CONSOLIDATED FINANCIAL STATEMENTS

AT 31 DECEMBER 2021

CONSOLIDATED INCOME STATEMENT

(in millions of euros)	Notes	2021	2020
Sales	5.1	84,461	69,031
Fuel and energy purchases	5.2	(44,299)	(32,425)
Other external expenses[1]		(8,595)	(8,461)
Personnel expenses	5.3	(14,494)	(13,957)
Taxes other than income taxes		(3,330)	(3,797)
Other operating income and expenses	5.4	4,262	5,783
Operating profit before depreciation and amortisation	**5**	**18,005**	**16,174**
Net changes in fair value on energy and commodity derivatives, excluding trading activities	6	(215)	(175)
Net depreciation and amortisation[2]		(10,789)	(10,838)
(Impairment)/reversals	10.8	(653)	(799)
Other income and expenses	7	(1 123)	(487)
Operating profit		**5,225**	**3,875**
Cost of gross financial indebtedness	8.1	(1,459)	(1,610)
Discount effect	8.2	(2,670)	(3,733)
Other financial income and expenses	8.3	4,489	2,761
Financial result	**8**	**360**	**(2,582)**
Income before taxes of consolidated companies		**5,585**	**1,293**
Income taxes	9	(1,400)	(945)
Share in net income of associates and joint ventures	12	644	425
Net income of discontinued operations	3.2	(1)	(158)
CONSOLIDATED NET INCOME		**4,828**	**615**
EDF net income		**5,113**	**650**
EDF net income - continuing operations		5,114	804
EDF net income - discontinued operations		(1)	(154)
Net income attributable to non-controlling interests		**(285)**	**(35)**
Net income attributable to non-controlling interests - continuing operations		(285)	(31)
Net income attributable to non-controlling interests - discontinued operations		-	(4)
Earnings per share (EDF share) in euros:	**14.7**		
Basic earnings per share		1.46	0.05
Diluted earnings per share		1.36	0.05
Basic earnings per share of continuing operations		1.46	0.10
Diluted earnings per share of continuing operations		1.36	0.10

(1) Other external expenses are reported net of capitalised production costs.

(2) Including net increases in provisions for renewal of property, plant and equipment operated under concessions.

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

(in millions of euros)	Notes	2021 EDF net income	2021 Net income attributable to non-controlling interests	2021 Total	2020 EDF net income	2020 Net income attributable to non-controlling interests	2020 Total
Consolidated net income		**5,113**	**(285)**	**4,828**	**650**	**(35)**	**615**
Fair value of cash flow hedges							
Fair value of cash flow hedges - gross change	18.7.5	(3,292)	(33)	(3,325)	(711)	(8)	(719)
Fair value of cash flow hedges - tax effects		779	8	787	210	3	213
Fair value of net investment hedges							
Fair value of net investment hedges - gross change	18.7.5	(673)	-	(673)	661	-	661
Fair value of net investment hedges - tax effects		(83)	-	(83)	(30)	-	(30)
Change in fair value of debt instruments							
Gross change in fair value of debt instruments	18.1.2	(346)	-	(346)	20	-	20
Related tax effect		101	-	101	10	-	10
Translation adjustments - controlled entities		**1,935**	**606**	**2,541**	**(1,425)**	**(430)**	**(1,855)**
Share in net income of associates and joint ventures - items that can be recycled to profit and loss		**(80)**	**-**	**(80)**	**(561)**	**-**	**(561)**
Gains and losses recorded in equity with recycling		***(1,659)***	***581***	***(1,078)***	***(1,826)***	***(435)***	***(2,261)***
Change in fair value of equity instruments							
Gross change in fair value of equity instruments	18.1.2	15	1	16	(34)	(4)	(38)
Related tax effect		-	-	-	-	-	-
Change in actuarial gains and losses on post-employment benefits							
Gross change in actuarial gains and losses on post-employment benefits	16.1.3	1,144	263	1,407	(983)	80	(903)
Related tax effect		(421)	(89)	(510)	(220)	(18)	(238)
Share in net income of associates and joint ventures - items that cannot be recycled to profit and loss		**(83)**	**-**	**(83)**	**(109)**	**-**	**(109)**
Gains and losses recorded in equity with no recycling		***655***	***175***	***830***	***(1,346)***	***58***	***(1,288)***
Total gains and losses recorded in equity		**(1,004)**	**756**	**(248)**	**(3,172)**	**(377)**	**(3,549)**
CONSOLIDATED COMPREHENSIVE INCOME		**4,109**	**471**	**4,580**	**(2,522)**	**(412)**	**(2,934)**
Comprehensive income of continuing operations		4,110	471	4,581	(2,368)	(408)	(2,776)
Comprehensive income of discontinued operations	3.2.2	(1)	-	(1)	(154)	(4)	(158)

CONSOLIDATED BALANCE SHEET

ASSETS *(in millions of euros)*	Notes	31/12/2021	31/12/2020
Goodwill	10.1	10,945	10,265
Other intangible assets	10.2	10,221	9,583
Property, plant and equipment used in generation and other tangible assets owned by the Group, including right-of-use assets	10.3	98,237	92,600
Property, plant and equipment operated under French public electricity distribution concessions	11	62,132	60,352
Property, plant and equipment operated under concessions other than French public electricity distribution concessions	10.5	6,881	6,858
Investments in associates and joint ventures	12	8,084	6,794
Non-current financial assets	18.1	55,609	47,615
Other non-current receivables	13.3.4	2,092	2,015
Deferred tax assets	9.3	1,667	1,150
Non-current assets		**255,868**	**237,232**
Inventories	13.2	16,197	14,738
Trade receivables	13.3	22,235	14,521
Current financial assets	18.1	39,937	23,532
Current tax assets		544	384
Other current receivables	13.3.4	16,197	6,918
Cash and cash equivalents	18.2	9,919	6,270
Current assets		**105,029**	**66,363**
Assets classified as held for sale	3.2	69	2,296
TOTAL ASSETS		360,966	305,891

EQUITY AND LIABILITIES *(in millions of euros)*	Notes	31/12/2021	31/12/2020
Capital	14	1,619	1,550
EDF net income and consolidated reserves		48,592	44,083
Equity (EDF share)		***50,211***	***45,633***
Equity (non-controlling interests)	14.6	11,778	9,593
Total equity	**14**	**61,989**	**55,226**
Provisions related to nuclear generation - back-end of the nuclear cycle, plant decommissioning and last cores	15	62,067	58,333
Provisions for employee benefits	16	21,716	22,130
Other provisions	17	5,442	5,374
Non-current provisions		***89,225***	***85,837***
Special French public electricity distribution concession liabilities	11.2	48,853	48,420
Non-current financial liabilities	18.3	56,543	55,899
Other non-current liabilities	13.5	4,816	4,874
Deferred tax liabilities	9.3	2,401	3,115
Non-current liabilities		**201,838**	**198,145**
Current provisions	15, 17 and 16.1	6,836	5,827
Trade payables	13.4	19,565	11,900
Current financial liabilities	18.3	45,014	17,609
Current tax liabilities		446	215
Other current liabilities	13.5	25,248	16,861
Current liabilities		**97,109**	**52,412**
Liabilities related to assets classified as held for sale	3.2	30	108
TOTAL EQUITY AND LIABILITIES		360,966	305,891

CONSOLIDATED CASH FLOW STATEMENT

(in millions of euros)	Notes	2021	2020 [1]
Operating activities:			
Consolidated net income		**4,828**	**615**
Net income of discontinued operations		**(1)**	**(158)**
Net income of continuing operations		**4 829**	**773**
Impairment/(reversals)		653	799
Accumulated depreciation and amortisation, provisions and changes in fair value		10,488	13,310
Financial income and expenses		(89)	785
Dividends received from associates and joint ventures		467	433
Capital gains/losses		(67)	(185)
Income taxes		1,401	945
Share in net income of associates and joint ventures		(644)	(425)
Change in working capital	13.1.3	(1,526)	(1,679)
Net cash flow from operations		***15,512***	***14,756***
Net financial expenses disbursed		(588)	(929)
Income taxes paid		(2 276)	(983)
Net cash flow from continuing operating activities		**12,648**	**12,844**
Net cash flow from operating activities relating to discontinued operations		**-**	**98**
Net cash flow from operating activities		**12,648**	**12,942**
Investing activities:			
Acquisitions of equity investments, net of cash acquired		(165)	(126)
Disposals of equity investments, net of cash transferred		1,154	498
Investments in intangible assets and property, plant and equipment	10.7	(17,606)	(16,007)
Net proceeds from sale of intangible assets and property, plant and equipment		264	54
Changes in financial assets		1,776	2,718
Net cash flow from continuing investing activities		**(14,577)**	**(12,863)**
Net cash flow from investing activities relating to discontinued operations		**-**	**(104)**
Net cash flow from investing activities		**(14,577)**	**(12,967)**
Financing activities:			
Transactions with non-controlling interests[2]		2,076	1,019
Dividends paid by parent company	14.3	(84)	-
Dividends paid to non-controlling interests		(163)	(267)
Purchases/sales of treasury shares		(3)	5
Cash flows with shareholders		***1,826***	***757***
Issuance of borrowings	18.3.2.1	6,943	6,601
Repayment of borrowings	18.3.2.1	(5,161)	(7,062)
Issuance of perpetual subordinated bonds and OCEANEs	14.4 and 14.5	1,235	2,243
Payments to bearers of perpetual subordinated bonds	14.4	(547)	(501)
Funding contributions received for assets operated under concessions and investment subsidies		677	534
Other cash flows from financing activities		***3,147***	***1,815***
Net cash flow from continuing financing activities		**4,973**	**2,572**
Net cash flow from financing activities relating to discontinued operations		**-**	**19**
Net cash flow from financing activities		**4,973**	**2,591**
Net cash flow from continuing operations		3,044	2,553
Net cash flow from discontinued operations		-	13
Net increase/(decrease) in cash and cash equivalents		**3,044**	**2,566**
CASH AND CASH EQUIVALENTS - OPENING BALANCE		**6,270**	**3,934**
Net increase/(decrease) in cash and cash equivalents		3,044	2,566
Currency fluctuations		180	(162)
Financial income on cash and cash equivalents		38	35
Other non-monetary changes [3]		387	(103)
CASH AND CASH EQUIVALENTS - CLOSING BALANCE	**18.2**	**9,919**	**6,270**

(1) The published figures for 2020 include a €79 million reclassification from "Net financial expenses disbursed" to "Changes in financial assets".

(2) Contributions via capital increases, or capital reductions and acquisitions of additional interests or disposals of interests in controlled companies. In 2021, this item includes an amount of €1,304 million relating to CGN's payment for the capital increases by NNB Holding Ltd (for the Hinkley Point C project) and Sizewell C Holding Co., an amount of €865 million relating to the sale of 49% of Edison Renewables and an amount of €(276) million relating to the acquisition of 70% of E2i Energie Speciali. In 2020, this item includes an amount of €998 million relating to CGN's payment for the capital increases by NNB Holding Ltd (for the Hinkley point C project) and Sizewell C Holding Co..

(3)Other non-monetary changes include €281 million resulting from reclassification at 1 January 2021 of debit positions on margin calls relating to derivatives, which were previously netted and included in other financial liabilities (see the "Other changes" line in note 18.3.2.1).

CHANGE IN CONSOLIDATED EQUITY

Details of the change in equity between 1 January and 31 December 2021 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 as published at 31/12/2019	**1,552**	**(64)**	**1,037**	**(1,198)**	**45,139**	**46,466**	**9,324**	**55,790**
Gains and losses recorded in equity	-	-	(1,908)	82	(1,346)	(3,172)	(377)	(3,549)
Net income	-	-	-	-	650	650	(35)	615
Consolidated comprehensive income	**-**	**-**	***(1,908)***	***82***	***(696)***	***(2,522)***	***(412)***	***(2,934)***
Payments on perpetual subordinated bonds	-	-	-	-	(501)	(501)	-	(501)
Issuance/Redemption of perpetual subordinated bonds and OCEANEs (see notes 14.4 and 15)	-	-	-	-	2,207	2,207	-	2,207
Dividends paid	-	-	-	-	-	-	(271)	(271)
Purchases/sales of treasury shares	-	1	-	-	-	1	-	1
Capital decrease by EDF (see note 14.1)	(2)	53	-	-	(51)	-	-	-
Other changes[4]	-	-	-	-	(18)	(18)	952	934
EQUITY AT 31/12/2020	**1,550**	**(10)**	**(871)**	**(1,116)**	**46,080**	**45,633**	**9,593**	**55,226**
Gains and losses recorded in equity	-	-	1,699	(3,358)	655	(1,004)	756	(248)
Net income	-	-	-	-	5,113	5,113	(285)	4,828
Consolidated comprehensive income	**-**	**-**	***1,699***	***(3,358)***	***5,768***	***4,109***	***471***	***4,580***
Payments on perpetual subordinated bonds	-	-	-	-	(547)	(547)	-	(547)
Issuance/Redemption of perpetual subordinated bonds (see notes 14.4)	-	-	-	-	972	972	-	972
Dividends paid	-	-	-	-	(1,599)	(1,599)	(163)	(1,762)
Purchases/sales of treasury shares	-	(4)	-	-	-	(4)	-	(4)
Capital increase by EDF (see note 14.1)	69	-	-	-	1,446	1,515	-	1,515
Other changes[5]	-	-	-	-	132	132	1,877	2,009
EQUITY AT 31/12/2021	**1,619**	**(14)**	**828**	**(4,474)**	**52,252**	**50,211**	**11,778**	**61,989**

(1) Changes in translation adjustments amount to €1,699 million at 31 December 2021. This variation is mainly due to the appreciation of the pound sterling and to a smaller degree the US dollar against the euro.

(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 this column.

(4) In 2020, "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 €998 million.

(5) In 2021, "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 1,304 million.
In 2021, "Other changes" in equity (EDF share) also include:
- adjustment of prior year provisions for post-employment employee benefits, amounting to €49 million net of tax, resulting from application of the IFRIC decision on attribution of benefits (see note 1.2.3);
- reclassification of net book values for previously capitalised configuration and customisation costs on SaaS (software as a service), amounting to €(64) million net of tax, following the IASB's confirmation of the IFRIC decision on recognition of these costs (see note 1.2.4).
"Other changes" in equity (EDF share and non-controlling interests) also include the effect on equity of transactions with minority shareholders in the form of acquisitions and disposals not entailing a change of consolidation method (sale of 49% of Edison Renewables, acquisition of 70% of E2i and the IPO by PodPoint, see note 3.1.1).

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

Electricité de France (EDF or the "Company") is a French *société anonyme* governed by French law, and registered in France (22-30, avenue de Wagram, 75008 Paris).

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 2021.

The Group is an integrated energy operator engaged in all aspects of the energy business: power generation (nuclear power, hydropower, wind and solar power, thermal energy, etc.), transmission, distribution, supply, trading, energy services, production of equipment and fuel assemblies, and reactor services.

The Group's consolidated financial statements at 31 December 2021 were prepared under the responsibility of the Board of Directors and approved by the Directors at the Board meeting held on 17 February 2022. They will become final after approval at the General Shareholders' Meeting to be held on 12 May 2022.

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 2021 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 2021. 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 2021.

1.2 CHANGES IN ACCOUNTING STANDARDS

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

The accounting and valuation methods applied by the Group in the consolidated financial statements at 31 December 2021 are identical to those used in the consolidated financial statements at 31 December 2020, with the exception of the changes presented below in notes 1.2.1, 1.2.2, 1.2.3 and 1.2.4. Information is also given on the standards, amendments and interpretations adopted by the European Union that are applicable from 1 January 2022 (note 1.2.5).

For purposes of clarity, the accounting principles and methods used are now described in individual notes to the financial statements.

1.2.1 Interest Rate Benchmark Reform - Amendments to IFRS 9, IAS 39, IFRS 7, IFRS 4 and IFRS 16 (phase 2)

These amendments were adopted on 13 January 2021 and have been applicable since 1 January 2021.

The principal interest rates concerned that are used by EDF are the Eonia, the Libor USD and the Libor GBP.

The modification of effective interest rates resulting from the reform is applied prospectively, there is no significant impact on profit and loss and the hedging relationships for the instruments concerned are continued.

This reform has no significant impact on the Group's net income for 2021, and its effects are mainly operational (renegotiation of contracts, fallback provisions, information system upgrades).

Due to its long-term fixed-rate borrowing position (see note 18.3.3.3), the Group's exposure is essentially concentrated in interest rate derivatives that are used to swap fixed-rate debt to floating rates. On these instruments, the reference rate curves for collateral agreements have been modified, replacing the Eonia by the Ester. Following adjustment of the value of the derivatives, receipt of cash compensation of €22 million was recognised.

The Group adhered to the ISDA Fallback protocol in November 2021 and the Libor GBP was replaced by the Sonia for all the derivatives concerned from 1 January 2022.

For the USD Libor, the transition operations will take place in line with the end date for its publication *i.e.* by 30 June 2023.

1.2.2 Covid-19-Related Rent Concessions - Amendment to IFRS 16

Application of the "Covid-19-Related Rent Concessions" amendment has been extended for one year (for payments up to 30 June 2022 at the latest). This allows lessees benefiting from "payment holidays" or temporary rent reductions as a direct result of the Covid-19 pandemic to record the impact directly in profit and loss.

This amendment has no impact on the Group's financial statements.

1.2.3 IFRIC decision: "Attributing benefit to Periods of service" (IAS 19)

In May 2021, the IASB approved the IFRIC's agenda decision concerning attribution of benefits earned under post-employment benefit plans.

This decision principally concerns retirement indemnities in France paid under the IEG (electricity and gas sector) benefit plans. The corresponding commitments amounted to €941 million at 31 December 2020 for the two segments "France – Generation and Supply activities" and "France – Regulated activities" (see note 16.2.2).

Modification of the benefit attribution method led to a €(67) million reduction before tax in benefit commitments at 1 January 2021, recognised in equity ("Other changes").

1.2.4 IFRIC decision on SaaS contracts (IAS 38)

In April 2021, the IASB confirmed the position taken by the IFRIC in March 2021 following its tentative agenda decision of December 2020 on recognition of configuration and customisation costs on a software provided under a SaaS (Software as a Service) contract. The matter was put on the agenda due to the diversity of practices observed. The IFRIC agenda decision states that in most cases, in application of IAS 38, these costs should be treated as expenses, not intangible assets, since the entity does not control the software and the configuration/customisation activities do not generate a resource that is controlled by the customer independently of the software.

In application of this decision, configuration and customisation costs for SaaS which were previously capitalised were restated at 1 January 2021, with a corresponding adjustment of €(88) million before tax to equity (in "Other changes"). Configuration and customisation costs incurred in 2021 on such contracts are included in "Other external expenses".

1.2.5 Standards adopted by the European Union and applicable for financial years beginning on or after 1 January 2022

Amendments to IAS 16 "Property, Plant and Equipment: Proceeds before Intended Use"

From 1 January 2022, the proceeds from sales of items produced by an asset that has not yet been commissioned will no longer be deducted from the cost of the asset. These proceeds and the related costs will be included in profit and loss.

The Group will be concerned *via* its projects for construction of energy generation plants.

Amendments to IAS 37 "Onerous Contracts - Cost of Fulfilling a Contract"

These amendments define the costs that must be taken into consideration when assessing whether a contract is onerous.

The Group does not anticipate any material impact as a result of application of these amendments.

Other standards, amendments and interpretations

The Group does not anticipate any material impact in connection with the following amendments:

- "Annual improvements – 2018-2020 cycle";
- Amendments to IFRS 3 "Reference to the Conceptual Framework".

1.3 BASIS FOR PREPARATION OF THE 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 Translation methods

1.3.2.1 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.

1.3.2.2 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.

1.3.2.3 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.

However, any payment or receipt of a non-monetary advance in a foreign currency is translated at the exchange rate of the transaction date, with no subsequent adjustment.

1.3.3 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.

1.3.4 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 volatility on the financial and energy markets, 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:

1.3.4.1 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 Group has therefore been making preparations for several years to extend the operation period, and making the necessary investments under its *Grand Carénage* industrial refurbishment programme which was approved in principle by the Board of Directors in January 2015.

The depreciation period of 900MW-series power plants was extended from 40 years to 50 years in 2016 (except for Fessenheim where both reactors were permanently shut down in the first half of 2020) since all the technical, economic and governance conditions were fulfilled.

On 23 February 2021, the Nuclear Safety Authority (*Autorité de Sûreté Nucléaire* (ASN)) issued a resolution on the conditions for continued operation of EDF's 900MW reactors beyond their fourth 10-year inspection. The ASN considered that "the measures planned by EDF combined with those prescribed by ASN open the prospect of continued operation of

these reactors for a further ten years following their fourth periodic safety review". This resolution ends the "generic" phase of the review, which concerns the studies and modifications of facilities common to all the 900MW reactors, which all have a similar design model.

After the pilot reactor Tricastin 1 in December 2019, Bugey 2, Bugey 4 and Tricastin 2 reached the milestone of 40 years of operation, and were restarted after a successful fourth 10-year inspection during 2021. Three other 10-year inspections were in progress at 31 December 2021 (Dampierre 1, Bugey 5 and Gravelines 1). The fourth 10-year inspection of Dampierre 1 was completed on 5 February 2022.

The depreciation period of other series (1300MW and 1450MW), which are more recent, remained at 40 years until 31 December 2020.

In 2021, the technical, economic and governance conditions for extending the depreciation period of 1300MW-series plants were fulfilled, and consequently the Group proceeded to the corresponding change of estimate at 1 January 2021 for all its 1300MW power plants (see note 1.4.1, Extension to 50 years of the depreciation period of the 1300MW PWR series in France).

The depreciation period of the 1450MW series (the four reactors at Chooz and Civaux), which are much more recent, currently remains at 40 years as the conditions for extension are not yet fulfilled.

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

1.3.4.2 Nuclear provisions

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

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

The Group considers that the assumptions used at 31 December 2021 are appropriate and justified. However, any future change in assumptions could have a significant impact on the Group's financial statements (see note 15).

For France, the main assumptions and sensitivity analyses relating to EDF's nuclear provisions are presented in note 15.1.1.5.

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 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 the contractual terms for spent fuel management;
- changes in certain financial parameters such as discount rates and/or inflation rates;
- the depreciation period of nuclear facilities (calculation of decommissioning provisions for nuclear plants in operation is based on the depreciation period of the assets concerned, *i.e.* 50 years for 900MW series and 1300MW series power plants and 40 years for 1450MW series power plants).

1.3.4.3 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 2021 are presented in note 16. These assumptions are updated annually. The Group considers the actuarial assumptions used at 31 December 2021 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 16.

1.3.4.4 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 10.8.

1.3.4.5 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.

1.3.4.6 Energy supplied but not yet measured and billed

As explained in note 5.1, 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.

1.3.4.7 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 11). Measurement of the concession liabilities concerning assets to be replaced is notably subject to unforeseeable developments in terms of costs, the useful life of assets and disbursement dates.

1.3.4.8 Deferred tax assets

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

1.3.4.9 Other judgements and estimates

- 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.
- 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. For example:
  - 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 15.1.2.2). 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.
  - Through its subsidiary Edison, the Group held a 30% investment in E2i Energie Speciali, alongside the other shareholder F2i. The governance arrangements and contractual agreements gave Edison exclusive control over this company under IFRS 10. On 16 February 2021, Edison acquired the other 70% of E2i Energie from F2i. As the company was already fully consolidated by the Group, the only impact of this acquisition was on non-controlling interests, and therefore on equity (see note 3.1) and ultimately on EDF net income.

1.3.5 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 16) and expenses related to nuclear liabilities (principally in France – see note 15.1.2 – and the United Kingdom – see note 15.2);
- 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 10.5);
- the sale of Group investments in certain subsidiaries may require 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 and Taishan (TNPJVC) in China);
- 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 18.3.4), and certain items of cash and cash equivalents are subject to restrictions (see note 18.2).

