel	872	(30)	842	957	(14)	943
Other supplies	1,624	(360)	1,264	1,613	(302)	1,311
Work-in-progress for production of goods and services	497	(30)	467	538	(30)	508
Other inventories	869	(38)	831	840	(40)	800
TOTAL INVENTORIES	**14,511**	**(462)**	**14,049**	**14,619**	**(392)**	**14,227**

The long-term portion (more than one year) mainly concerns nuclear fuel inventories amounting to €7,828 million at 31 December 2019 (€7,810 million at 31 December 2018).

The value of EDF Trading's inventories stated at market value is recognised in "Other fuel" and "Other inventories" and stands at €141 million at 31 December 2019 (€142 million at 31 December 2018).

NOTE 28 TRADE RECEIVABLES

Details of net trade receivables are as follows:

(in millions of euros)	Note	31/12/2019	31/12/2018
Trade receivables, gross value – excluding EDF Trading		15,066	14,468
- contract assets	28.3	*400*	*439*
Trade receivables, gross value – EDF Trading		1,583	2,446
Impairment		(1,043)	(1,004)
TRADE RECEIVABLES, NET VALUE		**15,606**	**15,910**

Most trade receivables mature within one year.

Advances received from customers in France who pay in regular monthly instalments, amounting to €6,719 million at 31 December 2019 (€6,827 million at 31 December 2018), are deducted from trade receivables.

28.1 TRADE RECEIVABLES DUE AND NOT YET DUE

(in millions of euros)	31/12/2019			31/12/2018		
	Gross value	Provision	Net value	Gross value	Provision	Net value
TRADE RECEIVABLES	16,649	(1,043)	15,606	16,914	(1,004)	15,910
overdue by up to 6 months	1,262	(187)	1,075	1,318	(214)	1,104
overdue by 6-12 months	367	(124)	243	393	(152)	241
overdue by more than 12 months	940	(514)	426	877	(511)	366
Trade receivables due	**2,569**	**(825)**	**1,744**	**2,588**	**(877)**	**1,711**
Trade receivables not yet due	**14,080**	**(218)**	**13,862**	**14,326**	**(127)**	**14,199**

28.2 ASSIGNMENT OF RECEIVABLES

(in millions of euros)	31/12/2019	31/12/2018
Trade receivables assigned and wholly retained in the balance sheet	-	-
Trade receivables assigned and partly retained in the balance sheet	32	38
Trade receivables assigned and wholly derecognised	1,042	1,095

The Group assigned trade receivables for a total of €1,042 million at 31 December 2019, mainly concerning Edison, EDF SA and Dalkia (€1,095 million at 31 December 2018).

As most assignment operations are carried out on a recurrent, without-recourse basis, the corresponding receivables are no longer carried in the Group's consolidated balance sheet.

28.3 CONTRACT ASSETS

Contract assets are rights held by an entity to receive a consideration in return for goods or services supplied to customers, when such rights are conditional on something other than the passage of time. Most contract assets mature within one year.

The contract assets included in receivables represent an amount of €400 million at 31 December 2019 and €439 million at 31 December 2018 and mainly concern Framatome, Dalkia and EDF Renewables.

NOTE 29 OTHER RECEIVABLES

Details of other receivables are as follows:

(in millions of euros)	31/12/2019	31/12/2018
Prepaid expenses	1,429	1,719
Compensation for Public Energy Service charges (CSPE)	1,667	799
VAT receivables	2,022	2,133
Other tax receivables	153	342
Other operating receivables	3,540	4,149
OTHER RECEIVABLES	8,811	9,142
Non-current portion	1,930	1,796
Current portion	6,881	7,346
Gross value	8,877	9,197
Impairment	(66)	(55)

At 31 December 2019, other receivables include an amount of €1,667 million corresponding to the CSPE receivable (€799 million at 31 December 2018). The rest of the CSPE receivable is included in "Loans and financial receivables" (see note 39.3).

Other operating receivables include €1,278 million of advances paid to suppliers (€1,192 million at 31 December 2018). Most of these advances concern the France – Generation and Supply segment.

NOTE 30 EQUITY

30.1 SHARE CAPITAL

At 31 December 2019, EDF's share capital amounts to €1,551,810,543 comprising 3,103,621,086 fully subscribed and paid-up shares with nominal value of €0.50, owned 83.58% by the French State, 14.92% by the public (institutional and private investors) and 1.34% by current and retired Group employees, with 0.16% held by EDF as treasury shares.

In June 2019, payment of part of the balance of dividends for 2018 in the form of a scrip dividend led to a €20 million increase in the share capital and an issue premium of €431 million following issuance of 40,701,950 new shares. The legal formalities for this operation were finalised in June 2019.

In December 2019, payment of part of the interim dividend for 2019 in the form of a scrip dividend led to a €27 million increase in the share capital and an issue premium of €403 million following the issuance of 52,651,460 new shares.

Under Article L. 111-67 of the French Energy Code, the French State must hold more than 70% of the capital of EDF at all times.

30.2 TREASURY SHARES

A share repurchase programme authorised by the General Shareholders' Meeting of 9 June 2006 was implemented by the Board of Directors, within the limit of 10% of the total number of shares making up the Company's capital. The initial duration of the programme was 18 months, renewed for 12 months then by tacit agreement every year.

A liquidity contract exists for this programme, as required by the French market regulator AMF (*Autorité des marchés financiers*).

At 31 December 2019, treasury shares deducted from consolidated equity represent 4,882,938 shares with total value of €64 million.

30.3 DIVIDENDS

The General Shareholders' Meeting of 16 May 2019 decided to distribute an ordinary dividend of €0.31 per share in respect of 2018, offering shareholders the choice of payment in cash or shares (scrip option).

In application of Article 24 of the Company's articles of association, shareholders who had held their shares continuously for at least 2 years at the year-end and still held them at the dividend distribution date benefit from a 10% bonus on their dividends. The number of shares carrying an entitlement to the bonus dividend cannot exceed 0.5% of the Company's capital per shareholder. The bonus dividend amounts to €0.341 per share.

As interim dividends of €0.15 per share had been paid in the form of cash on 10 December 2018, the balance payable for 2018 amounted to €0.16 per share benefiting from the ordinary dividend and €0.191 per share benefiting from the bonus dividend. The balance of the dividend was paid out on 18 June 2019.

The French government opted for the scrip dividend for the balance of 2018 dividends payable.

The balance of the cash dividend paid to shareholders who did not opt for the scrip dividend for 2018 amounts to €31 million.

On 19 November 2019, EDF's Board of Directors decided to distribute an interim dividend of €0.15 per share in respect of 2019. This interim dividend amounting to a total of €458 million was paid out in the form of new shares (scrip option) or cash on 17 December 2019.

The French government opted for the scrip interim dividend for 2019.

The amount of the cash dividend paid to shareholders who did not opt for the scrip interim dividend for 2019 amounted to €27 million.

30.4 EQUITY INSTRUMENTS

At 31 December 2019, perpetual subordinated bonds carried in equity amounted to €9,209 million (less net-of-tax transaction costs).

Issues and redemptions of perpetual subordinated bonds were recorded in equity at 31 December 2019 at the total net value of €(1,125) million (see notes 3.3.2 and 3.3.3).

Interest paid by EDF to the bearers of perpetual subordinated bonds issued totalled €589 million in 2019 and €584 million in 2018. The resulting cash payout is reflected in a corresponding reduction in Group equity.

In January 2020, EDF paid interest of around €286 million to the bearers of perpetual subordinated bonds.

Perpetual subordinated bonds in the accounts of EDF

(in millions of currencies)

Entity	Issue	Nominal amount	Currency	Redemption option	Coupon
EDF	01/2013	1,250	EUR	12 years	5.38%
EDF	01/2013	1,250	GBP	13 years	6.00%
EDF	01/2013	2,098	USD	10 years	5.25%
EDF	01/2014	1,500	USD	10 years	5.63%
EDF	01/2014	267	EUR	8 years	4.13%
EDF	01/2014	1,000	EUR	12 years	5.00%
EDF	01/2014	750	GBP	15 years	5.88%
EDF	10/2018	1,250	EUR	6 years	4.00%
EDF	11/2019	500	EUR	8 years	3.00%

30.5 NON-CONTROLLING INTERESTS (MINORITY INTERESTS)

30.5.1 Details of non-controlling interests

(in millions of euros)	31/12/2019			31/12/2018	
	Ownership %	Equity (non-controlling interests)	Net income attributable to non-controlling interests	Equity (non-controlling interests)	Net income attributable to non-controlling interests
Principal non-controlling interests:					
EDF Energy Nuclear Generation Ltd.	20.0%	2,764	(16)	2,612	(21)
NNB Holding Ltd.	33.5%	3,977	5	2,849	(3)
EDF Investissements Groupe SA	6.1%	516	10	516	11
Luminus SA (formerly EDF Luminus SA)	31.4%	376	(6)	380	(21)
Framatome	24.5%	163	(22)	194	24
Other non-controlling interests	-	1,528	56	1,626	24
TOTAL	**-**	**9,324**	**27**	**8,177**	**14**

Non-controlling interests in EDF Energy Nuclear Generation Ltd. (formerly British Energy), which is owned 80% by the Group via EDF Energy, correspond to Centrica's share.

Non-controlling interests in NNB Holding Limited, the holding company for the Hinkley Point C project, which is owned 66.5% by the Group via EDF Energy, correspond to CGN's share.

Non-controlling interests in Framatome, the group which was acquired on 31 December 2017 and is owned 75.5% by the Group via EDF SA, correspond to the 19.5% share held by Mitsubishi Heavy Industries and the 5% share held by Assystem.

Non-controlling interests in Luminus correspond to the investments held by Belgian local authorities.

Non-controlling interests in EDF Investissements Groupe correspond to the investment held by Natixis Belgique Investissements.

Other non-controlling interests in 2018 and 2019 principally comprised minority interests in Sizewell C Holding Co and subsidiaries of the Edison and EDF Renewables subgroups.

Other non-controlling interests also include instruments in the form of bonds convertible into shares, issued by the Dalkia group and subscribed by minority interests, amounting to a total €239 million at 31 December 2019 (€260 million in 2018).

30.5.2 Non-controlling interests in EDF Energy

The key financial indicators (100% basis) for EDF Energy Nuclear Generation Ltd. are as follows:

(in millions of euros)	**31/12/2019**	31/12/2018
Non-current assets	25,807	21,304
Current assets	3,649	3,289
Total assets	**29,456**	**24,593**
Equity	13,820	13,061
Non-current liabilities	15,175	10,805
Current liabilities	461	727
Total equity and liabilities	**29,456**	**24,593**
Sales	2,807	2,765
Net income	(81)	(106)
Gains and losses recorded directly in equity	841	(100)
Net cash flow from operating activities	328	649
Net cash flow from investing activities	(474)	(555)
Net cash flow from financing activities	-	(113)
Cash and cash equivalents – opening balance	**472**	**483**
Net increase/(decrease) in cash and cash equivalents	(146)	(19)
Effect of currency fluctuations	17	1
Other	(14)	7
Cash and cash equivalents – closing balance	**329**	**472**
Dividends paid to non-controlling interests	-	23

NOTE 31 PROVISIONS

The breakdown between current and non-current provisions is as follows:

		31/12/2019			31/12/2018		
(in millions of euros)	Notes	Current	Non-current	Total	Current	Non-current	Total
Provisions for the back-end of the nuclear cycle		1,432	23,822	25,254	1,515	22,362	23,877
Provisions for decommissioning and last cores		364	31,761	32,125	302	26,842	27,144
Provisions related to nuclear generation	32	**1,796**	**55,583**	**57,379**	**1,817**	**49,204**	**51,021**
Other provisions for decommissioning	33	**105**	**1,573**	**1,678**	**91**	**2,033**	**2,124**
Provisions for employee benefits	34	**945**	**20,539**	**21,484**	**998**	**17,627**	**18,625**
Other provisions	35	**2,710**	**3,065**	**5,775**	**3,104**	**2,908**	**6,012**
TOTAL PROVISIONS		5,556	80,760	86,316	6,010	71,772	77,782

NOTE 32 PROVISIONS RELATED TO NUCLEAR GENERATION –BACK-END OF THE NUCLEAR CYCLE, PLANT DECOMMISSIONING AND LAST CORES

Provisions related to nuclear generation comprise provisions for back-end nuclear cycle expenses (management of spent fuel and radioactive waste), provisions for plant decommissioning and provisions for last cores.

Provisions are estimated under the principles presented in note 1.3.2.2.

Obligations can vary noticeably depending on each country's legislation and regulations, and the technologies and industrial scenarios involved.

The movement in provisions for the back-end of the nuclear cycle, provisions for decommissioning and provisions for last cores breaks down as follows:

(in millions of euros)	31/12/2018	Increases	Decreases	Discount effect	Translation adjustments	Other movements	31/12/2019
Provisions for spent fuel management	12,162	548	(1 092)	576	74	58	12,326
Provisions for waste removal and conditioning	1,120	32	(29)	51	23	140	1,337
Provisions for long-term radioactive waste management	10,595	165	(232)	680	46	337	11,591
Provisions for the back-end of the nuclear cycle	**23,877**	**745**	**(1,353)**	**1,307**	**143**	**535**	25,254
Provisions for nuclear plant decommissioning	23,040	105	(174)	984	444	3,210	27,609
Provisions for last cores	4,104	-	-	167	88	157	4,516
Provisions for decommissioning and last cores	**27,144**	**105**	**(174)**	**1,151**	**532**	**3,367**	32,125
PROVISIONS RELATED TO NUCLEAR GENERATION	51,021	850	(1,527)	2,458	675	3,902	57,379

The change in provisions related to nuclear generation in 2019 is mainly due to:

- a lower real discount rate in France and the United Kingdom. The corresponding effects are included in the "Discount effect" (€449 million) for provisions with corresponding entries in the income statement, and in "Other movements" (€1,708 million) for changes in provisions with related assets (assets associated with provisions and underlying assets in France; the NLF receivable in the United Kingdom);
- revision of the assumptions used to determine nuclear plant decommissioning liabilities in the United Kingdom. The related effects (€1,994 million) are presented in "Other movements" and correspond to changes in provisions associated with the NLF receivable (see note 32.2.3).

The breakdown of provisions by company is shown below:

(in millions of euros)	EDF Note 32.1	EDF Energy Note 32.2	Belgium	Total
Provisions for spent fuel management	10,823	1,503	-	12,326
Provisions for waste removal and conditioning	805	532	-	1,337
Provisions for long-term radioactive waste management	10,531	1,053	7	11,591
PROVISIONS FOR THE BACK-END OF THE NUCLEAR CYCLE AT 31/12/2019	22,159	3,088	7	25,254
Provisions for the back-end of the nuclear cycle at 31/12/2018	**21,295**	**2,576**	**6**	**23,877**
Provisions for nuclear plant decommissioning	16,937	10,303	369	27,609
Provisions for last cores	2,624	1,892	-	4,516
PROVISIONS FOR DECOMMISSIONING AND LAST CORES AT 31/12/2019	19,561	12,195	369	32,125
Provisions for decommissioning and last cores at 31/12/2018	**18,511**	**8,332**	**301**	**27,144**

Details of nuclear provisions in France and the United Kingdom are provided in notes 32.1 and 32.2 respectively.

In Belgium, the Belgian law of 11 April 2003 assigned management of provisions concerning the Belgian nuclear plants, and the funds that cover them, to Synatom (a subsidiary of the Engie Group). Luminus contributes via Synatom to these funds, to cover its share of plant decommissioning and back-end nuclear fuel expenses as a co-owner of 4 nuclear plants. These funding mechanisms are reflected through the following items in the consolidated financial statements:

- obligations presented in the liabilities in the form of provisions, amounting to €259 million at 31 December 2019 (€209 million at 31 December 2018);
- a receivable representing the advance payments made to Synatom, recognised in the consolidated balance sheet assets as financial assets carried at fair value (see note 39.3) at the value of €230 million at 31 December 2019 (€203 million at 31 December 2018). This receivable, which corresponds to the fair value of the share of funds held by Synatom on behalf of Luminus, is discounted by applying the same real discount rate used to determine the obligations they will cover.

32.1 NUCLEAR PROVISIONS IN FRANCE

In France, the provisions established by EDF SA for the nuclear generation fleet result from the Law of 28 June 2006 on long-term management of radioactive materials and waste, and the associated implementing provisions concerning secure financing of nuclear expenses.

In compliance with the accounting principles described in note 1.3.2.2:

- EDF books provisions to cover all obligations related to the nuclear facilities it operates;
- EDF holds dedicated assets for secure financing of long-term obligations (see note 48).

The calculation of provisions incorporates a level of risks and unknowns as appropriate to the operations concerned. The valuation of costs carries uncertainty factors such as:

- changes in legislation, particularly regarding safety, security and environmental protection, and financing of long-term nuclear expenses;
- changes in the regulatory decommissioning process and the time necessary for issuance of administrative authorisation;
- future methods for storing long-lived radioactive waste and provision of storage facilities by the French agency for radioactive waste management ANDRA (Agence nationale pour la gestion des déchets radioactifs);
- changes in certain financial parameters such as discount rates, notably in view of the regulatory limits, inflation rates, or changes in the contractual terms of spent fuel management.

Details of changes in provisions for the back-end of the nuclear cycle, decommissioning and last cores are as follows:

(in millions of euros)	Notes	31/12/2018	Increases	Decreases	Discount effect [1]	Other movements [2]	31/12/2019
Provisions for spent fuel management	32.1.1	10,698	535	(890)	515	(35)	10,823
Provisions for waste removal and conditioning	32.1.2	751	29	(29)	36	18	805
Provisions for long-term radioactive waste management	32.1.2	9,846	161	(232)	650	106	10,531
Provisions for the back-end of the nuclear cycle		**21,295**	**725**	**(1,151)**	**1,201**	**89**	**22,159**
Provisions for nuclear plant decommissioning	32.1.3	15,985	105	(141)	694	294	16,937
Provisions for last cores	32.1.4	2,526	-	-	97	1	2,624
Provisions for decommissioning and last cores		**18,511**	**105**	**(141)**	**791**	**295**	**19,561**
PROVISIONS RELATED TO NUCLEAR GENERATION		**39,806**	**830**	**(1,292)**	**1,992**	**384**	**41,720**

(1) The discount effect comprises the €1,543 million cost of unwinding the discount, and the €449 million effect of the change in the real discount rate in 2019, which were recorded in the income statement for provisions with no related assets (costs of unwinding the discount)

(2) Other movements mainly include the €361 million effect of the change in the real discount rate at 31 December 2019 for provisions with related assets.

Concerning non-EDF installations:

- EDF, COGEMA (now Orano Cycle) and the French Atomic Energy Commission (*Commissariat a l'Energie Atomique* or CEA) signed an agreement in December 2004 which transferred the management and financing of final shutdown, decommissioning and waste recovery and reconditioning for the UP1 reprocessing facility at Marcoule to the CEA. In return, EDF paid the CEA a one-time financial contribution covering its full share of the cost of outstanding operations, while remaining the owner of its final waste and bearing only the transport and storage costs;
- EDF, AREVA and AREVA NC (now Orano Cycle) signed two agreements in December 2008 and July 2010 defining the legal and financial terms for the transfer to AREVA NC of EDF's contractual obligations regarding its financial contribution to the dismantling of La Hague installations and the recovery and conditioning of waste. In application of those agreements, EDF paid AREVA NC a one-time financial contribution covering its full share of the cost of outstanding operations, while remaining the owner of its final waste and bearing only the transport and storage costs.

32.1.1 Provisions for spent fuel management

EDF's currently adopted strategy with regards to the fuel cycle, in agreement with the French State, is to process spent fuel and to recycle the separated plutonium in the form of MOX fuel (Mixed OXide of plutonium and uranium).

The quantities processed by Orano at the request of EDF, totalling approximately 1,100 tonnes per year, are determined based on the quantity of recyclable plutonium in the reactors that are authorised to load MOX fuel.

Consequently, provisions for spent fuel cover services associated with the following:

- removal of spent fuel from EDF's generation centres, as well as reception and interim storage;
- processing, including conditioning and storage of recyclable matter.

The processing expenses included in these provisions exclusively concern spent fuel that can be recycled in existing facilities, including the portion in reactors but not yet irradiated.

Expenses are measured based on forecast physical flows at the year-end, with reference to the contracts with Orano which define the terms for implementation of the framework agreement for the period 2008-2040. The most recent contract signed on 5 February 2016, covers the period 2016-2023. These contracts contain price indexes that will be revised annually.

In 2018 the Board of Directors approved resumption of recycling of uranium from reprocessing (which had been suspended in 2013 pending availability of a new industrial schema), with loading of the first fuel assemblies scheduled for 2023, subject to technical adaptations and the necessary authorisations from the Nuclear Safety Authority. The objective is to start recycling in certain 900MW units, and later in certain 1300MW units. The corresponding contracts were signed with the respective suppliers in the second quarter of 2018. In 2019 EDF continued to monitor the plants' preparation trajectory with reference to those contracts.

The portion of the provision for spent fuel management relating to uranium from reprocessing (€759 million) will be recovered once all the industrial, regulatory and economic conditions for resumption of uranium recycling have been fulfilled, but EDF has no control over fulfilment of some of these conditions (currently, no advance timetable has been set).

This provision also covers long-term storage of spent fuel that cannot currently be recycled in existing installations: plutonium fuel (MOX) or uranium fuel derived from enriched processing, and fuel from Creys-Malville and Brennilis until fourth-generation reactors become available. Dedicated assets are held in association with this provision (see note 48.4).

32.1.2 Provisions for waste removal and conditioning – Provisions for long-term radioactive waste management

32.1.2.1 Provisions for waste removal and conditioning

The provisions for waste removal and conditioning are reported separately from 1 January 2017.

They cover the following future expenses for radioactive waste resulting from operations or decommissioning (apart from spent fuel):

- characterisation and conditioning of waste;
- interim storage of waste.

Equipment assembly for the conditioning and intermediate storage facility for radioactive waste (*Installation de conditionnement et d'entreposage des déchets activés* – ICEDA) was completed in December 2018 and pre-service testing is currently in process. Information on the identification of EIP equipment (equipment that is important for protection of interests) has been added to the commissioning permit application (DAMS) and the documents required for examination of the commissioning authorisation application sent to the ASN. The ICEDA is expected to start operations in the first half of 2020.

32.1.2.2 Provisions for long-term radioactive waste management

These provisions concern future expenses for:

- removal and storage of radioactive waste resulting from decommissioning of nuclear installations operated by EDF;
- interim storage removal and storage of radioactive waste packages resulting from spent fuel processing;
- direct storage, where relevant, of spent fuel that cannot be recycled in existing installations: specifically plutonium fuel (MOX) or uranium fuel derived from enriched processing, and fuel from Creys-Malville and Brennilis;
- EDF's share of the costs of studies, construction, operation and maintenance, shutdown and surveillance of existing and future storage centres.

The volumes of waste concerned by provisions include existing packages of waste and all waste to be conditioned, resulting from plant decommissioning or spent fuel processing at La Hague (comprising all fuel in reactors at 31 December, irradiated or otherwise). These volumes are regularly reviewed, in keeping with the data declared for the purposes of the national waste inventory undertaken by ANDRA.

The provisions for long-term radioactive waste management break down as follows:

(in millions of euros)	31/12/2019	31/12/2018
Very low-level and low and medium-level waste	1,561	1,278
Long-lived low-level waste	330	292
Long-lived medium and high-level waste	8,640	8,276
PROVISIONS FOR LONG-TERM RADIOACTIVE WASTE MANAGEMENT	10,531	9,846

Very low-level and low and medium-level waste

Very low-level waste mainly comes from nuclear plant decommissioning, and generally takes the form of rubble (concrete, scrap metal, insulating materials and piping). This type of waste is stored at surface level at the Morvilliers storage centre managed by ANDRA.

Low and medium-level waste comes from nuclear facilities (gloves, filters, resins). This type of waste is stored at surface level at the Soulaines storage centre managed by ANDRA.

The cost of removing and storing short-lived waste (very low-level and low and medium-level) is assessed on the basis of current contracts with transporters, Cyclife France (for waste processing) and ANDRA for operation of the existing storage centres. In 2019, the cost and inventory assumptions were updated by applying a long-term projection based on time series analysis of past waste removal and better characterisation of future volumes. The effects resulting from the work on updating cost estimates led to a €206 million increase in the provision (with an unfavourable effect of €132 million on the income statement, while the rest of the change was recognised via adjustments to fixed assets).

Long-lived low-level waste

Long-lived low-level waste belonging to EDF essentially consists of graphite waste from the ongoing decommissioning of the former UNGG (natural uranium graphite gas-cooled) reactors.

As this waste has a long lifetime but is lower-level than long-lived medium and high-level waste, specific subsurface storage requirements apply under the French Law of 28 June 2006.

Following the initial geological investigations, in July 2015 ANDRA remitted a report on the proposed storage centre for long-lived low-level waste on a site located in the Soulaines region (Aube) in France. This report was submitted to the ASN for its opinion. Uncertainties remain about the site's capacity to accommodate all of the waste included in the baseline inventory of the long-lived low-level waste storage facility. Further studies are planned under the 2016-2018 period of the National Plan for the Management of Radioactive Materials and Waste (PNGMDR), concerning both the feasibility of this storage centre and the search for additional waste management solutions. A general industrial strategy for management of all long-lived low-level radioactive waste is currently under examination prior to finalisation under the National Plan.

Long-lived medium and high-level waste

Long-lived medium and high-level waste essentially comes from processing of spent fuel, and to a lesser extent waste resulting from nuclear plant decommissioning (metallic components that have been inside the reactor).

The French Law of 28 June 2006 requires reversible storage in deep geological layers for this type of waste.

The provision established for long-lived medium and high-level waste is the largest component of provisions for long-term radioactive waste management.

Until June 2015 the gross value and disbursement schedules for forecast expenses were based on a scenario of industrial geological waste storage, following conclusions presented in the first half of 2005 by a working group formed under supervision of the State involving representatives of the administrations concerned, ANDRA and the producers of waste (EDF, Orano, CEA). EDF applied a reasonable approach to information supplied by this working group, leading to a benchmark cost, for storage of waste from all producers, of €14.1 billion under the economic conditions of 2003 (€20.8 billion under 2011 economic conditions).

In 2012 ANDRA carried out preliminary conceptional studies for the Cigéo geological storage project, after discussing the technical optimisations proposed by the producers of waste.

On this basis, ANDRA drew up figures which, in compliance with the Law of 28 June 2006, were subjected to a consultation process with waste producers started in late 2014 by the French Department for Energy and Climate (Direction Générale de l'Énergie et du Climat or DGEC). In April 2015 EDF and the other producers sent the DGEC their comments on ANDRA's report and a joint estimation of the target Cigéo storage cost due to divergent

approaches. All this information was included, together with the ASN's opinion, in a report submitted to the Minister for Ecology, Sustainable Development and Energy.

On 15 January 2016 the Ministry of Ecology, Sustainable Development and Energy issued a Ministerial Order setting the target cost for the Cigéo storage project at €25 billion under 2011 year-end economic conditions. The cost as defined constitutes an objective to be met by ANDRA, in compliance with safety standards set by the ASN, working in close liaison with the operators of nuclear installations.

Publication of this Order entailed an €820 million adjustment to the provision shown in the Group's financial statements at 31 December 2015. The cost of the Cigéo project defined in the Order has replaced the estimated benchmark cost of €20.8 billion previously used by EDF for its consolidated financial statements.

In application of this Ministerial Order, the cost of the Cigéo project will be regularly updated, at least at each key milestone in the course of the project's development (authorisation to create the facility, commissioning, end of the "pilot industrial phase", safety reviews) in accordance with the opinion of the ASN.

Design studies for future facilities are currently in process with ANDRA and stakeholders. They include technical and economic optimisation and the responses to the safety option report sent by ANDRA to the ASN in April 2016. The law of 11 July 2016 also clarified the concept of reversibility. In 2017 ANDRA opted for a new configuration to provide the basis for the preliminary project.

On 11 January 2018, the ASN issued its opinion on the Cigéo safety option file (DOS Cigéo). It considered that the project had reached satisfactory overall technological maturity at that stage. This opinion included a requirement for examination of alternatives to the proposals for storage of bituminous waste at Cigéo. A group of experts appointed by the DGEC in September 2018 to draw up a report on current bituminous waste management concluded in September 2019 that various options were feasible (storage or neutralisation) but stressed the importance of continuing the studies in order to identify the most appropriate option.

Under the schedule prepared by ANDRA, the application to develop Cigéo (classified as a basic nuclear facility) is now due to be made in 2020, with a corresponding extension for obtaining authorisation. After an industrial pilot phase extending to 2030, producers are still currently working on the hypothesis that the first waste packages would be received in 2031. The provision is therefore unaffected by this change to the schedule.

32.1.3 Decommissioning provisions for nuclear power plants

EDF bears full technical and financial responsibility for decommissioning of the nuclear plants it operates. The decommissioning process is governed by French Law of 13 June 2006, Decree 2007-1557 of 2 November 2007, and the French Environment Code (Articles L. 593-25 and following). It involves the following operations for each site:

- a shutdown declaration, to be made at least two years prior to the planned shutdown date;
    - since the Energy Transition Law of 17 August 2015, the final shutdown, which takes place during the operating phase of the basic nuclear facility, is considered separately from dismantling, as a notable change of lesser importance (simply requiring a declaration by the operator to the Minister and the ASN);
- an application for decommissioning, which after examination by the authorities and a public inquiry, leads to a single decree authorising the decommissioning;
- key progress reviews with the ASN, included in a formal safety procedure specific to dismantling operations;
- an internal authorisation procedure for the operator, independent of operational personnel and audited by the ASN, allowing some specific work to be started ahead of the authorised safety procedure;
- finally, once these operations are complete, declassification of the facility to remove it from the legal regime governing basic nuclear facilities.

The decommissioning scenario adopted by EDF complies with France's environmental Code, which requires as short a period as possible to elapse between final shutdown and dismantling in economically acceptable conditions and in compliance with the principles laid down in Article L. 1333-1 of the public health code (radioprotection) and section II of Article L. 110-1 of the environmental code (protection of the environment). The intended end-state is industrial use: the sites will be restored to their original condition and will be reusable for industrial facilities.

The ongoing operations concern plants that were constructed and operated before the current nuclear fleet ("first-generation" plants), and the Superphenix plant and Irradiated Materials Workshop at Chinon. These

operations cover four different technologies: a heavy water reactor (Brennilis), a sodium-cooled fast-neutron reactor (the Superphenix at Creys-Malville), natural uranium graphite gas-cooled (UNGG) reactors (at Chinon, Saint Laurent and Bugey) and a pressurised water reactor (PWR at Chooz). Each of them is a first for EDF, and apart from the PWR, they concern reactor technologies for which there is little or no international experience. They therefore require development of new methods and technologies that are riskier than technologies for which feedback already exists. Decommissioning of the Chooz PWR is benefiting from past experience (essentially in the US and limited), but the reactor has the specificity of being located in a cave, making this a unique operation, generating experience that is not immediately transposable and involves specific risks.

The experience gained from dismantling the Chooz PWR will make the studies and estimates of future decommissioning of the nuclear fleet currently in operation ("second-generation" plants) as robust as possible. But so far, neither EDF nor any other operator has begun a decommissioning programme on a scale comparable to the current PWR fleet, and as a result the estimates include both opportunities and risks, especially the risks associated with the scale effect.

The decommissioning provisions cover future decommissioning expenses as described above (excluding the cost of removing and storing waste, which is covered by the provisions for long-term waste management).

The preliminary dismantling plan and the orientations for the fourth periodic review of Fessenheim (RP4) were sent to the ASN in July 2018. The Consolidated Preliminary Plan (*Avant-Projet Consolidé* or APC) was finalised in late 2018, with more in-depth studies for derisking of the Summary Preliminary Plan (*Avant-Projet Sommaire* or APS). Studies in 2019 focused on preparing the dismantling plan, with the objective of filing the dismantling and RP4 documents in mid-2020.

On 30 September 2019 EDF sent the Minister for the Ecological and Inclusive Transition and the ASN its application requesting approval for the termination of operations, and a declaration of the permanent shutdown of both reactors at Fessenheim nuclear power plant, scheduled for 22 February 2020 for reactor 1 and 30 June 2020 for reactor 2 (see note 3.1.6).

Details of changes in decommissioning provisions for nuclear power plants are as follows:

(in millions of euros)	31/12/2018	Increases	Decreases	Discount effect	Other movements	31/12/2019
Provisions for decommissioning nuclear plants in operation	12,480	2	(20)	488	294	13,244
Provisions for decommissioning permanently shut-down nuclear plants	3,505	103	(121)	206	-	3,693
DECOMMISSIONING PROVISIONS FOR NUCLEAR POWER PLANTS	15,985	105	(141)	694	294	16,937

For nuclear power plants currently in operation (PWR pressurized water reactor plants with 900MW, 1,300MW and N4 reactors)

Until 2013, provisions were estimated based on a 1991 study by the French Ministry of Trade and Industry, which set an estimated benchmark cost for decommissioning expressed in €/MW, confirming the assumptions defined in 1979 by the PEON commission. These estimates had been confirmed from 2009 by a detailed study of decommissioning costs conducted by EDF at the representative site of Dampierre (four 900MW units), and its results were corroborated by an intercomparison with the study carried out by consultants LaGuardia, based mainly on the Maine Yankee reactor in the US.

In 2014 the Dampierre study was reviewed by EDF to make sure that the previous calculations were still valid in view of recent developments and experience, both internationally and internally. For this revision, the decommissioning provisions for plants in operation were based on costs resulting from the Dampierre study, in order to incorporate best estimates and feedback from inside and outside France. This change of estimate had no significant impact on the level of provisions at 31 December 2014.

Between June 2014 and July 2015, an audit of dismantling costs for EDF's nuclear fleet currently in operation was conducted by specialised consulting firms, at the request of the French Department for Energy and Climate (Direction Générale de l'Énergie et du Climat or DGEC). On 15 January 2016 the DGEC published a summary of the audit report. It stated that although estimating the cost of decommissioning nuclear reactors is a demanding exercise due to relatively limited past experience, the prospects of changes in techniques, and the distant timing of the expenditure, overall, the audit confirmed EDF's estimate of decommissioning costs for its nuclear fleet currently in operation. The DGEC also made a number of recommendations to EDF following this audit.

In 2016, EDF revised the decommissioning estimate, in order to incorporate the audit recommendations and past experience gained from dismantling operations for first-generation reactors (particularly Chooz A).

A detailed analytical approach was used to revise this estimate, identifying all costs for the engineering, construction work, operation and waste processing involved in future decommissioning of reactors currently in operation. This led to figures based on detailed timetables for plant decommissioning. The approach adopted made it possible to explore more thoroughly the assessment of costs specific to the initial units of each series, estimated for each series based on transposition coefficients applied to the baseline costs for the initial 900MW unit, and the series and mutualisation effects, as these costs and effects are inherent to the fleet's size and configuration.

The natures of the principal mutualisation and series effects used to arrive at the estimate are explained below.

There are several types of mutualisation effects:

- some of them relate to the fact that several reactors may share common buildings and facilities on the same site, and these buildings and facilities will not have to be decommissioned twice. Structurally, decommissioning a pair of reactors on the same site costs less than decommissioning two standalone reactors on two different sites. In France, unlike other countries, there are no single reactors but sites with two or four, and in one case six reactors;
- certain costs are no higher when 2 or 4 reactors are decommissioned on the same site. This is usually the case for surveillance costs and cost of maintaining safe operating conditions on the site;
- waste processing in centralised facilities (for example for dismantling major components) costs less than having several waste processing facilities at the decommissioning location.

Series effects are mainly of two types:

- first, in a fleet using the same technology, many of the studies do not need to be repeated each time;
- second, in a fleet using the same technology, robots and tooling can be largely reused from one site to another.

Such series effects are comparable in nature to the effects observed during construction of the fleet, in terms of studies or component manufacturing plants.

For example, for the 900MW fleet, a series effect of approximately 20% is expected between the first-of-a-kind reactor with 2 units and an average 2-units reactor.

Series and mutualisation effects in particular explain why it is not appropriate simply to compare the average decommissioning cost per reactor between the French fleet and other countries' nuclear fleets.

The figures only marginally reflect changes in productivity and the learning effect. The external audit of the decommissioning cost for the fleet currently in operation, ordered by the DGEC, considered that the learning effect incorporated into the estimate was conservative.

For reasons of prudence, the estimate also includes an assessment of risks, contingencies and uncertainties.

The Group considers that the work done to revise the estimate answers the recommendations issued after the audit. The approach adopted and its results have been presented to the administrative authority and gave rise to further questions and discussions.

EDF is also continuing to support its analyses through an international comparison, making it sure it takes into consideration a number of factors that could distort direct comparisons, for example differences in the scope concerned by costs estimate, or national and regulatory contexts.

The results of this detailed approach led to limited changes overall in the cost estimate and the associated provisions at 31 December 2016, apart from the consequences of the change in the depreciation period for 900MW series plants (excluding Fessenheim) at 1 January 2016, and the effect of changes in discount rates at 31 December 2016, i.e.:

- an increase of €321 million in the estimated decommissioning costs and an increase of €334 million in the estimated cost of long-term management of long-lived medium-level waste;
- a decrease of €(451) million in the provision for plant decommissioning, and an increase of €162 million in the provision for long-term management of long-lived medium-level waste, with corresponding changes in the underlying assets.

After its revision in 2016, it was decided that the estimate would be reviewed annually. Reviews since 2017 have led to non-significant adjustments.

The scope of the provision for very low-level and low and medium-level waste includes the cost of demolishing back-up diesel facilities and installations for processing control rod cluster guide tubes commissioned in 2019, and this resulted in a €43 million increase in the provision.

For permanently shut-down nuclear power plants

Unlike the PWR fleet currently in operation, the first-generation reactors now shut down used a range of different technologies: a PWR reactor at Chooz A, UNGG (natural uranium graphite gas-cooled) reactors at Bugey, St-Laurent and Chinon, a heavy water reactor at Brennilis, and a sodium-cooled fast neutron reactor at Creys-Malville.

The decommissioning costs are based on contractor quotes, which take account of accumulated industrial experience, unforeseen and regulatory developments, and the latest available figures.

In 2015 the industrial decommissioning strategy for UNGG plants was totally revised. The previously selected strategy was based on a scenario involving "underwater" dismantling of caissons (UNGG reactor buildings) for four of the reactors, with direct graphite storage in a centre currently under examination by ANDRA (see Long-lived low-level waste, note 32.1.2). Several new technical developments showed that the alternative "in-air" dismantling solution for the caissons would improve industrial control of operations and was apparently more favourable in terms of safety, radioprotection and environmental impact. The company therefore selected a new "in-air" dismantling scenario as the benchmark strategy for all six caissons. This scenario includes a consolidation phase, building on experience acquired from dismantling the first caisson before beginning work on the other five. The decommissioning phase will ultimately be longer than previously planned, leading to higher contractor quotes due to the induced operating costs.

Updating the industrial decommissioning scenario for first-generation power plants, particularly UNGGs plants, led to a €590 million increase in the provision at 31 December 2015.

After the revision of the estimated cost in 2015, the decision was made that it should be reviewed annually. The 2016 review led to non-significant adjustments, apart from one increase of €125 million for a specific installation (the Irradiated Materials Workshop at Chinon). Since 2017, this annual review has given rise to non-significant adjustments.

The amended industrial scenario in 2015 was presented to the ASN's commissioners on 29 March 2016. In 2018 the ASN issued its main questions and conclusions about the UNGG strategy file. A consensus was reached regarding "in-air" dismantling for all reactors, the usefulness of an industrial demonstrator, and the timetable for dismantling the first-of-a-kind reactor (Chinon A2), but discussions continued regarding the dismantling timetable for the other 5 reactors. EDF's proposed schedule allows for significant experience-based adjustments (after dismantling the first reactor) before beginning almost simultaneous dismantling of the other 5 reactors. On 12 February 2019, EDF presented all the information justifying the Group's chosen timetable to the ASN's commissioners. The ASN then issued draft decisions that were submitted to public consultation between July and November 2019, setting the deadline for filing regulatory applications for authorisation of dismantling work, and the dismantling schedule to be included in the applications. In those draft decisions, the ASN has acknowledged that the required operations are complex, and that EDF's proposed risk control strategy (industrial demonstrator, significant experience with a first reactor) is justified. However, it is asking for work on the five reactors after the first-of-a-kind reactor to be brought forward slightly and begin no later than 2055. The results of this consultation, which is now closed, should not fundamentally call into question the draft decisions.

In view of the ASN's draft decisions, the nuclear provisions were increased in 2019 by a total €108 million (via profit and loss): €77 million for decommissioning provisions for permanently shut-down nuclear power plants and €31 million for provisions for long-term radioactive waste management (long-lived low-level waste, very low-level and low and medium-level waste). The final decisions are expected to be issued in 2020.

32.1.4 Provisions for last cores

These provisions cover the future expenses resulting from scrapping fuel that will only be partially irradiated when the reactor is shut down. It is measured based on:

- the cost of the loss on fuel in the reactor that is not totally spent at the time of final reactor shutdown and cannot be reused due to technical and regulatory constraints;
- the cost of fuel processing, and waste removal and storage operations. These costs are valued in a similar way to provisions for spent fuel management and long-term radioactive waste management.

These unavoidable costs are components of the cost of nuclear reactor shutdown and decommissioning. As such, they are fully covered by provision from the commissioning date and an asset associated with the provision is recognised.

32.1.5 Discounting of provisions related to nuclear generation and sensitivity analyses

32.1.5.1 Discount rate and inflation rate

Calculation of the discount rate and inflation rate

The discount rate is determined based on long-series data for a sample of bonds with maturities as close as possible to that of the liability. However, some expenses covered by these provisions will be disbursed over periods significantly longer than the duration of instruments generally traded on the financial markets.

The benchmark used to determine the discount rate is the sliding 10-year average of the return on French OAT 2055 treasury bonds which have a similar duration to the obligations, plus the spread of corporate bonds rated A to AA, which include EDF.

The methodology used to determine the discount rate, particularly the reference to sliding 10-year averages, is able to prioritise long-term trends in rates, in keeping with the long-term horizon for disbursements. The discount rate is therefore revised in response to structural developments in the economy leading to medium and long-term changes.

Until 31 December 2018, the assumed inflation rate used was determined in line with the consensus forecast and expected inflation based on the returns on inflation-linked bonds. From 2019, as declining forecasts made short-term consensus forecast projections less appropriate, the inflation rate used was deduced from inflation swaps.

Considering the long durations of nuclear obligations for which the long-term inflation rate is needed, and the volatility according to the date of the swaps, the assumed average inflation rate at 31 December 2019 is this 1.4% (1.5% at 31 December 2018).

The discount rate determined is thus 3.7% at 31 December 2019, assuming inflation of 1.4% (3.9% and 1.5% respectively at 31 December 2018), giving a real discount rate of 2.3% at 31 December 2019 (2.4% at 31 December 2018).

Regulatory discount rate limit

The discount rate applied must also comply with two regulatory limits. Under the amended decree of 23 February 2007 and the ministerial order of 21 March 2007, itself modified by the order of 29 December 2017, the discount rate must be lower than:

- a regulatory maximum, set until 31 December 2026 as the weighted average of two terms, the first set at 4.3%, and the second corresponding to the arithmetic average over the 48 most recent months of the TEC 30-year rate plus 100 points. The weighting given to the first constant term of 4.3% reduces on a straight-line basis from 100% at 31 December 2016 to 0% at 31 December 2026;
- and the expected rate of return on assets covering the liability (dedicated assets).

The ceiling rate based on the TEC 30-year rate is 3.8% (3.75% rounded up to 3.8%) at 31 December 2019 (4.0% at 31 December 2018).

The discount rate used at 31 December 2019 is 3.7%.

By a letter dated 12 February 2020, the Minister for the Ecological and Inclusive Transition and the Minister of the Economy and Finance informed EDF of their decisions to change certain regulations regarding secure financing of nuclear expenses:

- The regulatory discount rate limit will be expressed in real value, and will correspond to the Ultimate Forward Rate applicable at the date concerned, published by the European Insurance and Occupational Pensions Authority, plus 150 base points. This change will be introduced gradually on a straight-line basis over 5 years from 1 January 2020, starting from a real rate of 2.3%.
- The obligation to hold assets providing a coverage rate between 100% and 110%, to offset the impact on provisions of changes in assumptions, will be cancelled and the threshold above which withdrawals can be made from those assets will be raised from 110% to 120%. The remaining obligation in respect of 2018 (€797 million) will nonetheless remain applicable. No allocation is required in respect of 2019.