1.4 COMPARABILITY

1.4.1 Extension to 50 years of the depreciation period of the 1300MW PWR series in France

The Group considers that all the technical, economic and governance conditions for bringing the depreciation period of 1300MW-series PWR plants in France into line with its industrial strategy are now fulfilled.

The studies and work already completed, particularly concerning replacement of components and controlled equipment ageing, have given the Group sufficient assurance of the 1300MW plants' technical capacity to operate for at least 50 years. This is also supported by the international benchmark.

The Group has also made progress with the ASN on the question of the content of the fourth 10 year inspections of the 1300MW series (a project included in the *Grand Carénage* programme). These inspections use a work methodology with ambitions focusing particularly on safety, similar to the fourth 10 year inspections of the 900MW series and incorporating the lessons learned from that series. In December 2019, the ASN's response to the Re-examination Orientation file for the fourth 10-year inspections of the 1300MW reactors gave general approval for the themes selected and commitments made by EDF for these inspections.

Most importantly, the ASN approval published in February 2021 for the generic aspects of the continued operation of 900MW reactors for ten years following their fourth 10-year inspection, and the industrial success of the initial fourth 10-year inspections for such reactors (after the pilot reactor Tricastin 1 in December 2019, Bugey 2 and Bugey 4 reached 40 years of operation and were restarted after a successful fourth 10-year inspection during the first half of 2021 followed by Tricastin 2 in the second half of 2021), reinforce EDF's confidence that its inspection content for the 1300MW series is appropriate and well controlled.

Once its fourth 10-year inspections are completed, the 1300MW PWR plants will thus have reached a level of safety close to EPR safety level.

Also, extending operation of the 1300MW-series plants beyond 40 years offers high profitability even in low long-term price scenarios, and in a range of sensitivity scenarios.

Finally, operating the 1300MW-series plants for 50 years is consistent with France's Energy and Climate law of 8 November 2019 (which sets a target of 50% nuclear for France's electricity output by 2035), and the adoption decree of 21 April 2020 for France's multi-year energy programme (*Programmation Pluriannuelle de l'Energie* (PPE)). A study for the energy future, *Futurs énergétiques 2050*, was conducted by France's national grid operator RTE at the request of the French government, examining electricity mix scenarios to achieve carbon neutrality in France by 2050. The related progress report published in June 2021, and the key results published on 25 October 2021, indicate a significant need for carbon-free generation capacity. For all scenarios relating to the post-2035 period, the study includes the assumption that EDF's existing nuclear power plant fleet will remain in operation beyond 50 years, and be shut down between 50 and 60 years of operation.

In view of all these factors, the Group considers that the best estimate for the depreciation period of the 1300MW-series plants is now 50 years. This accounting estimate does not predetermine the ASN's future decisions to authorise continued operation, which will be given individually for each unit after each 10-year inspection, as currently applied and required by law.

The Group therefore changed the estimate at 1 January 2021 for all 1300MW power plants.

This change of accounting estimate is applied prospectively, and has the following consequences for the Group's consolidated financial statements at 31 December 2021:

- At 1 January 2021, due to timing differences in the payment schedules, provisions relating to nuclear power generation were reduced by €1,016 million (see note 15), including €848 million covered by dedicated assets. This reversal from provisions is principally allocated to the net book value of the assets in accordance with IFRIC 1 (€1,031 million, see note 10.3), with the balance allocated to profit and loss (€(15) million). It is largely taxable and generated a tax payment of €184 million;

- In 2021:
  - the 10-year extension of the depreciation period and the reduction in the value of assets at 1 January in line with the decrease in nuclear provisions have led to a lower depreciation charge than for a 40 year depreciation period, estimated at €564 million for the year,
  - the decrease in nuclear provisions at 1 January 2021 led to a €33 million decrease in the cost of unwinding the discount,
  - the amounts of contributions received on jointly-operated power plants transferred to profit and loss decreased by €23 million.

In total, the various effects in 2021 lead to a €559 million increase in the income before taxes, and a €405 million increase in EDF net income.

1.4.2 Effects of market price levels on comparability

The significant increase in 2021 in market prices for electricity and gas, which was particularly noticeable during the second half-year and even more pronounced in the final quarter, had various effects on the Group's financial statements that affect the comparability of certain items, as highlighted in the notes. As an illustration, between 2020 and 2021 spot baseload electricity prices in France increased by an average 240%, and the forward annual contract baseload price increased by around 113%.

The principal items concerned include, but are not limited to, the following:

In the balance sheet:

- The increases in trade receivables (around €8 billion, see note 13.3), current financial assets (around €17 billion, see note 18.1), and other current liabilities (around €9 billion, see note 13.3.4) particularly concern EDF Trading (through margin calls on assets and the positive fair value of trading derivatives) and Edison (through gas activities);
- The increases in trade payables (around €8 billion, see note 13.4), current financial liabilities (around €27 billion, see note 18.3), and other current liabilities (around €8 billion, see note 13.5), particularly concern EDF Trading (notably through margin calls on liabilities and the negative fair value of trading derivatives) and Edison (through gas activities). The value of derivatives hedging cash flows on commodities (see note 18.7.5) has also changed significantly in the statement of comprehensive income;
- In other current receivables, the normal debit position of the CSPE for EDF SA (a receivable of some €2 billion at 31 December 2020) is in a credit position in "other current liabilities" at the value of €0.3 billion at 31 December 2021 (see note 13.3.4).

In the income statement:

In general, the high level of prices had significant upward impacts on sales (see note 5.1.2) and fuel and energy purchases (see note 5.2). The trading margin included in sales benefited from the volatility and high energy prices.

However, the profitability of certain Group entities was penalised by electricity purchases made at very high prices on the markets late in the year, in response to their own supply-demand balance, as these prices could only partially be passed on through sale prices to final customers in 2021, depending on any regulatory systems applicable. This situation particularly affected the France- Generation and supply and United Kingdom segments, and to a lesser extent the Other international segment (Belgium), and France - regulated activities (cost of purchases to cover energy losses) (see note 5).

Note 23 presents the measures announced to date by the French and UK government to limit the impact of the market price rises for consumers in 2022.

1.4.3 Consequences of the Covid-19 pandemic

The economic disruption caused by the Covid-19 pandemic in 2020 had significant repercussions for many of the Group's activities in 2020, particularly nuclear power, worksites and services.

For the half-yearly closing at 30 June 2020, then the annual closing at 31 December 2020, in-depth analyses were conducted in the Group's entities to prepare reliable estimates of the impacts of the pandemic on the Group's financial statements, based on specific reporting and valuation principles explained in the 2020 half-year financial statements (see note 2.1) and 2020 annual financial statements (see note 1.4.1).

The impact of the Covid-19 pandemic on the Group's operating profit before depreciation and amortisation was estimated at €(1,479) million at 31 December 2020 and mainly concerned:

- the France - Generation and Supply segment €(872) million, due to lower nuclear power output, a decrease in demand, and recognition of impairment on trade receivables;

- the France - Regulated activities segment €(237) million, reflecting lower delivery volumes and the downturn in network connection activity as site work was suspended or slowed down; and
- the United Kingdom €(182) million, mainly due to the decline in demand.

Even though the Covid-19 pandemic continued to have effects during 2021, its impacts on the Group's operating profit before depreciation and amortisation at 31 December 2021 are not very significant, diffuse and not easily traceable

Impairment of trade receivables

Analyses conducted by different Group entities to estimate credit losses on trade receivables at 31 December 2020 led to a €223 million increase to impairment of trade receivables for 2020 resulting from the pandemic, recognised in "Other operating income and expenses" in the income statement. This amount was calculated under the principles presented in note 1.4.1.2 to the consolidated financial statements at 31 December 2020. It comprised €80 million concerning the France – Generation and Supply segment, €58 million for the France – Regulated activities segment, €68 million for the United Kingdom, and €13 million for Belgium.

The risk analyses were updated at 31 December 2021 in view of the recovery levels observed over the year, and this led to recovery of a total €115 million from impairment concerning the various operating segments.

NOTE 2 SUMMARY OF SIGNIFICANT EVENTS

The main significant events and transactions for the Group **in 2021** and up to the date of approval of the consolidated financial statements are the following:

- **Nuclear developments:**
  - EDF submitted to the Indian nuclear operator NPCIL the French binding techno-commercial offer to build six EPRs at the Jaitapur site (see the Group press release of 23 April 2021);
  - EDF decided to move Dungeness B into the defueling phase (see the EDF Energy press release of 7 June 2021, and notes 7, 10.8, 15.2);
  - Reactors of the Civaux and Chooz nuclear power plants: replacements and preventive checks on parts of the piping of a safety system (see the Group press release of 15 December 2021, and note 23);
  - AGR lifetime reviews were carried out (see the EDF Energy press release of 15 December 2021, and note 10.8);
  - Update on the Flamanville EPR (see the Group press release of 12 January 2022, and note 10.6);
  - On 13 January 2022 EDF updated its estimated nuclear output in France for 2022 (see the Group press release of 13 January 2022, and note 23);
  - On 7 February 2022 EDF adjusted its estimated nuclear output in France for 2022 (see the Group press release of 7 February 2022, and note 23);
  - On 11 February 2022 EDF adjusted its estimated nuclear output in France for 2023 (see the Group press release of 11 February 2022, and note 23).
- **Disposals:**
  - Edison completed the sale of Edison Norge to Sval Energi for a value of $374 million (see the Edison press release of 25 March 2021, and note 3.1);
  - Edison completed the sale of Infrastrutture Distribuzione Gas (IDG) to 2I ReteGas for a value of €150 million (see the Edison press release of 30 April 2021, and note 3.1);
  - Dalkia completed the sale of its subsidiary Dalkia Wastenergy to Paprec (see the Dalkia press release of 28 July 2021, and notes 3.1 and 7);
  - EDF completed the sale of its interest in CENG (see the Group press release of 9 August 2021, and notes 3.1 and 7);
  - EDF completed the sale of the West Burton B CCGT gas power station to EIG (see the EDF Energy press release of 31 August 2021, and note 3.1);
  - Edison and Credit Agricole Assurances completed the transaction to accelerate the development of renewables in Italy together (see the Edison press releases of 3 and 14 December 2021, and note 3.1);
  - EDF transferred a property portfolio in the Île-de-France region to a joint venture with POWERHOUSE HABITAT (see the Group press release of 16 December 2021, and note 5.4).
- **Financing operations:**
  - EDF launched an issue of a Euro-denominated perpetual social hybrid notes on 26 May 2021 with a total nominal amount of €1.25 billion (see the Group press release of 27 May 2021, and note 14.4);
  - EDF launched an issue of a senior green bond with a nominal amount of €1.75 billion euros on 23 November 2021 (see the Group press release of 24 November 2021 and note 18.3.2.2);

- EDF announced the signature of a new credit facility indexed on social indicators, syndicated with 9 banks on 23 December 2021 (see the Group press release of 23 December 2021, and note 18.4).

- **Renewable energies:**
  - Edison completed the acquisition of E2i (see the Edison press release of 16 February 2021, and notes 1.3.4.9 and 3.1);
  - EDF Renewables, Enbridge and wpd launched construction of the Calvados offshore wind farm (see the EDF Renewables press release of 22 February 2021, and note 12.3);
  - The EDF group won a 1.5GW offshore wind power project in New Jersey in the United States (see the Group and EDF Renewables press releases of 1 July 2021 and note 12.3);
  - For construction of France's first offshore wind farm in Saint-Nazaire, production of components was finalised and offshore operations continued (see the Group and EDF Renewables press releases of 28 August 2021, and note 12.3);
  - The Dongtai V offshore wind farm in China was commissioned (see the Group and EDF Renewables press releases of 9 December 2021, and note 12.3).
- EDF and Areva reached a settlement agreement (see the Group press release of 30 June 2021, and note 7);
- EDF put an end to Ecocombust, a project to develop a new class B wood-based fuel (see the Group press release of 8 July 2021, and note 10.3);
- Framatome announced the completion of its purchase of Rolls Royce Civil Nuclear I&C (see the Framatome press release of 8 November 2021, and note 3.1);
- Exceptional measures were announced by the French Government (see the Group press release of 13 January 2022, and note 23);
- EDF signed an exclusive agreement to acquire part of GE Steam Power's nuclear activities (see the Group press release of 10 February 2022 and note 23).

Apart from the Covid-19 pandemic, the main significant events and transactions for the Group **in 2020** were the following:

- **Nuclear developments:**
  - EDF restarted Hunterston B power station and confirmed its plan to move into the decommissioning phase by January 2022. It also announced that Hinkley Point B power station in Somerset would enter into the defueling phase no later than 15 July 2022 (see the EDF Energy press release of 27 August 2020 and 19 November 2020, and note 10.8);
  - The Group readjusted the cost of the *Grand Carénage* programme to increase safety and extend the operating life of nuclear reactors beyond 40 years (see the press release of 29 October 2020 and note 10.6);
  - Hinkley Point C project update (see the press release of 27 January 2021 and note 10.6).
- **Disposals:**
  - Edison completed the sale of Edison Exploration & Production SpA to Energean (see the Edison press release of 17 December 2020 and note 3.1).

NOTE 3 SCOPE OF CONSOLIDATION

Accounting principles and methods

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.

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 (see note 12).

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 Markets, co-owned by EDF Trading, and the gas storage operator activity carried out by Friedeburger Speicherbetriebsgesellschaft mbH (FSG).

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.

3.1 CHANGES IN THE SCOPE OF CONSOLIDATION

3.1.1 Changes in the scope of consolidation in 2021

The following main changes took place in the Group's scope of consolidation during 2021:

- acquisition of 70% of E2i on 16 February 2021;
- disposal of Edison Norge on 25 March 2021;
- disposal of Infrastrutture Distribuzione Gas (IDG) on 30 April 2021;

- disposal of Dalkia Wastenergy on 28 July 2021;
- disposal of interests in CENG on 9 August 2021;
- disposal of West Burton B on 31 August 2021;
- initial public offering of Pod Point on 4 November 2021;
- acquisition of Rolls-Royce Civil Nuclear I&C on 8 November 2021;
- disposal of 49% of Edison Renewables on 3 December 2021;
- consolidation of IZI Solutions Renov and Hynamics.

Acquisition of 70% of E2i

On 16 February 2021, Edison announced the completion of the agreement signed on 14 January 2021 with F2i Fondi Italiani per le Infrastrutture to take over 70% of E2i Energie Speciali, a leading company in the Italian wind power sector that is already fully consolidated by Edison, which held the remaining stake of 30%, in application of a specific governance arrangement.

This acquisition increased the Group's net indebtedness by €0.3 billion.

As it concerned a minority interest and there is no change of consolidation method, the €155 million difference between the sale price and the equity acquired has been charged to Equity (EDF share).

Sale of Edison Norge

On 25 March 2021, Edison announced the closing of the agreement signed with Sval Energi on 30 December 2020 to sell 100% of Edison Norge AS (the hydrocarbon exploration and production activities in Norway).

The balance sheet items for all of Edison Norge's operations were reclassified at 31 December 2020 as assets held for sale and related liabilities (see note 3.2).

This operation relates to the Group's exit from hydrocarbons exploration and production, and followed a first sale by Edison Exploration & Production to Energean, completed in December 2020. The price was based on an enterprise value of $374 million and included a payment of $12.5 million receivable when the Dvalin gas field is commissioned.

The sale of Edison Norge reduced the EDF group's net indebtedness by €0.3 billion and has no significant impact on the Group's net income.

Sale of Infrastrutture Distribuzione Gas (IDG)

On 30 April 2021, Edison announced the closing of the agreement signed with 2i Rete Gas to sell 100% of Infrastrutture Distribuzione Gas (IDG) for €150 million, pursuant to an agreement signed on 14 January 2021.

IDG manages gas distribution networks and plants in 58 municipalities in Abruzzo, Emilia-Romagna, Lazio, Lombardy and Veneto, and is present in 17 minimum territorial areas (Atem) and has 152,000 customers.

The balance sheet items for all of IDG were reclassified at 31 December 2020 as assets held for sale and related liabilities (see note 3.2).

This transaction reduced the Group's net indebtedness by €0.2 billion and has no significant impact on the Group's net income.

These two disposals (Edison Norge and IDG) will support Edison's plan for growth in strategic areas of business: production of renewable and low-carbon energies, energy efficiency, sustainable mobility and value-added services for customers.

Sale of Dalkia Wastenergy

Following receipt of the required regulatory approvals, Dalkia announced completion of the sale of 100% of Dalkia Wastenergy (formerly TIRU) to Paprec on 28 July 2021.

This transaction reduced the Group's net indebtedness by €0.1 billion and has no significant impact on the Group's net income.

Sale of the investment in CENG

On 9 August 2021, EDF announced completion of the sale of its 49.99% interest in Constellation Energy Nuclear Group, LLC ("CENG") to its joint venture partner, Exelon Generation, LLC ("Exelon"). The sale followed a Put Agreement entered into by EDF and Exelon in April 2014[1], in which Exelon granted EDF the right to sell its interest to Exelon at fair market value. EDF exercised the put option in January 2020[2].

The sale price for EDF's investment in CENG was $885 million (€750 million), and the transaction reduced the Group's net indebtedness by the same amount.

1 Cf. EDF Press Release of 1 April 2014 "EDF and Exelon finalize agreement on CENG".

2 Cf. EDF Press Release of 20 November 2019 "EDF notifies the exercise of its put option on its participation in CENG".

This transaction has an impact of €(0.3) million on the Group's net income.

Sale of West Burton B

On 9 April 2021, EDF announced the signature of a binding agreement with the investment fund EIG to sell its 1332MW Combined Cycle Gas Turbine power station and 49MW battery storage system at West Burton B in Nottinghamshire, and the West Burton C development project. On 31 August 2021, further to satisfaction of all necessary conditions precedent, the sale process was completed.

This transaction reduced the Group's net indebtedness by €0.3 billion and has no significant impact on the Group's net income.

Initial public offering of Pod Point

On 9 November 2021, EDF's subsidiary Pod Point, a UK company specialising in charging infrastructures for electric vehicles, was admitted to trading on the London Stock Exchange. Its IPO through new share issues raised £120 million. Following these operations EDF, as owner of more than 50%, retains control of Pod Point.

As this was a sale of a minority interest with no change of consolidation method, the non-significant difference between the sale price and the equity transferred was recognised as an increase to Equity (EDF share).

This transaction reduced the Group's net indebtedness by €0.1 billion.

Rolls-Royce Civil Nuclear I&C

On 8 November 2021 Framatome completed the purchase of Rolls Royce Civil Nuclear Instrumentation and Control (I&C), for which the contract had been signed on 7 December 2020.

The acquisition of Rolls-Royce Civil Nuclear's products and technologies (such as Spinline, Rodline and Hardline) will enable Framatome to capitalise on its engineering expertise, broaden its industrial footprint, strengthen its ability to serve customers and expand its nuclear I&C business across the world.

As control was acquired through this acquisition, the €92 million difference between the purchase price and the equity acquired was recognised as goodwill.

Sale of 49% of Edison Renewables

On 14 December 2021, Edison and Crédit Agricole Assurances completed the transaction signed on 3 December 2021. Crédit Agricole Assurances has thus become Edison's long-term financial partner, acquiring 49% of Edison Renewables' platform and participating in the development of its wind and photovoltaic production. The transaction valued Edison Renewables at more than €2 billion and followed the acquisition of 70% of the capital of E2i on 16 February 2021.

Edison retains full control over the company's business and governance and will lead its development in renewable energies in line with the decarbonisation targets fixed by the Italian PNIEC (National Integrated Energy and Climate Plan) and the European Green Deal. Edison will continue to fully consolidate Edison Renewables, which has renewable energy assets with a total capacity of 1.1GW, including approximately 1,000MW of wind farms located in the windiest areas of the country.

As this was a sale of a non-controlling interest with no change of consolidation method, the €455 million difference between the sale price and the equity transferred was recognised as an increase to Equity (EDF share).

This transaction reduced the Group's net indebtedness by €0.9 billion.

All the transactions completed as part of the disposal plan in 2021 reduced the Group's net indebtedness by a total €2.8 billion.

3.1.2 Changes in the scope of consolidation in 2020

The following changes in the Group's scope of consolidation took place during 2020:

- disposal of Edison Exploration and Production SpA. (E&P) on 17 December 2020 (see notes 1.4.2 and 3.2 to the consolidated financial statements at 31 December 2020);
- consolidation of EDF Pulse Holding (formerly EDF Pulse Croissance), Agregio, Energy2Market (E2M) and IZIVIA.

3.2 DISCONTINUED OPERATIONS

Accounting principles and methods

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.

In accordance with IFRS 5:

- for assets or groups of assets that are identified and classified as held for sale during the year, there is no change of presentation or retrospective restatement in prior year balance sheets;
- assets or groups of assets that qualify as discontinued operations are restated in the income statement and the cash flow statement for the prior periods presented in the financial statements.

3.2.1 Assets held for sale and related liabilities

(in millions of euros)	31/12/2021	31/12/2020
ASSETS HELD FOR SALE	**69**	**2,296**
LIABILITIES RELATED TO ASSETS HELD FOR SALE	**30**	**108**

In application of IFRS 5, assets held for sale and related liabilities are shown below:

(in millions of euros)	31/12/2021	31/12/2020
Non-current non-financial assets[1]	-	316
Non-current financial assets	-	1,811
Current non-financial assets[2]	69	151
Current financial assets	-	18
TOTAL ASSETS HELD FOR SALE	**69**	**2,296**

(in millions of euros)	31/12/2021	31/12/2020
Non-current non-financial liabilities[3]	-	86
Non-current financial liabilities	-	1
Current non-financial liabilities	30	21
Current financial liabilities	-	-
TOTAL LIABILITIES RELATED TO ASSETS HELD FOR SALE	**30**	**108**

[1]Non-current non-financial assets comprise tangible assets and property, plant and equipment.

[2]Current non-financial assets comprise components of working capital and deferred taxes.

[3]Non-financial liabilities comprise provisions.

At 31 December 2021, assets held for sale and related liabilities concern the following:

- the residual amount of assets corresponds to the price supplement for the Dvalin gas project (E&P in Norway) and Cassiopea (E&P in Italy);
- the residual amount of liabilities corresponds to provisions on the Energian contract.

The decrease in assets held for sale and related liabilities is explained by:

- the sale of Edison Norge in March 2021 (see note 3.1) which represented assets of €331 million and liabilities of €42 million at 31 December 2020;
- the sale of Infrastrutture Distribuzione Gas (IDG), a fully-owned subsidiary of Edison (see note 3.1) which represented assets of €98 million and liabilities of €7 million at 31 December 2020;
- the sale of the shares held in CENG (see note 3.1) in August 2021 which represented assets of €1,811 million at 31 December 2020.

3.2.2 Net income of discontinued operations

In the 2020 financial statements, the line "Net income of discontinued operations" comprised Edison's E&P operations (excluding the Algerian and Norwegian operations), and impairment recognised in respect of these assets.

As these E&P operations were sold in December 2020, no net income of discontinued operations is presented in 2021 except for the estimated adjustments to prices or warranties related to the sale transaction (see note 1.4.2 to the consolidated financial statements at 31 December 2020).

The principal profit and loss indicators for the E&P operations (excluding the Algerian and Norwegian operations) in 2020 and 2021 are as follows:

(in millions of euros)	2021	2020
Sales	-	216
Operating profit before depreciation and amortisation	(1)	86
Operating profit	(1)	13
Financial result	-	(22)
Income taxes	-	(32)
NET INCOME	**(1)**	**(41)**
Impairment of discontinued operations, net of income taxes	-	(117)
NET INCOME OF DISCONTINUED OPERATIONS	**(1)**	**(158)**

3.3 SCOPE OF CONSOLIDATION AT 31 DECEMBER 2021

The Group's business sectors are defined as follows:

- **"Generation/Supply"** (G)**:** generation of nuclear energy, thermal energy, and renewable energies (wind, photovoltaic and hydro) and energy sales to industry, local authorities, small businesses and private customers. This segment also includes 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;
- **"Services and other activities"** (O)**:** energy services (district heating, thermal energy services, etc.) for industry and local authorities. This activity also includes EDF Invest's holding companies and entities that are classified as dedicated assets.

The companies and subgroups included in the EDF Group consolidation are listed below.

3.3.1 Fully consolidated companies

France – Generation and Supply		Percentage ownership at 31/12/2021	Percentage ownership at 31/12/2020	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		100.00	100.00	O
CHAM SAS		100.00	100.00	O
Sowee		100.00	100.00	O
IZI Solutions		100.00	100.00	O
IZI Solutions Renov		100.00	-	O
IZIVIA		100.00	100.00	O
EDF Pulse Holding (formerly EDF Pulse Croissance)		100.00	100.00	O
Hynamics		100.00	-	G
Agregio		100.00	100.00	O
Energy2Market (E2M)		100.00	100.00	O
EDF ENR (formerly ENRS)		100.00	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
Italy				
Edison SpA (Edison)		97.17	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	Belgium	68.63	68.63	G, O
EDF Norte Fluminense SA	Brazil	100.00	100.00	G
French Investment Guangxi Laibin Electric Power Co., Ltd. (Figlec)[1]	China	-	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	O
Mekong Energy Company Ltd. (MECO)	Vietnam	56.25	56.25	G
EDF Andes Spa	Chile	100.00	100.00	G

Business sectors: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other

(1) French Investment Guangxi Laibin Electric Power Co., Ltd. (Figlec) has been liquidated in 2021.

		Percentage ownership at 31/12/2021	Percentage ownership at 31/12/2020	Business sector
EDF Renewables				
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
EDF IMMO and real estate subsidiaries	France	100.00	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.	United Kingdom	100.00	100.00	G
Wagram Insurance Company DAC	Ireland	100.00	100.00	O
EDF Investissements Groupe SA	Belgium	92.46	92.46	O
Océane Re	Luxembourg	99.98	99.98	O
EDF Gas Deutschland GmbH	Germany	100.00	100.00	O

Business sectors: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

3.3.2 Joint operations

Other activities		Percentage ownership at 31/12/2021	Percentage ownership at 31/12/2020	Business sector
Friedeburger Speicherbetriebsgesellschaft GmbH (Crystal)	Germany	50.00	50.00	O

Business sectors: G = Generation, D = Distribution, T = Transmission, R = Reactors, O = Other.

3.3.3 Companies accounted for by the equity method

France – Generation and Supply		Percentage ownership at 31/12/2021	Percentage ownership at 31/12/2020	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
AREPE Fund SCS (EDF Invest)	Luxembourg	-	21.99	O
Géosel Manosque (EDF Invest)	France	38.35	38.35	O
Transport Stockage Hydrocarbures (EDF Invest)	France	50.00	50.00	O
Central Sicaf (EDF Invest)	Italy	24.50	24.50	O
Thyssengas (EDF Invest)	Germany	50.00	50.00	O
Aéroports Côte d'Azur (EDF Invest)	France	19.40	19.40	O
Ecowest (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	50.00	G
Switch (EDF Invest)	USA	50.00	50.00	G
MiRose (EDF Invest)	USA	50.00	50.00	G
Red Pine (EDF Invest)	USA	50.00	50.00	G
Energy Assets Group (EDF Invest)	United-Kingdom	40.00	40.00	O
Valentine Solar (EDF Invest)	USA	50.00	50.00	G
Glacier's Edge (EDF Invest)	USA	50.00	50.00	G
Nicolas Riou (EDF Invest)	Canada	50.00	50.00	G
Arada (EDF Invest)	Portugal	-	30.00	G
Cabreira (EDF Invest)	Portugal	-	30.00	G
Montemuro (EDF Invest)	Portugal	-	30.00	G
Korian & Partenaires Immobilier 1 & 2 (EDF Invest)	France	24.50	24.50	O
Issy Shift (EDF Invest)	France	33.33	-	O
Orange Concessions (EDF Invest)	France	16.66	-	O
92 France (EDF Invest)	France	50.00	-	O
Other international				
Compagnie Énergétique de Sinop (CES)	Brazil	51.00	51.00	G
Constellation Energy Nuclear Group LLC (CENG) [2]	USA	-	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
Generadora Metropolitan (GM)	Chile	50.00	50.00	G
Nachtigal Hydro Power Company	Cameroon	40.00	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] Shares in Constellation Energy Nuclear Group LLC (CENG) was sold on 6 August 2021 (see note 3.1).

3.3.4 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 ownership at 31/12/2021	Percentage of voting rights held at 31/12/2021
Edison SpA	97.17	99.48
EDF Investissements Groupe SA	92.46	50.00

NOTE 4 SEGMENT REPORTING

4.1 REPORTING BY OPERATING SEGMENT

Accounting principles and methods

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 SA's energy production and sales activities. This segment also includes entities operating on the downstream sectors (B2B and B2C, aggregation) and all EDF Invest's shareholdings;
- "**France – Regulated activities**": Enedis and Electricité de Strasbourg's distribution activities, and EDF's island activities;
- "**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 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.

4.1.1 At 31 December 2021

(in millions of euros)	France – Generation and Supply	France – Regulated activities	Framatome	United Kingdom	Italy	Other international	EDF Renewables	Dalkia	Other activities[5]	Inter-segment eliminations	Total
Income statement:											
External sales	31,532	17,483	1,862	10,103	11,166	3,148	1,203	4,503	3,461	-	**84,461**
Inter-segment sales	1,650	81	1,500	11	46	205	564	693	444	(5,194)	**-**
TOTAL SALES	**33,182**	**17,564**	**3,362**	**10,114**	**11,212**	**3,353**	**1,767**	**5,196**	**3,905**	**(5,194)**	**84,461**
OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION	**7,394**	**5,992**	**584**	**(21)**	**1,046**	**267**	**815**	**378**	**1,824**	**(274)**	**18,005**
OPERATING PROFIT	**2,394**	**2,610**	**265**	**(2,016)**	**608**	**(475)**	**241**	**217**	**1,655**	**(274)**	**5,225**
Balance sheet:											
Goodwill	126	223	1,428	8,095	108	46	185	592	142	-	**10,945**
Intangible assets and property, plant and equipment	61,468	67,273	2,826	24,408	5,744	2,084	10,842	2,248	578	-	**177,471**
Investments in associates and joint ventures[1]	3,474	-	70	187	178	2,071	1,453	64	587	-	**8,084**
Financial assets and cash[2]	55,415	420	323	18,949	1,512	697	1,788	262	26,099	-	**105,465**
Other segment assets[3]	22,024	4,204	1,997	5,240	5,913	1,265	1,166	2,708	14,415	-	**58,932**
Assets classified as held for sale	-	-	-	-	69	-	-	-	-	-	**69**
TOTAL ASSETS	**142,507**	**72,120**	**6,644**	**56,879**	**13,524**	**6,163**	**15,434**	**5,874**	**41,821**	**-**	**360,966**
Other information:											
Net depreciation and amortisation[4]	(4,449)	(3,381)	(291)	(1,071)	(422)	(305)	(520)	(281)	(69)	-	**(10,789)**
Impairment	(24)	-	(5)	(713)	149	-	(54)	(5)	(1)	-	**(653)**
Equity (non-controlling interests)	115	43	86	8,899	552	407	897	258	521	-	**11,778**
Investments in intangible assets and property, plant and equipment	5,327	4,784	280	4,325	592	129	1,849	295	25	-	**17,606**
Loans and other financial liabilities	71,214	3,386	304	5,417	1,902	13,761	7,513	2,143	3,267	(39,501)	**69,406**
- external liabilities	*63,378*	*820*	*237*	*201*	*988*	*112*	*3,165*	*303*	*202*	-	***69,406***
- intersegment liabilities[6]	*7,836*	*2,566*	*67*	*5,216*	*914*	*13,649*	*4,348*	*1,840*	*3,065*	*(39,501)*	-

[1] At 31 December 2021, 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] Financial assets and cash mainly comprise dedicated assets amounting to €31,013 million in the France – Generation and Supply segment (see note 18.1.2), the NLF receivable (see note 18.1.3) amounting to €15,986 million in the United Kingdom segment and the positive fair value of EDF Trading's derivatives, amounting to €19,605 million (in "Other activities").

[3] Other segment assets include inventories, trade receivables, other receivables and tax assets.

[4] Including net increases in provisions for renewal of property, plant and equipment operated under concessions.

[5] Sales by the "Other activities" segment include the €1,518 million trading margin realised by EDF Trading.

[6] The amount of intersegment liabilities corresponds to the group's centralised cash management (cash pooling by EDF SA, included in the France – Generation and Supply segment) and financing of controlled subsidiaries, particularly EDF International (Other international segment), EDF Energy (United Kingdom segment) and EDF Trading (in the "Other activities" segment).

4.1.2 At 31 December 2020

(in millions of euros)	France – Generation and Supply	France – Regulated activities	Framatome	United Kingdom	Italy	Other international	EDF Renewables	Dalkia	Other activities [5]	Inter-segment eliminations	Total
Income statement:											
External sales	27,112	16,178	1,900	9,041	5,937	2,242	1,069	3,729	1,823	-	**69,031**
Inter-segment sales	1,249	50	1,395	-	30	178	513	483	304	(4,202)	**-**
TOTAL SALES	**28,361**	**16,228**	**3,295**	**9,041**	**5,967**	**2,420**	**1,582**	**4,212**	**2,127**	**(4,202)**	**69,031**
OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION	**7,412**	**5,206**	**534**	**823**	**683**	**380**	**848**	**290**	**261**	**(263)**	**16,174**
OPERATING PROFIT	**2,270**	**1,893**	**269**	**(947)**	**134**	**98**	**354**	**(32)**	**99**	**(263)**	**3,875**
Balance sheet:											
Goodwill	109	223	1,332	7,569	98	37	183	572	142	-	**10,265**
Intangible assets and property, plant and equipment	60,773	65,383	2,603	20,537	5,286	2,127	9,782	2,255	647	-	**169,393**
Investments in associates and joint ventures [1]	2,859	-	65	119	156	1,991	1,197	75	332	-	**6,794**
Financial assets and cash [2]	52,134	339	263	14,833	400	654	1,727	170	6,897	-	**77,417**
Other segment assets [3]	19,901	5,608	1,763	4,772	1,661	662	866	1,919	2,574	-	**39,726**
Assets classified as held for sale	-	-	-	-	485	1,811	-	-	-	-	**2,296**
TOTAL ASSETS	**135,776**	**71,553**	**6,026**	**47,830**	**8,086**	**7,282**	**13,755**	**4,991**	**10,592**	**-**	**305,891**
Other information:											
Net depreciation and amortisation [4]	(4,613)	(3,314)	(276)	(1,122)	(417)	(284)	(458)	(278)	(76)	-	**(10,838)**
Impairment	(16)	-	-	(638)	(74)	-	(36)	(34)	(1)	-	**(799)**
Equity (non-controlling interests)	118	38	115	7,090	178	423	828	284	519	-	**9,593**
Investments in intangible assets and property, plant and equipment	5,503	4,187	215	3,485	492	191	1,650	257	27	-	**16,007**
Loans and other financial liabilities	67,534	2,335	288	5,311	1,737	11,564	6,537	1,695	264	(31,674)	**65,591**
- external liabilities	*60,181*	*761*	*198*	*225*	*823*	*96*	*2,792*	*312*	*203*	-	**65,591**
- intersegment liabilities [6]	*7,353*	*1,574*	*90*	*5,087*	*913*	*11,468*	*3,747*	*1,380*	*62*	*(31,674)*	**-**

[1] At 31 December 2020, 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] Financial assets and cash mainly comprise dedicated assets amounting to €28,398 million in the France – Generation and Supply segment (see note 18.1.2) and the NLF receivable (see note 18.1.3) amounting to €13,034 million in the United Kingdom segment.
[3] Other segment assets include inventories, trade receivables, other receivables and tax assets. By convention, the CSPE receivable is totally allocated to the France-Regulated Activities segment, in the amount of €1,993 million (see note 13.3.4).
[4] Including net increases in provisions for renewal of property, plant and equipment operated under concessions.
[5] Sales by the "Other activities" segment include the €912 million trading margin realised by EDF Trading.
[6] The amount of intersegment liabilities corresponds to the group's centralised cash management (cash pooling by EDF SA, included in the France – Generation and Supply segment) and financing of controlled subsidiaries, particularly EDF International (Other international segment) and EDF Energy (United Kingdom segment).

4.2 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 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
2021 :				
External sales:				
- France [2]	31,678	16,960	377	49,015
- International and Other activities	27,292	-	8,154	35,446
SALES	**58,970**	**16,960**	**8,531**	**84,461**

(in millions of euros)	Generation - Supply	Distribution	Other[1]	Total
2020 :				
External sales:				
- France[2]	27,261	15,731	298	43,290
- International and Other activities	18,601	-	7,140	25,741
SALES	**45,862**	**15 731**	**7,438**	**69,031**

[1]"Other" groups of services include Framatome.
[2]France comprises the two operating segments France – Generation and Supply and France – Regulated activities (see note 4.1).

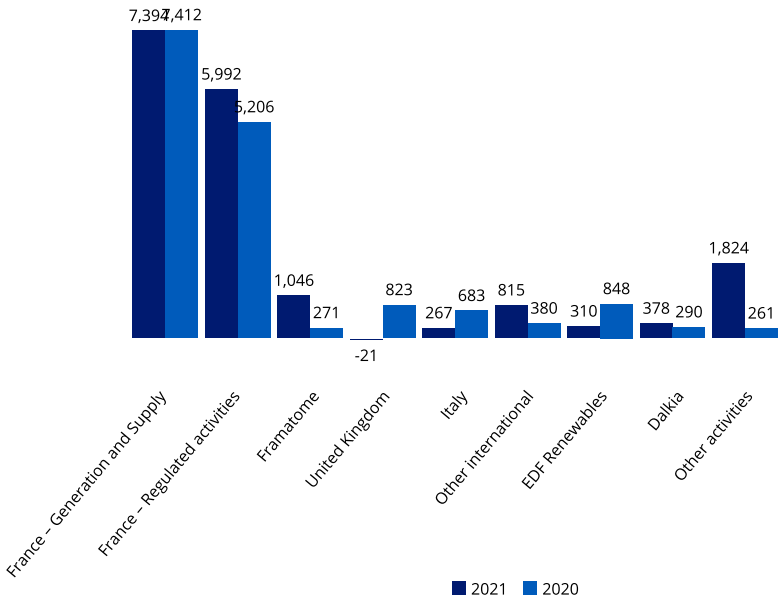
NOTE 5 OPERATING PROFIT BEFORE DEPRECIATION AND AMORTISATION

(in millions of euros)	Notes	2021	2020
Sales	5.1	**84,461**	**69,031**
Fuel and energy purchases	5.2	**(44,299)**	**(32,425)**
External services		(14,145)	(13,072)
Other purchases (excluding external services, fuel and energy)		(3,698)	(3,524)
Change in inventories and capitalised production		8,987	7,888
(Increase)/decrease in provisions on other external expenses		261	247
Other external expenses[1]		**(8,595)**	**(8,461)**
Personnel expenses	5.3	**(14,494)**	**(13,957)**
Payroll taxes		(301)	(292)
Energy taxes		(1,672)	(1,635)
Other non-income taxes[2]		(1,357)	(1,870)
Taxes other than income taxes[3]		**(3,330)**	**(3,797)**
Other operating income and expenses	5.4	**4,262**	**5,783**
Operating profit before depreciation and amortisation		**18,005**	**16,174**

[1]After elimination of the effect of changes in foreign exchange rates and the scope of consolidation, other external expenses increased by 1.3% compared to 2020.
[2]Taxes other than income taxes mainly concern France and essentially comprise land tax and the French business taxes on land and value added.
[3]After elimination of changes in foreign exchange rates and scope of consolidation, taxes other than income taxes decreased by 12% compared to 2020, principally due to lower generation taxes introduced in France's economic recovery plan.

The Group's consolidated operating profit before depreciation and amortisation for 2021 amounts to €18,005 million, an organic increase of 11.3% from 2020.

The breakdown of the Group's Operating profit before depreciation and amortisation by operating segment in 2021 and 2020 is as follows, in millions of euros (see note 4.1):



After elimination of foreign exchange effects and changes in the scope of consolidation, the Group's operating profit before depreciation and amortisation registered organic growth of 11.3% or €1,825 million. This increase is principally explained by the contributions of the France – Regulated activities segment (+15.1% or +€786 million), Other activities (+€1,563 million), Italy (+53.0% or +€362 million) and the United Kingdom (-108.0% or €(889) million).

The rise in operating profit before depreciation and amortisation includes €476 million resulting from the lower generation taxes in France under the government measures decided for the national recovery plan, comprising €322 million for the France – Generation and Supply segment and €130 million for the France – Regulated activities segment.

Note that in 2020, operating profit before depreciation and amortisation had been affected by the Covid-19 pandemic which had an estimated impact of €(1,479) million. The principal business segments concerned were France – Generation and Supply (€(872) million), France – Regulated activities (€(237) million) and the United Kingdom (€(182) million).

The stability of the operating profit before depreciation and amortisation in the France – Generation and Supply segment (€(21) million) is explained by several factors, particularly the following two contrasting effects: a 25.3TWh rise in nuclear power output in 2021, whereas generation in 2020 had been greatly affected by the Covid-19 pandemic (estimated impact of 33TWh in 2020 due to modulation and adaptation of the maintenance outage schedule) and a 2.6TWh decrease in hydropower output; and despite the favourable effects of higher generation volumes, very unfavourable energy price effects relating to purchases and sales on the open market as purchases had to be made at very high prices, particularly in the fourth quarter when certain power plants were offline. The operating profit before depreciation and amortisation was also supported by the reduction in generation taxes introduced as part of the French government's national recovery plan.

Operating profit before depreciation and amortisation for the France – Regulated activities segment registered growth of €786 million, principally reflecting the 15.8TWh increase in volumes delivered due to the favourable climate effect, changes in tariff indexations, and the unfavourable effect of higher energy purchases to compensate for network losses as prices rose substantially at the end of the year. The operating profit before depreciation and amortisation was also sustained by a high number of consumer and producer connections, after 2020 had been affected by Covid-19 measures, and a decrease in generation taxes.

The €(31) million decline in EDF Renewables' operating profit before depreciation and amortisation was principally due to the negative consequences of the exceptional spell of cold weather in Texas, and conversely, the favourable effect of progress in generation and development and sales of structured assets, mainly in the United States and Portugal.

The Italy segment saw a rise of €362 million in operating profit before depreciation and amortisation, notably reflecting the resumption of business with industrial customers on the gas segment, and residential and business customers on the electricity segment, after the pandemic-affected year 2020. This rise also reflects the colder weather in a context of good performances by fossil-fired and renewable generation, and optimisation activities. The operating profit before depreciation and amortisation was also augmented by the gain on disposal of Infrastrutture Distribuzione Gas (IDG).

In the United Kingdom, the substantial €(889) million decrease in operating profit before depreciation and amortisation is explained by a number of factors: a decline in nuclear power output (-4TWh) and the substantial decline in realised nuclear power prices reflecting purchases made at high prices to serve customers in this context of lower output; a recovery of business with industrial customers, which had been penalised in 2020 by the Covid-19 pandemic; the impossibility in 2021 of passing on energy price rises to customers on the Standard Variable Tariff due to the price cap mechanism, and the takeover of certain suppliers' customer portfolios in application of the regulator's supplier of last resort mechanism.

The significant €92 million increase in Dalkia's operating profit before depreciation and amortisation largely reflects the resumption of services and works after the Covid-19-affected year 2020.

In the Other activities segment, of the €1,563 million improvement in operating profit before depreciation and amortisation, €881 million is attributable to the gas activities, principally reflecting higher gas prices (including the variation in increases/ decreases to provisions for onerous contracts between 2020 and 2021), and €567 million is attributable to EDF Trading following the high market volatility observed in Europe and the United States (notably during the spell of extremely cold weather in Texas), and to a lesser degree sales of real estate assets in France.

5.1 SALES

Accounting principles and methods

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 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.

Trading activities

Sales revenues include the margin realised, essentially by EDF Trading, on energy market trading operations that fall within the scope of IFRS 9, which are recognised at fair value.

EDF Trading is the Group's trading entity. It operates on the markets on behalf of other Group entities and through trading activity for its own purposes or for non-Group entities, backed by the Group's industrial assets and within its assigned risk mandate.

EDF Trading trades on organised or OTC markets in derivatives such as futures, forwards, swaps and options.

EDF Trading undertakes purchase and sale operations on the wholesale markets in Europe and North America for:

- electricity and fuel (principally gas);
- CO_2 emission permits, weather derivatives and other environmental instruments;
- capacity guarantees for electricity production.

EDF Trading also operates in the unregulated North American markets as part of its energy supply activities.

For LNG, optimisation activities (recognised as a joint operation) and trading activities (recognised as a joint venture) are carried out through JERA Global Markets, which is jointly owned with JERA.

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 guaranteeing a secure power supply from January 2017.

Operators of electricity generation plants 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), as an electricity supplier (EDF SA, Électricité de Strasbourg) and as a purchaser of power to compensate for network losses (Enedis and Électricité de Strasbourg).

As a result of the capacity mechanism review clause, in 2021 RTE published a report on the mechanism's first few years of operation and performance. On the basis of this report, on 29 November 2021 RTE submitted rule change proposals to the CRE for its opinion. In decision 2021-370 of 16 December 2021, the CRE issued a favourable opinion of these proposals and of changes to certain parameters for delivery years 2023 and 2024 (the contribution by interconnections, the extreme temperature vector and the safety coefficient). The CRE considered that the proposed changes will simplify the capacity mechanism for all actors, and improve visibility for capacity market participants. The new rules were approved by decision of the Ministry for the Ecological Transition on 21 December 2021. They set the opening date for trading of capacity guarantees for delivery years 2023 and 2024 at 1 March 2022.

The auctions organised by EPEX Spot for delivery years 2023 and 2024 will be held from March 2022.

Another consultation phase is due to take place in 2022. It will concern structural changes to the capacity mechanism starting from delivery year 2025, which will require approval by the European Commission.

The trading sessions of 2020 registered a significant increase in capacity prices for the 2020s and subsequent years from the auction in June 2020. This is mainly explained by the market actors anticipating lower fleet availability for peak periods, in the context of the Covid-19 crisis. In 2021, prices generally remained high, sustained by electricity prices and tensions on the electricity system for the winter 2021-2022.

For delivery years 2017 to 2021, the mean market prices resulting from capacity auctions ahead of the delivery year were as follows:

Delivery year	2017	2018	2019	2020	2021
Price (€/kW)	10.0	9.3	17.4	19.5	31.2

The delivery year 2022 was opened to auction in 2020, and ten auctions have been held since then, six of them in 2021. These capacity auctions resulted in the following prices, in chronological order:

- In 2020: €16.6/kW in April; €38.9/kW in June; €18.1/kW in October and €18.2/kW in December;
- In 2021: €28.3/kW in March; €28.2/kW in April; €28.8/kW in June; €29.9/kW in September and €31.5/kW in October and €23.9/kW in December.

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. In addition, the ARENH price, although it has not changed since first introduced, is considered to have 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 scheme 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 operators of installations, if the effective capacity is lower than the certified capacity, a liability (accrued expenses or provision) is recorded equivalent to the best estimate of the expense necessary to extinguish the obligation (rebalancing or settlement mechanism);
- 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 was introduced in 2014 to ensure security of electricity supply by providing a payment for reliable sources of capacity, alongside their electricity revenues, to ensure they deliver energy when needed. It 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 energy purchases 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.