- The limitation period for necessary measures by the administrative authorities in the event of a shortfall in coverage will be increased from 3 to 5 years from the end of the accounting year in which that shortfall was recorded.

32.1.5.2 Analyses of sensitivity to macro-economic assumptions

Sensitivity to assumptions concerning costs, inflation rate, long-term discount rate, and disbursement schedules can be estimated through comparison of the gross amount estimated under year-end economic conditions with the present value of the amount.

	31/12/2019		31/12/2018	
(in millions of euros)	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
Spent fuel management	19,455	10,823	18,737	10,698
Waste removal and conditioning	1,243	805	1,194	751
Long-term radioactive waste management	32,372	10,531	30,970	9,846
BACK-END NUCLEAR CYCLE EXPENSES	**53,070**	**22,159**	**50,901**	**21,295**
Decommissioning provisions for nuclear plants in operation	21,134	13,244	20,755	12,480
Decommissioning provisions for shut-down nuclear plants	6,428	3,693	6,576	3,505
Provisions for last cores	4,331	2,624	4,346	2,526
DECOMMISSIONING AND LAST CORE EXPENSES	**31,893**	**19,561**	**31,677**	**18,511**

This approach can be complemented by estimating the impact of a change in the discount rate on the present value.

In application of Article 11 of the Decree of 23 February 2007, the following table reports these details for the main components of provisions for the back-end of the nuclear cycle, decommissioning of nuclear plants and last cores:

At 31 December 2019:

	Amounts in provisions at present value	Sensitivity to discount rate			
		Balance sheet provisions		Pre-tax net income	
(in millions of euros)		+ 0.20%	- 0.20%	+ 0.20%	- 0.20%
Back-end nuclear cycle expenses:					
- spent fuel management	10,823	(228)	249	196	(215)
- waste removal and conditioning	805	(25)	27	16	(17)
- long-term radioactive waste management	10,531	(659)	750	554	(636)
Decommissioning and last core expenses:					
- decommissioning of nuclear plants in operation	13,244	(506)	529	7	(7)
- decommissioning provisions for shut-down nuclear plants	3,693	(139)	150	139	(150)
- last cores	2,624	(88)	94	-	-
TOTAL	**41,720**	**(1,645)**	**1,799**	**912**	**(1,025)**

At 31 December 2018:

(in millions of euros)	Amounts in provisions at present value	Sensitivity to discount rate			
		Balance sheet provisions		Pre-tax net income	
		+ 0.20%	- 0.20%	+ 0.20%	- 0.20%
Back-end nuclear cycle expenses:					
- spent fuel management	10,698	(218)	237	185	(202)
- waste removal and conditioning	751	(23)	25	14	(15)
- long-term radioactive waste management	9,846	(597)	780	498	(673)
Decommissioning and last core expenses:					
- decommissioning of nuclear plants in operation	12,480	(496)	520	7	(7)
- decommissioning provisions for shut-down nuclear plants	3,505	(138)	149	138	(149)
- last cores	2,526	(88)	94	-	-
TOTAL	**39,806**	**(1,560)**	**1,805**	**842**	**(1,046)**

32.2 EDF ENERGY'S NUCLEAR PROVISIONS

The specific financing terms for long-term nuclear obligations related to EDF Energy are reflected as follows in the EDF group's financial statements:

- the obligations are reported in liabilities in the form of provisions amounting to €15,282 million at 31 December 2019;
- in the assets, EDF Energy reports receivables corresponding to the amounts payable under the restructuring agreements by the NLF, for non-contracted obligations or decommissioning obligations, and by the British Government for contracted obligations (or historical liabilities).

These receivables are discounted at the same real rate as the obligations they are intended to finance. They are included in "Financial assets" in the consolidated balance sheet (see note 39.3) at the amount of €13,303 million at 31 December 2019 (€9,220 million at 31 December 2018).

Details of changes in provisions for the back-end of the nuclear cycle and provisions for decommissioning and last cores are as follows:

(in millions of euros)	31/12/2018	Increases	Decreases	Discount effect	Translation adjustments	Other movements [1]	31/12/2019
Provisions for spent fuel management	1,464	13	(202)	61	74	93	1,503
Provisions for waste removal and conditioning	369	3	-	15	23	122	532
Provisions for long-term radioactive waste management	743	3	-	30	46	231	1,053
Provisions for the back-end of the nuclear cycle	**2,576**	**19**	**(202)**	**106**	**143**	**446**	**3,088**
Provisions for nuclear plant decommissioning	6,754	-	(33)	280	444	2,858	10,303
Provisions for last cores	1,578	-	-	70	88	156	1,892
Provisions for decommissioning and last cores	**8,332**	**-**	**(33)**	**350**	**532**	**3,014**	**12,195**
PROVISIONS RELATED TO NUCLEAR GENERATION	**10,908**	**19**	**(235)**	**456**	**675**	**3,460**	**15,283**

(1) Other movements include the change in nuclear liabilities, with an equivalent change in the receivable corresponding to amounts reimbursable by the NLF (Nuclear Liabilities Fund) and the British government. This change results from the €1,347 million decrease in the discount rate and the €1,994 million effect of revision of assumptions used to calculate nuclear obligations (see note 32.2.3).

32.2.1 Regulatory and contractual framework

Amendments signed with the Nuclear Liabilities Fund (NLF – an independent trust set up by the UK Government as part of the restructuring of British Energy) following the EDF group's acquisition of British Energy had a limited impact on the contractual financing commitments made to British Energy by the UK Secretary of State and the NLF under the "Restructuring Agreements". These agreements were entered into by British Energy on 14 January 2005 as part of the restructuring led by the UK Government from 2005 in order to stabilise British Energy's financial position. British Energy Generation Limited changed its name to EDF Energy Nuclear Generation Limited on 1 July 2011 and replaced British Energy in these agreements and amendments.

Under the terms of the Restructuring Agreements:

- the NLF agreed to fund, to the extent of its assets: (i) qualifying contingent and/or latent nuclear liabilities (including liabilities for management of spent fuel from the Sizewell B power station); and (ii) qualifying decommissioning costs for EDF Energy's existing nuclear power stations;
- the Secretary of State agreed to fund: (i) qualifying contingent and/or latent nuclear liabilities (including liabilities for the management of spent fuel from the Sizewell B power station) and qualifying decommissioning costs related to EDF Energy's existing nuclear power stations, to the extent that they exceed the assets of the NLF; and (ii) subject to a cap of £2,185 million (in December 2002 monetary values, adjusted accordingly), qualifying known existing liabilities for EDF Energy's spent fuel (including liabilities for management of spent fuel from plants other than Sizewell B loaded in reactors prior to 15 January 2005);
- EDF Energy is responsible for funding certain excluded or disqualified liabilities (e.g. those defined as EDF Energy liabilities), and additional liabilities which could be created as a result of failure by EDF Energy to meet minimum performance standards under applicable law. The obligations of EDF Energy to the NLF and the Secretary of State are guaranteed by the assets of the principal members of EDF Energy.

EDF Energy also made commitments to pay:

- annual decommissioning contributions for a period limited to the useful life of the plants as at the date of the "restructuring agreements"; the corresponding provision amounts to €117 million at 31 December 2019;
- £150,000 (indexed to inflation) per tonne of uranium loaded in the Sizewell B reactor after the date of the "restructuring agreements".

Furthermore, EDF Energy entered into a separate contract with the Nuclear Decommissioning Authority (NDA) for management of AGR spent fuel and associated radioactive waste resulting from operation of power plants other than Sizewell B after 15 January 2005, and bears no responsibility for this fuel and waste once it is transferred to the processing site at Sellafield. The corresponding costs of £150,000 (indexed to inflation) per tonne of loaded uranium – plus a rebate or surcharge dependent on market electricity price and electricity generated in the year – are included in inventories (see note 1.3.16.1).

EDF Energy and the British authorities began discussions in 2019 to clarify the terms for implementing certain agreements concluded in January 2005 when British Energy was restructured, particularly the Nuclear Liabilities Funding Agreement (NLFA), in view of future nuclear plant closures. The purpose of these discussions is to have a more detailed definition of the dismantling costs to be recovered by EDF Energy from the Nuclear Liabilities Fund (and potentially from the UK Treasury which guarantees the NLF), and of the conditions in which the British authorities can exercise their option to purchase the nuclear power plants after the defueling phase (a right governed by the Option Agreement). A set of principles was agreed in 2019 as a result of these discussions, which are continuing with a view to achieving comprehensive binding agreements.

EDF Energy is drafting a modification for the Baseline Decommissioning Plan (BDP), which was approved in 2017 and is currently in force, in order to reflect the proposed change in the division of liability between EDF Energy during the defueling phase and the NDA (Nuclear Decommissioning Authority), a public body, during the decommissioning phase. In the first stage, concerning updating the estimated cost of removing the fuel, EDF Energy filed its Decommissioning Plan in January 2020 and the NDA's response is expected in April 2020. The second stage, concerning updating the estimated cost of decommissioning, is expected to take place in 2021.

32.2.2 Provisions for the back-end of the nuclear cycle

Spent fuel from the Sizewell B PWR (pressurised water reactor) plant is stored on site. Spent fuel from other plants is transferred to Sellafield for storage and reprocessing.

EDF Energy's provisions for the back-end of the nuclear cycle concern obligations for reprocessing and storage of spent fuel and long-term storage of radioactive waste, required by the existing regulations in the UK approved by the Nuclear Decommissioning Authority (NDA). Their amount is based on contractual agreements or if this is not possible, on the most recent technical estimates.

	31/12/2019		31/12/2018	
(in millions of euros)	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
Spent fuel management	2,655	1,503	2,665	1,464
Waste removal and conditioning	1,979	532	1,856	369
Long-term radioactive waste management	3,886	1,053	3,645	743
BACK-END NUCLEAR CYCLE EXPENSES	**8,520**	**3,088**	**8,166**	**2,576**

32.2.3 Provisions for nuclear plant decommissioning

Provisions for decommissioning of nuclear plants result from the Group management's best estimates. They cover the full cost of decommissioning and are measured on the basis of existing techniques and methods that are most likely to be used for application of current regulations.

As explained above, in late January 2020 EDF Energy undertook the first phase of the Decommissioning Plan Submission (DPS 2020). The plan submitted contains an update for the strategy, plan and estimates for the defueling phase of Advanced Gas-Cooled Reactor (AGR) power plants. This led to a €1.9 billion increase in the provision (to €3.9 billion, against the previous estimate of €2 billion), notably reflecting i) the extension of the defueling period following risk and contingency modelling, ii) better definition of the costs covered, and iii) an updated estimate of the costs of preparing and removing fuel, following a review of the industrial scenario.

The NDA is due to examine the proposals in the DPS 2020 by April 2020. All the costs stated in these proposals are considered admissible by the NDA, and the NLF receivable has therefore been updated.

The second phase of the DPS 2020 should take place in 2021. It will involve updates of all the other decommissioning activities for the AGR plants, decommissioning of Sizewell, and an update to the non-contractual commitment plan.

	31/12/2019		31/12/2018	
(in millions of euros)	Costs based on year-end economic conditions	Amounts in provisions at present value	Costs based on year-end economic conditions	Amounts in provisions at present value
PLANT DECOMMISSIONING EXPENSES	**19,278**	**10,187**	**15,741**	**6,637**

The table above concerns decommissioning obligations excluding the present value of decommissioning contributions payable to the NLF, which is €117 million at 31 December 2019 (see note 32.2.1).

32.2.4 Discounting of provisions related to nuclear generation

The discount rate has been calculated using an average series of data for a sample of UK Government gilts over the longest available durations plus the spread of UK Corporate bonds rated A to AA, again over the longest-term duration. The implicit inflation rate used in determining a discount rate is based on a long-term forecast of adjusted retail prices (the UK's CPIH index).

At 31 December 2019, EDF Energy applied a real discount rate of 2% to nuclear liabilities in the United Kingdom (2.5% at 31 December 2018).

NOTE 33 OTHER PROVISIONS FOR DECOMMISSIONING

The breakdown by company is as follows:

(in millions of euros)	EDF	EDF Energy	Edison [1]	Framatome [2]	Other entities [3]	Total
OTHER PROVISIONS FOR DECOMMISSIONING AT 31/12/2019 [2]	667	143	161	388	319	1,678
Other provisions for decommissioning at 31/12/2018	658	132	716	350	268	2,124

(1) The decrease in Edison's other provisions for decommissioning is essentially explained by the reclassification of the E&P operations as assets held for sale and related liabilities (see notes 2.3 and 46).
(2) Including €83 million of provisions concerning basic nuclear facilities in France.
(3) Including €48 million of provisions concerning basic nuclear facilities of Cyclife France (formerly SOCODEI).

Other provisions for decommissioning principally concern fossil-fired power plants, installations for the production of nuclear fuel assemblies, and dismantling of wind farms.

The costs of decommissioning fossil-fired power plants are calculated using regularly updated studies based on estimated future costs, measured by reference to the charges recorded on past operations and the most recent estimates for plants still in operation.

The provision recorded at 31 December 2019 reflects the most recent known cost estimates and includes rehabilitation costs for generation sites.

NOTE 34 PROVISIONS FOR EMPLOYEE BENEFITS

34.1 EDF GROUP

(in millions of euros)	31/12/2019	31/12/2018
Provisions for employee benefits – current portion	945	998
Provisions for employee benefits – non-current portion	20,539	17,627
PROVISIONS FOR EMPLOYEE BENEFITS	21,484	18,625

34.1.1 Breakdown of the change in the net liability

(in millions of euros)	Obligations	Fund assets	Net Liability
Balance at 31/12/2018 [1]	38,479	(20,791)	17,688
Net expense for 2019	1,954	(523)	1,431
Actuarial gains and losses	5,130	(2,668)	2,462
Employer's contributions to funds	-	(283)	(283)
Employees' contributions to funds	12	(12)	-
Benefits paid [2]	(2,128)	1,117	(1,011)
Translation adjustment	455	(501)	(46)
Changes in scope of consolidation	-	-	-
Other movements	(3)	-	(3)
BALANCE AT 31/12/2019	43,899	(23,661)	20,238
Including:			
Provisions for employee benefits			21,484
Non-current financial assets			(1,246)

(1) The net liability at 31 December 2018 comprised €18,625 million for the provisions for employee benefits and €(937) million of non-current financial assets, giving a net liability amount of €17,688 million.
(2) Including €272 million for a plan settlement in the United States.

Actuarial gains and losses on obligations amount to €5,130 million for 2019, including:

- €4,151 million in France as a result of:
  - the €5,515 million change in the discount rate;
  - the €(926) million change in the inflation rate;
  - €(285) million due to the proposed law on social security system funding for 2020;
  - €(183) million due to an update of the wage law;
- €873 million in the United Kingdom, essentially associated with changes in the discount and inflation rates (see note 34.3.6).

Actuarial gains and losses on fund assets amount to €(2,668) million for 2019. They mainly result from a €(998) million change in the United Kingdom and a €(1,647) million change in France due to a very good performance on the equity markets.

Actuarial gains and losses on obligations amounted to €(3,898) million for 2018, including:

- €(3,323) million in France as a result of the €(2,174) million change in the discount rate, €(462) million due to an update of the official mortality table, and €(491) million due to an update of the wage law;
- €(518) million in the United Kingdom, essentially associated with changes in the discount and inflation rates.

34.1.2 Post-employment and other long-term employee benefit expenses

(in millions of euros)	**2019**	2018
Current service cost	(821)	(1,018)
Past service cost	3	(19)
Actuarial gains and losses – long-term benefits	(205)	20
Net expenses recorded as operating expenses	**(1,023)**	**(1,017)**
Interest expense (discount effect)	(931)	(875)
Return on fund assets	523	475
Net interest expense included in financial result	**(408)**	**(400)**
EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT	(1,431)	(1,417)
Actuarial gains and losses – post-employment benefits	(5,130)	3,898
Actuarial gains and losses on fund assets	2,668	(746)
Actuarial gains and losses	**(2,462)**	**3,152**
Translation adjustments	**46**	**(8)**
GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY	(2,416)	3,144

34.1.3 Net employee benefit liability by geographical area

(in millions of euros)	France [1]	United Kingdom	Other	Total
Obligations at 31/12/2018	**29,201**	**8,248**	**1,030**	**38,479**
Net expense for 2019	1,436	473	45	1,954
Actuarial gains and losses	4,151	873	106	5,130
Employees' contributions to funds	-	11	1	12
Benefits paid	(1,478)	(369)	(281)	(2,128)
Translation adjustment	-	454	1	455
Changes in scope of consolidation	-	-	-	-
Other movements	-	-	(3)	(3)
OBLIGATIONS AT 31/12/2019	33,310	9,690	899	43,899
Fair value of fund assets	(12,581)	(10,712)	(368)	(23,661)
NET EMPLOYEE BENEFIT LIABILITY AT 31/12/2019	20,729	(1,022)	531	20,238
Including:				
Provisions for employee benefits	20,729	224	531	21,484
Non-current financial assets [2]		(1,246)		(1,246)

(1) France comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 34.2).
(2) At 31 December 2019, EDF Energy recognised surplus funding on its EEGSG and BEGG pension schemes (see note 34.3.1).

(in millions of euros)	France [1]	United Kingdom	Other	Total
Obligations at 31/12/2018	**29,201**	**8,248**	**1,030**	**38,479**
Fair value of fund assets	(11,165)	(9,039)	(587)	(20,791)
PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2018	18,036	(791)	443	17,688
Including:				
Provisions for employee benefits	18,036	146	443	18,625
Non-current financial assets		(937)		(937)

(1) France comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 34.2).

34.2 FRANCE (REGULATED ACTIVITIES, AND GENERATION AND SUPPLY)

Given the strong similarities between their pension schemes, the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 6.1) are combined here into a single subtotal, "France", which primarily includes EDF and Enedis. Almost all of these companies' employees have IEG status, including the special IEG pension and other IEG benefits.

These benefits are described in note 1.3.21.

34.2.1 Details of changes in the provisions

(in millions of euros)	Obligations	Fund assets	Provisions in the balance sheet
Balances at 31/12/2018	**29,201**	**(11,165)**	**18,036**
Net expense for 2019	1,436	(252)	1,184
Actuarial gains and losses	4,151	(1,647)	2,504
Contributions to funds	-	-	-
Benefits paid	(1,478)	483	(995)
BALANCES AT 31/12/2019	33,310	(12,581)	20,729

34.2.2 Post-employment and other long-term employee benefit expenses

(in millions of euros)	2019	2018
Current service cost	(563)	(732)
Past service cost	-	-
Actuarial gains and losses – other long-term benefits	(205)	17
Net expenses recorded as operating expenses	**(768)**	**(715)**
Interest expense (discount effect)	(668)	(627)
Return on fund assets	252	221
Net interest expense included in financial result	**(416)**	**(406)**
EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT	**(1,184)**	**(1,121)**
Actuarial gains and losses – post-employment benefits	(4,151)	3,323
Actuarial gains and losses on fund assets	1,647	(259)
Actuarial gains and losses	**(2,504)**	**3,064**
GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY	**(2,504)**	**3,064**

Actuarial gains and losses on post-employment benefits break down as follows:

(in millions of euros)	2019	2018
Experience adjustments	(95)	(90)
Changes in demographic assumptions	(1)	462
Changes in financial assumptions [(1)]	(4,260)	2,968
ACTUARIAL GAINS AND LOSSES ON OBLIGATIONS	**(4,356)**	**3,340**
Including:		
-Actuarial gains and losses on post-employment benefits	(4,151)	3,323
-Actuarial gains and losses on other long-term benefits	(205)	17

(1) Financial assumptions mainly concern the discount rate, inflation rate and wage increase rate.

The actuarial gains and losses on obligations generated over 2019 amount to €(4,356) million, and are mainly associated with changes in the discount rate, the inflation rate, the proposed law on social security system funding for 2020 and the updating of the wage law (see note 34.2.7).

The actuarial gains and losses on obligations generated over 2018 amount to €3,340 million and are mainly associated with changes in the discount rate, the wage increase rate and the updating of the mortality table.

34.2.3 Provisions for employee benefits by nature

At 31 December 2019:

(in millions of euros)	Obligations	Fund assets	Provisions in the balance sheet
Provisions for post-employment benefits at 31/12/2019	**31,776**	**(12,581)**	**19,195**
Comprising:			
Pensions	24,463	(11,778)	12,685
Benefits in kind (electricity/gas)	4,876	-	4,876
Retirement gratuities	898	(787)	111
Other	1,539	(16)	1,523
Provisions for other long-term employee benefits at 31/12/2019	**1,534**	**-**	**1,534**
Comprising:			
Annuities following work-related accident and illness, and invalidity	1,290	-	1,290
Long service awards	214	-	214
Other	30	-	30
PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2019	33,310	(12,581)	20,729

At 31 December 2018:

(in millions of euros)	Obligations	Fund assets	Provisions in the balance sheet
Provisions for post-employment benefits at 31/12/2018	**27,798**	**(11,165)**	**16,633**
Comprising:			
Pensions	21,514	(10,416)	11,098
Benefits in kind (electricity/gas)	4,233	-	4,233
Retirement gratuities	822	(734)	88
Other	1,229	(15)	1,214
Provisions for other long-term employee benefits at 31/12/2018	**1,403**	**-**	**1,403**
Comprising:			
Annuities following work-related accident and illness, and invalidity	1,177	-	1,177
Long service awards	197	-	197
Other	29	-	29
PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2018	29,201	(11,165)	18,036

34.2.4 Breakdown of obligations by type of beneficiary

(in millions of euros)	31/12/2019	31/12/2018
Current employees	18,994	16,009
Retirees	14,316	13,192
OBLIGATIONS	33,310	29,201

34.2.5 Fund assets

For France, fund assets, managed under an asset/liability model, amount to €12,581 million at 31 December 2019 (€11,165 million at 31 December 2018) and concern the coverage of retirement gratuities and the specific benefits of the special pension system.

They consist of insurance contracts with the following risk profile:

- 69% in a hedging pocket consisting of bonds, designed to replicate variations in the obligation caused by changes in interest rates;
- 31% in a growth asset pocket consisting of international equities.

Fund assets break down as follows:

(in millions of euros)	31/12/2019	31/12/2018
FUND ASSETS	12,581	11,165
Assets funding special pension benefits	*11,778*	*10,416*
Comprising (%)		
Listed equity instruments (shares)	31%	27%
Listed debt instruments (bonds)	69%	73%
Assets funding retirement gratuities	*787*	*734*
Comprising (%)		
Listed equity instruments (shares)	34%	27%
Listed debt instruments (bonds)	66%	73%
Other fund assets	*16*	*15*

At 31 December 2019, the equities held as part of fund assets are distributed as follows:

- approximately 57% of the total are shares in North American companies;
- approximately 19% of the total are shares in European companies;
- approximately 24% of the total are shares in companies in the Asia-Pacific zone and emerging countries.