In November 2018, a judgment by the General Court of the Court of Justice of the EU had the effect of annulling the European Commission's State aid approval for the capacity market scheme, leading to a standstill period during which no capacity payments could be made.

In October 2019, following a further State aid investigation; the European Commission reapproved the capacity market scheme, enabling the resumption of capacity payments.

Deferred capacity payments in respect of the standstill period were made to capacity providers, including EDF Energy's nuclear, coal and gas-fired generation, in January 2020. The capacity market continues to operate, although the inclusion of new emission limits means that unabated coal-fired generation will be unable to compete for capacity agreements for periods after 30 September 2024. The UK Government has also announced its intention to require unabated coal-fired generation to close by this date. The UK Government's five-year review of the capacity market, published in 2019, committed to retaining the capacity market as a guarantee of system reliability and to making further incremental improvements to its design. The UK Government's Energy White Paper, published in December 2020, confirmed that the next review will take place by 2024 and that the UK Government intends that the mechanism will act in concert with other markets to incentivise investment in capacity.

Italian system: A capacity mechanism 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. Edison did not participate in any auction in 2021.

The fixed premium is recorded in income during the corresponding delivery year, and reduced if appropriate by any repayments made to TERNA, or if the power plant is unavailable.

5.1.1 Regulatory changes in France

The principal regulatory changes in 2021 are presented below. Changes in 2022 are presented in note 23.

Regulated electricity sales tariffs in France – "Blue" tariffs

In accordance with article L. 337-4 of the French Energy Code, regulated electricity sales tariffs are set by the Ministers for Energy and the Economy following proposals by the French Energy Regulatory Commission (*Commission de Régulation de l'Énergie* or CRE).

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 general economic interest objective of guaranteeing consumers an electricity price that is more stable than market prices.

In accordance with European Directive 2019/944 of 5 June 2019 on common rules for the internal market for electricity, the French Energy and Climate law of 8 November 2019 authorises continuation of regulated sales tariffs, but they are reserved for residential or business consumers with a subscribed power level of up to 36kVA, provided they have fewer than 10 employees and their annual sales, income or balance sheet total is below €2 million.

Tariff changes

In accordance with article L. 337-4 of the French Energy Code, the French Energy Regulatory Commission "CRE" (*Commission de Régulation de l'Énergie*) is 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 14 January 2021, the CRE proposed an increase of 1.61% including taxes (1.93% excluding taxes) in the "blue" tariffs for residential customers and 2.61% including taxes (3.23% excluding taxes) in the "blue" tariffs for non-residential customers from 1 February 2021. This proposed increase takes particular account of the rising cost of energy supplies and capacity guarantees, the "catch-up" adjustment to cover the cost-income differential on regulated sales tariffs in 2019 and 2020, movements in selling costs associated with unpaid receivable forecasts for 2021, particularly in the context of the Covid-19 pandemic, and adjustment of selling costs for non-residential customers who are still eligible for the regulated tariffs. This CRE proposal was confirmed by tariff decisions of 28 January 2021 that were published in the *Journal officiel* of 31 January 2021, and has applied since 1 February 2021.

In a decision of 8 July 2021, in view of changes in the TURPE tariff from 1 August 2021 and in application of the Energy Code, the CRE proposed an increase of 0.48% including taxes (1.08% excluding taxes) in the "blue" tariffs for residential customers and 0.38% including taxes (0.84% excluding taxes) in the "blue" tariffs for non-residential customers. The CRE has proposed that this change should apply from 1 August 2021.

The proposed tariff increase results from the increase in the TURPE network access tariffs from 1 August 2021 (+0.33% on regulated sales tariffs including taxes), the increase in the remuneration received by suppliers for the service of managing customers on behalf of the network operator, which is deducted from selling costs (-0.07% on regulated sales tariffs including taxes), and a new update of the "catch-up" adjustment for amounts not covered in 2019, so that the full amount will be recovered in two years, as the CRE had announced (+0.21% on regulated sales tariffs including taxes).

Comparability between periods is thus affected by the tariff changes introduced since 1 August 2020, presented in the table below:

Date of the CRE proposal	Increase in "blue" residential customer tariffs (inc. taxes / excl. taxes)	Increase in "blue" non- residential customer tariffs (inc. taxes/excl. taxes)	Date of the tariff decision	Date of application
02/07/2020	1.54% / 1.82%	1.58% / 1.81%	29/07/2020	01/08/2020
14/01/2021	1.61% / 1.93%	2.61% / 3.23%	28/01/2021	01/02/2021
08/07/2021	0.48% / 1.08%	0.38% / 0.84%	29/07/2021	01/08/2021
18/01/2022	4.00% / 24.3%	4.00% / 23.6%	28/01/2022	01/02/2022

"TURPE" Network access tariffs

The costs borne by the network operators Enedis and RTE for management of the public electricity distribution and transmission networks are covered, provided they are in line with the costs of an efficient network operator, by the "TURPE" tariffs for using the networks, as stipulated in Articles L. 341-2 and following of the French Energy Code.

These tariffs apply to users connected to the distribution and transmission networks.

Second TURPE 5 Distribution tariff and TURPE 5 Transmission tariff

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 from 1 August 2017 to 31 July 2021.

On 28 June 2018, the CRE adopted a decision regarding the TURPE 5 HTA-BT (medium voltage – low voltage) tariff and the new version of that tariff from 1 August 2018, known as the "second TURPE 5 HTA-BT". Among other things, this decision reflected implementation of the Council of State's partial cancellation decision of 9 March 2018. 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.

By a decision of 20 May 2020, the CRE adopted a +2.75% increase to the second TURPE 5 tariff for the medium and low voltage network from 1 August 2020. This increase comprises +0.92% for inflation, +1.85% to balance the CRCP, and -0.02% in application of the Council of State's decision of 9 March 2018.

For transmission expenses, on 14 May 2020, the CRE adopted a decision reducing the TURPE 5 tariff for the high voltage network by -1.08% from 1 August 2020, comprising +0.92% for inflation, and -2% to balance the income and expenses adjustment account (CRCP[1]).

TURPE 6 Distribution and Transmission tariffs

The CRE issued two decisions of 21 January 2021 (published in France's *Journal Officiel* 0096 of 23 April 2021) on the TURPE 6 Transmission (high voltage) and TURPE 6 Distribution (medium voltage – low voltage), after the Higher Energy Council (*Conseil supérieur de l'énergie*) gave its approval. These tariffs apply from 1 August 2021 for a period of approximately 4 years.

For distribution expenses, in its tariff decision n° 2021-13 of 21 January 2021, the CRE set the margin on assets at 2.5% and the additional return on regulated equity at 2.3%. The average tariff increase is +0.91% at 1 August 2021 and +1.39% per year for the whole tariff period, assuming average annual inflation of 1.07%.

For transmission expenses, in its tariff decision n° 2021-12 of 21 January 2021, the CRE set a nominal pre-tax weighted average cost of capital (WACC) of 4.6% for the return on RTE's regulated asset base. The average tariff increase is +1.09% at 1 August 2021 and +1.57% per year for the whole tariff period, assuming average annual inflation of 1.07%.

Supplier commissioning

In application of the CRE's decision of 18 January 2018, energy suppliers receive remuneration from distribution network operators for the service of managing single-contract customers on their behalf.

The commissioning principle is identical for all suppliers selling single-contract market-price offers. Only regulated electricity tariffs have given 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 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 at the Paris Commercial Court are still ongoing.

Electricity Equalisation Fund

The TURPE tariff for the medium and low-voltage network is identical for every electricity network operator. It is determined on the basis of forecast expenses to be borne by Enedis, provided they correspond to an efficient network operator, and forecasts of the number of consumers connected to Enedis' networks, their consumption, and the power level subscribed.

As this tariff cannot always cover the specific needs of certain service zones, the Electricity Equalisation Fund (FPE) exists to compensate for disparities in network operating conditions. The Energy Code requires electricity distribution costs resulting from public network operation to be shared between public distribution network operators. There are two equalisation mechanisms: one based on fixed amounts, the other set by the CRE based on analysis of the network operators' accounts. The calculation method for the fixed-rate allocation mechanism is defined by decree and

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

ministerial order. The EDF entities concerned by the Electricity Equalisation Fund are Enedis, Electricité de Strasbourg and SEI.

On 28 July 2021, the CRE published its decision setting the final amount of the allocation from the Electricity Equalisation Fund (*Fonds de Péréquation de l'Electricité*) to SEI, following analysis of the network operators' accounts. SEI's allocation is set at €195.3 million for 2021.

For the fixed-amount mechanism, the ministerial order of 7 October 2021 set the 2021 contributions payable and allocations receivable from the Electricity Equalisation Fund for distribution network operators. The fixed contribution due by Strasbourg Electricité Réseaux and Enedis amount to €1.7 million and €26.4 million respectively. Enedis is also the CRE's designated operator for collection and payment of Electricity Equalisation Fund contributions from all the Local Distribution Companies.

ARENH

The ARENH[1] scheme for regulated access to historic nuclear power, set up in 2011, allows alternative suppliers to purchase electricity from EDF to supply their final customers, after signing a framework agreement, at a regulated price for set quantities determined under the provisions of the French Energy Code. This scheme is also open to network operators to cover their energy losses.

The ARENH price, determined by the Ministers for Energy and the Economy following a proposal by the CRE, has been fixed at €42/MWh since January 2012. This includes delivery of the electricity and has incorporated the associated capacity guarantees since 2017.

The maximum total volume that can be sold under the ARENH scheme to suppliers who apply to the scheme to cover the needs of their final customers is set at 100TWh per year (see note 23).

In decision 2021-339 of 8 November 2021, as required by the Energy Code, the CRE set out the method for allocating ARENH volumes if applications exceed the maximum total volume defined for 2022. In view of the current exceptional crisis in the electricity market, it also introduced reinforced checks and special rules for accepting the ARENH volumes applied for by suppliers.

The CRE stated that EDF-controlled subsidiaries' excess applications would be fully curtailed (this does not apply to network operators) and they could enter into contracts with the parent company that replicate the ARENH scheme and terms of supply, particularly the curtailment rate for alternative suppliers.

The Energy and Climate law of 8 November 2019 introduced new measures. It raised the initial 100TWh ceiling for ARENH sales to 150TWh from 1 January 2020, allowing the French government to raise the maximum total volume of ARENH deliveries above 100TWh by ministerial order, and to revise the ARENH price by ministerial order during a transition period (see note 23).

ARENH applications during the November 2021 session for delivery in 2022 totalled 160.36TWh (excluding applications from EDF subsidiaries and network operators). The CRE scaled down certain applications (- 0.03TWh in total), bringing the total application volumes validated by the CRE to 160.33TWh, and curtailed each supplier's application. Further volumes were also sold by EDF to its subsidiaries through contracts that replicate the ARENH scheme, and to compensate for network electricity losses (26.4TWh).

Litigation relating to the ARENH scheme has also been instigated in 2020 by some energy suppliers in the context of the Covid-19 pandemic. Details are provided in note 17.3.4.

As announced in the draft multi-year energy programme (PPE) published on 25 January 2019, in January 2020 the French government launched a call for contributions regarding the fundamental findings driving the plan to reform the economic regulations for existing nuclear facilities, and its construction and operating principles. The proposed new regulations would replace the ARENH scheme. Like many other actors in the sector, the EDF group participated in this consultation, which ended on 17 March 2020. France's Minister for the Ecological and Inclusive Transition and Minister of the Economy and Finance then commissioned the CRE to carry out an assessment of the costs borne by the nuclear operator, and to determine fair remuneration for its nuclear activities under the government's potential future regulations for existing nuclear facilities. There were no significant developments in 2021 concerning the terms and conditions of these potential new regulations.

1 *Accès Régulé à l'Énergie Nucléaire Historique.*

5.1.2 Sales

Sales are comprised of:

(in millions of euros)	2021	2020
Sales of energy and energy-related services	77,432	62,918
– energy[(1)]	*56,866*	*43,767*
– energy-related services (including delivery[(2)])	*20,566*	*19,151*
Other sales of goods and services	5,511	5,201
Trading	1,518	912
SALES	**84,461**	**69,031**

[(1)]Sales of energy include €1,623 million of sales related to optimisation operations on the wholesale gas and electricity markets in 2021 (€1 112 million in 2020). These operations are carried out by certain Group entities to balance supply and demand, in compliance with the group's risk management policy. In 2021, the principal operating segments with a net short position in euros on the markers are France – Generation and supply (gas) and Italy (electricity). In 2020, the segments were France – Generation and supply (gas), Italy (electricity) and the United Kingdom (electricity).

[(2)]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. 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 5.2.

After elimination of foreign exchange effects and changes in the scope of consolidation, the Group's sales for 2021 were up by 21.6% or €14.9 billion. Practically all operating segments were concerned by this increase, which reflects the rise in energy prices and a recovery in business after the Covid-19-affected year 2020, particularly France – Generation and Supply (+16.3% or +€4.4 billion), France – Regulated activities (+8.1% or +€1.3 billion), Italy (+88.3% or €5.2 billion), Other activities (+90.6% or €1.7 billion), Dalkia (+21.3% or €0.8 billion) and the United Kingdom (+8.3% or +€0.8 billion).

Note that in 2020, sales were affected by the Covid-19 pandemic which had an estimated impact of €(2,306) million. The principal operating segments concerned were France – Generation and Supply (€(1,083) million), France – Regulated activities (€(278) million), the United Kingdom (€(451) million), Italy (€(90) million), and Dalkia (€(193) million).

Sales by the France – Generation and Supply segment registered an organic increase of +€4.4 billion. This increase is principally explained by favourable energy market price effects on resales of purchase obligations. Sales were also affected by the following two contrasting effects: a 25.3TWh increase in nuclear power output compared to 2020, which was greatly affected by the Covid-19 pandemic (with an estimated impact of 33TWh in 2020 due to modulation and adaptation of the maintenance outage schedule) and a 2.6TWh decrease in hydropower output; and despite the favourable effects of higher generation volumes, very unfavourable price effects relating to purchases and sales on the wholesale market as purchases had to be made at very high prices, particularly in the fourth quarter when certain power plants were offline. This segment's sales were also supported by good levels of business by the service subsidiaries.

The rise in sales by the France – Regulated activities segment (+€1.3 billion) principally reflects changes made to the TURPE distribution tariff in a context of higher delivery quantities (as the weather was colder in 2021 than 2020), and an increase in connection services (including the unfavourable effect of the Covid-19 pandemic, particularly in the first half of 2020).

The Italy segment registered an increase of +€5.2 billion in sales, principally explained by favourable gas price effects across all markets, and to a lesser degree by a volume effect. Higher electricity prices also contributed to the rise in sales in 2021.

The +€1.7 billion organic growth in sales by the Other activities segment essentially concerned the gas businesses (+€1.0 billion) due to rising gas prices on the wholesale markets, and higher sales by EDF Trading (+€0.6 billion) thanks to its trading performance in highly volatile commodity markets in Europe and the United States (notably during the spell of extremely cold weather in Texas in early 2021).

Dalkia registered an organic increase of +€0.8 billion in sales, notably attributable to higher business volumes (including the unfavourable effect of the Covid-19 pandemic in 2020, especially in the first half-year), a substantial rise in gas prices, and a favourable weather-related volume effect in 2021.

5.2 FUEL AND ENERGY PURCHASES

Fuel and energy purchases comprise:

(in millions of euros)	2021	2020
Fuel purchases used – power generation[1]	(14,973)	(10,162)
Energy purchases[1]	(21,417)	(14,645)
Transmission and delivery expenses	(8,088)	(7,916)
Gain/loss on hedge accounting	(10)	(22)
(Increase)/decrease in provisions related to nuclear fuels and energy purchases	189	320
FUEL AND ENERGY PURCHASES	**(44,299)**	**(32,425)**

[1]Fuel purchases used and Energy purchases include respectively €864 million and €4,167 million for optimisation operations on the wholesale gas and electricity markets in 2021 (€514 million and €1,674 million in 2020). In 2021 the principal operating segments with net long positions in euros on the markets are France – Generation and supply (electricity), United Kingdom (gas and electricity), Other international (Luminus – gas and electricity) and Dalkia (gas). In 2020, the same segments were concerned.

Fuel purchases used include costs relating to raw materials for energy generation (principally nuclear fuels and fissile materials, gas to a smaller degree, and a non-significant proportion of coal and oil), 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 purchases made under the purchase obligation mechanism in France.

After elimination of foreign exchange effects and changes in the scope of consolidation, the Group's fuel and energy purchases were up by €11.4 billion from 2020. The increase principally concerned the following segments: Italy (€4.9 billion, essentially gas purchases), France – Generation and Supply (€2.5 billion, essentially electricity purchases), and the United Kingdom (€1.8 billion). The main explanation for the higher amount of purchases is the effect of price rises on the commodity markets.

5.3 PERSONNEL EXPENSES

Personnel expenses comprise:

(in millions of euros)	2021	2020
Wages and salaries	(9,351)	(9,024)
Social contributions	(2,059)	(2,020)
Employee profit sharing	(319)	(271)
Other contributions related to personnel	(350)	(347)
Other expenses linked to short-term benefits	(219)	(219)
Short-term benefits	**(12,298)**	**(11,881)**
Expenses under defined-contribution plans	(1,029)	(952)
Expenses under defined-benefit plans	(1,003)	(944)
Post-employment benefits	**(2,032)**	**(1,896)**
Other long-term expenses	(132)	(155)
Termination payments	(32)	(25)
Other personnel expenses	**(164)**	**(180)**
PERSONNEL EXPENSES	**(14,494)**	**(13,957)**

Excluding foreign exchange effects and changes in the scope of consolidation, personnel expenses increased by 3.5% from 2020, mainly in the Framatome, United Kingdom, Dalkia and EDF Renewables segments.

Average workforce comprise:

	2021	2020
IEG status	94,775	95,530
Other	68,648	65,673
AVERAGE WORKFORCE	**163,423**	**161,203**

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 section 3.3.3.9, "Detail of Group's workforce" of the 2021 Universal Registration Document.

5.4 OTHER OPERATING INCOME AND EXPENSES

Other operating income and expenses comprise:

(in millions of euros)	Notes	2021	2020
Operating subsidies	5.4.1	5,685	8,305
Net income on deconsolidation	5.4.2	302	221
Gains on disposal of fixed assets	5.4.2	(29)	(229)
Net increase/decrease in provisions on current assets [1]		124	(203)
Net increase in provisions for operating contingencies and losses		(381)	(348)
Other items	5.4.3	(1,439)	(1,963)
OTHER OPERATING INCOME AND EXPENSES		**4,262**	**5,783**

[1] *For details of impairment of trade receivables as a result of the Covid-19 pandemic see note 1.4.3.*

5.4.1 Operating subsidies

This item mainly comprises the subsidy received or receivable by EDF in respect of the compensation for public energy charges (CSPE), excluding the annual repayment of the past CSPE receivable and associated interest, reflected in the financial statements through recognition of income of €5,472 million for 2021 (€8,081 million for 2020). The decrease in CSPE income is principally explained by the higher market prices observed in 2021 compared to 2020.

The operating liability corresponding to the CSPE is recorded in "Other liabilities" at 31 December 2021 (see note 13.5).

Compensation for public energy charges (CSPE) (France)

Mechanism

The compensation mechanism for public energy service charges (*compensation des Charges de Service Public de l'Energie*) resulted 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, public energy service charges (electricity and gas) were to be compensated. Compensation initially came from two State budget items, a special "energy transition" item and a "public energy service" item, but since 1 January 2021 public energy service charges have been compensated entirely through the general budget.

In compensation for the 2021 charges, France's initial finance law for 2021 introduced a €9.1 billion "public energy service" item in the general budget, to cover additional costs incurred on support contracts (purchase obligations and additional remuneration) for renewable energies and biogas, solidarity charges borne by gas and electricity suppliers, costs associated with support for non-renewable energy production (essentially cogeneration), and the cost of applying the standard national tariffs to zones that are not connected to France's mainland network.

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 (collected by the 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). These rates remain unchanged in 2021.

5.4.2 Net income on deconsolidation and gains on disposal of fixed assets

In 2021, 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 €245 million (€210 million in 2020);
- gains on sales of real estate assets in France and the gain on the sale of IDG (a gas distribution network, see note 3.1), amounting to €260 million.

5.4.3 Other items

Other items mainly include costs relating to energy savings certificates used or consumed during the year, additional remuneration paid to producers of electricity from renewable sources in France and losses on non-recoverable operating receivables. The favourable change in other items in 2021 is principally explained by changes in the additional remuneration as a result of higher market prices, and to a smaller extent lower costs relating to energy savings certificates.

The additional remuneration paid to electricity producers using renewable energies was introduced by France's law on the Energy Transition for green growth. It is a support mechanism intended to guarantee reasonable remuneration for producers who sell their energy directly on the markets, by compensating for the differential between the revenues from those sales and a reference amount. This mechanism complements the purchase obligation system in France.

From the first half of 2020, other items also include income and expenses related to closure of the Fessenheim plant.

Closure of Fessenheim nuclear power plant

In accordance with the application for termination of operations and the declaration of the permanent shutdown of both reactors at Fessenheim nuclear power plant sent by EDF to the Minister for the Ecological and Inclusive Transition and to the ASN on 30 September 2019, EDF shut down reactor 1 on 22 February 2020 and reactor 2 on 30 June 2020.

On 27 September 2019, due to the cap on nuclear power output set by the "energy transition for green growth" law of 17 August 2015, the French State and EDF signed a protocol agreement whereby the State will compensate EDF for the early closure of Fessenheim.

The compensation paid under the terms of this protocol comprises:

- 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. An amount of €370 million was received on 14 December 2020 (see note 13.5);

  This compensation is 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. There is no reason to recognise such income in the financial statements at this stage.

Since its decoupling from the network, the Fessenheim plant has entered a post-operating phase that will last approximately five years. During that period, units 1 and 2 will continue to be operated and maintained as "defueled core" and "evacuated fuel" reactors. This will require a series of technical and administrative operations. A significant milestone was reached on 18 October 2021 when the last two packages of spent fuel were dispatched from Fessenheim unit 1 to the Orano site at La Hague

All the post-operating expenses and income associated with the closure of the two units in 2020 are recognised in other operating income and expenses. At 31 December 2021, they mainly comprise:

- expenses of €126 million (salaries and social security charges for labour at the site amounting to €57 million, purchases of goods and services amounting to €54 million, taxes other than income taxes, mainly payroll taxes, energy taxes and local taxes amounting to €15 million);
- the compensation defined in the protocol for expenses that will be incurred after the closure, amounting to €57 million, recognised as an operating subsidy in the income statement under the methods explained above.

Energy savings certificates

Accounting principles and methods

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 extinguish the obligations related to the energy sales made.

Energy saving regulations in France

4th period of the French Energy Savings Certificates Scheme (2018-2021):

Initially planned for the period 2018-2020, the fourth period of France's energy savings certificates scheme was extended by one year (by law no. 2019-1147 of 8 November 2019 on Energy and the Climate). This period substantially raises the energy savings obligation levels (to 1,600TWhc for the "standard" obligations and 533TWhc for the obligations intended to benefit households in situations of energy poverty), and adds a new chapter on antifraud measures concerning energy savings certificates (increasing the number and effectiveness of controls and sanctions).

If there is a shortfall in certificates surrendered at the end of the period, obligated actors must pay a fine of €15 per MWhc of shortfall.

In order to fulfil these obligations, EDF has made every effort to increase its number of energy savings certificates, taking advantage of the "*Coup de pouce*" operations launched in France early in 2019 (subsidies for insulation, 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, etc.).

Despite a substantial increase in the energy savings obligation in the fourth period (2018-2021) of the scheme, the EDF group met its energy savings target and has a stock of certificates for the start of the fifth period (2022-2025).