This distribution is relatively stable compared to the distribution at 31 December 2018.

At 31 December 2019, the bonds held as part of fund assets are distributed as follows:

- approximately 84% of the total are AAA and AA-rated bonds;
- approximately 16% of the total are bonds with A, BBB and other ratings.

Around 80% of bonds are sovereign bonds issued by Euro zone countries, and the balance mainly consists of bonds issued by financial and non-financial firms.

The performance of pension fund assets in France is +17.4% in 2019.

34.2.6 Future Cash Flows

Cash flows related to future employee benefits are as follows:

(in millions of euros)	Cash flow under year-end economic conditions	Amount covered by provisions (present value)
Less than one year	1,427	1,418
One to five years	4,837	4,645
Five to ten years	5,033	4,514
More than ten years	36,539	22,733
CASH FLOWS RELATED TO EMPLOYEE BENEFITS	47,836	33,310

At 31 December 2019, the average duration of employee benefit commitments in France is 19.6 years.

34.2.7 Actuarial assumptions

(in %)	**31/12/2019**	31/12/2018
Discount rate/rate of return on assets [(1)]	1.30%	2.30%
Inflation rate	1.30%	1.50%
Wage increase rate [(2)]	2.40%	2.60%

(1) The interest income generated by assets is calculated using the discount rate. The difference between this interest income and the return on assets is recorded in equity.
(2) Average wage increase rate, including inflation and projected over a full career.

In France, the discount rate used for employee benefit obligations is determined by applying the yield rate on high-quality corporate bonds of appropriate duration to maturities corresponding to the future disbursements resulting from these obligations. For longer durations, the calculation also takes into consideration data from a wider selection of corporate bonds adjusted for comparability with the high-quality bonds, given the smaller panel of bonds with these durations since 2017. The substantial decrease in the discount rate (100 bp) essentially relates to the decrease in risk-free rates observed over 2019.

Changes at 31 December 2019 in the economic and market parameters used have led the Group to set the discount rate at 1.30% at 31 December 2019 (2.30% at 31 December 2018).

Until 31 December 2018, the assumed inflation rate used was determined in line with the consensus forecast and expected inflation based on the returns on inflation-linked bonds. From 2019, as declining forecasts made short-term consensus forecast projections less appropriate, the inflation rate used was deduced from inflation swaps

As a result, the assumed average inflation rate used as the Group's benchmark for Euro zone countries is 1.3% at 31 December 2019 (1.5% at 31 December 2018).

The wage law used to calculate obligations was updated in 2019 by applying wage increase rates observed over the period 2015-2018 (adjusted for non-recurring effects), instead of the changes observed over the period 2010-2012 adjusted by a coefficient to reflect the lower expected long-term wage increases. This update had no significant impact on the valuation of the obligations.

The mortality table used to calculate obligations is adjusted for specificities of the IEG (gas and electricity sector) system; in 2018 it was updated by using the INSEE 2013-2070 generation table (produced by the French statistics office), instead of the INSEE 2007-2060 generation table.

34.2.8 Sensitivity analysis

Sensitivity analyses on the amount of the obligation are as follows:

(in %)	**31/12/2019**
Impact of a 25bp increase or decrease in the discount rate	-4.8% / +5.2%
Impact of a 25bp increase or decrease in the inflation rate	+4.6% / -4.9%
Impact of a 25bp increase or decrease in the wage increase rate	+4.6% / -4.3%

34.3 UNITED KINGDOM

The United Kingdom segment chiefly comprises EDF Energy, whose principal employee benefits are described in note 1.3.21.

34.3.1 Details of the change in the net liability

(in millions of euros)	Obligations	Fund assets	Net liability
Balances at 31/12/2018	**8,248**	**(9,039)**	**(791)**
Net expense for 2019	473	(263)	210
Actuarial gains and losses	873	(998)	(125)
Employer's contributions to funds	-	(269)	(269)
Employees' contributions to funds	11	(11)	-
Benefits paid	(369)	369	-
Translation adjustment	454	(501)	(47)
BALANCES AT 31/12/2019	**9,690**	**(10,712)**	**(1,022)**
Including:			
Provisions for employee benefits			224
Non-current financial assets			(1,246)

At 31 December 2019, EDF Energy's EEGSG and BEGG pension schemes (see note 1.3.21.2.2) were overfunded to the extent of €1,246 million compared to €937 million at 31 December 2018.

The surplus funding, which has increased due to the good performance by fund assets, is recognised in balance sheet assets as "non-current financial assets".

EDF Energy also recorded a €224 million provision in respect of its EEPS pension scheme at 31 December 2019, compared to €146 million at 31 December 2018.

34.3.2 Post-employment benefit and other long-term employee benefit expenses

(in millions of euros)	**2019**	2018
Current service cost	(230)	(258)
Past service cost	-	(15)
Actuarial gains and losses – other long-term benefits	-	-
Net expenses recorded as operating expenses	**(230)**	**(273)**
Interest expense (discount effect)	(243)	(232)
Return on fund assets	263	248
Net interest expense included in financial result	**20**	**16**
EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT	**(210)**	**(257)**
Actuarial gains and losses – post-employment benefits	(873)	518
Actuarial gains and losses on fund assets	998	(463)
Actuarial gains and losses	**125**	**55**
Translation adjustments	**47**	**(6)**
GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY	**172**	**49**

34.3.3 Breakdown of obligations by type of beneficiary

(in millions of euros)	31/12/2019	31/12/2018
Current employees	5,202	4,948
Retirees	4,488	3,300
OBLIGATIONS	9,690	8,248

34.3.4 Fund assets

Pension obligations in the United Kingdom are partly covered by external funds with a present value of €10,712 million at 31 December 2019 (€9,039 million at 31 December 2018).

The investment strategy applied in these funds is a liability driven investment strategy. The allocation between growth and back-to-back is regularly reviewed by the trustees, at least after every actuarial valuation, to ensure that the funds' overall investment strategy remains coherent in order to achieve the target coverage level required.

These assets break down as follows:

(in millions of euros)	31/12/2019	31/12/2018
BEGG pension fund	8,144	6,963
EEGSG pension fund	1,493	1,267
EEPS pension fund	1,075	809
FUND ASSETS	10,712	9,039
Comprising (%)		
Listed equity instruments (shares)	11%	9%
Listed debt instruments (bonds)	57%	61%
Real estate properties	7%	8%
Cash and cash equivalents	2%	3%
Other	23%	19%

At 31 December 2019, the equities held as part of fund assets are distributed as follows:

- approximately 64% of the total are shares in North American companies;
- approximately 21% of the total are shares in European companies;
- approximately 15% of the total are shares in companies in the Asia-Pacific zone and emerging countries.

At 31 December 2019, the bonds held as part of fund assets are distributed as follows:

- approximately 68% of the total are AAA and AA-rated bonds;
- approximately 32% of the total are bonds with A, BBB and other ratings.

Around 67% of all these bonds are sovereign bonds, mainly issued by the United Kingdom. The balance mainly consists of bonds issued by financial and non-financial firms.

The portion of sovereign bonds issued by the United Kingdom was 7 percentage points higher than at 31 December 2018.

34.3.5 Future cash flows

Cash flows related to future employee benefits are as follows:

(in millions of euros)	Cash flow under year-end economic conditions	Amount covered by provisions (present value)
Less than one year	269	264
One to five years	1,093	1,050
Five to ten years	1,515	1,353
More than ten years	12,953	7,023
CASH FLOWS RELATED TO EMPLOYEE BENEFITS	15,830	9,690

The contribution to funds for 2020 is estimated at approximately €289 million (€277 million contributed by the employer and €12 million by the employees).

The average weighted duration of funds in the United Kingdom is 19.5 years at 31 December 2019.

34.3.6 Actuarial assumptions

(in %)	31/12/2019	31/12/2018
Discount rate/rate of return on assets [1]	2.11%	2.86%
Inflation rate	2.89%	2.99%
Wage increase rate	2.28%	2.39%

(1) The interest income generated by assets is calculated using the discount rate. The difference between this interest income and the return on assets is recorded in equity.

In the United Kingdom, the discount rate used for employee benefit obligations is determined by applying the yield rate on high-quality non-financial corporate bonds based on their duration to maturities corresponding to the future disbursements resulting from these obligations.

34.3.7 Sensitivity analyses

Sensitivity analyses on the amount of the obligations are as follows:

(in %)	31/12/2019
Impact of a 25bp increase or decrease in the discount rate	-4.6% / +4.9%
Impact of a 25bp increase or decrease in the inflation rate	+3.6% / -3.4%
Impact of a 25bp increase or decrease in the wage increase rate	+0.4% / -0.4%

NOTE 35 OTHER PROVISIONS

Details of changes in other provisions are as follows:

(in millions of euros)	31/12/2018	Increases	Decreases		Changes in scope	Other Changes	31/12/2019
			Utilisations	Reversals			
Provisions for contingencies related to subsidiaries and investments [1]	934	9	(201)	-	-	24	**766**
Provisions for tax liabilities [2]	448	59	(91)	(3)	(2)	(256)	**155**
Provisions for litigation	562	64	(69)	(86)	-	8	**479**
Provisions for onerous contracts and losses on completion [3]	1,208	448	(324)	(14)	-	38	**1,356**
Provisions related to environmental schemes	1,137	1,847	(1,529)	(13)	-	75	**1,517**
Other provisions for risks and liabilities [4]	1,723	694	(732)	(115)	(20)	(48)	**1,502**
TOTAL	**6,012**	**3,121**	**(2,946)**	**(231)**	**(22)**	**(159)**	**5,775**

(1) Including the reversal of the provision concerning Alpiq.
(2) Reclassification of the provision for fiscal liabilities as deferred taxes (see note 17.3) in the amount of €235 million, in accordance with IFRIC 23.
(3) Provisions for onerous contracts are mainly attributable to the long-term contract with Dunkerque LNG and long-term power purchase and sale agreements.
(4) These provisions cover various contingencies and expenses related to operations (employers' matching contributions to employee profit sharing, restructuring operations, contractual maintenance obligations, etc.). No individual provision is significant.

Provisions related to environmental schemes

Provisions related to environmental schemes include provisions for greenhouse gas emission rights, renewable energy certificates and energy savings certificates (see note 1.3.26).

The provisions related to environmental schemes principally correspond to provisions for renewable energy certificates in the United Kingdom.

The increase in these provisions over the year principally results from over-quota emissions by the Group; amounting to €414 million at 31 December 2019 (€175 million at 31 December 2018).

Gas emission quotas

One of the main features of the third phase of the European Union greenhouse gas emission quota system, running from 2013 to 2020, is the discontinuation of free allocation of emission rights to electricity producers in certain countries, including France and United Kingdom.

In the EDF group, the entities concerned by this system are EDF, EDF Energy, Edison, Dalkia, and Luminus.

In 2019, the Group surrendered 26 million tonnes in respect of emissions generated in 2018. In 2018, the Group surrendered 30 million tonnes in respect of emissions generated in 2017.

The Group's total emission rights allocation for 2019 recorded in the national registers is 1 million tonnes (1 million tonnes for 2018).

The volume of emissions at 31 December 2019 stood at 21 million tonnes (24 million tonnes for 2018).

Renewable energy certificates

Through the renewable energy certificates scheme, the EDF group has an obligation to surrender renewable energy certificates, particularly in the United Kingdom and Belgium.

At 31 December 2019, a provision of €1,103 million was booked in connection with the obligation to surrender renewable energy certificates at that date, essentially concerning EDF Energy (United Kingdom) and Luminus (Belgium). A large portion of these obligations is covered by purchases of certificates included in intangible assets.

NOTE 36 SPECIAL FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION LIABILITIES

The changes in special concession liabilities for existing assets and assets to be replaced are as follows:

(in millions of euros)	31/12/2019	31/12/2018
Value in kind of assets [1]	51,085	49,327
Unamortised financing by the operator	(27,387)	(25,669)
Rights in existing assets –net value	**23,698**	**23,658**
Amortisation of financing by the concession-granting authority	14,389	13,792
Provisions for replacement	9,378	9,474
Rights in assets to be replaced	**23,767**	**23,266**
SPECIAL FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION LIABILITIES	**47,465**	**46,924**

(1) Including contributions received to finance concession assets, amounting to €131 million (€131 million in 2018).

NOTE 37 TRADE PAYABLES

(in millions of euros)	31/12/2019	31/12/2018
Trade payables – excluding EDF Trading	11,243	11,177
Trade payables – EDF Trading	1,624	2,244
TRADE PAYABLES	**12,867**	**13,421**

The Group has a reverse factoring programme allowing suppliers to transfer their receivables on EDF to a factoring company, at their own initiative.

For the Group, this programme does not cause any change in the substance and features of the receivables held by suppliers on EDF. In particular it does not affect the sequences of operating cash flows. The associated liabilities are therefore included in "trade payables" in the Group's financial statements.

NOTE 38 OTHER LIABILITIES

Details of other liabilities are as follows:

(in millions of euros)	31/12/2019	Including contract liabilities	31/12/2018	Including contract liabilities
Advances and progress payments received	1,975	1,761	1,920	1,858
Liabilities related to property, plant and equipment	3,824	-	3,757	-
Tax liabilities	4,439	-	4,624	-
Social charges	4,535	-	4,388	-
Deferred income on long-term contracts	3,412	3,412	3,413	3,413
Other deferred income	641	509	609	577
Other	2,712	-	2,198	-
OTHER LIABILITIES	21,538	5,682	20,908	5,848
Non-current portion	4,928	3,473	4,896	3,805
Current portion	16,610	2,209	16,012	2,043

38.1 ADVANCES AND PROGRESS PAYMENTS RECEIVED

Advances and progress payments received comprise €651 million of payments made by the customers in Framatome's long-term contracts (€679 million at 31 December 2018).

38.2 TAX LIABILITIES

At 31 December 2019, tax liabilities mainly include an amount of €560 million for the CSPE to be collected by EDF on energy supplied but not yet billed, less the CSPE collected on advances from customers who pay in regular monthly instalments (€659 million at 31 December 2018).

38.3 DEFERRED INCOME ON LONG-TERM CONTRACTS

EDF's deferred income on long-term contracts at 31 December 2019 comprises €1,709 million (€1,663 million at 31 December 2018) of partner advances made to EDF under the nuclear plant financing plans.

Deferred income on long-term contracts also includes an advance of €1.7 billion paid to the EDF group in 2010 under the agreement with the Exeltium consortium. This advance is transferred to the income statement progressively over the term of the contract (24 years).

38.4 OTHER ITEMS

The "Other" line of the table includes investment subsidies received during 2019, amounting to €543 million (€351 million in 2018).

38.5 CONTRACT LIABILITIES

Contract liabilities represent an entity's obligations to provide customers with goods or services for which it has already been paid, or for which payment is due.

Changes in contract liabilities were as follows:

(in millions of euros)	31/12/2018	Amounts recorded during the period	Amounts transferred to sales during the period	Amounts cancelled during the period with no impact on sales	Effect of unwinding the discount	Change in scope of consolidation	Foreign exchange effect	31/12/2019
Advance payments received	**1,858**	1,915	(1,992)	(37)	(1)	-	18	**1,761**
Deferred income on long-term contracts	**3,413**	476	(545)	(2)	64	4	2	**3,412**
Other deferred income	**577**	413	(481)	-	-	-	-	**509**

These liabilities comprise the majority of advances and progress payments received, amounting to €1,761 million (principally concerning the Framatome, United Kingdom and France – Regulated Activities segments), and the majority of deferred income (on long-term and other contracts), amounting to €3,921 million (principally concerning the France – Generation and Supply segment). They thus total €5,682 million at 31 December 2019 (€5,848 million at 31 December 2018).

Contracts expiring in more than one year on which obligations are unfulfilled or partially fulfilled at the reporting date should generate sales revenues of approximately €12,388 million which have not yet been recognised. €1,330 million of these sales revenues will be recognised progressively until 2034 on the Exeltium contract, and the balance will be recognised over the operating period for contracts relating to jointly-operated power plants, and over the term of the contract for other firm sale contracts (excluding energy sales).

NOTE 39 CURRENT AND NON-CURRENT FINANCIAL ASSETS

39.1 BREAKDOWN BETWEEN CURRENT AND NON-CURRENT FINANCIAL ASSETS

Current and non-current financial assets break down as follows:

	31/12/2019			31/12/2018		
(in millions of euros)	Current	Non-current	Total	Current	Non-current	Total
Instruments at fair value through OCI with recycling	17,711	6,208	23,919	17,659	5,279	**22,938**
Instruments at fair value through OCI with no recycling	5	447	452	6	407	**413**
Instruments at fair value through profit and loss	1,593	20,193	21,786	3,175	16,985	**20,160**
Debt and equity securities	***19,309***	***26,848***	***46,157***	***20,840***	***22,671***	***43,511***
Trading derivatives – Positive fair value in profit and loss	6,813	-	6,813	6,404	-	**6,404**
Hedging derivatives – Positive fair value in profit and loss	1,803	3,956	5,759	1,646	2,737	**4,383**
Loans and financial receivables [1]	1,476	15,415	16,891	2,253	11,696	**13,949**
CURRENT AND NON-CURRENT FINANCIAL ASSETS	29,401	46,219	75,620	31,143	37,104	68,247

(1) Including impairment of €(352) million at 31 December 2019 (€(281) million at 31 December 2018).

39.2 DEBT AND EQUITY SECURITIES

Details of debt and equity securities are shown in the table below.

	31/12/2019				31/12/2018
(in millions of euros)	At fair value through OCI with recycling	At fair value through OCI with no recycling	At fair value through profit and loss	Total	Total
Debt and equity securities					
EDF dedicated assets	6,253	-	19,765	**26,018**	21,820
Liquid assets	17,347	-	1,553	**18,900**	20,538
Other securities [1]	320	452	468	**1,240**	1,153
TOTAL	23,919	452	21,786	46,157	43,511

(1) Investments in non-consolidated companies, principally EDF Invest.

Information on EDF's dedicated assets is given in note 48.

Changes in the fair value of debt and equity securities were recorded in equity (EDF share) over the period as follows:

	2019			2018		
(in millions of euros)	Gross changes in fair value recorded in OCI with recycling [1]	Gross changes in fair value recorded in OCI with no recycling [1]	Gross changes in fair value recycled to profit and loss [2]	Gross changes in fair value recorded in OCI with recycling [1]	Gross changes in fair value recorded in OCI with no recycling [1]	Gross changes in fair value recycled to profit and loss [2]
EDF dedicated assets	297	-	136	(72)	-	(12)
Liquid assets	139	-	7	(43)	-	12
Other assets	-	(22)	-	-	(37)	-
DEBT AND EQUITY SECURITIES [3]	**436**	**(22)**	**143**	**(115)**	**(37)**	**-**

(1) + / ( ): increase / (decrease) in equity (EDF share).
(2) + / ( ): increase / (decrease) in income (EDF share).
(3) Excluding associates and joint ventures.

In 2019, gross changes in fair value recorded in OCI with recycling principally concern EDF (€293 million, including €161 million for dedicated assets).

In 2018, gross changes in fair value recorded in OCI with recycling principally concern EDF (€(115) million, including €(60) million for dedicated assets).

No significant impairment was recorded in 2019.

39.2.1 Dedicated assets

Diversified bond investments and equities included in EDF's dedicated assets are recorded as "debt and equity securities". The general management policy for dedicated assets is presented in note 48.

39.2.2 Liquid assets

Liquid assets are financial assets consisting of funds or interest rate instruments with initial maturity of over three months that are readily convertible into cash, and are managed according to a liquidity-oriented policy.

EDF's monetary UCITS, included in liquid assets, amount to €409 million at 31 December 2019 (€2,863 million at 31 December 2018).

39.3 LOANS AND FINANCIAL RECEIVABLES

Loans and financial receivables consist of the following:

(in millions of euros)	31/12/2019	31/12/2018
Loans and financial receivables – amounts receivable from the NLF	13,303	9,220
Loans and financial receivables – CSPE [1]	684	2,060
Loans and financial receivables – other	2,904	2,669
LOANS AND FINANCIAL RECEIVABLES	**16,891**	**13,949**

(1) Including €684 million allocated to dedicated assets at 31 December 2019 (€2,060 million at 31 December 2018).

At 31 December 2019 loans and financial receivables mainly include:

- amounts representing reimbursements receivable from the NLF and the British government for coverage of long-term nuclear obligations, totalling €13,303 million at 31 December 2019 (€9,220 million at 31 December 2018), discounted at the same rate as the provisions they finance. The increase in the NLF receivable in 2019 is a corollary of the increase in provisions following changes to the cost estimates as explained in note 32.2;

- the receivable corresponding to the balance of the shortfall in the Contribution to the Public Electricity Service (CSPE) at 31 December 2017 and the costs of bearing that shortfall. Reimbursements of principal and interest during 2019 amounted to €1,399 million, in line with the schedule published in the ministerial orders of 13 May 2016 and 2 December 2016, made in application of Article R. 121-31 of the French Energy Code. This CSPE receivable is allocated in its entirety to dedicated assets;
- other loans and financial receivables notably include:
  - the overfunding of EDF Energy's EEGSG and BEGG pension schemes by €1,246 million, compared to €937 million at 31 December 2018;
  - an amount of €230 million representing the advance payments made by Luminus to Synatom to cover long-term nuclear obligations (€203 million at 31 December 2018). In Luminus' financial statements these amounts are discounted at the same rate as the provisions they fund. This receivable is equal to the fair value of the amounts held by Synatom on behalf of Luminus as fund assets.

39.4 CHANGE IN FINANCIAL ASSETS OTHER THAN DERIVATIVES

The variation in financial assets is as follows:

39.4.1 At 31 December 2019

(in millions of euros)	31/12/2018	Net increases	Changes in fair value	Discount effect	Changes in scope	Translation adjustments	Other	31/12/2019
Instruments at fair value through OCI with recycling	**22,938**	445	468	-	-	50	18	**23,919**
Instruments at fair value through OCI with no recycling	**413**	39	(48)	-	10	1	37	**452**
Instruments at fair value through profit and loss	**20,160**	(1,079)	2,792	-	(30)	-	(57)	**21,786**
Loans and financial receivables	**13,949**	(1,754)	-	378	194	657	3,467	**16,891**

The net decrease in loans and financial receivables includes the €(1,376) million change in the CSPE receivable.

Other changes in loans and financial receivables principally correspond to the changes in the financial asset that corresponds to the receivable representing amounts reimbursable by the Nuclear Liabilities Fund (NLF) and the British government (€13,303 million at 31 December 2019 compared to €9,220 million at 31 December 2018), and the surplus funding of EDF Energy's EEGSG and BEGG pension schemes (€1,246 million at 31 December 2019, compared to €937 million at 31 December 2018).

39.4.2 At 31 December 2018

(in millions of euros)	31/12/2017	Change of method	Net increases	Changes in fair value	Discount effect	Changes in scope	Translation adjustments	Other	31/12/2018
Available-for-sale financial assets	**40,924**	(40,924)	-	-	-	-	-	-	**-**
Instruments at fair value through OCI with recycling	-	20,828	2,060	(102)	-	-	112	40	**22,938**
Instruments at fair value through OCI with no recycling	-	444	(9)	(37)	-	7	-	8	**413**
Instruments at fair value through profit and loss	-	19,652	1,489	(847)	-	(6)	-	(128)	**20,160**
Loans and financial receivables	**14,622**	-	(1,362)	-	460	(34)	(96)	359	**13,949**

NOTE 40 CASH AND CASH EQUIVALENTS

Cash and cash equivalents comprise cash in hand and at bank and investments in money market instruments. Cash and cash equivalents as stated in the cash flow statements include the following amounts recorded in the balance sheet:

(in millions of euros)	31/12/2019	31/12/2018
Cash	3,698	2,855
Cash equivalents [1]	236	435
Financial current accounts	-	-
CASH AND CASH EQUIVALENTS	3,934	3,290

(1) Items stated at fair value amount to €236 million at 31 December 2019 (€435 million at 31 December 2018).

Cash restrictions

Cash and cash equivalents include €213 million of cash subject to restrictions at 31 December 2019 (€235 million at 31 December 2018) (see note 1.3.25).

NOTE 41 CURRENT AND NON-CURRENT FINANCIAL LIABILITIES

41.1 BREAKDOWN BETWEEN CURRENT AND NON-CURRENT FINANCIAL LIABILITIES

Current and non-current financial liabilities break down as follows:

	31/12/2019			31/12/2018		
(in millions of euros)	Non-current	Current	Total	Non-current	Current	Total
Loans and other financial liabilities	56,306	11,074	**67,380**	50,901	8,287	**59,188**
Negative fair value of derivatives held for trading	-	6,327	**6,327**	-	7,160	**7,160**
Negative fair value of hedging derivatives	696	1,134	**1,830**	1,228	1,720	**2,948**
FINANCIAL LIABILITIES	57,002	18,535	75,537	52,129	17,167	69,296

41.2 LOANS AND OTHER FINANCIAL LIABILITIES

41.2.1 Changes in loans and other financial liabilities

(in millions of euros)	Bonds	Loans from financial institutions	Other financial liabilities	Lease liability [1]	Accrued Interest	Total
Balances at 31/12/2018	**50,401**	**3,098**	**4,026**	**324**	**1,339**	**59,188**
IFRS 16 restatements (see note 2.1)	-	-	-	4,492	-	4,492
Restated balances at 01/01/2019	**50,401**	**3,098**	**4,026**	**4,816**	**1,339**	**63,680**
Increases	3,025	1,789	4,266	544	188	9,812
Decreases	(3,336)	(533)	(2,679)	(721)	(185)	(7,454)
Translation adjustments	311	32	26	26	-	395
Changes in scope of consolidation [2]	-	(1,266)	(17)	3	-	(1,280)
Changes in fair value	2,047	-	(38)	-	-	2,009
Other changes	-	19	367	(158)	(11)	217
BALANCES AT 31/12/2019	52,448	3,139	5,952	4,510	1,331	67,380

(1) At 31 December 2018 this consists of loans related to finance-leased assets.
At 31 December 2019, finance-leased assets are included in the lease liability.
(2) Changes in the scope of consolidation essentially concern the effect of loss of control over NnG (see note 3.4.5).

A breakdown of the issuance and repayments of borrowings presented in the cash flow statement is presented below:

(in millions of euros)	Bonds	Loans from financial institutions	Other financial liabilities	Lease liability	Termination of hedging derivatives	Total
Issuance of borrowings	3,025	1,789	4,266	-	-	**9,080**
Repayments of borrowings	(3,336)	(533)	(2,679)	(721)	293	**(6,976)**

Loans and other financial liabilities of the Group's main entities are as follows:

(in millions of euros)	31/12/2019	31/12/2018
EDF and other related subsidiaries [1]	56,777	48,650
EDF Energy [2]	3,711	3,345
EDF Renewables	5,438	5,741
Edison [3]	654	549
Other	800	903
LOANS AND OTHER FINANCIAL LIABILITIES	67,380	59,188

(1) Enedis, EDF PEI, EDF International, EDF Holding SAS, C3 and EDF Investissements Groupe.
(2) Including holding companies.
(3) Edison excluding TdE SpA.

At 31 December 2019, none of these entities had defaulted on any borrowing.

The Group's principal borrowings at 31 December 2019 are as follows:

Type of borrowing *(in millions of currencies)*	Entity	Issue [(1)]	Maturity	Issue amount	Currency	Rate
Bond	EDF	01/2010	01/2020	1,400	USD	4.60%
Euro MTN	EDF	05/2008	05/2020	1,200	EUR	5.38%
Bond	EDF	10/2015	10/2020	1,500	USD	2.35%
Euro MTN	EDF	01/2009	01/2021	2,000	EUR	6.25%
Euro MTN (green bond)	EDF	11/2013	04/2021	1,400	EUR	2.25%
Euro MTN	EDF	01/2012	01/2022	2,000	EUR	3.88%
Euro MTN	EDF	09/2012	03/2023	2,000	EUR	2.75%
Euro MTN	EDF	09/2009	09/2024	2,500	EUR	4.63%
Bond (green bond)	EDF	10/2015	10/2025	1,250	USD	3.63%
Euro MTN	EDF	11/2010	11/2025	750	EUR	4.00%
Euro MTN (green bond)	EDF	10/2016	10/2026	1,750	EUR	1.00%
Bond	EDF	01/2017	01/2027	107,900	JPY	1.09%
Euro MTN	EDF	03/2012	03/2027	1,000	EUR	4.13%
Bond	EDF	09/2018	09/2028	1,800	USD	4.50%
Euro MTN	EDF	04/2010	04/2030	1,500	EUR	4.63%
Euro MTN	EDF	10/2018	10/2030	1,000	EUR	2.00%
Euro MTN	EDF	07/2001	07/2031	650	GBP	5.88%
Euro MTN	EDF	02/2003	02/2033	850	EUR	5.63%
Euro MTN	EDF	06/2009	06/2034	1,500	GBP	6.13%
Euro MTN	EDF	10/2016	10/2036	750	EUR	1.88%
Bond	EDF	09/2018	09/2038	650	USD	4.88%
Bond	EDF	01/2009	01/2039	1,750	USD	6.95%
Euro MTN	EDF	11/2010	11/2040	750	EUR	4.50%
Euro MTN	EDF	10/2011	10/2041	1,250	GBP	5.50%
Bond	EDF	01/2014	01/2044	1,000	USD	4.88%
Bond	EDF	10/2015	10/2045	1,500	USD	4.75%
Bond	EDF	10/2015	10/2045	1,150	USD	4.95%
Bond	EDF	09/2018	09/2048	1,300	USD	5,00%
Euro MTN	EDF	12/2019	12/2049	1,250	EUR	2.00%
Euro MTN	EDF	09/2010	09/2050	1,000	GBP	5.13%
Euro MTN	EDF	10/2016	10/2056	2,164	USD	4.99%
Euro MTN	EDF	11/2019	12/2069	2,000	USD	4.50%
Bond	EDF	01/2014	01/2114	1,350	GBP	6.00%

(1) Date funds were received.

On 27 November and 2 December 2019, EDF raised US $2 billion and 1.25 billion euros respectively as part of its EMTN program (see note 3.3.4).

At 31 December 2019, the total ceiling on EDF's EMTN (Euro Medium Term Notes) programme, allowing issuance of borrowings under the programme, is €45 billion.

41.2.2 Maturity of loans and other financial liabilities

At 31 December 2019:

(in millions of euros)	Bonds	Loans from financial institutions	Other financial liabilities	Lease liability [1]	Accrued Interest	Total
Less than one year	3,741	271	5,391	645	1,026	**11,074**
From one to five years	11,194	906	-	2,225	74	**14,399**
More than five years	37,513	1,962	561	1,640	231	**41,907**
LOANS AND OTHER FINANCIAL LIABILITIES AT 31/12/2019	52,448	3,139	5,952	4,510	1,331	67,380

(1) At 31 December 2018, this item consisted of loans related to finance-leased assets.
At 31 December 2019, finance-leased assets are included in the lease liability.

At 31 December 2018:

(in millions of euros)	Bonds	Loans from financial institutions	Other financial liabilities	Loans related to finance-leased assets	Accrued Interest	Total
Less than one year	3,316	464	3,382	45	1,080	**8,287**
From one to five years	11,908	650	81	111	39	**12,789**
More than five years	35,177	1,984	563	168	220	**38,112**
LOANS AND OTHER FINANCIAL LIABILITIES AT 31/12/2018	50,401	3,098	4,026	324	1,339	59,188

The non-discounted lease liability matures as follows:

	31/12/2019			
	Total	Maturity		
(in millions of euros)		< 1 year	1-5 years	> 5 years
NON-DISCOUNTED CONTRACTUAL CASH FLOWS	5,052	709	2,338	2,005

41.2.3 Breakdown of loans and other financial liabilities by currency

	31/12/2019			31/12/2018		
(in millions of euros)	Initial debt structure	Impact of hedging instruments [1]	Debt structure after hedging	Initial debt structure	Impact of hedging instruments [1]	Debt structure after hedging
Euro (EUR)	33,360	18,491	51,851	26,783	21,438	48,221
American dollar (USD)	20,867	(14,814)	6,053	20,546	(17,564)	2,982
Pound sterling (GBP)	10,269	(1,705)	8,564	9,250	(2,414)	6,836
Other	2,884	(1,972)	912	2,609	(1,460)	1,149
LOANS AND OTHER FINANCIAL LIABILITIES	67,380	-	67,380	59,188	-	59,188

(1) Hedges of liabilities and net investments in foreign subsidiaries.

41.2.4 Breakdown of loans and other financial liabilities by type of interest rate

	31/12/2019			31/12/2018		
(in millions of euros)	Initial debt structure	Impact of derivatives	Final debt structure	Initial debt structure	Impact of derivatives	Final debt structure
Fixed rates	62,128	(21,035)	41,093	55,810	(21,949)	33,861
Floating rates	5,252	21,035	26,287	3,378	21,949	25,327
LOANS AND OTHER FINANCIAL LIABILITIES	**67,380**	**-**	**67,380**	**59,188**	-	**59,188**

The breakdown of loans and financial liabilities by interest rate includes the impact of all derivatives classified as hedges in accordance with IFRS 9.

A large portion of the EDF group's fixed-rate loans is swapped to variable rates.

41.2.5 Credit lines

At 31 December 2019, the Group has unused credit lines with various banks totalling €10,490 million (€11,393 million at 31 December 2018). This total includes €5,050 million of credit lines indexed on ESG criteria, which were totally undrawn at 31 December 2019 (see note 3.3.1).

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
CONFIRMED CREDIT LINES	**10,490**	1,371	9,099	20	**11,393**

41.2.6 Early repayment clauses

Project financing loans to EDF Renewables from non-Group parties generally include early repayment clauses, mainly applicable when the project company concerned fails to maintain a minimum Debt Service Coverage Ratio (DSCR). In general, early repayment clauses are activated when this ratio falls below 1.

In other Group entities, certain clauses contained in contracts for financing or other commitments may make reference to Group ratings but are not classified as covenants.

Two borrowings with a combined total of €750 million contain a rendezvous clause requiring contact between the borrower and lender if the borrower's rating falls below a specified level, possibly leading to renegotiation of the terms of the loan.

No early repayment took place in 2019 as a result of any Group entity's failure to comply with contractual clauses concerning loans.

41.3 NET INDEBTEDNESS

Net indebtedness is not defined in the accounting standards and is not directly presented in the consolidated balance sheet. It comprises total loans and financial liabilities, less cash and cash equivalents and liquid assets. Liquid assets are financial assets consisting of funds or interest rate instruments with initial maturity of over three months that are readily convertible into cash and are managed according to a liquidity-oriented policy.

(in millions of euros)	Notes	31/12/2019	31/12/2018
Loans and other financial liabilities (1)	41.2.1	67,380	59,188
Derivatives used to hedge liabilities	44	(3,387)	(1,972)
Cash and cash equivalents	40	(3,934)	(3,290)
Debt and equity securities – liquid assets	39.2.2	(18,900)	(20,538)
Net indebtedness of assets held for sale		(26)	-
NET INDEBTEDNESS (1)		**41,133**	**33,388**

(1) From 1 January 2019, due to application of IFRS 16, net indebtedness includes the lease liability, amounting to €4,492 million (see note 41.2).

NOTE 42 OTHER INFORMATION ON FINANCIAL ASSETS AND LIABILITIES

42.1 FAIR VALUE OF FINANCIAL INSTRUMENTS

The following tables show the breakdown of financial assets and liabilities in the balance sheet, by level.

42.1.1 At 31 December 2019

(in millions of euros)	Balance sheet value	Fair value	Level 1 Unadjusted quoted prices	Level 2 Observable data	Level 3 Non-observable data
Financial assets at fair value through profit and loss (1)	6,813	6,813	53	6,244	516
Debt and equity securities	46,157	46,157	3,733	41,800	624
Positive fair value of hedging derivatives	5,759	5,759	15	5,731	13
Cash equivalents carried at fair value	236	236	156	80	-
Financial assets carried at fair value in the balance sheet	**58,965**	**58,965**	**3,957**	**53,855**	**1,153**
Loans and financial receivables – assets receivable from the NLF	13,303	13,303	-	13,303	-
Loans and financial receivables – CSPE	684	688	-	688	-
Other loans and financial receivables	2,904	2,904	-	2,904	-
Financial assets carried at amortised cost	**16,891**	**16,895**	**-**	**16,895**	**-**
Negative fair value of hedging derivatives	1,830	1,830	5	1,825	-
Negative fair value of trading derivatives	6,327	6,327	38	5,914	375
Financial liabilities carried at fair value in the balance sheet	**8,157**	**8,157**	**43**	**7,739**	**375**
Loans and other financial liabilities (2)	67,380	75,407	-	75,407	-
Financial liabilities carried at amortised cost	**67,380**	**75,407**	**-**	**75,407**	**-**

(1) Including €6,813 million for the positive fair value of trading derivatives.
(2) Loans and other financial liabilities are carried in the balance sheet at amortised cost, adjusted for changes in the fair value of risks covered by a fair value hedge.

Level 3 debt and equity securities are principally non-consolidated investments carried at historical value.

Cash equivalents, which principally take the form of negotiable debt instruments and short-term investments, are generally valued using yield curves, and therefore observable market data.

42.1.2 At 31 December 2018

(in millions of euros)	Balance sheet value	Fair value	Level 1 Unadjusted quoted prices	Level 2 Observable data	Level 3 Non-observable data
Financial assets at fair value through profit and loss [1]	6,404	6,404	569	5,497	338
Debt and equity securities	43,511	43,511	2,442	40,470	599
Positive fair value of hedging derivatives	4,383	4,383	68	4,315	-
Cash equivalents carried at fair value	435	435	181	254	-
Financial assets carried at fair value in the balance sheet	**54,733**	**54,733**	**3,260**	**50,536**	**937**
Loans and financial receivables – assets receivable from the NLF	9,220	9,220	-	9,220	-
Loans and financial receivables – CSPE	2,060	2,080	-	2,080	-
Other loans and financial receivables	2,669	2,669	-	2,669	-
Financial assets carried at amortised cost	**13,949**	**13,969**	**-**	**13,969**	**-**
Negative fair value of hedging derivatives	2,948	2,948	96	2,852	-
Negative fair value of trading derivatives	7,160	7,160	554	6,274	332
Financial liabilities carried at fair value in the balance sheet	**10,108**	**10,108**	**650**	**9,126**	**332**
Loans and other financial liabilities [2]	59,188	63,772	-	63,772	-
Financial liabilities carried at amortised cost	**59,188**	**63,772**	**-**	**63,772**	**-**

(1) Including €6,404 million for the positive fair value of trading derivatives.
(2) Loans and other financial liabilities are carried in the balance sheet at amortised cost, adjusted for changes in the fair value of risks covered by a fair value hedge.

42.2 OFFSETTING OF FINANCIAL ASSETS AND LIABILITIES

42.2.1 At 31 December 2019

(in millions of euros)	As reported in balance sheet	Balance without offsetting	Balance with offsetting under IAS 32			Amounts covered by a general offsetting agreement but not offset under IAS 32		
			Gross amount recognised (before offsetting)	Gross amount offset under IAS 32	**Net amount recognised after offsetting under IAS 32**	Financial instruments	Fair value of financial collateral	**Net amount**
Fair value of derivatives – assets	**12,572**	**3,752**	13,300	(4,480)	**8,820**	(1,298)	(3,097)	**4,425**
Fair value of derivatives – liabilities	**(8,157)**	**(3,785)**	(8,852)	4,480	**(4,372)**	1,298	531	**(2,543)**

42.2.2 At 31 December 2018

(in millions of euros)	As reported in balance sheet	Balance without offsetting	Balance with offsetting under IAS 32			Amounts covered by a general offsetting agreement but not offset under IAS 32		
			Gross amount recognised (before offsetting)	Gross amount offset under IAS 32	Net amount recognised after offsetting under IAS 32	Financial instruments	Fair value of financial collateral	Net amount
Fair value of derivatives – assets	**10,787**	**218**	16,481	(5,912)	**10,569**	(1,711)	(960)	**7,898**
Fair value of derivatives – liabilities	**(10,108)**	**(848)**	(15,172)	5,912	**(9,260)**	1,711	959	**(6,590)**

NOTE 43 MANAGEMENT OF MARKET AND COUNTERPARTY RISKS

As an operator in the energy sector worldwide, the EDF group is exposed to financial market risks, energy market risks and counterparty risks. All these risks could generate volatility in the financial statements.

- **Financial market risks**

  The main financial market risks to which the Group is exposed are the liquidity risk, the foreign exchange risk, the interest rate risk and the equity risk.

  The objective of the Group's liquidity risk management is to seek resources at optimum cost and ensure their constant accessibility.

  The foreign exchange risk relates to the diversification of the Group's businesses and geographical locations, and results from exposure to the risk of exchange rate fluctuations. These fluctuations can affect the Group's translation differences, balance sheet items, financial expenses, equity and net income.

  The interest rate risk results from exposure to the risk of fluctuations in interest rates that can affect the value of assets invested by the Group, the value of the liabilities covered by provision, or its financial expenses.

  The Group is exposed to equity risks, particularly through its dedicated asset portfolio held for secure financing of long-term nuclear commitments, through external pension funds, and to a lesser extent through its cash assets and directly-held investments.

  A more detailed description of these risks can be found in section 5.1.6.1 of the Universal Registration Document (formerly Reference Document), "Financial Information – Management and control of financial risks".

- **Energy market risks**

  With the opening of the final customer market, development of the wholesale markets and international business expansion, the EDF group operates on deregulated energy markets, mainly in Europe, through its generation and supply activities. This exposes the Group to price variations on the wholesale markets for energy (electricity, gas, coal, oil products) and the CO_2 emissions quota market, with a potentially significant impact on the financial statements.

  A more detailed description of these risks can be found in section 5.1.6.2 of the Universal Registration Document (formerly Reference Document), "Financial Information – Management and control of energy market risks".

- **Counterparty risks**

  Counterparty risk is defined as the total loss that the EDF group would sustain on its business and market transactions if a counterparty defaulted and failed to perform its contractual obligations.

  A more detailed description of these risks can be found in section 5.1.6.1.7 of the Universal Registration Document (formerly Reference Document), "Financial Information – Management and control of market risks".

Regarding the customer risk, which is another component of the counterparty risk, a statement of receivables not yet due and overdue is shown in note 28.

The sensitivity analyses required by IFRS 7 are presented in section 5.1.6.1 of the Universal Registration Document (formerly Reference Document), "Financial Information – Management and control of financial risks":

- Foreign exchange risks: section 5.1.6.1.3,
- Interest rate risks: section 5.1.6.1.4,
- Equity risk on financial assets: sections 5.1.6.1.5 and 5.1.6.1.6.

The principal information on financial assets and liabilities is described by theme in the following notes and sections:

- Liquidity risks:
  - maturity of loans and other financial liabilities: note 41.2.2 to the consolidated financial statements,
  - credit lines: note 41.2.5 to the consolidated financial statements,
  - early repayment clauses for borrowings: note 41.2.6 to the consolidated financial statements,
  - off-balance sheet commitments: note 49 to the consolidated financial statements;
- Foreign exchange risks:
  - breakdown of loans and financial liabilities by currency and type of interest rate: notes 41.2.3 and 41.2.4 to the consolidated financial statements;
- Equity risks (sections 5.1.6.1.5 and 5.1.6.1.6 of the Universal Registration Document (formerly Reference Document), "Financial Information - Management of equity risks/Management of risk on the dedicated asset portfolio"):
  - coverage of nuclear obligations: notes 49 and 32.1.5 to the consolidated financial statements,
  - coverage of social obligations: notes 34.2.5 and 34.3.4 to the consolidated financial statements,
  - long-term cash management,
  - direct investments;
- Interest rate risks:
  - discount rate for nuclear provisions: calculation method and sensitivity: note 32.1.5.2 to the consolidated financial statements,
  - discount rate used for employee benefits: notes 34.2.7 and 34.3.6 to the consolidated financial statements,
  - breakdown of loans by currency and interest rate: notes 41.2.3 and 41.2.4 to the consolidated financial statements;
- Balance sheet treatment of financial and market risks:
  - derivatives and hedge accounting: note 44 to the consolidated financial statements, and the statement of changes in equity,
  - derivatives not classified as hedges: note 45 to the consolidated financial statements.