5th period of the French Energy Savings Certificates Scheme (2022-2025):

Decree 2021-712 on the fifth period of the energy savings certificates scheme (2022-2025) was published in the *Journal officiel* of 5 June 2021. The decree makes the scheme more effective (for example by significantly reducing special measures and bringing calculations close to the real savings), increases funding for very vulnerable households (higher obligations intended to benefit households in situations of energy poverty, restriction of the scope to very vulnerable households, an increase in the penalties in this category to €20/MWhc) and encourages development of carbon-free energies:

- the overall obligation is increased by 17.2% to 2,500TWhc for this period (obligations intended to benefit households in situations of energy poverty: +37% to 730TWhc, "standard" obligations: +11% to 1,770TWhc);
- the Energy Savings Certificate coefficient (MWhc to be produced per MWh of energy sold) is reduced by 10.2% for electricity and increased by 51.8% for gas;
- for electricity and gas, the threshold below which no energy savings certificates are required is progressively reduced from the current 400GWh/year to 300GWh/year in 2022, 200GWh/year in 2023 and 100GWh/year in 2024 and subsequent years.

NOTE 6 NET CHANGES IN FAIR VALUE ON ENERGY AND COMMODITY DERIVATIVES, EXCLUDING TRADING ACTIVITIES

Accounting principles and methods

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 eligible 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.

(in millions of euros)	2021	2020
NET CHANGES IN FAIR VALUE ON ENERGY AND COMMODITY DERIVATIVES, EXCLUDING TRADING ACTIVITIES	(215)	(175)

NOTE 7 OTHER INCOME AND EXPENSES

Other income and expenses amount to €(1,123) million in 2021. They principally comprise:

- an amount of €505 million received in application of the agreement signed by Areva and EDF on 29 June 2021 (see note 2) for a settlement payment of €563 million, less certain amounts, principally payments collected for third parties and assets previously included in the balance sheet;
- exceptional additional costs relating to work for repairs to the main secondary circuit welds at the Flamanville 3 EPR, totalling €(573) million at 31 December 2021 (these are defined by IAS 16.22 as abnormal costs and cannot be included in the cost of assets in progress);
- the net loss on the sales of Dalkia Wastenergy and the investment in CENG, amounting to a total €(286) million (see note 3.1);
- costs relating to the early closure of Dungeness B, amounting to €(164) million including impairment of fuel inventories and spare parts, and provisions for penalties due under the capacity mechanism (see notes 2 and 10.8);
- provisions relating to proceedings before the civil, administrative and criminal courts concerning the sale by Montedison of Ausimont (the Bussi site) in Italy to Solvay in 2002 (see note 17.3.5);
- a provision relating to litigation proceedings in process.

Other income and expenses includes 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 €(487) million for 2020. They principally comprised exceptional additional costs relating to repair work on the main secondary circuit welds in the Flamanville 3 EPR, totalling €(397) million in 2020.

NOTE 8 FINANCIAL RESULT

8.1 COST OF GROSS FINANCIAL INDEBTEDNESS

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

(in millions of euros)	2021	2020
Interest expenses on financing operations[1]	(1,494)	(1,699)
Change in the fair value of derivatives and hedges of liabilities	15	90
Transfer to income of changes in the fair value of cash flow hedges	32	(8)
Net foreign exchange gain on indebtedness	(12)	7
COST OF GROSS FINANCIAL INDEBTEDNESS	**(1,459)**	**(1,610)**

[1]Interest expenses on financing operations includes interest on the IFRS 16 lease liability amounting to €(75) million in 2021 and €(80) million in 2020.

8.2 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)	2021	2020
Provisions for long-term and post-employment employee benefits [1]	(498)	(637)
Provisions for the back-end of the nuclear cycle, decommissioning and last cores [2]	(2,109)	(2,679)
Other provisions and advances	(63)	(417)
DISCOUNT EFFECT	**(2,670)**	**(3,733)**

[1]See note 16.1.3.
[2]Including the effect of discounting the receivable corresponding to amounts reimbursable by the NLF (see note 18.1.3).

The decrease in the effect of unwinding the discount on nuclear provisions is largely explained by the 10bp decrease in the real discount rate in 2021 (versus a 20bp decrease in 2020) applied to nuclear provisions in France (see note 15.1.1).

The decrease in the effect of unwinding the discount on "Other provisions and advances" is largely explained by a change of method introduced in 2020 for determining the discount rates to be used in calculating provisions (particularly provisions for onerous contracts).

8.3 OTHER FINANCIAL INCOME AND EXPENSES

Other financial income and expenses comprise:

(in millions of euros)	2021	2020
Financial income on cash and cash equivalents	38	35
Gains/(losses) on other financial assets (including loans and financial receivables)	312	181
Gains/(losses) on debt and equity securities	673	691
Changes in financial instruments carried at fair value through profit and loss	2,683	1,253
Other financial expenses	(217)	(102)
Foreign exchange gain/loss on financial items other than debts	120	(254)
Return on fund assets	319	378
Capitalised borrowing costs	561	579
OTHER FINANCIAL INCOME AND EXPENSES	**4,489**	**2,761**

"Gains/(losses) on debt and equity securities" in 2021 principally include:

- €605 million of dividends and interest income on debt securities (€518 million in 2020);
- €68 million of net gains and losses on sales of debt securities carried at fair value through OCI with recycling (including 41 million on dedicated assets), compared to €173 million in 2020 (including €162 million on dedicated assets).

In 2021, other financial income and expenses include changes in fair value on financial instruments, amounting to €2,683 million. In a context of bullish markets, this favourable overall change for the year was driven by a €2,739 million increase in the fair value of dedicated assets.

In 2020, changes in financial instruments carried at fair value through profit and loss amounted to €1,253 million, including €1,218 million relating to dedicated assets.

NOTE 9 INCOME TAXES

Accounting principles and methods

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.

9.1 BREAKDOWN OF TAX EXPENSE

The tax expense breaks down as follows:

(in millions of euros)	2021	2020
Current tax expense	(2,016)	(747)
Deferred taxes	616	(198)
TOTAL	**(1,400)**	**(945)**

In 2021, €(1,679) million of the current tax expenses relates to French companies, and €(337) million relates to other subsidiaries (€(604) million and €(143) million respectively in 2020).

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

(in millions of euros)	2021	2020
Income of consolidated companies before tax	**5,585**	**1,293**
Income tax rate applicable to the parent company	28.41%	32.02%
Theoretical tax expense	**(1,587)**	**(414)**
Differences in tax rate[1]	(349)	(225)
Permanent differences	(160)	6
Taxes without basis[2]	727	(27)
Unrecognised deferred tax assets[3]	(36)	(288)
Other	5	3
ACTUAL TAX EXPENSE	**(1,400)**	**(945)**
EFFECTIVE TAX RATE	**25.09%**	**73.10%**

The income tax expense amounts to €(1,400) million in 2021, corresponding to an effective tax rate of 25.09% (compared to €(945) million in 2020, corresponding to an effective tax rate of 73,10%).

The €455 million increase in the Group's tax expense between 2021 and 2020 essentially reflects the €4,292 million increase in net income before tax, generating an additional tax charge of €1,219 million.

The tax expense also reflects the favourable effects of deferred tax asset recognition in the United States and asset revaluations for tax purposes in Italy, which were partly counterbalanced by the forthcoming increase in the UK's income tax rate from 19% to 25% from 2023 (creating a larger negative impact than in 2020, which the rate was raised from 17% to 19%).

Regarding the tax revaluations of assets in Italy, special tax measures introduced in response to the Covid-19 pandemic allow Italian companies, by virtue of article 110 of decree-law 104/2020, to realign the tax value of certain assets and goodwill with their accounting value in return for payment of a 3% tax. The Group's Italian companies opted to realign the tax value of certain tangible assets and goodwill at 31 December 2021.

Finally, the income tax expense in 2020 was strongly affected by the unfavourable Council of State decision issued in December 2020 rejecting the tax-deductibility of certain long-term liabilities of EDF SA, a factor that had no equivalent in 2021.

After elimination of these non-recurring items (principally unrealised gains and losses on financial assets, impairment, asset restatements for tax purposes in Italy, the impact of changes in the UK tax rate and the sale of CENG), the effective current tax rate for 2021 is 21.3%, compared to 19.0% in 2020.

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

- 2021:
  - (1)the unfavourable impact of tax rate differences amounting to €359 million, due to the forthcoming increase in the UK's normative rate from 19% to 25% from 2023;
  - (2)the favourable impact of asset restatements for tax purposes in Italy (amounting to €422 million) and deduction of payments made to bearers of perpetual subordinated bonds (amounting to €157 million);
  - (3)the effect of non-recognition of deferred tax assets, amounting to €(36) million, including €(309) million of deferred taxes recognised during the year following restatements of the tax value of assets in Italy, partly offset by the favourable effect of deferred tax assets recognised in the United States (€191 million);
- 2020:
  - (1) the unfavourable impact of tax rate differences amounting to €225 million, mainly explained by an increase in the UK income tax rate from 17% to 19% and the difference between the current tax rate (32.02%) and deferred tax rate in France (28.41% or 25.82%, depending on the timing of reversal of the temporary differences);
  - (2) the economic impact of tax litigation, amounting to €(175) million, partly offset by the positive effect of deduction of payments made to bearers of perpetual subordinated bonds amounting to €162 million;
  - (3) the effect of non-recognition of deferred tax assets, amounting to €(288) million, including €(361) million of deferred taxes recognised in connection with tax litigation (resulting from the future deductibility of expenses whose deductibility is temporarily being questioned), due to the Group's prudent policy concerning recognition of deferred taxes beyond a 10-year horizon.

9.3 CHANGE IN DEFERRED TAX ASSETS AND LIABILITIES

(in millions of euros)	2021	2020
Deferred tax assets	1,150	557
Deferred tax liabilities	(3,115)	(2,295)
Net deferred taxes at 1 January	***(1,965)***	***(1,738)***
Change in net income	616	(198)
Change in equity	694	(215)
Translation adjustments	(93)	72
Changes in scope of consolidation(1)	28	69
Other movements	(14)	45
NET DEFERRED TAXES AT 31 DECEMBER	**(734)**	**(1,965)**
Deferred tax assets	1,667	1,150
Deferred tax liabilities	(2,401)	(3,115)

(1)*Changes in the scope of consolidation essentially concern the sale of West Burton.*

In 2021, the change in deferred taxes included in equity includes €(510) million of actuarial gains and losses on post-employment benefits (€(238) million in 2020) and €1,223 million of changes in the fair value of hedges (€(50) million in 2020).

9.4 BREAKDOWN OF DEFERRED TAX ASSETS AND LIABILITIES BY NATURE

(in millions of euros)	31/12/2021	31/12/2020
Deferred taxes:		
Fixed assets	(6,201)	(6,194)
Provisions for employee benefits	4,706	5,222
Other provisions and impairment	346	321
Financial instruments	1,408	290
Tax loss carryforwards and unused tax credits	2,004	1,172
Other	1,080	711
Total deferred tax assets and liabilities	**3,343**	**1,523**
Unrecognised deferred tax assets	(4,077)	(3,489)
NET DEFERRED TAXES	**(734)**	**(1,965)**

At 31 December 2021, unrecognised deferred tax assets represent a potential tax saving of €4,077 million (€3,489 million at 31 December 2020), mainly relating to Italy, France and the United States.

In Italy, the potential tax saving of €310 million relates to the tax value of goodwill, which was restated in 2021 and can be amortised over 50 years for tax purposes. Some of the corresponding deferred taxes are unrecognised due to the Group's prudent policy concerning recognition of deferred taxes beyond a 10-year horizon.

In France, this potential tax saving, which amounts to €2,913 million (€2,900 million at 31 December 2020), 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 €730 million (€428 million in 2020) and relates mainly to losses which can be carried forward until dates between 2030 and 2037 if generated before 31 December 2017, and for an unlimited period otherwise.

Recognised deferred tax assets on tax loss carryforwards and unused tax credits amount to €1,140 million (€584 million in 2020) and principally concern the United States (€286 million in 2021, €151 million in 2020), United Kingdom (€548 million in 2021, €173 million in 2020), France (€51 million in 2021, €52 million in 2020) and in Germany (€65 million in 2021, €47 million in 2020). 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 10 PROPERTY, PLANT AND EQUIPMENT AND INTANGIBLE ASSETS (EXCLUDING FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION ASSETS)

Details of property, plant and equipment and intangible assets (excluding French electricity distribution concession assets) are as follows:

(in millions of euros)	Notes	31/12/2021	Assets in progress [1]	31/12/2020	Assets in progress[1]
Goodwill	10.1	10,945	n.a.	10,265	n.a.
Other intangible assets	10.2	10,221	1,793	9,583	1,581
Property, plant and equipment used in generation and other tangible assets owned by the group, including right-of-use assets	10.3	98,237	45,220	92,600	39,460
- Right-of-use assets	*10.4*	*4,146*	*n.a.*	*4,116*	*n.a.*
Property, plant and equipment operated under concessions other than French electricity distribution concessions	10.5	6,881	621	6,858	574
TOTAL PROPERTY, PLANT AND EQUIPMENT AND INTANGIBLE ASSETS (EXCLUDING FRENCH ELECTRICITY DISTRIBUTION CONCESSION ASSETS)		**126,284**	**47,634**	**119,306**	**41,615**

[1] Assets in progress are presented in note 10.6.

n.a.: not applicable.

10.1 GOODWILL

Accounting principles and methods

Determination of goodwill

In application of IFRS 3, "Business combinations"(see note 3), 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.

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 10.8.

In 2021, goodwill primarily related to Framatome (€1,428 million) and EDF Energy (€8,095 million). The breakdown by operating segment is presented in note 4.1.

Changes in goodwill in 2021 and 2020 were as follows:

(in millions of euros)	31/12/2021	31/12/2020
Net book value at opening date	**10,265**	**10,623**
Acquisitions	143	139
Disposals	(1)	-
Impairment (note 10.8)	-	(31)
Translation adjustments	537	(439)
Other changes	1	(27)
NET BOOK VALUE AT CLOSING DATE	**10,945**	**10,265**
Gross value at closing date	11,715	11,032
Accumulated impairment at closing date	(770)	(767)

The changes in goodwill in 2021 primarily related to:

- the acquisition of Rolls Royce Civil Nuclear I&C from Framatome for €92 million (see note 3.1);
- translation adjustments (€537 million) resulting chiefly from the rise of the pound sterling against the Euro.

The changes in goodwill in 2020 primarily related to:

- the acquisition of Pod Point by EDF Energy for €74 million, a company specialising in charging for electric vehicles in the United Kingdom;
- the first consolidation of Energy2market for €37 million;
- translation adjustments of €(439) million, principally due to the pound sterling's depreciation against the euro.

10.2 OTHER INTANGIBLE ASSETS

Accounting principles and methods

General principles

Other intangible assets mainly comprise:

- software, which is amortised on a straight-line basis over its useful life, including SaaS (Software as a Service) contracts which are not treated as service contracts and included in expenses. To qualify for treatment as fixed assets, SaaS contracts must confer a right of control to the user in addition to access to the software for a fixed period;
- research and development costs that qualify for capitalisation under IAS 38 amortised on a straight-line basis over their foreseeable 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;
- 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 10.5);
- 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;
- incremental costs of winning or renewing customer contracts, which are amortised over the average duration of customer contracts;
- intangible assets related to environmental regulations.

Intangible assets relating to environmental regulations

These include greenhouse gas emission rights and renewable energy certificates purchased (see notes 20.1.1 and 20.1.2).

Greenhouse gas emission rights

EU Directive 2003/87/EC set up a greenhouse gas emission quota system for the European Union. Although the United Kingdom is no longer a member of the European Union, it is still concerned by this system.

This quota 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.

In the EDF group, the entities subject to this Directive are EDF, EDF Energy, Edison, Dalkia, and 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 intangible assets as "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).

A provision is established at the year-end when the estimated annual emissions by an entity are higher than the rights held or purchased on the forward market, less any rights sold on the forward market (see note 17.2).

This provision is equal to the acquisition cost up to the amount of rights acquired on the spot or forward markets, and to 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 emission rights at the end of the year and not subject to forward sale is higher than the number of rights to 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.

Renewable energy certificates (green 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. Although the United Kingdom is no longer a member of the European Union, it is still concerned by this system.

States can use two possible mechanisms to meet these targets:

- introducing a specific sales tariff for energy from renewable sources (this system is used in France and Italy);
- introducing a system of renewable energy certificates to be surrendered by energy suppliers (this system is used in the United Kingdom (Renewable Obligation Certificates) and Belgium (*Certificats verts*)).

For renewable energy certificate systems, the Group applies the following accounting treatment:

- certificates earned through energy generation are not recognised, since their cost is nil;
- certificates purchased are recognised as intangible assets in the line "Greenhouse gas emission rights - green certificates";
- a provision is established to reflect the obligation to surrender certificates. It is based on the cost of certificates earned (with nil value) and purchased (on the spot or forward market), the market price of the certificates still be purchased, and where relevant the market price or penalty price for the balance. The provision is cancelled when the certificates are surrendered to the State (see note 17.2).

The net value of other intangible assets breaks down as follows:

(in millions of euros)	31/12/2020	Acquisitions	Disposals	Translation adjustments	Changes in scope[2]	Other movements	31/12/2021
Software	**5,970**	897	(83)	76	2	(75)	**6,787**
Positive fair value of commodity contracts acquired in a business combination	**504**	-	-	-	-	-	**504**
Greenhouse gas emission rights – green certificates	**769**	1,820	(1,732)	21	-	22	**900**
Other intangible assets	**7,546**	541	(52)	45	58	14	**8,152**
Intangible assets in development[1]	**1,581**	207	(8)	4	11	(2)	**1,793**
Gross value	**16,370**	**3,465**	**(1,875)**	**146**	**71**	**(41)**	**18,136**
Software	**(3,569)**	(756)	79	(58)	5	17	**(4,282)**
Positive fair value of commodity contracts acquired in a business combination	**(216)**	(25)	-	-	-	-	**(241)**
Other intangible assets	**(3,002)**	(463)	51	(32)	15	39	**(3,392)**
Accumulated amortisation and impairment	**(6,787)**	**(1,244)**	**130**	**(90)**	**20**	**56**	**(7,915)**
NET VALUE	**9,583**	**2,221**	**(1,745)**	**56**	**91**	**15**	**10,221**

[1] Increases in intangible assets in development are stated net of the effects of newly-commissioned assets. Intangible assets in development are detailed in note 10.6.
[2] Changes in scope essentially comprise EDF Luminus (acquisition of Essent).

The gross value of other intangible assets at 31 December 2021 includes:

- the Edison brand and intangible assets related to Edison's hydropower concessions, amounting to €945 million and €489 million respectively;
- the Dalkia brand and intangible assets related to Dalkia's concession agreements in France, amounting to €130 million and €1,341 million respectively;
- the Framatome brand, Framatome's nuclear technology-related intangible assets and Framatome's customer contracts, amounting to €151 million, €712 million and €344 million respectively.

Net impairment of €59 million was recorded in respect of other intangible assets in 2021 (€(85) million in 2020).

EDF's research and development expenses recorded in the income statement total €487 million for 2021 (€518 million in 2020).

10.3 PROPERTY, PLANT AND EQUIPMENT USED IN GENERATION AND OTHER TANGIBLE ASSETS OWNED BY THE GROUP

Accounting principles and methods

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 costs are recognised in assets against the provision recognised to cover these obligations. At the date of commissioning, these assets are measured and recorded in the same way as the corresponding provision (see note 15);
- decommissioning costs for nuclear generation installations also include last core costs (see note 15).

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

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.

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:

▪ nuclear generation facilities	40 to 50 years
▪ wind farm and photovoltaic facilities	20 to 25 years
▪ fossil-fired power plants (mainly CCGT-Combined Cycle Gas Turbine plants)	25 to 45 years
▪ transmission and distribution installations (lines, substations)	20 to 60 years
▪ other general plant and machinery	10 to 20 years

The net values of property, plant and equipment used in generation and other tangible assets owned by the group are as follows:

(in millions of euros)	31/12/2020	Increases	Decreases	Translation adjustments	Changes in the scope of consolidation[1]	Other movements[2]	31/12/2021
Land and buildings	**14,091**	346	(122)	66	(210)	46	**14,217**
Nuclear power plants	**77,329**	3,765	(2,546)	784	-	204	**79,536**
Fossil-fired & hydropower plants	**18,166**	330	(119)	179	(1,188)	(3)	**17,365**
Other installations, plant, machinery, equipment & other	**20,620**	3,026	(691)	641	(934)	(25)	**22,637**
Right-of-use assets[3]	**5,733**	764	-	68	(88)	(273)	**6,204**
Assets in progress[4]	**39,616**	4,637	(40)	1,251	(33)	(63)	**45,368**
Gross value	**175,555**	**12,868**	**(3,518)**	**2,989**	**(2,453)**	**(114)**	**185,327**
Land and buildings	**(7,843)**	(608)	79	(16)	71	(13)	**(8,330)**
Nuclear power plants	**(50,353)**	(3,907)	2,449	(465)	-	(1,379)	**(53,655)**
Fossil-fired & hydropower plants	**(13,450)**	(643)	116	(203)	994	646	**(12,540)**
Other installations, plant, machinery, equipment & other	**(9,536)**	(1,347)	647	(229)	51	56	**(10,358)**
Right-of-use assets[3]	**(1,617)**	(723)	-	(8)	81	208	**(2,059)**
Assets in progress[4]	**(156)**	(39)	1	(6)	8	44	**(148)**
Depreciation and impairment	**(82,955)**	**(7,267)**	**3,292**	**(927)**	**1,205**	**(438)**	**(87,090)**
NET VALUE	92,600	5,601	(226)	2,062	(1,248)	(552)	98,237

[1]Changes in the scope of consolidation essentially relate to EDF Renewables (development and sale of structured assets) and EDF Energy (sale of West Burton B - see note 3.1).
[2]Other movements include the effect on assets associated with provisions and underlying assets of the €495 million change in the real discount rate used to calculate provisions related to EDF's nuclear generation (see note 15.1).
[3]Right-of-use assets are detailed in note 10.4.
[4]Increases in assets in progress are stated net of the effects of newly-commissioned assets. Assets in progress are detailed in note 10.6.

The changes observed in property, plant and equipment used in generation owned by the Group include a €2,062 million impact of translation adjustments due to the rise of the pound sterling against the euro and a €(1,031) million impact resulting from extension to 50 years of the depreciation period of 1300MW PWR nuclear plants at 1 January 2021 (see note 1.4.1).

Depreciation periods of nuclear plants in France

As stated in note 1.3.4.1, the depreciation period of nuclear power plants currently in operation in France, i.e. thirty-two 900MW reactors, twenty 1300MW reactors and four 1450MW reactors, is 50 years for 900MW-series plants (since 1 January 2016) and 1300MW-series plants (since 1 January 2021), and 40 years for N4-series plants which do not yet fulfil the conditions for a longer depreciation period.

Under France's multi-year energy programme (PPE, standing for *Programmation Pluriannuelle de l'Énergie*) for the periods 2019-2028, adopted by decree 2020-456 of 21 April 2020, twelve French nuclear reactors are to be shut down by 2035, in addition to closure of the two reactors at Fessenheim which took place in the first half of 2020 in accordance with decree 2020-129 of 18 February 2020 terminating the plant's operating licence. Consequently two 900MW reactors will be shut down in 2027 and 2028 ahead of their fifth 10-year inspection (two others could also be shut down early in 2025-2026 if certain conditions are fulfilled, notably concerning the price of electricity and security of supply). To select the two reactors concerned, priority will be given to shutdowns that minimise the economic and social impact, have the 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. The PPE also stipulates that early reactor shutdowns will be confirmed 3 years prior to implementation. Consequently, notwithstanding the depreciation periods indicated above, adoption of the PPE in April 2020 has led to re-estimation of nuclear provisions since 2020 by reference to various scenarios for the early shutdowns of two 900MW reactors in 2027 and 2028, resulting in a €29 million increase in nuclear provisions (mainly decommissioning provisions, due to the payment schedules being shortened by a few years). Accelerated depreciation schedules were also estimated based on these scenarios, leading to an increase in the depreciation expense recognised, with no significant impact on the Group's financial statements.