NOTE 44 DERIVATIVES AND HEDGE ACCOUNTING

Hedge accounting is applied in compliance with IFRS 9, and concerns interest rate derivatives used to hedge long-term indebtedness, currency derivatives used to hedge net foreign investments and debts in foreign currencies, and currency and commodity derivatives used to hedge future cash flows.

The fair value of hedging derivatives reported in the balance sheet breaks down as follows:

(in millions of euros)	Notes	31/12/2019	31/12/2018
Positive fair value of hedging derivatives	39.1	5,759	4,383
Negative fair value of hedging derivatives	41.1	(1,830)	(2,948)
FAIR VALUE OF HEDGING DERIVATIVES		3,929	1,435
Interest rate hedging derivatives	44.4.1	2,939	1,550
Exchange rate hedging derivatives	44.4.2	877	582
Commodity-related cash flow hedges	44.4.3	48	(645)
Commodity-related fair value hedges	44.5	65	(52)

An alternative breakdown of hedging derivatives is shown below:

(in millions of euros)	Notes	31/12/2019	31/12/2018
Fair value of derivatives hedging liabilities	41.3	3,387	1,972
Fair value of derivatives hedging net foreign investments		261	106
Fair value of other hedging derivatives (commodities)		281	(643)
Fair value of hedging derivatives		3,929	1,435

44.1 FAIR VALUE HEDGES

The EDF group hedges the exposure to changes in the fair value of fixed-rate debts. The derivatives used for this hedging are fixed/floating interest rate swaps and cross currency swaps, with changes in fair value recorded in the income statement. Fair value hedges also include currency hedging instruments on certain firm purchase commitments.

In 2019, the ineffective portion of fair value hedges represents a loss of €(17) million (loss of (3) million in 2018), included in the financial result.

44.2 CASH FLOW HEDGES

The EDF group uses cash flow hedging principally for the following purposes:

- to hedge its floating-rate debt, using interest-rate swaps (floating/fixed rate);
- to hedge the exchange rate risk related to debts contracted in foreign currencies, using cross currency swaps;
- to hedge future cash flows related to expected sales and purchases of electricity, gas, and coal, using futures, forwards and swaps.

The EDF group also hedges the currency risk associated with fuel and commodity purchases.

The ineffective portion of cash flow hedges in 2019 represents a gain of €3 million which was included in the financial result (gain of €5 million in 2018).

44.3 HEDGES OF NET INVESTMENTS IN FOREIGN ENTITIES

Hedging of net foreign investments is used for protection against exposure to the exchange rate risk related to net investments in the Group's foreign entities.

This risk is hedged at Group level either by contracting debts for investments in the same currency, or through the markets, in which case the Group uses currency swaps and forward exchange contracts.

44.4 IMPACT OF HEDGING DERIVATIVES ON EQUITY

Changes during the period in the fair value of hedging instruments included in equity (EDF share) are detailed below:

	2019			2018		
(in millions of euros)	Gross changes in fair value recorded in equity (1)	Gross changes in fair value transferred to income - Recycling (2)	Gross changes in fair value transferred to income - Ineffectiveness	Gross changes in fair value recorded in equity (1)	Gross changes in fair value transferred to income - Recycling (2)	Gross changes in fair value transferred to income - Ineffectiveness
Interest rate hedging	(39)	(106)	3	(73)	-	1
Exchange rate hedging	(200)	(156)	(17)	890	443	(5)
Net foreign investment hedging	(416)	(448)	-	(85)	-	-
Commodity hedging	1,482	719	3	(1,043)	(788)	(9)
HEDGING DERIVATIVES (3)	**827**	**9**	**(11)**	**(311)**	**(345)**	**(13)**

(1) +/( ): increase/(decrease) in equity (EDF share).
(2) +/( ): increase/(decrease) in net income (EDF share).
(3) Excluding associates and joint ventures.

44.4.1 Interest rate hedging derivatives

Interest rate hedging derivatives break down as follows:

	Notional at 31/12/2019				Notional at 31/12/2018	Fair value	
(in millions of euros)	< 1 year	1-5 years	> 5 years	**Total**	Total	**31/12/2019**	31/12/2018
Fixed rate payer/floating rate receiver	39	1,377	1,317	**2,733**	1,168	(51)	(75)
Floating rate payer/fixed rate receiver	1,905	4,399	17,329	**23,633**	23,143	3,143	1,619
Floating rate/floating rate	-	800	1,647	**2,447**	3,031	60	56
Fixed rate/fixed rate	912	1,294	7,695	**9,901**	14,053	(213)	(50)
Interest rate swaps	**2,856**	**7,870**	**27,988**	**38,714**	**41,395**	**2,939**	**1,550**
INTEREST RATE HEDGING DERIVATIVES	2,856	7,870	27,988	38,714	41,395	2,939	1,550

The fair value of interest rate/exchange rate cross-currency swaps comprises the interest rate effect only.

The notional value of cross-currency swaps is included both in this note and the note on exchange rate hedging derivatives (see note 44.4.2).

A large portion of the EDF group's fixed-rate loans is swapped to variable rates.

44.4.2 Exchange rate hedging derivatives

Exchange rate hedging derivatives break down as follows:

At 31 December 2019:

	Notional amount to be received at 31/12/2019				Notional amount to be given at 31/12/2019				Fair value
(in millions of euros)	< 1 year	1-5 years	> 5 years	**Total**	< 1 year	1-5 years	> 5 years	**Total**	**31/12/2019**
Forward exchange transactions	1,843	1,357	-	**3,200**	1,838	1,526	-	**3,364**	3
Swaps	19,619	6,566	17,367	**43,552**	19,006	6,268	16,892	**42,166**	874
EXCHANGE RATE HEDGING DERIVATIVES	**21,462**	**7,923**	**17,367**	**46,752**	**20,844**	**7,794**	**16,892**	**45,530**	**877**

At 31 December 2018:

	Notional amount to be received at 31/12/2018				Notional amount to be given at 31/12/2018				Fair value
(in millions of euros)	< 1 year	1-5 years	> 5 years	**Total**	< 1 year	1-5 years	> 5 years	**Total**	**31/12/2018**
Forward exchange transactions	1,550	393	-	1,943	1,540	387	-	1,927	17
Swaps	17,085	9,543	16,884	43,512	16,791	9,163	16,785	42,739	565
EXCHANGE RATE HEDGING DERIVATIVES	**18,635**	**9,936**	**16,884**	**45,455**	**18,331**	**9,550**	**16,785**	**44,666**	**582**

The notional value of cross-currency swaps shown in this note is also included in the note on interest rate hedging derivatives (see note 44.4.1).

44.4.3 Commodity-related cash flow hedges

For commodities, changes in fair value are mainly explained by:

(in millions of euros)	**31/12/2019**	31/12/2018
Electricity hedging contracts	510	(629)
Gas hedging contracts	763	(231)
Coal hedging contracts	(56)	(107)
Oil product hedging contracts	51	(446)
CO_2 emission rights hedging contracts	214	370
Changes in fair value before taxes	**1,482**	**(1,043)**

The main components of the amount transferred to operating profit before depreciation and amortisation in respect of commodity hedges terminated during the year are:

(in millions of euros)	**31/12/2019**	31/12/2018
Electricity hedging contracts	(753)	(388)
Gas hedging contracts	1,428	(280)
Coal hedging contracts	2	(109)
Oil product hedging contracts	(61)	(194)
CO_2 emission rights hedging contracts	103	183
Changes in fair value before taxes	**719**	**(788)**

Details of commodity-related cash flow hedges are as follows:

(in millions of euros)	Units of measure	31/12/2019 Net notional < 1 year	1-5 years	> 5 years	Total	Fair value	31/12/2018 Net notional	Fair value
Swaps		(9)	-	-	(9)	105	(4)	50
Forwards/futures		(4)	(36)	-	(40)	288	(51)	(859)
Electricity	**TWh**	**(13)**	**(36)**	**-**	**(49)**	**393**	**(55)**	**(809)**
Swaps		74	77	-	151	(24)	(190)	9
Forwards/futures		1,038	1,066	-	2,104	(373)	1,504	25
Gas	**Millions of therms**	**1,112**	**1,143**	**-**	**2,255**	**(397)**	**1,314**	**34**
Swaps		2,027	4,589	-	6,616	7	10,402	(53)
Options		-	-	-	-	-	180	-
Oil products	**Thousands of barrels**	**2,027**	**4,589**	**-**	**6,616**	**7**	**10,582**	**(53)**
Swaps		-	(1)	-	(1)	1	-	-
Coal	**Millions of tonnes**	**-**	**(1)**	**-**	**(1)**	**1**	**-**	**-**
Swaps		-	-	-	-	-	-	-
Forwards/futures		15,710	10,956	-	26,666	44	13,488	183
CO_2	**Thousands of tonnes**	**15,710**	**10,956**	**-**	**26,666**	**44**	**13,488**	**183**
COMMODITY-RELATED CASH FLOW HEDGES						48		(645)

44.5 COMMODITY-RELATED FAIR VALUE HEDGES

Details of commodity-related fair value hedges are as follows:

(in millions of euros)	Units of measure	31/12/2019 Net notional	Fair value	31/12/2018 Net notional	Fair value
Coal and freight	Millions of tonnes	(415)	71	(3)	2
Oil products	Thousands of barrels	7,021	(5)	5,136	(23)
Gas	Millions of therms	(2)	(1)	(93)	(31)
COMMODITY-RELATED FAIR VALUE HEDGES			65		(52)

NOTE 45 NON-HEDGING DERIVATIVES

Details of the fair value of trading derivatives reported in the balance sheet are as follows:

(in millions of euros)	Notes	31/12/2019	31/12/2018
Positive fair value of trading derivatives	39.1	6,813	6,404
Negative fair value of trading derivatives	41.1	(6,327)	(7,160)
FAIR VALUE OF TRADING DERIVATIVES		486	(756)
Interest rate derivatives held for trading	45.1	(22)	(60)
Currency derivatives held for trading	45.2	(185)	(96)
Non-hedging commodity derivatives	45.3	693	(641)
Other contracts		-	41

45.1 INTEREST RATE DERIVATIVES HELD FOR TRADING

Interest rate derivatives held for trading break down as follows:

	Notional at 31/12/2019				Notional at 31/12/2018	Fair value	
(in millions of euros)	< 1 year	1-5 years	> 5 years	Total	Total	31/12/2019	31/12/2018
Purchases of options	-	-	520	520	516	14	7
Interest rate operations	**-**	**-**	**520**	**520**	**516**	**14**	**7**
Fixed rate payer/floating rate receiver	-	3,848	935	4,783	3,885	(33)	(64)
Floating rate payer/fixed rate receiver	93	28	-	121	122	(1)	(4)
Floating rate/floating rate	1	10	-	11	5	-	-
Fixed rate/fixed rate	42	45	179	266	140	(2)	1
Interest rate swaps	**136**	**3,931**	**1,114**	**5,181**	**4,152**	**(36)**	**(67)**
INTEREST RATE DERIVATIVES HELD FOR TRADING	136	3,931	1,634	5,701	4,668	(22)	(60)

45.2 CURRENCY DERIVATIVES HELD FOR TRADING

Currency derivatives held for trading break down as follows:

At 31 December 2019:

	Notional amount to be received at 31/12/2019				Notional amount to be given at 31/12/2019				Fair value
(in millions of euros)	< 1 year	1-5 years	> 5 years	**Total**	< 1 year	1-5 years	> 5 years	**Total**	**31/12/2019**
Forward transactions	4,220	3,280	-	7,500	4,187	3,262	-	7,449	29
Swaps	14,203	6,387	198	20,788	14,328	6,536	198	21,062	(214)
CURRENCY DERIVATIVES HELD FOR TRADING	18,423	9,667	198	28,288	18,515	9,798	198	28,511	(185)

At 31 December 2018:

	Notional amount to be received at 31/12/2018				Notional amount to be given at 31/12/2018				Fair value
(in millions of euros)	< 1 year	1-5 years	> 5 years	**Total**	< 1 year	1-5 years	> 5 years	**Total**	**31/12/2018**
Forward transactions	3,223	2,017	4	5,244	3,215	1,989	5	5,209	2
Swaps	11,885	6,570	70	18,525	11,981	6,689	69	18,739	(98)
CURRENCY DERIVATIVES HELD FOR TRADING	15,108	8,587	74	23,769	15,196	8,678	74	23,948	(96)

45.3 NON-HEDGING COMMODITY DERIVATIVES

Details of commodity derivatives not classified as hedges are as follows:

		31/12/2019		31/12/2018	
(in millions of euros)	Unit of measure	Net notional	Fair value	Net notional	Fair value
Swaps		(10)	366	3	502
Options		-	49	4	(22)
Forwards/futures		(7)	409	(50)	(123)
Electricity	**TWh**	**(17)**	**824**	**(43)**	**357**
Swaps		(166)	(219)	(510)	(515)
Options		(720)	49	32	185
Forwards/futures		(6,940)	246	16,323	80
Gas	**Millions of therms**	**(7,826)**	**76**	**15,845**	**(250)**
Swaps		15,162	11	27,715	(82)
Options		(875)	(3)	500	1
Forwards/futures		3	-	(360)	(3)
Oil products	**Thousands of barrels**	**14,290**	**8**	**27,855**	**(84)**
Swaps		-	(1)	(2,521)	6
Options		-	(6)	-	(14)
Forwards/futures		-	-	-	-
Freight		2	(5)	3,232	(2)
Coal and freight	**Millions of tonnes**	**2**	**(12)**	**711**	**(10)**
Swaps		-	-	-	-
Options		(2,626)	(124)	(5,000)	(150)
Forwards/futures		(38,978)	(4)	(56,433)	(446)
CO_2	**Thousands of tonnes**	**(41,604)**	**(128)**	**(61,433)**	**(596)**
Swaps/options		-	(56)	-	29
Forwards/futures		-	(19)	-	(87)
Other commodities		-	**(75)**	-	**(58)**
Embedded commodity derivatives		-	**-**	-	**-**
NON-HEDGING COMMODITY DERIVATIVES			693		(641)

These mainly include contracts included in EDF Trading's portfolio.

NOTE 46 ASSETS HELD FOR SALE AND RELATED LIABILITIES

(in millions of euros)	31/12/2019	31/12/2018
ASSETS HELD FOR SALE	3,662	-
LIABILITIES RELATED TO ASSETS HELD FOR SALE	1,043	-

The Group reclassified the balance sheet items concerned by the following operations as assets held for sale and related liabilities at 31 December 2019:

- the sale of Exploration and Production (E&P) operations, which is currently in process (see note 2.3);
- the sale of CENG shares, which is currently in process (see note 3.2.2).

E&P operations

In application of IFRS 5, details of the assets and liabilities of the E&P operations presented as assets held for sale and related liabilities at 31 December 2019 are shown below:

(in millions of euros)	31/12/2019
Non-current non-financial assets	893
Non-current financial assets	-
Current non-financial assets	784
Current financial assets	60
TOTAL ASSETS HELD FOR SALE	1,737

(in millions of euros)	31/12/2019
Non-current non-financial liabilities	711
Non-current financial liabilities	34
Current non-financial liabilities	298
Current financial liabilities	-
TOTAL LIABILITIES RELATED TO ASSETS HELD FOR SALE	1,043

The E&P operations contributed €(26) million to the Group's net indebtedness at 31 December 2019 (see note 41.3).

CENG

EDF notified Exelon on 20 November 2019 that it had decided to exercise its put option on 49.99% of the shares of CENG (see note 3.2.2).

The investment in CENG has been reclassified as assets held for sale at the amount of €1,925 million.

Although completion of this operation is conditional on obtaining the required regulatory approvals and will take several months, in view of the terms of the contractual agreements, the Group is engaged in an irrevocable process. The range of valuations determined with consultants for use in the contractual determination method for the put option sale price does not indicate any risk of impairment, given that Exelon has not yet informed the Group of its own valuation.

These valuations are very sensitive to market price forecasts, which could change significantly in the course of the put option exercise process. They are also sensitive to the effects of New York State's Zero Emission Credit (ZEC) programme of subsidies for nuclear power plants, which provides additional income for the Ginna and Nine Mile Point plants. This programme is currently the subject of legal proceedings. On 8 October 2019, the New York Supreme Court dismissed the court case against the ZEC and declared the programme legal. The applicants have filed an appeal, but the risk of cancellation is low in view of the stated grounds for the Supreme Court's decision.

CASH FLOWS AND OTHER INFORMATION

NOTE 47 CASH FLOWS

47.1 CHANGE IN WORKING CAPITAL

(in millions of euros)	2019	2018 [1]
Change in inventories	191	(12)
Change in the receivable for Contribution to the Public Electricity Service (CSPE)	(864)	357
Change in trade receivables	174	1,230
Change in trade payables	(46)	(664)
Change in other receivables and payables (excluding CSPE)	997	(441)
CHANGE IN WORKING CAPITAL	452	470

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

47.2 INVESTMENTS IN INTANGIBLE AND TANGIBLE ASSETS

(in millions of euros)	2019	2018 [1]
Acquisitions of intangible assets	(1,370)	(1,798)
Acquisitions of tangible assets	(15,436)	(13,850)
Change in payables to suppliers of fixed assets	97	(368)
INVESTMENTS IN INTANGIBLE AND TANGIBLE ASSETS	(16,709)	(16,016)

(1) Restated for the impacts of IFRS 5 concerning the discontinued E&P operations (see note 2.3).

47.3 PAYMENTS RELATING TO LEASES

(in millions of euros)	2019
TOTAL PAYMENTS RELATING TO THE LEASE LIABILITY	(790)

Payments relating to the lease liability mainly concern principal repayments, and amount to €721 million.

NOTE 48 EDF'S DEDICATED ASSETS

48.1 REGULATIONS

Article L. 594 of France's Environment Code and its implementing regulations require assets (dedicated assets) to be set aside for secure financing of nuclear plant decommissioning expenses and long-term storage expenses for radioactive waste. These regulations govern the way dedicated assets are built up, and the management and governance of the funds themselves. Dedicated assets are clearly identified and managed separately from the company's other financial assets and investments. They are also subject to specific monitoring and control by the Board of Directors and the administrative authorities.

The law requires the realisable value of dedicated assets to be higher than the value of the provisions corresponding to the present value of the long-term nuclear expenses defined above.

The Decree of 24 March 2015 contains two measures concerning dedicated assets:

- the annual allocation to dedicated assets, net of any increases to provisions, must be positive or zero as long as their realisable value is below 110% of the amount of the provisions concerned;
- subject to certain conditions, real estate property owned by the operators of nuclear facilities may be allocated to coverage of these provisions.

The Decree of 29 December 2010 made RTE shares eligible for inclusion in dedicated assets subject to certain conditions and administrative authorisation. The Decree of 19 December 2016 authorised allocation of the shares of CTE, which holds 100% of the capital of RTE, to the portfolio of dedicated assets from 31 December 2017, subject to conditions (see note 48.2.2 below).

The Decree of 24 July 2013 revised the list of eligible assets by reference to the Insurance Code, making unlisted assets eligible subject to certain conditions.

EDF received ministerial authorisation on 31 May 2018 to increase the portion of unlisted assets in its dedicated assets from 10% to 15% subject to conditions (this does not apply to the shares of CTE or real estate assets).

48.2 PORTFOLIO CONTENTS AND MEASUREMENT

Given the applicable regulations, these dedicated assets are a highly specific category of assets.

Dedicated assets are structured and managed according to a strategic allocation defined by the Board of Directors and reported to the administrative authorities. The strategic allocation is designed to meet the overall objective of long-term coverage of obligations, and determines the structure and management of the portfolio as a whole. It takes into account regulatory constraints concerning the nature and liquidity of the dedicated assets, the financial outlook for the equity and bond markets, and the diversifying contribution of unlisted assets.

As part of the strategic allocation review process and in order to pursue the diversification into unlisted assets begun in 2010 with the shares in RTE, in 2013 the Board of Directors approved the introduction of an unlisted asset portfolio alongside the diversified equity and bond investments. This portfolio is managed by the EDF SA division "EDF Invest", which was formed following the Decree of 24 July 2013 on securing the funding for nuclear expenses. EDF Invest has the following target asset classes: infrastructures, real estate and debt or equity funds.

Following the French government's authorisation issued on 8 February 2013, and the approval of the Nuclear Commitments Monitoring Committee and the Board of Directors' decision of 13 February 2013, EDF allocated the entire receivable recognised by the French State, representing the accumulated shortfall in CSPE financing at 31 December 2012, to its dedicated assets.

This financial receivable was increased in the financial statements at 31 December 2015 by an additional amount estimated at €644 million that was not allocated to dedicated assets, corresponding to the shortfalls in compensation that arose between the beginning of 2013 and the end of 2015, as acknowledged by the State in a ministerial letter of 26 January 2016. In accordance with this letter, the total financial receivable bears interest at 1.72% and will be repaid under a revised schedule ending in late 2020. This schedule was laid down in a ministerial order of 2 December 2016, based on the CRE's confirmation of the shortfall for 2015.

On 22 December 2016, EDF assigned a 26.4% portion of this financial receivable, including the additional receivable corresponding to the shortfalls in compensation between 2013 and 2015, to a pool of investors. Consequently, the realisable value of the non-assigned portion of the receivable, which is totally allocated to dedicated assets, is calculated based on the assignment value at that date. The amount received for assignment of the portion of the CSPE receivable that was allocated to dedicated assets (€894 million) was reinvested in dedicated assets, in the same way as the reimbursements received.

After receiving the ministerial letter of 31 May 2018 authorising EDF, subject to conditions, to increase the portion of unlisted assets in its dedicated assets, on 29 June 2018 the Board of Directors validated the following new strategic allocation for dedicated assets:

- Yield assets (target of 30% of dedicated assets), consisting of infrastructure assets, including the shares of CTE, and real estate property;
- Growth assets (target of 40% of dedicated assets), consisting of equity funds investing in listed or unlisted equities;

- Fixed-income assets (target of 30% of dedicated assets), consisting of listed bonds or listed bond funds, unlisted debt funds, receivables and cash.

These targets should be reached gradually, mainly by reinvesting fixed-income assets in yield assets.

48.2.1 Growth assets and fixed-income assets

Certain growth and fixed-income assets take the form of bonds held directly by EDF. Others consist of specialised collective investment funds on leading international markets, managed by independent asset management companies. They take the form of open-end funds and "reserved" funds established for the Group (which does not participate in the fund management).

The listed equity funds consist of international equities (mainly in North America but also in Europe, Asia-Pacific and emerging countries). Listed bonds and listed bond funds consist of sovereign and corporate bonds.

These investments are structured and managed in line with the strategic allocation, which takes into consideration international stock market cycles, for which the statistical inversion generally observed between equity market cycles and bond market cycles – as well as between geographical areas – has led the Group to define a long-term investment policy with appropriate allocation between growth assets and fixed-income assets.

Under the new strategic allocation, growth assets also include a small portion of funds invested in unlisted equities, and fixed-income assets also include a small portion of funds invested in unlisted debt. These funds are managed by EDF Invest (see note 48.2.2).

Since the application of IFRS 9 from 1 January 2018, all these assets have been included in debt and equity securities.

At the year-end, dedicated assets are presented in debt and equity securities in the balance sheet, at their liquidation value.

In the course of operational asset monitoring, the Group applies long-term, specific management rules defined and supervised by its governance bodies (maximum investment ratios, volatility analyses and assessment of individual fund manager quality).

48.2.2 Yield assets

The yield assets managed by EDF Invest consist mainly of assets related to investments in infrastructures and real estate.

Through investment funds, EDF Invest also manages growth assets and fixed-income assets (see note 48.2.1).

At 31 December 2019, the assets managed by EDF Invest represent a total realisable value of €6,498 million, including €6,080 million of yield assets. Yield assets particularly include:

- 50.1% of the Group's shares in CTE, the joint venture that owns RTE, in compliance with Decree 2016-1781 of 19 December 2016 amending the Decree of 23 February 2007. These shares amount to €2,926 million at 31 December 2019 (€2,738 million at 31 December 2018), which are presented in investments in associates in the consolidated balance sheet;
- the Group's investment in Terega, Porterbrook, Autostrade per l'Italia, Q-Park and companies that own wind farms in the United Kingdom (Bicker Fen, Glass Moor II, Green Rigg, Rusholme), which are presented in debt and equity securities in the consolidated balance sheet;
- the Group's investments in Madrileña Red de Gas (MRG), Géosel, Thyssengas, Aéroports de la Côte d'Azur, Central Sicaf, Fallago Rig, Fenland, Ecowest SCI A and B, Nam Theun Power Company and companies that own solar farms (Catalina Solar, Switch) and wind farms (MiRose, Red Pine) in United States, which are presented in investments in associates in the consolidated balance sheet.

48.3 VALUATION OF EDF'S DEDICATED ASSETS

EDF's dedicated assets are included in the Group's consolidated financial statements at the following values:

		31/12/2019		31/12/2018	
(in millions of euros)	Consolidated balance sheet presentation	Book value	Realisable value	Book value	Realisable value
Yield assets (EDF Invest)		**4,304**	**6,080**	**3,919**	**5,356**
CTE	Investments in associates [1]	1,417	2,926	1,406	2,738
Other associates	Investments in associates [2]	1,563	1,777	1,167	1,234
Other unlisted assets	Debt and equity securities and other net assets [3]	1,334	1,387	1,346	1,384
Derivatives	Fair value of derivatives	(10)	(10)	-	-
Growth assets		**13,300**	**13,300**	**10,108**	**10,108**
Equities [4]	Debt securities	12,978	12,978	9,844	9,844
Unlisted equity funds (EDF Invest)	Debt securities	276	276	219	219
Derivatives	Fair value of derivatives	46	46	45	45
Fixed-income assets		**12,240**	**12,244**	**12,205**	**12,225**
Bonds	Debt securities	11,225	11,225	10,010	10,010
Unlisted debt funds (EDF Invest)	Debt securities	142	142	105	105
Cash portfolio [5]	Debt securities	188	188	30	30
CSPE receivable [6]	Loans and financial receivables	684	688	2,060	2,080
Derivatives	Fair value of derivatives	1	1	-	-
TOTAL EDF DEDICATED ASSETS		**29,844**	**31,624**	**26,232**	**27,689**

(1) The Group's investment of 50.1% of CTE, the company that holds 100% of the shares in RTE. The CTE shares are included at their equity value in the consolidated financial statements (book value in the table). The realisable value of CTE in the above table has been determined by an independent assessor, in the same way as for EDF Invest's other assets.

(2) Including the value of the share in equity of the controlled companies owning these investments.

(3) Including debt and equity securities amounting to €1,209 million and the value of the share in equity of other controlled companies.

(4) Including €391 million of securities acquired in late December 2018 for which payment took place in early January 2019.

(5) After deduction of the €391 million of liabilities on securities acquired in late December 2018 for which payment took place in early January 2019.

(6) The receivable consisting of accumulated shortfalls in compensation at 31 December 2015, less the portion assigned on 22 December 2016 and reimbursements received since then, in line with the repayment schedule. The realisable value of the CSPE receivable is estimated based on market rates.

Structured entities – Investment funds

The investment funds held by the Group (see note 1.3.2.9) reported in the table under "Debt and equity securities" are located in France and owned by EDF. The Group has not given these funds any financial support.

The value of the assets of these investment funds amounts to €8,492 million at 31 December 2019 (€4,898 million at 31 December 2018). The funds mainly consist of 12 listed funds with total value of €7,875 million (at 31 December 2018, 11 listed funds with total value of €4,340 million).

48.4 COVERAGE OF LONG-TERM NUCLEAR OBLIGATIONS

At 31 December 2019, by the regulatory calculations provisions are 105.5% covered by dedicated assets. The regulatory limit on the realisable value of certain investments (decree 2007-243) has no effect at 31 December 2019.

At 31 December 2018, by the regulatory calculations provisions were 98.3% covered by dedicated assets. The regulatory limit on the realisable value of certain investments (decree 2007-243) also had no effect at 31 December 2018.

Withdrawals from dedicated assets in 2019 totalled €442 million, equivalent to payments made in respect of the long-term nuclear obligations to be covered during the year (€403 million in 2018).

Because of changes (other than regulatory modifications) in the assumptions used to calculate long-term nuclear provisions, the required allocation to dedicated assets for 2018 amounted to €1,337 million. The administrative authorities authorised EDF to spread this allocation as follows: €540 million in 2019 and 2020, and €257 million in 2021. Allocations to dedicated assets in 2019 thus totalled €540 million in realisable value (€387 million in 2018) (see note 48.5), and took the form of shares rather than cash. At 1 January 2019, the outstanding required allocation for 2018 amounts to €797 million. In accordance with the letter received on 12 February 2020 (see note 32.1.5.1), this allocation must be made in 2020, but no allocation is required in respect of 2019.

Over a 10-year horizon, disbursements will be made to the following extent (at year-end economic conditions, i.e. in 2019 euros):

- 15% of provisions for long-term radioactive waste management;
- 11% of provisions for decommissioning.

Over a 50-year horizon, disbursements will be made to the following extent (at year-end economic conditions, i.e. in 2019 euros):

- 37% of provisions for long-term radioactive waste management;
- 93% of provisions for decommissioning.

The Group's long-term nuclear obligations in France concerned by the regulations for dedicated assets related to nuclear generation are included in the EDF group's consolidated financial statements at the following values:

(in millions of euros)	**31/12/2019**	31/12/2018
Provisions for spent fuel management – portion unrelated to the operating cycle as defined in the regulations	1,152	1,067
Provisions for long-term radioactive waste management	10,531	9,846
Provisions for waste removal and conditioning	805	751
Provisions for nuclear plant decommissioning	16,937	15,985
Provisions for last cores – portion for future long-term radioactive waste management	550	518
PRESENT COST OF LONG-TERM NUCLEAR OBLIGATIONS	**29,975**	**28,167**

48.5 CHANGES IN DEDICATED ASSETS IN 2019

Under the new strategic allocation for dedicated assets which increased the portion of unlisted assets from one quarter to one third, in December 2018 EDF SA acquired EDF International's minority interest in Nam Theun Power Company (NTPC), a hydroelectric dam in Laos, part of which was allocated to dedicated assets at that date in the EDF Invest. The rest was allocated during 2019. In December 2019 EDF SA acquired an investment in solar power plants (Catalina Solar, Switch) and wind farms (MiRose, Red Pine) in the United States from EDF Renewables US, and some of this investment was allocated to dedicated assets in the EDF Invest subgroup during 2019.

The total realisable value of assets allocated to dedicated assets in 2019 is €540 million.

Positive changes in the fair value of the dedicated asset portfolio (investment funds, equities) amounting to €2,545 million were recognised in the financial result in 2019 (see note 16.3), compared to negative changes amounting to €(989) million in 2018.

Positive changes in the fair value of the bonds in the dedicated asset portfolio amounting to €162 million were recognised in OCI in 2019 (see note 39.2), compared to negative changes amounting to €(60) million in 2018.

48.6 DEDICATED ASSETS OF FRAMATOME AND CYCLIFE FRANCE (FORMERLY SOCODEI)

The dedicated assets of Framatome and Cyclife France (formerly SOCODEI) relating to Basic nuclear facilities (INB) in France have realisable values of €92 million and €54 million respectively and the degree of coverage of provisions according to the regulations is 110.1% for Framatome and 113.4% for Cyclife France (calculated using EDF group discount and inflation rates for nuclear provisions in France – see note 32).

These two entities' long-term nuclear obligations in France concerned by the regulations for dedicated assets are included in the EDF group's consolidated financial statements at the amounts of €83 million for Framatome and €48 million for Cyclife France (see note 33).

NOTE 49 OFF-BALANCE SHEET COMMITMENTS

This note presents off-balance sheet commitments given and received by the Group at 31 December 2019. The amounts of commitments correspond to non-discounted contractual values.

49.1 COMMITMENTS GIVEN

The table below shows off-balance sheet commitments given by the Group that have been valued. Other commitments are described separately in the detailed notes.

(in millions of euros)	Notes	31/12/2019	31/12/2018
Operating commitments given	49.1.1	41,110	45,370
Investment commitments given	49.1.2	18,237	17,572
Financing commitments given	49.1.3	6,343	5,494
TOTAL COMMITMENTS GIVEN		65,690	68,436

In almost all cases, these are reciprocal commitments, and the third parties concerned are under a contractual obligation to supply the Group with assets or services related to operating, investment and financing activities.

49.1.1 Operating commitments given

Operating commitments given by the Group at 31 December 2019 are as follows:

(in millions of euros)	31/12/2019	31/12/2018
Fuel and energy purchase commitments (1)	25,373	26,878
Operating contract performance commitments given	15,248	14,117
Operating lease commitments as lessee	489	4,375
TOTAL OPERATING COMMITMENTS GIVEN	41,110	45,370

(1) Excluding gas purchases and related services.

49.1.1.1 Fuel and energy purchase commitments

In the course of its ordinary generation and supply activities, the Group has entered into long-term contracts for purchases of electricity, gas, other energies and commodities and nuclear fuel, for periods of up to 20 years.

The Group has also entered into long-term purchase contracts with a certain number of electricity producers, by contributing to the financing of power plants.

At 31 December 2019, fuel and energy purchase commitments mature as follows:

	31/12/2019					31/12/2018
	Total	Maturity				Total
(in millions of euros)		< 1 year	1-5 years	5-10 years	> 10 years	
Electricity purchases and related services [1]	9,999	2,305	3,614	2,157	1,923	10,368
Other energy and commodity purchases [2]	281	62	144	75	-	377
Nuclear fuel purchases	15,093	1,580	6,142	4,771	2,600	16,133
FUEL AND ENERGY PURCHASE COMMITMENTS	**25,373**	**3,947**	**9,900**	**7,003**	**4,523**	**26,878**

(1) Including commitments given by controlled entities to joint ventures, amounting to €569 million at 31 December 2019 (€604 million at 31 December 2018).
(2) Excluding gas purchases and related services – see note 49.1.1.1.4.

49.1.1.1.1 Electricity purchases and related services

Electricity purchase commitments mainly concern EDF and EDF Energy. In the case of EDF many of these commitments are borne by the Island Energy Systems (SEI), which have made commitments to purchase the electricity generated using bagasse and coal.

In addition to the obligations reported above and under Article 10 of the Law of 10 February 2000, in mainland France, EDF is obliged, at the producer's request and subject to compliance with certain technical features, to purchase the power produced by co-generation plants and renewable energy generation units (wind turbines, small hydro-electric plants, photovoltaic power, etc). The additional costs generated by this obligation are offset, after validation by the CRE, by the CSPE. These purchase obligations total 57TWh for 2019 (53TWh for 2018), including 7TWh for co-generation (7TWh for 2018), 30TWh for wind power (26TWh for 2018), 11TWh for photovoltaic power (9TWh for 2018) and 3TWh for hydropower (3TWh for 2018).

49.1.1.1.2 Other energy and commodity purchases

Purchase commitments for other energies and commodities mainly concern coal and oil used to operate the fossil-fired plants, and purchases of biomass fuel used by Dalkia in the course of its business.

49.1.1.1.3 Nuclear fuel purchases

Commitments for purchases of nuclear fuel arise from supply contracts for the nuclear plants intended to cover the EDF group's needs for uranium and fluoration, enrichment and fuel assembly production services.

49.1.1.1.4 Gas purchases and related services

Gas purchase commitments are principally undertaken by Edison and EDF. The volumes concerned for both entities at 31 December 2019 are as follows:

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in billions of m^3)		< 1 year	1-5 years	> 5 years	
Edison	135	12	44	79	140
EDF	24	2	6	16	22

Gas purchase contracts

Edison has entered into agreements to import natural gas from Russia, Libya, Algeria and Qatar, for a total maximum volume of 12.4 billion m^3 per year. The residual terms of these contracts vary between 1 and 15 years.

The contract with Algeria was renewed in 2019 for 1 billion m^3 per year until 2027. The long-term contract for gas from Russia terminated in 2019 and Edison signed a new contract for 1 billion m^3 per year for 2020.

EDF has entered into an import contract for LNG from the United States, concerning an annual supply of 0.7 million tonnes of LNG (1 billion m^3 of natural gas per year) for a 20-year period beginning in May 2020.

Gas-related service contracts

Under the contract with Terminale GNL Adriatico, Edison also benefits from approximately 80% of the terminal's regasification capacities until 2034.

Under the contract with the Dunkerque LNG methane terminal, EDF benefits from approximately 61% of the terminal's regasification capacities until 2037, in return for payment of an annual premium of approximately €150 million. A provision for onerous contracts has been recorded in connection with this contract.

Other commitments and risks

Edison has recently signed two significant purchase contracts for gas from Azerbaijan (1 billion m^3 per year), with deliveries scheduled to start in 2021, and LNG from the United States (1 million tonnes per year), with deliveries scheduled to start in 2023.

49.1.1.2 Operating contract performance commitments given

At 31 December 2019, these commitments mature as follows:

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
Operating guarantees given	7,349	2,243	2,133	2,973	7,047
Operating purchase commitments [1]	7,594	4,100	2,717	777	6,898
Other operating commitments	305	82	131	92	172
OPERATING CONTRACT PERFORMANCE COMMITMENTS GIVEN [2]	**15,248**	**6,425**	**4,981**	**3,842**	**14,117**

(1) Excluding fuel and energy.
(2) Including commitments given by controlled entities to joint ventures, amounting to €1,019 million at 31 December 2019 (€982 million at 31 December 2018).

In the course of its business, the Group provides contract performance guarantees, generally through the intermediary of banks.

Operating guarantees given at 31 December 2019 mainly consist of guarantees given by EDF, Edison and EDF Renewables in connection with its development projects.

49.1.1.2.1 Operating guarantees given

Operating guarantees given are as follows:

(in millions of euros)	31/12/2019	31/12/2018
EDF	2,081	2,038
EDF Renewables	1,612	1,677
Edison	1,319	1,262
EDF Energy	912	795
Framatome	552	517
Other entities	873	758
TOTAL	**7,349**	**7,047**

49.1.1.2.2 Operating purchase commitments

Operating purchase commitments are as follows:

(in millions of euros)	31/12/2019	31/12/2018
EDF	3,028	2,533
Framatome	1,880	2,024
Enedis	829	764
EDF Energy	613	524
Other entities	1,244	1,053
TOTAL	7,594	6,898

49.1.1.3 Lease commitments as lessee

At 31 December 2019, lease commitments as lessee break down as follows:

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
LEASE COMMITMENTS AS LESSEE	489	67	222	200	4,375

From 1 January 2019, most existing leases are recognised in the balance sheet in application of IFRS 16, while at 31 December 2018 they were reported as off-balance sheet commitments.

The residual off-balance sheet lease commitments amounted to €434 million at 1 January 2019 (see note 2.1.1).

The only remaining off-balance sheet lease commitments are:

- Leases that are exempt from recognition in application of IFRS 16. The total amount concerned at 31 December 2019 is €211 million (€105 million at 31 December 2018).
- Leases of assets that have not yet been made available to the Group (principally real estate and LNG tankers under construction). The right-of-use assets and the lease liability will be recognised in the balance sheet when the leased asset is made available. The total amount concerned at 31 December 2019 is €278 million (€329 million at 31 December 2018).

49.1.2 Investment commitments given

At 31 December 2019, details of investment commitments are as follows:

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
Commitments related to acquisition of tangible and intangible assets	17,430	9,422	7,245	763	16,545
Commitments related to acquisition of financial assets	583	54	431	98	746
Other commitments related to investments	224	184	40	-	281
TOTAL INVESTMENT COMMITMENTS GIVEN [1]	18,237	9,660	7,716	861	17,572

(1) Including commitments given by controlled entities to joint ventures, amounting to €265 million at 31 December 2019 (€399 million at 31 December 2018).

49.1.2.1 Commitments related to acquisition of tangible and intangible fixed assets

The commitments related to acquisition of tangible and intangible fixed assets are as follows:

(in millions of euros)	31/12/2019	31/12/2018
EDF	4,654	4,715
EDF Energy	6,466	6,082
Enedis	2,555	3,092
EDF Renewables	2,437	1,622
Framatome	517	587
Other entities	801	447
TOTAL	17,430	16,545

The increase in commitments given related to acquisition of tangible and intangible fixed assets is mainly explained by the projects in development, notably EDF Renewables projects in the United States, Brazil and India, Edison's Marghera levante thermoelectric plant project, and a rise in commitments associated with EDF Energy's HPC project. The decrease in Enedis' commitments is due to further progress on the rollout of Linky meters.

49.1.2.2 Commitments related to acquisition of financial assets

The main share purchase commitments that cannot be valued concern Luminus.

Luminus signed an amendment to the shareholder pact on 26 October 2015 defining a liquidity clause for the investments held by its minority shareholders, which could, in certain conditions under the control of EDF, result in sale of their shares through an IPO, or purchase of their shares by the Group at market value. This liquidity clause is valid at all times from 1 July 2018 to 31 December 2025.

Regarding the investment in EDF Investissements Groupe (EIG), C3 (a fully-owned EDF subsidiary) and NBI (Natixis Belgique Investissement, a subsidiary of the Natixis group) amended the agreements for their investment in EIG on 19 December 2018.

C3 now has a call option to buy EIG shares held by NBI at a fixed price, exercisable at any time until May 2026. Meanwhile, NBI has a put option to sell EDF all of its EIG shares for a fixed amount of cash, exercisable subject to certain conditions between February 2024 and May 2025.

Due to their features, in compliance with IAS 32, NBI's put option and C3's call option are considered as derivatives and their net value is included in the positive or negative fair value of trading derivatives. At 31 December 2019, the fair value of these trading derivatives is not significant.

49.1.2.3 Other commitments related to investments

Other commitments given related to investments at 31 December 2019 mainly comprise guarantees given by EDF Norte Fluminense in connection with its 51% investment in CES, the company in charge of constructing and operating a hydroelectric dam on the Teles Pires river in Brazil.

49.1.3 Financing commitments given

Financing commitments given by the Group at 31 December 2019 comprise the following:

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
Security interests in real property	4,587	231	1,998	2,358	4,226
Guarantees related to borrowings	1,314	77	475	762	974
Other financing commitments	442	426	5	11	294
TOTAL FINANCING COMMITMENTS GIVEN [1]	6,343	734	2,478	3,131	5,494

(1) Including commitments given by controlled entities to joint ventures, amounting to €1,225 million at 31 December 2019 (€917 million at 31 December 2018). These financing commitments to joint ventures mainly concern EDF Renewables.

Security interests and assets provided as guarantees mainly concern pledges or mortgages of tangible assets and shares representing investments in consolidated subsidiaries which own property, plant and equipment, for EDF Renewables.

49.2 COMMITMENTS RECEIVED

The table below shows off-balance sheet commitments received by the Group that have been valued. Other commitments received are described separately in the detailed notes.

(in millions of euros)	Notes	31/12/2019	31/12/2018
Operating commitments received [1]	49.2.1	9,291	9,539
Investment commitments received	49.2.2	181	183
Financing commitments received	49.2.3	22	31
Total commitments received [2]		9,494	9,753

(1) Excluding commitments related to supplies of energy and related services (see note 49.2.1.4)
(2) Excluding commitments related to credit lines, which are described in note 41.2.5.

49.2.1 Operating commitments received

Operating commitments received by the Group at 31 December 2019 comprise the following:

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
Operating lease commitments as lessor	770	118	414	238	678
Operating sale commitments	6,706	1,911	3,733	1,062	7,004
Operating guarantees received	1,756	962	560	234	1,791
Other operating commitments received	59	21	20	19	66
OPERATING COMMITMENTS RECEIVED	9,291	3,012	4,727	1,553	9,539

49.2.1.1 Operating lease commitments as lessor

The Group benefits from commitments as lessor in operating leases amounting to €770 million.

These commitments mainly concern the Asian Independent Power Projects (IPPs) and real estate leases.

49.2.1.2 Operating sale commitments

Operating sale commitments received exclude energy deliveries and principally concern firm orders made through contracts recorded on a percentage-of-completion basis at Framatome (construction and engineering contracts) and EDF Renewables (agreements for operation services, maintenance services, and development and sale of structured assets).

49.2.1.3 Operating guarantees received

Operating guarantees received primarily concern EDF and relate to guarantees received from suppliers, particularly in connection with deliveries under the ARENH system.

49.2.1.4 Electricity supply commitments

In the course of its business, the EDF group has signed long-term contracts to supply electricity as follows:

- long-term contracts with a number of European electricity operators, for a specific plant or for a defined group of plants in the French nuclear generation fleet, corresponding to installed power capacity of 3.5GW;
- in execution of France's NOME Law on organisation of the French electricity market, EDF has a commitment to sell some of the energy generated by its existing nuclear power plants to other suppliers. This covers volumes of up to 150TWh each year until 31 December 2025.