Depreciation period of coal-fired plants in France

In view of France's Energy and Climate law of 8 November 2019, the ends of the depreciation periods for the Le Havre and Cordemais coal-fired plants were changed at 1 June 2019, setting the closure of Le Havre at 1 April 2021 while Cordemais is to continue operating until 2026, considering a conversion to biomass as part of the Ecocombust project.

Le Havre power plant was permanently shut down on 31 March 2021.

As a result of the changes made in 2019 to the end of the depreciation period, accelerated depreciation (compared to the previous depreciation period) of €222 million was recognised during 2021 (€250 million in 2020, as the Le Havre plant ceased operations on 31 March 2021).

On 8 July 2021, EDF announced it had decided to put an end to the Ecocombust project to develop fuel from class B "waste" wood as an alternative to coal, since the conditions for continuing the project were not fulfilled: the project cost could not guarantee an attractive price for the final product, and the industrial partner recently withdrew.

EDF began the Ecocombust project in 2015. Since late 2018 the project had consisted of adapting the Cordemais plant to use this alternative fuel, and creating a dedicated facility to produce pellets on site. EDF carried out successful technical and environmental feasibility studies.

The economics of the project were penalised by its very innovative nature, and the lack of experience with this type of product, as well as recently soaring commodity prices. Also, the partner with which EDF was holding discussions for the treatment of effluents from the pellet production facility decided to withdraw from the project. This meant the industrial commissioning date had to be deferred to 2024, as the Cordemais plant would not have been able to produce electricity from an alternative non-coal fuel during the period 2022/2024.

Cordemais will continue to operate until 2024, perhaps even 2026, to meet the requirements of the electricity system as defined by RTE, in compliance with the Energy and Climate law which allows the Cordemais plant to be used at full capacity for a maximum 750 hours a year. Consequently, the end of the depreciation period is currently unchanged at 2026, and the depreciation schedule was accelerated from the second half of 2021 to take account of the expected new operating arrangements. The investment expenditure on the Ecocombust project was written off at 30 June 2021.

10.4 RIGHT-OF-USE ASSETS

Accounting principles and methods

Under IFRS 16, applicable since 1 January 2019, 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.

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, 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 applies 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 21.1.1 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).

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.

10.4.1 Change in right-of-use assets

(in millions of euros)	31/12/2020	Increases[1]	Decreases	Changes in the scope of consolidation	Other movements[2]	31/12/2021
Land and buildings	**4,740**	479	-	1	(68)	**5,152**
Other installations, plant, machinery, equipment & other	**993**	285	-	(89)	(137)	**1,052**
Gross value	**5,733**	**764**	**-**	**(88)**	**(205)**	**6,204**
Land and buildings	**(1,055)**	(566)	-	3	89	**(1,529)**
Other installations, plant, machinery, equipment & other	**(562)**	(157)	-	78	112	**(529)**
Depreciation and impairment	**(1,617)**	**(723)**	**-**	**81**	**201**	**(2,058)**
NET VALUE	**4,116**	**41**	**-**	**(7)**	**(4)**	**4,146**

[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 and translation differences.

10.4.2 Impacts in the income statement

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

(in millions of euros)	2021	2020
Income from subleases	56	56
Variable lease expenses	(53)	(46)
Expenses on short-term leases or leases of low-value assets	(70)	(106)
Income from sale and leaseback operations	-	-
Operating profit before depreciation and amortisation	**(67)**	**(96)**
Depreciation on right-of-use assets	(723)	(697)
Operating profit	**(790)**	**(793)**
Interest expense on the lease liability	(75)	(80)
Income before taxes of consolidated companies	**(865)**	**(873)**

10.4.3 Payments relating to leases

(in millions of euros)	2021	2020
TOTAL PAYMENTS RELATING TO THE LEASE LIABILITY	**(801)**	**(795)**

Payments relating to the lease liability mainly concern principal repayments, and amount to €729 million in 2021 (€719 million in 2020).

10.5 PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER CONCESSIONS OTHER THAN FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

Accounting principles and methods

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

Concessions in France

In France, the Group is the operator for three types of concessions:

- public electricity distribution concessions granted by local authorities (municipalities or syndicated municipalities) (see note 11);
- hydropower concessions granted by the State;
- heat generation and distribution concessions from public authorities.

Hydropower concessions

Hydropower concessions follow standard rules approved by decree. For concessions granted before 1999, hydropower concession assets consist solely of hydropower generation equipment (dams, pipes, turbines, etc.), while for more recent concessions, they also include hydropower generation equipment and switching facilities (alternators, etc.).

Most concessions that expired before 2012 were initially for 75 years and were renewed for terms of 30 to 50 years. However, the French government has not yet renewed 29 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).

As these concession agreements are not concerned by IFRIC 12 “Service concession agreements”, the assets used, whether directly owned or part of the concession, are recorded under “Property, plant and equipment operated under concessions other than French public electricity distribution concessions” at acquisition cost.

The main depreciation periods applied are:

▪ Hydroelectric dams	75 years
▪ Electromechanical equipment used in hydropower plants	50 years

Heat generation and distribution concessions from public authorities

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 "Other intangible assets", in accordance with IFRIC 12 “Service concession agreements”.

Concession assets generally comprise:

- boiler houses;
- networks;
- network extensions;
- network connections;
- and sometimes cogeneration assets.

Intangible assets are depreciated on a straight-line basis over the term of the concession, which is generally between 15 and 25 years.

Almost all of these assets are located in France.

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 other than French public electricity distribution concessions”. 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.

The net values of property, plant and equipment operated under concessions other than French public electricity distribution concessions are as follows:

(in millions of euros)	31/12/2020	Increases	Decreases	Changes in the scope of consolidation	Other movements	31/12/2021
Land and buildings	**1,640**	17	(17)	1	-	**1,641**
Fossil-fired & hydropower plants	**11,711**	260	(96)	21	38	**11,934**
Other	**677**	13	(16)	-	6	**680**
Assets in progress[(1)]	**590**	64	(4)	-	(11)	**639**
Gross value	**14,618**	**354**	**(133)**	**22**	**33**	**14,894**
Land and buildings	**(980)**	(34)	16	-	1	**(997)**
Fossil-fired & hydropower plants	**(6,282)**	(291)	92	-	(24)	**(6,505)**
Other	**(482)**	(35)	19	-	6	**(492)**
Assets in progress[(1)]	**(16)**	(2)	(4)	-	2	**(19)**
Depreciation and impairment	**(7,760)**	**(362)**	**123**	**-**	**(15)**	**(8,013)**
NET VALUE	**6,858**	**(8)**	**(10)**	**22**	**19**	**6,881**

(1) Increases in assets in progress are stated net of the effects of newly-commissioned assets. Assets in progress are detailed in note 10.6.

At 31 December 2021, property, plant and equipment operated under concessions other than French public electricity distribution concessions comprise concession facilities mainly located in France and in Italy (hydropower, excluding public electricity distribution).

10.6 ASSETS IN PROGRESS

(in millions of euros)	2021	2020
Intangible assets	1,793	1,581
Property, plant and equipment used in generation and other tangible assets owned by the Group	45,220	39,460
Property, plant and equipment operated under concessions other than French public electricity distribution concessions	621	574
TOTAL ASSETS IN PROGRESS	**47,634**	**41,615**

Intangible assets

At 31 December 2021, intangible assets in progress include notably studies for the EPR 2 and SMR projects, amounting respectively to €761 million (€577 million at 31 December 2020), and €69 million.

New nuclear reactors in France: the EPR 2 project

The EPR 2 project concerns a new pressurised water nuclear reactor that meets the objectives for third-generation reactor safety, aiming to incorporate design, construction and commissioning experience acquired from EPR reactors and the nuclear reactors currently in operation.

On 16 July 2019, the ASN issued an opinion that the safety levels of EDF's key design options for its EPR 2 were satisfactory. It stated that "the general safety objectives, the safety baseline requirements and the main design options are on the whole satisfactory".

The EPR 2 will also offer superior operating performance in terms of power (1650MW compared to 1450MW for the most powerful current reactor), output, availability and manoeuvrability.

The draft PPE published on 25 January 2019 by the Ministry for the Ecological and Inclusive Transition stated that the Government, together with the nuclear industry, would 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, and that based on this information and depending on developments in the energy situation, the Government would make a decision regarding the suitability of launching a renewal programme for nuclear installations.

While awaiting a decision about the EPR 2, EDF was authorised by its Board of Directors on 16 December 2020 to continue the project until the end of 2022, with a cost budget of around €1 billion.

In 2021, EDF, working with the French authorities, finalised its contribution to the government-supervised work programme: formal provision of feedback from construction of the first EPRs, and demonstration of the French nuclear sector's ability to handle an industrial programme to build 3 pairs of reactors (using an adjusted EPR model incorporating feedback from the earliest EPR projects in France and internationally).

The analysis conducted covered justification of the need, an action plan to mobilise actors in the nuclear sector, estimation of anticipated costs, analysis of the possible options for the programme's leadership and funding (and their consequences as regards regulation and changes in the legal framework), identification of locations, consideration of questions relating to management of the waste produced by a new nuclear fleet and action to be taken, including interaction with the European Commission and public consultation.

The DGEC audited this programme in the summer of 2021 and validated the methods used to estimate the schedule and costs.

The French President declared in a speech in November 2021 that France would restart a nuclear programme and build new reactors on French soil. On 10 February 2022 during a visit to Belfort in eastern France, he announced the launch of a programme to construct 6 EPR 2 reactors by 2035, and begin studies for an additional 8 EPR 2 reactors by 2050. No investment decision has yet been taken, and the programme will require appropriate regulation and funding arrangements.

NUWARD, France's Small Modular Reactor (SMR) project

Regarding Small Modular Reactors (SMRs), development of the NUWARD™, a 340MW pressurised water plant with two 170MW units, continued in 2021. Power plants in this bracket are largely designed for the export market, to contribute to the widespread replacement of the oldest fossil-fired plants in the next few decades. These export sales will be backed up by a model plant in France, due to start construction by 2030.

Development, industrial production and marketing of the NUWARD will be supervised by EDF with engineering support from the CEA, Naval Group, and TechnicAtome. Given its export target, this development is the subject of an investigation into the viability of cooperation with one or more international partner, particularly European partners.

The conceptual design phase is currently in process, benefiting from public funding of €50 million granted by the French State as part of the "France Relance" national recovery plan.

Property, plant and equipment used in generation and other tangible assets owned by the Group

At 31 December 2021, property, plant and equipment in progress used in generation and owned by the Group mainly comprise:

- Investments for the Flamanville 3 EPR amounting to €15,014 million, including capitalised interim interest of €3,471 million at 31 December 2020 (€14,565 million at 31 December 2020, including capitalised interim interest of €3,291 million). The amount capitalised for the Flamanville 3 project in the financial statements at 31 December 2021 is €15,251 million, which also includes €231 million[1] for assets that have been commissioned, including €25 million of interim interest (see note 10.3).

  This capitalised amount of €15,251 million including capitalised interim interest, includes, in addition to the construction cost:

  - an inventory of spare parts and capitalised amounts totalling €529 million for related projects (notably the initial comprehensive inspection and North Area development);
  - €781 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 (€311 million, essentially consisting of advances and progress payments);
  - giving a construction cost at historical value of €10,445 million in the consolidated financial statements at 31 December 2021, and a construction cost at completion (excluding interim interest) of €12.7 billion (in 2015 euros).

1 €336 million in gross value, less €105 million of depreciation.

This follows the Group's announcement on 12 January 2022 that the schedule for the Flamanville 3 project was being adjusted and the estimated completion cost raised from €12.4 billion to €12.7 billion (in 2015 euros, excluding interim interest).

In its report of July 2020 on EPR technology, the French Court of Auditors (*Cour des Comptes*) stated that by its calculations, in addition to the construction cost of €12.4 billion (in 2015 euros) announced by EDF in its press release of 9 October 2019, there would be further costs that could reach €6.7 billion (in 2015 euros), including €4.2 billion of interest expenses. As stated above, at 31 December 2021 the capitalised interest amounts to €3.5 billion and other capitalised project costs amount to €1.3 billion.

The non-recurring additional costs resulting from the necessary repairs to the main secondary circuit welds (see Group press release of 9 October 2019) are recorded in other income and expenses at the amount of €573 million in 2021 (€397 million in 2020) (see note 7). Additional costs induced by the readjustment announced on 12 January 2022 will be recognised in other operating income and expenses.

- Investments relating to Hinkley Point C, amounting to €18,542 million including capitalised interim interest of €835 million (€13,586 million at 31 December 2020 including capitalised interim interest of €518 million). In 2021 investments in this project amounted to €3,635 million (€2,868 million in 2020).
- Studies concerning Sizewell C amounting to €533 million (€324 million in 2020).

The balance of property, plant and equipment in progress (excluding assets operated under concessions), i.e. €11,131 million, principally concerns EDF SA's existing nuclear plants (70%) in line with the *Grand Carénage* programme (replacement of major components, particularly steam generators; work in connection with periodic reviews and 10-year inspections), and to a lesser extent (around 15%) EDF Renewables (power plants in development in Europe, North America and emerging countries).

Property, plant and equipment in progress increased by €5,760 million as the level of investment in 2021 is significantly higher than the amount of assets brought into service during the year (see note 10.3).

Principal projects in progress and investments during the year

Grand Carénage programme

Since 2014 EDF has been implementing its *Grand Carénage* industrial refurbishment programme designed to enhance reactor safety and extend nuclear fleet operating lifetimes beyond 40 years. The most recent estimate of the programme's cost for the period 2014 to 2025 was established in 29 October 2020 and amounted to €49.4 billion in current euros.

This cost estimate mainly reflected the first information about the additional works to be conducted, based on the fourth periodic review of the Group's 900MW reactors, a process that concluded with the ASN's decision issued on 23 February 2021. The work required covers studies, modification work and initially unplanned additional equipment to improve safety levels. This estimate also factored in the revised duration of scheduled maintenance outages for 10-year and partial inspections, building on prior year experience, and the impacts of the Covid-19 pandemic for the period 2020-2022 as estimated in 2020. The estimated cost of the *Grand Carénage* programme is regularly updated, and currently stands at €50.2 billion in current euros. This figure takes account of further work, studies and controls to be conducted, and a revaluation of certain costs. The industrial work will continue beyond 2025, and consequently the investment expenses will remain high beyond that date.

The principal events and industrial milestones of the *Grand Carénage* programme in 2021 were the following:

- On 23 February 2021, the ASN issued its opinion on the generic aspects of continued operation of 900MW reactors for ten years following their fourth 10-year inspection, considering that all the measures taken and recommended by EDF make this feasible. After Tricastin 1 in late 2019, Bugey 2, Bugey 4 and Tricastin 2 reached the milestone of 40 years of operation in 2021, and were restarted after a successful fourth 10-year inspection during 2021. Three other fourth 10-year inspections were in process at 31 December 2021 (Dampierre 1, Bugey 5 and Gravelines 1).
- The programme for preventive replacement of the main unit transformers continued. 150 of a total 174 main unit transformers have been replaced, i.e. 86% of the programme.
- The steam generators have been replaced at 27 of the total 32 900MW-series units.
- All 56 Emergency Diesel Generators are now in operation. The 56th (Paluel 1) was commissioned in February 2021.

Flamanville 3 EPR project

Developments in 2020

The main developments at the Flamanville site in 2020 were the following:

The second hot functional test phase which started on 21 September 2019 was completed in February 2020. Hot functional testing checks plant performance under simulated normal operating conditions.

In the context of the Covid-19 pandemic, after a cluster of cases was identified in the Manche area, work on the Flamanville site was restricted to safety, security and environment monitoring work only from mid-March (see note 1.4.3). General activity on the site resumed progressively from 4 May 2020 and was back to near-normal levels in July 2020.

Functional tests of the open reactor vessel were successfully completed between 21 May and 25 June 2020.

Following the ASN's decision of 8 October 2020 authorising partial commissioning of the EPR, the first fuel assemblies arrived at the site on 26 October and are stored in the reactor building pool.

In parallel, the upgrading work continued on non-penetration welds on the main secondary circuit that had quality deviations or did not meet the break preclusion requirements defined by EDF, and several welds were repaired in August 2020 once the ASN issued its first authorisations. EDF also decided to include the welds on the circuit supplying water to the steam generators in the scope of the repairs concerning the main secondary circuit. Qualification of the repair procedure for these welds began, with the objective of performing the work in the second half of 2021. At this stage, the repairs concern a hundred welds in the secondary circuits.

A review was conducted in 2020 of the impact of France's first national lockdown on the Flamanville project. This did not lead to any change to the fuel loading dates or the construction cost announced in October 2019, but it showed that the project has no remaining margin in its schedule or cost. However, achievement of the targets depends on a number of factors, notably the ASN's examinations of EDF's proposed methods for repairing the main secondary circuit welds, particularly the qualification of welding robots for repairing the penetration welds.

Work on these repairs could not begin until the ASN made its final decision as to approval of the entire process involving remote-controlled robots, which was deferred to the first quarter of 2021. This phase of the project is among those in the critical path for on-schedule finalisation of the EPR.

Developments in 2021

The fuel assemblies required for the first fuel load continued to arrive during the first half of the year, and the entire first core is now stored in the Flamanville 3 reactor building pool.

The process of repairing the penetration welds on the main secondary circuit using remote-controlled robots was approved by the ASN on 19 March 2021, several weeks behind the expected date, and work began on the eight welds that were not compliant with the break preclusion principle. All eight were repaired in 2021, then subjected to stress-relieving heat treatment. Demonstration of the qualification of the stress-relieving heat treatment for repairs of VVP (steam discharge pipework circuit) penetration welds was validated by the ASN, which issued authorisation for its use in late 2021. Furthermore, four ARE (steam generator water supply circuit) penetration welds also require repair, and qualification of the repair process is under way at the ASN. This process is an adaptation of the process used for VVP penetration weld repairs.

For the non-penetration welds located on the main secondary circuit that had quality deviations (this concerns 45 VVP welds and 32 ARE welds), the ASN issued approval in April 2021 for the repair of a third batch of 6 welds. In the 3 batches authorised to date, 12 weld upgrades have been completed. In April the ASN gave approval for the related regulatory checks, which are currently in process.

In total, a hundred welds (penetration and non-penetration) on the main secondary circuit are concerned by repairs to the VVP and ARE pipework. The final stage of repair for most of these welds will be an optimised stress-relieving heat treatment, prior to the final verification. Repairing these welds remains one of the key challenges on the Flamanville 3 critical pathway.

On 2 March 2021 EDF declared a significant event to the ASN, concerning incomplete application of the 2006 design standards when installing three nozzles on the main primary circuit (these nozzles connect auxiliary circuits to the primary circuit). At the request of the ASN, three scenarios were examined by the Group's engineering teams. A file was sent to the ASN on 21 June 2021, stating that EDF's chosen solution is to install a "containment collar", and asking the ASN for its position on this solution, so that all the design and procurement activities could be launched by the end of 2021. In a letter of 8 October 2021 the ASN indicated that it had no objections to this solution in principle. Nonetheless the design file for the containment collar will be examined by the French Radiation protection and Nuclear Safety Institute IRSN (*Institut de radioprotection et de sûreté nucléaire*).

Also, after corrosion was observed on pressuriser valves at the EPR at Olkiluto (Finland), the Group carried out equipment checks and also detected traces of corrosion on the Flamanville EPR's valves. The material used for certain components of the pilots control valves has been changed accordingly. Several corrosion stress tests were conducted to select the best material. The components are currently in production and will be installed on site during the first half of 2022. The ASN has been regularly informed of the technical choices, and made no objection to this strategy. The ASN and the IRSN are also continuing their examination of the operation and reliability of the pressuriser valves. EDF is due to respond to the IRSN's most recent questions so that it can finalise examination of the valve design by the end of the first half of 2022.

As the work advances, new technical matters emerge that could increase the completion cost and the risk of deferred timelines. In view of the progress made on operations and preparations for start-up, on 2 January 2022 EDF has adjusted

the schedule for the Flamanville 3 project. The fuel loading date has been deferred from late 2022 to the second quarter of 2023, and the estimated completion cost revised from €12.4 billion to €12.7 billion (in 2015 euros, excluding interim interest).

Before loading the fuel into the reactor vessel and carrying out the overall start-up tests, several operations remain to be carried out, mainly:

- completion of the weld repairs on the main secondary circuit;
- a new series of qualification tests of the installation before loading the fuel into the reactor;
- incorporation of experience gained from the technical issue handled at Taishan reactor 1;
- finishing work on the installation, and remittal of all the documents required for operation.

As announced in January 2022, inspections of fuel assemblies of the Taishan 1 reactor following the technical issue encountered during its second operating cycle showed mechanical wear on certain assembly components. This kind of wear has already been observed in several reactors of the French nuclear fleet. For the future commissioning of Flamanville 3, a solution will be examined with the ASN.

Hinkley Point C

Following the final investment decision (FID) made by EDF's Board of Directors on 28 July 2016, EDF and China General Nuclear Power Corporation (CGN) signed contracts with the UK government for the construction and operation of two EPR reactors at the Hinkley Point site in Somerset (the "Hinkley Point C" or "HPC" project). EDF's share in HPC is 66.5% and CGN's share is 33.5%.

Construction work continued on the HPC project in 2021, and many milestones including the following have been reached (work on Unit 2 follows around 11 months after the work on Unit 1):

- At unit 1, the concrete base for the reactor building has been completed. On the conventional island, the 2,500 m^3 concrete "table" that will support the turbine has been completed.
- The 1.8km water outfall tunnel is complete, and work has begun on the second water intake tunnel. The six water intake and outfall tunnel heads are ready.
- Electrical and mechanical work began in a first room following completion of the civil engineering works. At Unit 2 the first steel ring of the containment liner was lifted into place on the reactor building in November 2021, just 11 months after the same operation on the Unit 1 reactor.
- Production of essential equipment continued: the beams for the rotary overhead crane and the first low-pressure turbine were completed.

Progress in 2021 on the HPC project was affected by the Covid-19 pandemic beyond the first quarter, and also by a lower-than-expected engineering performance and tensions on the worldwide building materials markets. The offshore phase of maritime work was also slowed down by delays with planning permission; a court case is currently ongoing. In this context, the risks of schedule and cost adjustments rose again in 2021. Action plans are under way to reduce the risk of delays, and steps are being taken to improve the engineering performance. Respect of the current schedule and completion costs will depend on the success of these measures.

A detailed review of the HPC project's schedule and cost was performed in 2020, particularly to estimate the impact of the pandemic so far. As a result the following information was announced on 27 January 2021:

- The start of electricity generation from Unit 1 is now expected in June 2026, instead of end-2025 as initially announced in 2016;
- The project completion costs are now estimated in the range of £22 to 23 billion (in 2015 sterling)[1];
- The risk of a Commercial Operation Date delay for Units 1 and 2 is maintained at 15 and 9 months respectively. The realisation of this risk, which has a high probability, would generate a potential additional cost in the region of £0.7 billion (in 2015 sterling).

A full review of the benchmark costs and schedule will be carried out in 2022.

Sizewell C

On 29 September 2016, alongside the HPC contracts, EDF and CGN signed agreements for the Sizewell C project, concerning the development, construction and operation of two EPR reactors at Sizewell in Suffolk with total capacity of 3.2GW, to supply electricity to 6 million British households for approximately 60 years. The project objective is to replicate HPC as far as possible.