49.2.2 Investment commitments received

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
INVESTMENT COMMITMENTS RECEIVED	181	60	121	-	183

Under the terms of the agreement signed with Exelon on 29 July 2013 and finalised on 1 April 2014, EDF had an option to sell its investment in CENG to Exelon at fair value, exercisable between January 2016 and June 2022. On 20 November 2019 EDF notified Exelon that it had decided to exercise this option (see note 3.2.2).

49.2.3 Financing commitments received

	31/12/2019				31/12/2018
	Total	Maturity			Total
(in millions of euros)		< 1 an	1-5 years	> 5 years	
FINANCING COMMITMENTS RECEIVED	22	6	6	10	30

NOTE 50 CONTINGENT LIABILITIES

In addition to the matters reported in note 4.2 and 4.3, the principal contingent liabilities at 31 December 2019 are the following.

50.1 TAX INSPECTIONS

EDF

For the period 2008 to 2017, EDF was notified of proposed tax adjustments, notably concerning the tax-deductibility of certain long-term liabilities. This recurrent reassessment, which is applied for each year, represents a cumulative financial risk of some €556 million in income taxes at 31 December 2019. In two rulings made in 2017 and another in 2019, Montreuil Administrative Court recognised the tax-deductibility of these liabilities and validated the position taken by the Company. The Minister appealed against two of these rulings. In January 2020, the Versailles Administrative Court upheld EDF's position for the year 2008.

For the years 2012 to 2017, the French tax authorities notified the Company of certain recurrent tax reassessments concerning the *Contribution sur la Valeur ajoutée des Entreprises* (tax on corporate value added) and questioned the deductibility of long-term provisions.

EDF International

Following the tax inspections of EDF International for the years 2009 to 2014, the French tax authorities questioned the valuation of the bond convertible into shares issued to refinance the acquisition of British Energy.

The total amount concerned is approximately €310 million. EDF International has contested this reassessment, and considers it has good chances of winning the dispute.

In a judgement of 2 July 2019, Montreuil Administrative Court confirmed the related tax readjustments for the period 2009-2013. The company has therefore paid the tax in execution of this decision, which it has also appealed. The amount concerned has been recorded in deferred tax assets, in accordance with IFRIC 23 (see note 17.3).

50.2 LABOUR LITIGATION

EDF and its subsidiaries are party to a number of labour lawsuits. The Group considers that none of these lawsuits, individually, is likely to have a significant impact on its financial results or financial position. However, because they relate to situations that could concern a large number of EDF's employees in France, any increase in such litigations could have a potentially negative impact on the Group's financial position.

50.3 LITIGATION WITH PHOTOVOLTAIC PRODUCERS

Announcements in 2010 of a cut in electricity purchase tariffs triggered an upsurge, particularly in August 2010, in connection applications submitted to distribution network operators in mainland France and in zones not interconnected to the mainland national grid (since at the time the applicable tariff depended on the date at which a complete connection application was filed). By a decree of 9 December 2010 (the "moratorium decree") the Government suspended the conclusion of new contracts with purchase obligations for a three-month period, and stated that any applications not approved by 2 December 2010 would have to be resubmitted at the end of this three-month period, based on a new decision fixing the purchase price for photovoltaic electricity. That tariff decision was issued on 4 March 2011, and significantly reduced the electricity purchase prices. A tender system was developed in parallel.

A ruling given by the French Council of State on 16 November 2011 rejecting appeals against the moratorium decree generated a large volume of legal proceedings against Enedis and EDF in late 2011 which continued through 2012, 2013, 2014 and 2015. Since March 2016, new actions for compensation in relation with the photovoltaic moratorium are definitively barred.

Most of these legal proceedings were initiated by electricity producers who argued that they were forced to abandon their projects because the new electricity purchase tariffs made operating conditions less favourable. These producers consider the network operators responsible for this situation, on the grounds that they did not issue the technical and financial connection proposals in time for them to benefit from more advantageous electricity purchase terms.

The first instance and appeal court rulings given have varied in their reasoning and verdicts: some have rejected all claims while others have awarded indemnities, which have generally been smaller than the amounts initially claimed.

In December 2015 Versailles Appeal Court decided to apply to the Court of Justice of the European Union (CJEU) for a preliminary ruling on the point of whether the tariff decisions of 2006 and 2010 complied with European law on State aid.

This application was considered irreceivable for procedural reasons. On 20 September 2016, Versailles Appeal Court made another application to the CJEU for a preliminary ruling on the same point, and decided to suspend its own ruling. In an order of 15 March 2017, the CJEU confirmed that the decisions of 10 July 2006 and 12 January 2010 setting the purchase tariffs for photovoltaic electricity constituted "intervention by the State or using State resources", one of the four criteria that characterise State aid. The Court stated that such a support measure, implemented without prior notification to the Commission, is illegal, and concluded that it was now up to the national courts to act accordingly, particularly by banning application of these illegal decisions.

Several courts found in favour of Enedis during 2018. Notably, in early July 2018 Versailles Appeal Court dismissed 150 producers' claims, because there was no evidence establishing misconduct by Enedis, or because there was no causal link between Enedis' misconduct and the prejudice, or because the prejudice was not deemed eligible for compensation since the tariff decisions of 2006 and 2010 are illegal, as the European Commission did not receive the prior notification required by State aid control rules. Appeals were filed before the Court of Cassation against most of these decisions. On 18 September 2019, the French Court of Cassation issued several decisions rejecting claims concerning both Enedis and EDF, judging the aid illegal because the tariff decisions were not notified to the

European Commission as required by article 108 of the TFEU. Consequently, the Court of Cassation concluded that the prejudice of producers who could not benefit from that aid is deemed not legally reparable.

In parallel to the compensation claims before civil courts, EDF and Enedis sought to apply their Civil Liability insurance policy, but the insurers refused their claim. The French Court of Cassation considered in a ruling of 9 June 2015 (for the Green Yellow case) that the insurance payment was due and that the distribution network operator was at fault. Following that ruling, Enedis and EDF brought action against their insurers in April 2017, applying to the courts for formal recognition of two partial serial claims. If the courts were to recognise the existence of two partial serial claims, a single excess and a single limit would apply for all claims with the same technical cause.

50.4 EDISON – SALE OF AUSIMONT (BUSSI)

Several legal actions were begun following the sale of the Ausimont SpA industrial complex to Solvay Solexis SpA in 2002. The criminal proceedings are now closed, but several proceedings are still ongoing:

- two administrative cases:
  - on 28 February 2018, the Province of Pescara notified Solvay Speciality Polymers Italy SpA (formerly Solvay Solexis SpA) and Edison SpA of the launch of an administrative procedure to determine who was responsible for the pollution of the land outside the industrial complex belonging to Ausimont SpA which had been sold. The Province also ordered Edison SpA to remove waste that was on the land concerned. Following rejection of Edison's appeal before Pescara regional administrative court, Edison lodged an appeal against the decision with the Italian Council of State. These proceedings are ongoing.
  - in an announcement of 18 December 2019, the Province of Pescara ordered Edison SpA to clean up the land located inside the industrial complex. Edison intends to challenge this order before Pescara regional administrative court;
- one arbitration case: in 2012, arbitration proceedings were launched by Solvay SA and Solvay Specialty Polymers Italy SpA for violation of the representations and warranties in environmental matters concerning the Bussi and Spinetta Marengo sites contained in the agreement for the sale of Agora SpA (the company that controls Ausimont SpA), which was signed in December 2001 between Montedison SpA and Longside International SA, and Solvay Solexis SpA (Solvay Specialty Polymers Italy SpA). After a phase of preliminary questions and applications for preliminary rulings, this procedure is continuing with examination of the merits of the parties' claims.
- one civil case: on 8 April 2019, the Italian Ministry for the Environment brought a civil action against Edison, claiming damages for environmental disaster. These proceedings are ongoing.

50.5 ENEDIS – QUADLOGIC

On 24 February 2016, Enedis received a summons for proceedings brought before the Paris Regional Court by an American company, Quadlogic Controls Corporation (QCC), for alleged infringement of a European patent held by QCC. Enedis strongly contests both QCC's inventive input and the alleged infringement.

In November 2017, the Paris Regional Court ruled in favour of Enedis and cancelled QCC's European patent in France. QCC filed an appeal against this ruling on 12 March 2018. The matter is currently before the Paris Appeal Court.

NOTE 51 RELATED PARTIES

Details of transactions with related parties are as follows:

	Associates and joint ventures		Joint operations		French State or State-owned entities [1]		Group Total	
(in millions of euros)	**31/12/2019**	31/12/2018	**31/12/2019**	31/12/2018	**31/12/2019**	31/12/2018	**31/12/2019**	31/12/2018
Sales	455	560	-	-	1,889	1,708	2,344	2,268
Energy purchases	4,063	4,071	4	5	2,104	2,031	6,171	6,107
External purchases	18	4	3	3	253	251	274	258
Financial assets	150	294	-	-	-	-	150	294
Other assets	633	730	-	-	532	486	1,165	1,216
Financial liabilities	-	-	-	-	-	-	-	-
Other liabilities	1,228	1,162	1	1	624	631	1,853	1,794

(1) Excluding tax and social liabilities and the CSPE receivable.

51.1 TRANSACTIONS WITH ENTITIES INCLUDED IN THE SCOPE OF CONSOLIDATION

Transactions with the principal associates (CTE, (the company that owns RTE), CENG and Taishan) are presented in note 26.

Transactions with other associates, joint ventures, and partner entities in joint arrangements with the Group mainly consist of sales and purchases of energy.

51.2 RELATIONS WITH THE FRENCH STATE AND STATE-OWNED ENTITIES

51.2.1 Relations with the French State

The French State holds 83.58% of the capital of EDF at 31 December 2019, and is thus entitled in the same way as any majority shareholder to control decisions that require approval by the shareholders.

In accordance with the legislation applicable to all companies having the French State as their majority shareholder, the EDF group is subject to certain inspection procedures, in particular economic and financial inspections by the State, audits by the French Court of Auditors (Cour des Comptes) or Parliament, and verifications by the French General Finance Inspectorate (Inspection générale des finances).

The public service contract between the French State and EDF was signed on 24 October 2005. This contract is intended to form the framework for public service missions assigned to EDF by the lawmaker for an unlimited period. The Law of 9 August 2004 does not stipulate the duration of the contract.

51.2.2 Relations with GRDF

The common service function shared by Enedis and GRDF is defined by Article L. 111-71 of the French Energy Code. Its missions in the electricity and gas distribution sector are building structures, site project management, network operation and maintenance, and metering operations. This service is not a legal entity in its own right.

Enedis and GRDF's relations in this common service are governed by an agreement that defines the scope of the service and the resulting division of costs. The agreement has an unlimited term and can be terminated at any time subject to 18 months notice: in such a case, the parties undertake to renegotiate the agreement during the notice period. It is updated regularly.

In July 2014, Enedis and GRDF issued a joint announcement that their joint activities of meter reading and work on meter panels would be discontinued in the future. Currently, Enedis prioritises a structure consisting of regional divisions covering all its operational missions at local level. A network of smaller units is used for very local activities.

In March 2018, Enedis and GRDF reorganised some of their joint operations by creating two mixed entities: one handles employment contracts, studies and medical/social matters and the other is the IT and telecoms operator for all telephone and office technology activities. These two entities took effect from 1 January 2019.

The support functions for Real Estate, Vehicles and Machines, Litigation and Insurance, Training and Recruitment, and Office purchases, which were previously combined, are now handled separately by each of the two companies.

51.2.3 Relations with public sector entities

The EDF group's relations with public sector entities mainly concern the two entities belonging to the former AREVA group (Orano and AREVA SA).

Transactions with Orano concern:

- the front-end of the nuclear fuel cycle (uranium supplies, conversion and enrichment services);
- the back-end of the nuclear fuel cycle (transportation, storage, processing and recycling services for spent fuel).

Front-end of the cycle

Several important long-term agreements were negotiated between EDF and Orano:

- for supplies of natural uranium: Orano Mining contracts;
- for fluoration: an Orano cycle contract;
- for enrichment of natural uranium into uranium 235: an Orano Cycle contract.

Back-end of the cycle

Relations between EDF and Orano concerning transportation, processing and recycling of spent fuels are described in note 32.1.1.

51.3 MANAGEMENT COMPENSATION

The Company's key management and governance personnel are the Chairman and CEO, the members of the COMEX (Executive Committee) throughout 2019 or since their date of appointment if they joined the COMEX during the year, and the Directors. Directors representing the employees receive no remuneration for their services.

The total compensation paid by EDF and controlled companies to the Group's key management and governance personnel amounted to €12.6 million in 2019 (€12.4 million in 2018). This amount covered short-term benefits (basic salaries, performance-related salary, profit share and benefits in kind), special IEG post-employment benefits where relevant, and the corresponding employer contributions, plus any director's fees.

EDF's key management and governance personnel benefit from no special pension system, starting bonus or severance payment entitlement except by contractual negotiation. EDF's Chairman and CEO could benefit from a termination indemnity if his term of office were ended.

NOTE 52 SUBSEQUENT EVENTS

No developments have occurred since the year-end in addition to those presented in other notes.

NOTE 53 SCOPE OF CONSOLIDATION AT 31 DECEMBER 2019

The Group's activities are defined as follows:

- **"Generation/Supply"** (G)**:** energy generation and energy sales to industry, local authorities, small businesses and residential consumers. This segment also includes EDF's commodity trading activities;
- **"Distribution"** (D)**:** management of the low and medium-voltage public electricity distribution networks;
- **"Transmission"** (T): operation, maintenance and development of the high-voltage and very-high-voltage electricity transmission networks;
- **"Reactors and Services (Framatome)"** (R): services and production of equipment and fuel for nuclear reactors;
- **"Other"** (O)**:** energy services (district heating, thermal energy services, etc.) for industry and local authorities, and new businesses mainly aimed at boosting electricity generation through cogeneration and renewable energy sources (e.g. wind turbines, photovoltaic panels, etc.). This activity also includes EDF Invest's holding companies and entities that are classified as dedicated assets.

53.1 FULLY CONSOLIDATED COMPANIES

France–Generation and Supply		Percentage of ownership at 31/12/2019	Percentage of ownership at 31/12/2018	Business sector
Electricité de France – Parent Company		100.00	100.00	G,D,O
Group Support Services (G2S)		100.00	100.00	O
Edvance		95.10	95.10	O
Cyclife France (formerly Société pour le Conditionnement des Déchets et Effluents Industriels (SOCODEI)) (1)		-	100.00	O
Cyclife (1)		100.00	-	O
CHAM SAS		100.00	100.00	O
Sowee		100.00	100.00	O
IZI Solutions		100.00	-	O
ENRS		100.00	-	O
Immo C47		51.00	51.00	O
Other holding companies (EDF Invest)		100.00	100.00	O
France – Regulated activities				
Enedis		100.00	100.00	D
Electricité de Strasbourg		88.64	88.64	G, D
EDF Production Electrique Insulaire (EDF PEI)		100.00	100.00	G
Framatome				
Framatome	France	75.50	75.50	R
United Kingdom				
EDF Energy Holdings Limited (EDF Energy)		100.00	100.00	G, O
EDF Energy UK Ltd.		100.00	100.00	O
EDF Development Company Ltd.		100.00	100.00	O
Italy				
Edison SpA (Edison)		97.45	97.45	G, O
Transalpina di Energia SpA (TdE SpA)		100.00	100.00	O
Other international				
EDF International SAS	France	100.00	100.00	O
EDF Belgium SA	Belgium	100.00	100.00	G
Luminus SA (formerly EDF Luminus SA)	Belgium	68.63	68.63	G, O
EDF Norte Fluminense SA	Brazil	100.00	100.00	G
Ute Paracambi SA	Brazil	100.00	100.00	G
French Investment Guangxi Laibin Electric Power Co, Ltd. (Figlec)	China	100.00	100.00	G
EDF (China) Holding Ltd.	China	100.00	100.00	O
EDF Inc.	USA	100.00	100.00	O
EDF Alpes Investissements SARL	Switzerland	100.00	100.00	O
Mekong Energy Company Ltd. (MECO)	Vietnam	56.25	56.25	G
EDF Andes Spa (formerly EDF Chile Spa)	Chile	100.00	100.00	G

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

(1) Cyclife France (formerly SOCODEI) is included in the Cyclife subgroup from 2019.

EDF Renewables		Percentage of ownership at 31/12/2019	Percentage of ownership at 31/12/2018	Business sector
EDF Renewables	France	100.00	100.00	G,O
Dalkia				
Dalkia	France	99.94	99.94	O
Other activities				
EDF Développement Environnement SA	France	100.00	100.00	O
Société Française d'Ingénierie Electronucléaire et d'Assistance (SOFINEL) (1)	France	-	88.98	O
EDF IMMO and real estate subsidiaries	France	100.00	100.00	O
Société C2 (2)	France	-	100.00	O
Société C3	France	100.00	100.00	O
EDF Holding SAS	France	100.00	100.00	O
Citelum	France	100.00	100.00	O
EDF Trading Ltd.	UK	100.00	100.00	O
Wagram Insurance Company DAC	Ireland	100.00	100.00	O
EDF Investissements Groupe SA	Belgium	93.89	93.89	O
Océane Re	Luxembourg	99.98	99.98	O
EDF Gas Deutschland GmbH	Germany	100.00	100.00	O

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

(1) Société Française d'Ingénierie Electronucléaire et d'Assistance (SOFINEL) has been liquidated.
(2) Société C2 has been merged with Société C3.

53.2 COMPANY HELD IN THE FORM OF A JOINT OPERATION

Other activities		Percentage of ownership at 31/12/2019	Percentage of ownership at 31/12/2018	Business sector
Friedeburger Speicherbetriebsgesellschaft GmbH (Crystal)	Germany	50.00	50.00	O

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

53.3 COMPANIES ACCOUNTED FOR BY THE EQUITY METHOD

France –Generation and Supply		Percentage of ownership at 31/12/2019	Percentage of ownership at 31/12/2018	Business sector
Domofinance	France	45.00	45.00	O
CTE (EDF Invest) [1]	France	50.10	50.10	O
Elisandra IV (Madrileña Red de Gas Holding) (EDF Invest)	Spain	20.00	20.00	O
Alba Real Estate SCS (EDF Invest)	Luxembourg	24.66	46.50	O
Géosel Manosque (EDF Invest)	France	38.35	38.35	O
Transport Stockage Hydrocarbures (TSH) (EDF Invest)	France	50.00	50.00	O
Central Sicaf (EDF Invest)	Italy	24.50	24.50	O
Thyssengaz (EDF Invest)	Germany	50.00	50.00	O
Aéroports Côte d'Azur (EDF Invest)	France	19.40	19.40	O
Ecowest SCI A and B (EDF Invest)	France	50.00	50.00	O
Fallago Rig (EDF Invest)	United Kingdom	20.00	20.00	G
Fenland Wind Farm (EDF Invest)	United Kingdom	20.00	20.00	G
Catalinar Solar (EDF Invest)	USA	50.00	-	G
Switch (EDF Invest)	USA	50.00	-	G
MiRose (EDF Invest)	USA	50.00	-	G
Red Pine (EDF Invest)	USA	50.00	-	G
Other international				
Compagnie Énergétique de Sinop (CES)	Brazil	51.00	51.00	G
Constellation Energy Nuclear Group LLC (CENG)	USA	49.99	49.99	G
SLOE Centrale Holding BV	Netherlands	50.00	50.00	G
Shandong Zhonghua Power Company, Ltd.	China	19.60	19.60	G
Datang Sanmenxia Power Generation Co., Ltd.	China	35.00	35.00	G
Taishan Nuclear Power Joint Venture Company Ltd. (TNPJVC)	China	30.00	30.00	G
Jiangxi Datang International Fuzhou Power Generation Company Ltd.	China	49.00	49.00	G
Nam Theun 2 Power Company (NTPC) (EDF Invest)	Laos	40.00	40.00	G
Alpiq [2]	Switzerland	-	25.04	G, D T, O
Generadora Metropolitan (GM) (formerly Central El Campesino SpA)	Chile	50.00	-	G
Nachtigal Hydro Power Company	Cameroon	40.00	-	G

Business segments: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

(1) Coentreprise de Transport d'Electricité or CTE, the company holding 100% of RTE.
(2) Alpiq was sold on 28 May 2019 (see note 3.2.1).

53.4 COMPANIES IN WHICH THE EDF GROUP'S VOTING RIGHTS DIFFER FROM ITS PERCENTAGE OWNERSHIP

The percentage of voting rights, which is decisive for assessing control, differs from the Group's percentage ownership for the following entities:

	Percentage of ownership at 31/12/2019	Percentage of voting rights at 31/12/2019
Edison SpA	97.45	99.48
EDF Investissements Groupe SA	93.89	50.00

NOTE 54 STATUTORY AUDITORS' FEES

The following table sets forth the fees paid for work done by the Statutory Auditors and their network during 2019:

	Deloitte network		KPMG network	
(in thousands of euros)	Amount (excluding taxes)	%	Amount (excluding taxes)	%
Audit –Statutory audit, certification, review of company and consolidated accounts				
EDF	2,709	19.2	2,822	17.1
Controlled entities [1]	8,104	57.4	11,654	70.6
Sub-total	10,813	76.6	14,476	87.7
Non-audit services [2]				
EDF	883	6.3	867	5.3
Controlled entities [1]	2,425	17.1	1,152	7.0
Sub-total	3,308	23.4	2,020	12.3
TOTAL	14,121	100	16,496	100

(1) Fully consolidated subsidiaries and jointly controlled entities whose auditors' fees are included in the consolidated income statement.
(2) Services required by laws and regulations, and services supplied at the request of the Group. Non-audit services mainly correspond to (i) certifications of financial and accounting information or Independent Reports on social, environmental and societal information required under Article L. 225-102-1 of the French Commercial Code, (ii) services relating to disposals of entities, (iii) tax services authorised by local legislation, and (iv) operating process reviews and information system consulting services that are unrelated to the production of accounting and financial information.

Statutory Auditors' fees for 2018

The following table sets forth the fees paid for work done by the Statutory Auditors and their network during 2018:

	Deloitte network		KPMG network	
(in thousands of euros)	Amount (excluding taxes)	%	Amount (excluding taxes)	%
Audit –Statutory audit, certification, review of company and consolidated accounts				
EDF	3,133	21.1	2,954	18.2
Controlled entities	7,249	48.8	10,839	66.9
Sub-total	10,382	69.9	13,793	85.1
Non-audit services				
EDF	397	2.7	772	4.8
Controlled entities	4,071	27.4	1,640	10.1
Sub-total	4,468	30.1	2,412	14.9
TOTAL	14,850	100	16,204	100