Development of this project is headed by EDF, which owns an 80% share at 31 December 2021 while CGN owns the other 20%. By the final investment decision date at the latest, EDF expects to become a minority shareholder with a maximum

1 The costs previously announced in the press release of 25 September 2019 were £21.5 – 22.5 billion (costs net of operational action plans, in 2015 sterling, excluding interim interest and foreign exchange effects versus the reference exchange rate for the project of £1 = €1.23. Costs are calculated by discounting estimated costs in current sterling using the British Construction Output Price Index for All New Work.

stake of 20% and correspondingly limited rights, at which point it will deconsolidate the project in the Group's financial statements. Consequently, the project aims to achieve the right conditions for non-Group investors and lenders to invest in the project, particularly the definition of an appropriate regulatory and funding framework, which is necessary to obtain a quality credit rating that will attract private sector funding at a competitive cost for consumers, and mobilise the necessary capital.

Once the final investment decision is made, EDF plans to supply design, equipment and essential nuclear components (particularly steam generators, instrumentation and control equipment, and fuel) and the associated services.

In June 2020, the UK's Planning Inspectorate accepted the application for a Development Consent Order (DCO) for construction of Sizewell C. Examination of the DCO took place between April and October 2021. As part of the UK planning process, a Deed of Obligation (programme of mitigation measures) and an Environment Trust (promising additional environmental protection) were set up. The Planning Inspectorate is currently studying the final draft of the DCO and all the related documents (technical assessments, mitigation measures, etc) before making a recommendation to the UK's Secretary of State. The Secretary of State's decision on the DCO application is expected to be made by the end of May 2022, and will be open to appeal for a six-week period. Applications for environmental permits and a nuclear site licence were submitted in May and June 2020 and are currently under examination. The requirements for attribution of a nuclear site licence should be fulfilled during 2022.

On 26 October 2021, the UK government presented the Nuclear Energy (Financing) Bill setting out a proposed funding framework for future nuclear projects, the Regulated Asset Base (RAB) model. The bill completed all the stages in the House of Commons on 10 January 2022 and was then sent to the House of Lords for a second reading. The RAB model aims to enable investors to share the risks of project construction and operation of the project with consumers. A Government Support Package (GSP) will also be defined to protect investors and lenders against certain risks. The Sizewell C project aims to be eligible for a RAB licence. The terms of the RAB model and the GSP for Sizewell C are currently in discussion.

On 27 October 2021, in its budget and spending review for 2021, the UK government announced that the budget for 2022-2025 included up to £1.7 billion of direct government funding to enable a large-scale nuclear project to reach a final investment decision, and that the government was in active negotiations with EDF over the Sizewell C project. On 27 January 2022 the UK government announced that it was granting £100 million of public funding in return for an option to purchase land at the Sizewell C site or EDF's shares in the Sizewell C company.

EDF's ability to participate along with other investors in a final investment decision and contribute to funding for the construction phase depends on the fulfilment of conditions which are not guaranteed at this date.

10.7 INVESTMENTS IN INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT

The table below provides a breakdown of the investments in intangible assets and property, plant and equipment presented in the cash flow statement:

(in millions of euros)	2021	2020
Acquisitions of intangible assets	(1,645)	(1,446)
Acquisitions of property, plant and equipment	(16,102)	(15,086)
Change in payables to suppliers of fixed assets	141	525
INVESTMENTS IN INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT	**(17,606)**	**(16,007)**

Investments in property, plant and equipment and intangible assets during 2021 mainly concern:

- the France – Generation and Supply segment for €5,327 million, primarily investments made under the "*Grand Carénage*" programme, investments for Flamanville 3, and investments in hydropower generation;
- the France – Regulated activities segment: €4,784 million, essentially investments related to connections for customers and producers, but also investments for network renewal, quality of service and network modernisation;
- the United Kingdom segment for €4,325 million, where investments principally related to nuclear power generation;
- the EDF Renewables segment for €1,849 million, which saw a significant rise in wind and solar capacities under construction in France, in North America, and in emerging countries.

10.8 IMPAIRMENT/REVERSALS

Accounting principles and methods

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 (thermal generation, renewable energy production, services), or single assets;
- 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; impairment booked on goodwill is irreversible.
- 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 closing 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 where the Group controls nuclear assets, within the framework of a scriptwriting process updated annually. 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, Wood Mackenzie or Aurora, 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 Group’s market shares, 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.

10.8.1 Impairment by category of asset

Details of impairment recognised and reversed are as follows:

(in millions of euros)	Notes	2021	2020
Impairment of goodwill	10.1	-	(31)
Impairment of other intangible assets	10.2	59	(85)
Impairment of tangible assets	10.3-10.5	(712)	(683)
IMPAIRMENT NET OF REVERSALS		**(653)**	**(799)**

Impairment recognised at 31 December 2020 amounted to €(799) million and concerned:

- nuclear assets (€(621) million) and gas storage assets (€(13) million) in the United Kingdom;
- various CGUs of EDF Renewables (€(36) million);
- hydropower assets (€(39) million) and energy service assets (€(27) million) owned by Edison in Italy;
- the goodwill of DES Groom, a subsidiary in the United States (€(26) million);
- and other assets (total €(37) million).

Impairment recognised in 2021 amounts to €(653) million. Details are given below.

10.8.2 Impairment test 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 2021, and some of the key assumptions used.

Impairment of goodwill and intangible assets with indefinite useful lives

No new impairment was recorded on the Group's goodwill and intangible assets with indefinite useful lives at 31 December 2021.

Operating segment	Cash-Generating Unit or asset	Net book value *(in millions of euros)*	WACC after tax	Growth rate to infinity	Impairment 2021 *(in millions of euros)*
United Kingdom[(1)]	EDF Energy goodwill	8,095	5.7%	-	-
Italy	Edison brand	945	6%	1.5%	-
Framatome	Framatome goodwill	1,428	5.9%	0.5%	-
	Framatome brand	151	5.9%	0.5%	-
Dalkia	Dalkia goodwill	592	4.2%	1.5%	-
	Dalkia brand	130	4.2%	1.5%	-
Other impairment					-
IMPAIRMENT OF GOODWILL AND INTANGIBLE ASSETS WITH INDEFINITE USEFUL LIVES					-

[(1)]The impairment test of EDF Energy goodwill covers the useful life of industrial assets, with no projection to infinity.

Impairment of other intangible assets and property, plant and equipment

Operating segment	Cash-Generating Unit or concerned asset	Impairment indicators	WACC after tax	Impairment 2021 *(in millions of euros)*
United Kingdom	Nuclear assets [1]	Early closure of the Dungeness plant	5.7%	(445)
	Land	Lower prospects for appreciation of land value	5.7%	(260)
Italy	Hydropower assets	Confirmed favourable developments in market prices and WACC	6%	60
	Wind power assets	Confirmed favourable developments in market prices and WACC, supported by a significant transaction	5%	90
EDF Renewables	Some CGUs (mainly in France)	Unfavourable prospects for tariffs and operations	3.6%	(54)
Other impairment				(44)
IMPAIRMENT OF OTHER INTANGIBLE ASSETS AND PROPERTY, PLANT AND EQUIPMENT				**(653)**

[1] *Impairment mainly booked at 30 June 2021.*

General assumptions

In the general context at 30 June 2021, following a financial year 2020 affected by the Covid-19 pandemic, the Group entities' market conditions and operating performance presented no indication of impairment in 2021. However, some specific situations required impairment tests, which led to recognition of impairment of €(502) million at 30 June 2021 on individual assets, principally in EDF Energy's nuclear power plants in operation in the UK, and in France some of EDF Renewables' photovoltaic plants and the Cordemais plant, following discontinuation of the Ecocombust project.

At 31 December 2021, the Group applied its usual method for impairment testing, updating the annual tests for goodwill and intangible assets.

Electricity prices

Over the market horizon (generally three years), the forward prices used in the impairment tests are the market prices observed at the end of December, including hedged positions, which (to an even greater extent than at 30 June) were significantly higher than observed forward prices at the end of 2020, in all geographical zones.

Over the long-term horizon, these tests use price curves constructed analytically by assembling blocks of assumptions and fundamental models of the supply-demand balance, in an annually updated scenario-building process.

The long-term scenarios constructed for electricity prices in countries where the Group does business are consistent with the trajectories of European decarbonisation targets, as defined in the 2015 Paris climate agreement, then the June 2021 "Fit for 55" package, setting a target 55% reduction in greenhouse gas emissions (compared to 1990 levels) by 2030. The scenarios used mainly include high CO_2 prices that can lead to carbon-free electricity production in Europe, and the economy more generally through electrification of uses. At this stage, however, the scenarios used for impairment testing do not include an assumption that the net-zero target for Europe will be attained by 2050.

The long-term price curves in the 2021 scenario rise until 2040, then decrease slightly due to the projected development of new-generation Combined Cycle Gas (CCG) power plants. Compared to the 2020 scenario, the long-term curves are higher until 2040 with a rise in the baseload power price of +€5 to +€10/MWh in the four core countries (France, the United Kingdom, Italy and Belgium), followed by a slight reversal in the trend expected for the last decade up to 2050, but on a smaller scale (-€1 to -€5/MWh). There are several explanatory factors for this pattern:

- a rising trajectory of CO_2 quotas in the ETS (EU Emissions Trading System), incorporating the European Union's stricter commitments from the start of the horizon to achieve a substantial reduction in greenhouse gas emissions from 2030 and aim for net-zero by 2050. The upward effect of CO_2 on electricity is lessened towards the end of the horizon by development of CCG plants with carbon capture and storage, which will make variable costs for those plants largely independent of carbon emissions.
- lower gas prices in Europe at the end of the horizon compared to the 2020 scenario, due to downward revision of long-term imports with greater penetration of the electricity mix by renewable energies (particularly in Europe, China and Japan) and upward revision of assumptions of LNG supply in regions with low-cost resources (particularly Russia and Qatar).

- updated assumptions regarding supply and demand for electricity, reflecting a decline in demand for electricity in the medium term due to an increase in energy efficiency measures. This trend self-corrects over the longer term, with demand rising in line with the growth in electric vehicles and electrolytic hydrogen.

As these assumptions are crucial in determining recoverable value, sensitivity analyses are conducted on long-term price curves when impairment tests are carried out.

Furthermore, for the assumptions concerning capacity mechanisms, the necessary non-market revenue is expected to be higher across European countries generally than in the 2020 scenario, due to the downward revision of the return of the peaking plants on the Energy Only Market, particularly given the upward revision of CO_2 prices. To break even and stay on the market, these facilities are having to draw on other revenue sources, including capacity revenue and ancillary services. This structural trend also concerns France, although the headroom is expected to recover in 2026 with the arrival of new capacities in the next few years, notably France's first offshore wind farm, the Flamanville EPR, and the Landivisiau CCG plant.

Discount rates

The discount rates used in impairment tests are lower than at 31 December 2020 for all Euro zone countries and the United Kingdom.

This is due to the general downward trend in risk-free rates despite an upturn at the end of the year, combined in the United Kingdom with a higher corporate income tax rate. In Italy, the sovereign risk premium, which had been raised in June 2020 due to the specific national context, decreased due to rate tightening on the markets, leading to a more pronounced decrease in the WACC.

The year-on-year decrease in the principal WACC rates used in the tests is around 10 to 30bp for France, United Kingdom and Belgium and 50bp for Italy. The test results have been subjected to analyses of their sensitivity to the discount rate.

At 31 December 2021, the macro-economic context presented above did not involve any major new risk for the Group compared to the risks already taken into account in prior financial statements; the impairment recorded relates to risks specific to certain CGUs and 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 the United Kingdom reducing the net book value of the remaining assets practically to zero.

The necessary investments for the Hole House and Hill Top gas storage site were fully written off at 31 December 2020, for a cost of €(13) million.

Regarding coal-fired plants, the Cottam power plant was closed in September 2019 and the Group will close the United Kingdom's last remaining coal-fired plant, West Burton A, in September 2022.

The sale of the West Burton B gas-fired (CCGT) plant announced at the end of the first half of 2021 was completed on 31 August 2021. Impairment had been recognised on this plant several times after it first began operation in 2013, mainly due to unfavourable developments in the spark spreads and the insufficient additional income from the capacity mechanism. The limited amount of impairment booked in the 2021 half-year financial statements in addition to previously-booked impairment was reversed in the second half-year after the final sale price was established when the sale was completed.

At 31 December 2021, the Group has practically no remaining coal-fired or gas-fired operations in the United Kingdom, confirming its ambition to take proactive steps for carbon-free electricity generation.

Sales and Supply segment

Despite several positive signals as the Covid-19 pandemic receded, the sales and supply segment was affected by the current crisis on the United Kingdom energy market that has obliged OFGEM (the Office of Gas and Electricity Markets) to apply the Supplier of Last Resort rule several times: for EDF Energy, this meant taking over the customers of Green Network Energy, Utility Point and Zog Energy. OFGEM's tariff method also prevented suppliers from passing on the substantial rise in raw material costs to the SVT (*Standard Variable Tariff*) cap for residential customers in winter 2022. In the long term, the margin prospects are confirmed for the BtoB and BtoC activities, which remain relatively insensitive to price scenarios as wholesale energy costs tend to be passed on the consumers in the long run. The recoverable value for the sales and supply segment is lower than in 2020 and benefits from a favourable effect of lower WACC. Sensitivity analysis was conducted with a reduction in long term margins, and loss of market share, this indicated that the CGU is sensitive to these parameters, particularly as it has few fixed assets (mainly information systems).

Nuclear assets (plants in operation)

The recoverable value of existing nuclear plants is determined by discounting future cash flows over their useful life, assuming a 20-year extension for the Sizewell B PWR plant, in line with Group strategy. The recoverable also value reflects the early shutdown decisions made in recent years for certain AGR plants, beginning with Hunterston, which was closed on 7 January 2022, and Hinkley Point B, to be closed no later than 15 July 2022, as announced by the Group on 27 August 2020 and 19 November 2020 respectively. It also incorporates the impact of the decision of 7 June 2021 to move Dungeness B AGR plant into the defueling phase; Dungeness had been offline since September 2018, and has had continuous specific technical difficulties (impairment of €(445) million was recognised at 30 June 2021). The updated impairment test conducted at 31 December 2021 also takes account of the decision made in December 2021 to bring forward the end of generation operations by Torness and Heysham 2 from 31 March 2030 to 31 March 2028. The operating lifetimes of the two AGR plants at Hartlepool and Heysham 1 are still scheduled to end in 2024.

Using higher, but volatile, market price forecasts, and taking into consideration possible production issues with AGR plants in view of recent history, the result of the impairment test did not lead to any change in impairment recorded in previous periods.

The recoverable value of nuclear assets is sensitive to price assumptions: a +/-5% difference over the entire horizon of the scenario used for the impairment test would have an impact of+/-£500 million on the result. The nuclear output assumptions used also have a substantial influence on the calculation: a +/-5% revision to forecasts over the entire horizon would result in a variation of +/-£700 million in the recoverable value, all other things being equal. In addition, a 50bp increase in the discount rate would lead to a reduction of around £200 million in the recoverable value.

Land associated with the nuclear fleet

Following the early end of generation at the Dungeness plant, the imminent end of generation by the Hunterston and Hinkley Point B plants and the option exercised by the British government (see note 15.2.1), confirming that EDF will carry out the defueling of the stations and that the ownership of the sites will be transferred to the government, an expert review was carried out of the land adjacent to each nuclear power station (known as non-operational land). This resulted in recognition of a total £226 million on various areas of land owned by EDF Energy.

Goodwill and the HPC Project

EDF Energy's goodwill amounted to €8.1 billion (or £6.8 billion) at 31 December 2021 and mainly results from the takeover of British Energy in 2009.

The recoverable value of EDF Energy is determined by discounting future cash flows over the assets' useful life, taking into consideration the two EPRs with a 60-year useful life currently under construction at the Hinkley Point site, a project for which the final contracts were signed on 29 September 2016. Future cash flows from 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 CfD exercise price for HPC is set at £92.50/MWh (in 2012 sterling) and is indexed on UK inflation *via* the consumer price index (CPI). Thus, for the operation period under a CfD, future cash flows include a long-term inflation assumption. For the 25 years of operation after the CfD period, for which no forecasts exist for long-term UK electricity market prices, future cash flows include a very long-term inflation assumption and a price assumption based on the CfD exercise price of £92.50/MWh (in 2012 sterling), which is the best estimate of market price levels over this horizon.

The impairment test conducted at 31 December 2021 incorporates the estimated completion cost range announced on 27 January 2021, i.e. total project completion costs (excluding interim interest and exchange rate effects compared to the project's benchmark rate of £1 = €1.23) of an estimated £22-23 billion (in 2015 sterling), instead of the estimate of £21.5 - 22.5 billion (in 2015 sterling) resulting from the previous cost revision of September 2019, and deferral of the delivery of reactor 1 to mid-2026. The breadth of the range will depend on the success of action plans to be delivered in partnership with contractors, and the impairment test used a mid-range value. A full examination of the benchmark costs and schedule will take place in 2022. A detailed review of the assumptions used in the model for the HPC's operating phase was conducted in 2021, leading among other things to an update of the very long-term inflation rate applied to electricity prices. The model also takes account of an increase in the UK tax rate, which is set to rise from the current 19% to 25% in April 2023. This change of assumption is applied across the whole lifetime of the model, since no other rate is known, and has a significant impact on the project's recoverable value. EDF's projected rate of return (IRR) is now estimated at between 6.8% and 6.9% (compared to 7.1%-7.2% previously).

Applying this revised basis to the HPC project, and in view of the unfavourable effects explained above, which particularly affect the recoverable value of existing nuclear assets, the headroom between the recoverable value and the book value of EDF Energy shows a moderate decline, but remains significant at 31 December 2021.

The risk of deferral of HPC's Commercial Operation Date (COD) by 15 months for Unit 1 and 9 months for Unit 2, which would generate a potential additional cost in the region of £0.7 billion (in 2015 sterling) as explained in the Group's press release of January 2021, could reduce the headroom indicated by the impairment test of EDF Energy by around 34%.

Sensitivity analyses on various dimensions and assumptions (particularly WACC) do not indicate any risk of impairment, all other things being equal.

Sensitivity analyses were also conducted for information purposes using extremely pessimistic assumptions: for example, it was estimated that a further 3-year deferral of the COD and an associated additional cost of £3 billion, or a 60-point rise in WACC, would lead to a threshold value for the goodwill impairment headroom, all other things being equal.

Finally, a multi-sensitivity scenario was developed to test the goodwill's resilience in the event of several adverse scenarios concerning the project's various phases (construction, operation, decommissioning) in the absence of any action or remedial plan, incorporating a delay of 1 year and additional costs of £1 billion in the construction phase, a 3% decrease in plant availability, a 5% rise in fuel costs and a 3% rise in operating and maintenance costs. Under this combined stress test, the headroom remains slightly positive, confirming the recoverability of the goodwill's net book value.

Finally, although at this stage Brexit has no observable impact on impairment tests of EDF Energy's assets since most cash flows (income, costs, investments) and assets are stated in sterling, the longer-term consequences are still hard to predict. The Group will monitor changes in the prices of fuel, materials and supplies, macro-economic data, and electricity price formation, which could all potentially affect the results of future tests.

Italy – Edison

As an intangible asset with an indefinite useful life, the impairment test of the Edison brand, first recognised at the value of €945 million when Edison was taken over in 2012, is updated annually using the royalty relief method and a 100bp risk premium for determining the discount rate. The updated test at 31 December 2021, incorporated the recommendations of an external assessment carried out in 2020 (reducing the long-term growth rate from 2% to 1.5% based on GDP forecasts; increasing the royalty rate for the Business customer segment following a survey of business customers). The result showed a rise in the brand's recoverable value, taking account of higher volume effects and a favourable WACC effect. Sensitivity analyses including a 50bp increase in the WACC, and a -0.2% decrease in royalties, did not indicate any risk of impairment.

At 31 December 2021, there was a general improvement in the recoverable value of Edison's CGUs due to the more favourable long-term price environment, favourable operating effects, particularly higher volumes for certain CGUs, and the impact of the decrease of around 50bp in the WACC. No risk of impairment was detected. On the contrary, some of the impairment booked previously in the context of a downward trend in market prices (especially in 2015) was recovered.

Concerning Edison's hydropower assets, accumulated impairment of €(430) million had been recorded in the past, principally in 2014, 2015 and 2016. Impairment of €(39) million was also recognised at 30 June 2020, based on conservative assumptions in the context of the Covid-19 pandemic. At 31 December 2020 the difference between this CGU's recoverable value and book value was observed to be positive once more, but a conservative approach was applied and no impairment was recovered. The durable increase in the recoverable value, confirmed at 31 December 2021, led to a partial recovery from past impairment, amounting to €60 million. This recovery was limited by depreciation recorded since the initial recognition of assets, together with long-term market price assumptions limited by including a PUN price sensitivity of -10%.

Concerning wind power assets, accumulated impairment of some €150 million had been recorded in the past, principally in 2014 and 2015. At 31 December 2021 the recoverable value was improving, confirming the durability of the headroom observed in recent years. This was also confirmed by the sale of 49% of Edison Renewables to Crédit Agricole Assurance in December 2021 (see note 3.1.1). The durable increase in this CGU's recoverable value at 31 December 2021 led to a partial recovery from past impairment, which was limited to €90 million due to the depreciation booked since the initial recognition of the assets.

Concerning thermal assets, on which accumulated impairment of some €600 million had been recorded in the past, the impairment test at 31 December 2021 showed significantly positive headroom, but no impairment was recovered in 2021 since this result essentially related to the new-generation CCGT plants at Marghera and Presenzano which are due to be commissioned in 2022 and 2023. Marghera and Presenzano are two new-generation gas-fired plants with respective capacities of 780MW and 760MW and low environmental impact (carbon emissions 40% below the national average, NOx emissions reduced by 70%) and will benefit from capacity revenue. Sensitivity analyses were conducted on these assets, and the results show that a 10% decrease in clean spark spreads or a 50 bp increase in WACC would not entail any risk of impairment.

Finally, the Algerian E&P assets still owned by the Group at this stage were subjected to an impairment test at 31 December 2021, particularly in view of the commodity price situation on the market. The value resulting from the test did not lead to recognition of any additional impairment.

Framatome

At 31 December 2021, the goodwill of Framatome amounted to €1,428 million, almost entirely resulting from EDF's acquisition of 75.5% of the capital of Framatome on 31 December 2017. The Group finalised recognition of the business combination in its financial statements at 31 December 2018.

The recoverable value of Framatome was 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 for services to the installed base and fuel deliveries to customers' reactors. The WACC applied in discounting future cash flows is weighted to reflect Framatome's different businesses depending on their risk profile. The headroom indicated by the impairment test remains very significant and was slightly higher than at 31 December 2020, principally due to the lower WACC.

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

Framatome's intangible assets recognised after its acquisition (technologies, including the EPR, which are depreciated over an average 15 to 20 years; customer relations amortised over an average period of 11 years; and the brand) were tested and no risk of impairment was identified.

EDF Renewables

EDF Renewables' assets mainly consist of CGUs benefiting from Power Purchase Agreements (PPAs) providing contractually defined revenues over most of the assets' useful lives, and consequently have low market risk exposure.

In 2021, impairment of €(54) million was recognised in respect of various CGUs of EDF Renewables.

As explained in the financial statements at 31 December 2020, the French Finance Law for 2021, published in the *Journal officiel* on 30 December 2020, introduced a reduction in purchase tariffs for electricity generated by photovoltaic plants of over 250 kWp covered by a purchase obligation contract in application of the tariff decisions of July 2006, January 2010 and August 2010 (article 225), but it was not possible at the time to determine the potential effects for EDF Renewables (which is the exclusive or joint owner of solar plants concerned by this tariff revision, with total net capacity of 145 MWp), since further details had yet to be set by decree and order. Decree 2021-1385 and the order of 26 October 2021, after examination by the Higher Energy Council *(Conseil Supérieur de l'Energie)*, stipulated the modalities for application of this tariff reduction and the "safeguard clause", and put the CRE in charge of defining the conditions and format for review applications submitted to it under that clause, and the information necessary to examine those applications.

Impairment tests conducted at 30 June 2021, based on tariff assumptions made available by the CRE at the time, led to recognition of impairment of €(9) million on fully-consolidated solar power plants, and €(25) million on investments accounted for by the equity method. The updated tests at 31 December using the final tariffs only led to minor adjustments to these amounts (see note 11.2).

Other impairment at EDF Renewables concerns specific assets, including €(24) million for a wind farm and a solar power plant in the United States. Sale of these facilities is under consideration for prices expected to be lower than the value of the assets.

Dalkia

At 31 December 2021, Dalkia's goodwill amounts to €592 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. The updated test at 31 December 2021 benefited from improvements in certain parameters since 31 December 2020, particularly the discount rate, the growth rate and the favourable effect of Dalkia's growth prospects under the "France Relance" plan. Applying the updated assumptions, the recoverable value is still well above the book value. The key parameters of the test are the terminal value and the discount rate: sensitivity analyses of those parameters did not call into question the headroom 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. The updated impairment test at 31 December 2021 supports its current book value.

An impairment test was conducted for the technical service subsidiary Imtech in the United Kingdom, in view of past losses made by this CGU. No risk of impairment was indicated, including for the brand, which is carried in the balance sheet at the value of €86 million. Threshold value analyses were performed to confirm that this result was robust in view of the

parameters used.

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 the accounting policies, over the assets' useful life, using an after-tax WACC of 5.1% at 31 December 2021 (5.2% at 31 December 2020). For nuclear assets, the Group's benchmark model assumes an operating lifetime of 50 years for currently active plants, as it is the Group's strategy to keep plants in operation for at least 50 years. This takes account of the proposed early closures of two 900MW nuclear reactors included in France's multi-year energy programme.

The impairment test incorporates the latest forecasts concerning Flamanville 3 (which has a planned operating lifetime of 60 years) established in January 2022, with an adjusted schedule reflecting the progress on the project and preparation for its start of operation.The fuel loading date has been deferred from late 2022 to the second quarter of 2023, and the estimated completion cost has been raised from €12.4 billion to €12.7 billion in 2015 euros (excluding interim interest).

At 31 December 2021, this impairment test showed that the recoverable value was clearly higher than at 31 December 2020, due to the favourable impact of higher short-term, medium-term and long-term price scenarios, while other changes in assumptions used in the test had moderate or minor impacts.

The sensitivity dimension of the test was updated to incorporate the effect of announcements made by the Group on 13 January 2022 concerning the French government's decision to attribute an additional 20TWh of volume to the ARENH scheme for 2022 at the price of €46.2/MWh, on 13 January and 7 February about the downward revision of estimated nuclear power output in France for 2022, and on 11 February about the revision of estimated nuclear power output in France for 2023 (see note 23). These factors noticeably reduce the headroom calculated by the test, but it remains very positive.

The key assumptions in the test still concern the useful life of nuclear assets, the long-term market price scenario, the discount rate, changes in costs and investments, and the capacity revenue. Each of these assumptions was subjected to sensitivity analyses and the results did not call into question the existence of a positive difference between the book value and recoverable value.

Other International – Belgium

The updated impairment test at the year-end showed that the difference between the recoverable value and the book value was higher than at 31 December 2020, due to favourable electricity price scenarios, and a higher value for wind power following increased capacity resulting from projects validated in 2021.

For tests of the nuclear plants operated by the ENGIE Group in which Luminus owns a 10.2% share (419MW), it has historically been assumed that operations will continue until 2025 at the latest depending on the plants.

Sensitivity analyses were conducted to incorporate the risk that the hydropower concessions may be shortened, and no associated risk of impairment has been identified.

Impairment of €(219) million was also recognised on associates at 31 December 2021, principally in respect of assets owned by EDF Renewables (see note 12.3). Impairment of €189 million was also booked at 31 December 2020 in respect of associates.

NOTE 11 FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

Accounting principles and methods

The accounting treatment of public distribution electricity concessions in France is determined by 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.

In application of the concession agreements, the concession operator manages the facilities at its own risk for the entire term of the concession, and bears substantially all the risks and benefits (both technical and economic) over the useful life of the network infrastructure. Under IAS 16, the assets are controlled by the operator and the grantors have no decisive characteristics of control over the infrastructures as defined by IFRIC 12.

All concession assets are consequently carried in the balance sheet, regardless of their origin (facilities constructed or purchased by the concession operators, and facilities provided by the concession grantors) and the source of financing, while the contractual obligations to the grantor are recognised in the liabilities.

Public electricity distribution facilities that are constructed or purchased by the concession operator are carried at production or acquisition cost:

- purchased facilities are initially recognised at acquisition cost including directly attributable expenses incurred to make the asset ready for use:
- the production cost of facilities developed in-house includes all labour and materials costs, and all other production costs attributable to the construction of the asset, whether incurred directly by the company or invoiced by third parties.

New facilities provided by the concession grantors are carried at the value of the cost the company would have borne if it had constructed them itself.

In the specific case of rising mains transferred for no consideration to the public distribution network in application of article 176 of French law 2018-1021 of 2 November 2018 on housing, development and digital affairs (the “ELAN” law), these assets are carried at their market value under article 213 of France’s national chart of accounts.

Balance sheet liabilities are recognised in respect of new facilities provided for no consideration by the concession grantors and the rising mains transferred under the ELAN law are included in “Special French public electricity distribution concession liabilities” in the balance sheet liabilities.

Distribution assets (pipes, substations) are depreciated over periods of 30 to 60 years, meters and metering equipment over periods of 20 to 30 years. The Group regularly checks the relevance of the main accounting parameters for concession assets (depreciation periods, replacement values, management levels).

Regulations governing distribution concessions in France

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

SEI is the concession operator for distribution network zones that are not interconnected with the network in mainland France, under identical concession regulations to Enedis.

Electricité de Strasbourg is the concession operator for public distribution networks in a limited zone depending on a non-nationalised distributor, in application of the Law of 8 April 1946.

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, with 415 concession agreements at 31 December 2021. 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.

In accordance with the agreement reached in late 2017 with the FNCCR and France Urbaine, negotiations for concession renewals continued in the regions of France during 2021. By 31 December 2021, 291 concession agreements had been concluded under the new model, for local projects with all kinds of concession-granting authorities: syndicated counties, two individual counties (*départements*), syndicated municipalities, major cities, urban boroughs, conglomerations and towns.

Added to the 41 previously renewed or amended concessions that contain stipulations similar to the new model, these 291 concessions bring the total number of modernised concession agreements to 332 of the 364 that are due for renewal. Negotiations are continuing with a view to renewing the small number of remaining agreements, mostly old-model agreement with syndicated counties.

11.1 PROPERTY, PLANT AND EQUIPMENT OPERATED UNDER FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSIONS

(in millions of euros)	31/12/2020	Increases[1]	Decreases	Other movements[2]	31/12/2021
Land and buildings	**3,219**	205	(20)	3	**3,407**
Networks	**100,899**	4,308	(512)	5	**104,700**
Other installations, plant, machinery, equipment & other	**4,872**	416	(209)	(7)	**5,072**
Assets in progress[3]	**1,828**	52	-	6	**1,886**
Gross value	**110,818**	**4,981**	**(741)**	**7**	**115,065**
Land and buildings	**(1,592)**	(80)	19	(8)	**(1,661)**
Networks	**(45,873)**	(237)	379	(2,388)	**(48,119)**
Other installations, plant, machinery, equipment & other	**(3,001)**	(215)	190	(127)	**(3,153)**
Depreciation and impairment	**(50,466)**	**(532)**	**588**	**(2,523)**	**(52,933)**
NET VALUE	60,352	4,449	(153)	(2,516)	62,132

[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.
[3]Increases in assets in progress are stated net of the effects of newly-commissioned assets.

11.2 SPECIAL FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION LIABILITIES

Accounting principles and methods

Concession 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) :
  - 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):
  - Amortisation of financing by the grantor: this is a liability owed by the concession operator to the grantor and is recognised progressively as the asset is used;
  - Provision for replacement: this provision exclusively concerns assets due for replacement before the end of concessions using the 1992 concession agreement model, except for the rising mains transferred in application of the ELAN law. It 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 grantor, 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 grantor's rights in assets to be replaced are thus transferred upon the asset's replacement to become the grantor's rights in existing assets, with no outflow of cash to the benefit of the grantor.

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

The changes in special concession liabilities for existing assets and assets to be replaced are as follows:

(in millions of euros)	31/12/2021	31/12/2020
Value in kind of assets[1]	54,391	52,907
Unamortised financing by the operator	(30,307)	(28,730)
Rights in existing assets – net value	**24,084**	**24,177**
Amortisation of financing by the grantor	15,630	15,000
Provisions for replacement	9,139	9,243
Rights in assets to be replaced	**24,769**	**24,243**
SPECIAL FRENCH PUBLIC ELECTRICITY DISTRIBUTION CONCESSION LIABILITIES	**48,853**	**48,420**

[1]Including contributions received to finance concession assets, amounting to €129 million (€108 million in 2020).

NOTE 12 INVESTMENTS IN ASSOCIATES AND JOINT VENTURES

Investments in associates and joint ventures are as follows:

		31/12/2021			31/12/2020	
(in millions of euros)	Notes	Ownership%	Share of net equity	Share of net income	Share of net equity	Share of net income
Principal investments in associates						
CTE	12.1	50.10	1,478	307	1,378	237
Taishan (TNPJVC) [1]	12.2	30.00	n.c	n.c	1,123	(12)
Other investments held by EDF SA	12.3	n.a.	2,282	102	1,742	-
Investments held by EDF Renewables	12.3	n.a.	1,453	(117)	1,198	70
Other investments in associates and joint ventures	12.3	n.a.	n.c	n.c	1,353	67
Subtotal			**8,084**	**513**	**6,794**	**362**
CENG (sold on 6 August 2021)	3.1	n.a.	n.a.	131	n.a.	63
Subtotal				**131**		**63**
TOTAL			**8,084**	**644**	**6,794**	**425**

n.a. = not applicable. n.c. = not communicated.
[1]The financial data for Taishan at 31 December 2021 are not reported in this table as CGN (Taishan's parent company) publishes its consolidated financial statements later than the Group.

12.1 COENTREPRISE DE TRANSPORT D'ÉLECTRICITÉ (CTE)

The key financial indicators for the CTE subgroup (on a 100% basis) are as follows:

(in millions of euros)	31/12/2021	31/12/2020
Non-current assets	19,866	19,202
Current assets	3,577	3,712
Total assets	**23,443**	**22,914**
Equity	2,950	2,750
Non-current liabilities	15,163	15,630
Current liabilities	5,330	4,534
Total equity and liabilities	**23,443**	**22,914**
Sales	5,254	4,729
Operating profit before depreciation and amortisation	2,094	1,914
Net income	***612***	***473***
Net indebtedness	12,602	12,700
Gains and losses recorded directly in equity	(161)	(188)
Dividends paid	259	367

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.

12.2 TAISHAN

12.2.1 Taishan financial indicators

The key financial indicators published for Taishan (on a 100% basis) are as follows:

(in millions of euros)	31/12/2020	31/12/2019
Non-current assets	11,303	12,183
Current assets	897	618
Total assets	**12,200**	**12,801**
Equity	3,744	3,882
Non-current liabilities	6,022	7,467
Current liabilities	2,434	1,452
Total equity and liabilities	**12,200**	**12,801**
Sales	1,027	783
Net income	***(41)***	***44***
Dividends paid	-	-

12.2.2 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. Comprising two 1750MW EPR reactors, Taishan nuclear power plant is the biggest cooperation project between China and France in the energy sector. CGN holds a 51% stake and Yudean a 19% stake.

Following the start of commercial operation by the first reactor on 13 December 2018, the second reactor began commercial operation on 7 September 2019. 2020 saw the first shutdown for refuelling of Taishan 1, from 29 June to 24 September 2020.

On 20 March 2019, the NDRC (National Development and Reform Commission) attributed regulated tariffs to the first three third-generation nuclear projects in China, one of which is Taishan. The tariff attributed to Taishan was set at RMB435/MWh until the end of 2021, with retroactive effect to the date the first unit was commissioned (13 December 2018). The indexing mechanisms applicable from 2022 were not set out in this decision and are still currently unknown.

On 14 June 2021, a build-up of noble gases was detected in the primary circuit of reactor 1 at the Taishan plant. The Chinese ministry for ecology and the environment stated that this was due to five unsealed fuel rods. Following an initial analysis of the situation, on 30 July 2021 the operator of the Taishan plant decided to shut down reactor 1 to assess the situation in more detail, prevent it from progressing, and take remedial action. Defueling operations were completed on 22 August 2021. As stated in the Group's press release of 12 January 2022, inspections carried out on the fuel assemblies of Taishan reactor 1 following the technical issue encountered during its second operating cycle showed mechanical wear on certain assembly components. This phenomenon has already been encountered in several reactors in the French nuclear fleet. EDF and Framatome are currently contributing to preparation of the documentation to safely restart Taishan reactor 1, and assisting TNPJVC in its examination.

Taishan's net electricity output in 2021 was affected by this unscheduled 5-month outage for reactor 1 during the second half of 2021, and by the scheduled outage of reactor 2 which underwent its first full inspection during the second quarter. Apart from these outages, availability was very high.

The net value of the investment in Taishan in the financial statements includes a level of prudence relating to the tariff projections from 2022, and updates to certain operational assumptions relating to the above information.

12.3 OTHER INVESTMENTS IN ASSOCIATES AND JOINT VENTURES

The other investments held by EDF SA are included in dedicated assets (see note 15.1.2).

The other investments held by EDF Renewables are mainly located in North America, and to a lesser degree in Europe, China and Brazil.

Other investments in associates and joint ventures principally concern:

- JERA Global Markets (JERA GM), 33%-owned by EDF Trading, a company specializing in trading and optimization activities, particularly for liquified natural gas (LNG);
- the supercritical coal-fired plant owned by Jiangxi Datang International Fuzhou Power Generation Company Ltd. in China, 49%-owned by the Group;
- the dam owned by Compagnie Énergétique de Sinop (CES) in Brazil, 51%-owned by the Group, which was commissioned in 2019;
- the Nachtigal dam in Cameroon, 40%-owned by the Group: construction began in March 2019, with commissioning expected in early 2024.

In 2021, €(219) million of impairment was booked in respect of investments in associates and joint ventures, principally concerning associates of EDF Renewables (€(149) million). This impairment primarily relates to wind power assets in the USA following the major weather event of February 2021 in Texas, photovoltaic plants in France due to revision of purchase obligation tariffs introduced for certain facilities by the French Finance Law for 2021 (see note 10.8.2), and an offshore wind farm currently being built off the coast of Scotland, following construction difficulties with the foundations. Some impairment was also booked on unlisted assets owned by EDF SA (EDF Invest), included in dedicated assets.

In 2020, €(189) million of impairment was booked in respect of investments in associates and joint ventures concerning various specific assets: certain coal-fired plants in China, investments held by Framatome in entities operating in sectors greatly impacted by the Covid-19 pandemic, and certain unlisted assets owned by EDF SA (EDF Invest) included in dedicated assets (see note 15.1.2).

Developments in 2021 in investments accounted for by the equity method owned by EDF Renewables

Launch of construction of the Calvados offshore wind farm by EDF Renewables, Enbridge and wpd

On 22 February 2021, EDF Renewables, EIH S.a.r.l, a subsidiary of Enbridge Inc., a North American energy infrastructure company, and wpd, a European renewable energies company, announced the launch of construction activity on the Calvados offshore wind farm (Courseulles-sur-Mer). This announcement followed the finalisation of financing agreements between the consortium and its financial partners.

The 448MW Calvados offshore wind power project is comprised of 64 wind turbines located more than 10km from the Bessin coastline and occupies a total surface area of approximately 45km². Upon its commissioning, expected in 2024, it will generate the equivalent of the annual electricity consumption of 630,000 people, or over 90% of the Calvados department's population.

The total project cost is estimated at around €2 billion. The majority will be financed through non-recourse project finance debt. The Calvados offshore wind farm holds a 20-year power purchase agreement (PPA) granted by the French government in June 2018.

The shareholders of this project are EDF Renewables and EIH S.a.r.l (each with a 42.5% stake in the project through Eolien Maritime France) and wpd (which holds a 15% stake in the project).

Successful bid for a 1.5GW offshore wind power project in New Jersey, USA

On 1 July 2021, the EDF group, through Atlantic Shores Offshore Wind (Atlantic Shores), a 50-50 joint venture between its subsidiary EDF Renewables and Shell New Energies US LLC., announced that it had been awarded a 1.5GW offshore wind farm project off the coast of New Jersey, USA. The New Jersey Board of Public Utilities selected the winner of the project.

The future wind farm is located between 15 and 30km off the coast of New Jersey. This offshore wind farm will be one of the most powerful in the United States and will be able to supply enough power for 700,000 homes every year. Construction is scheduled to begin in 2024.

Construction of France's first offshore wind farm in Saint-Nazaire: continuation of component production and offshore operations

The Saint-Nazaire offshore wind farm is jointly owned by EDF Renewables, and EIH S.à r.l., a joint venture between Enbridge Inc. and the Canada Pension Plan Investment Board (through its wholly owned subsidiary CPP Investment Board Europe S.à r.l.). With a capacity of 480MW, it comprises 80 wind turbines located on the rocky plateau of the Banc de Guérande, more than 12 km off the coast of the Guérande peninsula.

Two years after construction works began, significant progress has been made in producing the various components required for the future wind farm.

Commissioning of the Dongtai V offshore wind farm in China

The EDF Group and China Energy Investment Corporation (CEI), its Chinese partner, announced the commissioning of the 200MW Dongtai V offshore wind farm. Located in the China Sea, off the Jiangsu coast, north of Shanghai, its construction took 20 months.

Together with the 300MW Dongtai IV wind farm commissioned in December 2019, the Group now operates 500MW in offshore wind capacity in China. The Dongtai IV and V wind farms lie approximately 40km off the coast of Jiangsu, the most advanced province in offshore technology, and operate 125 wind turbines which will generate electricity covering the annual needs of 2 million local inhabitants.

The joint venture between CEI (62.5%) and the EDF group (37.5%) operates both the Dongtai IV and V wind farms. It is the first Sino-French joint venture dedicated to the development and operation of offshore wind energy projects in China.

NOTE 13 WORKING CAPITAL

13.1 WORKING CAPITAL: COMPOSITION AND CHANGE

13.1.1 Composition of working capital

Changes in net working capital during 2021 are as follows:

(in millions of euros)	Notes	31/12/2020	Monetary changes	Non-monetary changes	31/12/2021
Inventories and work-in-process	13.2	**(14,738)**	(626)	(833)	**(16,197)**
Trade receivables net of provisions	13.3	**(14,521)**	(7,411)	(303)	**(22,235)**
Trade payables	13.4	**11,900**	7,407	258	**19,565**
Compensation receivable for Public Energy Service charges (CSPE receivable)	13.3.4	**(1,993)**	2,268	(275)	**-**
Other receivables and payables[1]	13.3.4 and 13.5	**9,551**	(3,133)	(74)	**6,344**
Other components of working capital[2]		**(740)**	(31)	123	**(648)**
NET WORKING CAPITAL		**(10,541)**	**(1,526)**	**(1,104)**	**(13,171)**

[1]Excluding receivables and payables on acquisition/disposal of assets and investment subsidies.
[2]The other components of working capital includes CO_2 emission rights and green certificates presented in intangible assets in the balance sheet, and derivatives related to operations.

13.1.2 Non-monetary changes in working capital

Non-monetary changes include the effect of changes in the scope of consolidation, foreign exchange effects, changes in fair values and the effect of reclassifications.

The variation in non-monetary changes in 2021 is principally due to the €(0.8) billion change in fair value (including €(0.5) billion on inventories carried at fair value) and the €(0.3) billion foreign exchange effect (principally attributable to the rise of the pound sterling against the euro). Reclassification of EDF's CSPE receivable to "Other liabilities" at 31 December 2021 in the amount of €294 million is also included in the variation in non-monetary changes (see note 13.3.4).

13.1.3 Monetary changes in working capital

(in millions of euros)	Notes	2021	2020
Change in inventories	13.2	(626)	(873)
Change in trade receivables	13.3	(7,411)	842
Change in trade payables	13.4	7,407	(861)
Change in the Compensation receivable for Public Energy Service charges (CSPE receivable)	13.3.4	2,268	(328)
Change in other receivables and payables[1]	13.3.4 and 13.5	(3,164)	(459)
CHANGE IN WORKING CAPITAL		**(1,526)**	**(1,679)**

[1]The change in other receivables and payables includes monetary changes in CO_2 emission rights and green certificates presented in intangible assets in the balance sheet, and derivatives related to operations.

Monetary changes in working capital were down by €(1.5) billion in 2021, mainly as a result of higher market prices with an effect of €(1.9) billion on working capital for the trading activity (an increase in net margin calls and inventories) and the operating working capital of other Group subsidiaries (change of €(1.8) billion in the net trade receivables/trade payables position). Conversely, the decrease in purchase obligations is reflected in a €2.3 billion improvement in working capital, relating to the CSPE receivable (see note 13.3.4).

These three factors also explain most of the difference in the change in working capital between 2020 and 2021.

13.2 INVENTORIES

Accounting principles and methods

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 materials costs, labour costs, and a share of indirect production costs.

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, fabrication, 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 ministerial order of 21 March 2007, the cost of inventories for fuel loaded in the reactors but not yet irradiated includes expenses for spent fuel management and long-term radioactive waste management. The corresponding amounts are taken into account in the relevant provisions.

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 fabrication) 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.

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 notes 5.4.3 and 10.2) and capacity obligation mechanisms (capacity guarantees in France – see note 5.1).

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.

The carrying value of inventories, broken down by nature, is as follows:

	31/12/2021			31/12/2020		
(in millions of euros)	Gross value	Provision	Net value	Gross value	Provision	Net value
Nuclear fuel	10,938	(459)	10,479	10,564	(33)	10,531
Other fuel	1,255	(4)	1,251	770	(42)	728
Other supplies	1,770	(402)	1,368	1,660	(398)	1,262
Work-in-progress for production of goods and services	615	(38)	577	469	(33)	436
Other inventories	2,540	(18)	2,522	1,804	(23)	1,781
TOTAL INVENTORIES	**17,118**	**(921)**	**16,197**	**15,267**	**(529)**	**14,738**

The long-term portion (more than one year) mainly concerns nuclear fuel inventories amounting to €8,576 million at 31 December 2021 (8,068 million at 31 December 2020).

At 31 December 2021, provisions on nuclear fuel inventories include the effect of the early closure decision for Dungeness B in the United Kingdom (see note 7).

The change in inventories in 2021 is principally explained by the rise in prices, particularly for EDF Trading's inventories, presented in "Other fuel" and "Other inventories" which are stated at market value (€1,068 million at 31 December 2021 and €300 million at 31 December 2020), and the increase over the year in stocks of energy savings certificates, presented in "Other inventories" (see note 5.4.3).

13.3 TRADE RECEIVABLES

Accounting principles and methods

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.

Details of net trade receivables are as follows:

(in millions of euros)	Note	31/12/2021	31/12/2020
Trade receivables, gross value – excluding EDF Trading		19,781	14,686
- contract assets	13.3.3	*545*	*389*
Trade receivables, gross value – EDF Trading		3,545	1,036
Impairment[(1)]		(1,091)	(1,201)
TRADE RECEIVABLES - NET VALUE		**22,235**	**14,521**

[(1)] *see note 1.4.3.*

Most trade receivables mature within one year.

Advances received from customers in France who pay in regular monthly instalments, amounting to €7,071 million at 31 December 2021 (€6,782 million at 31 December 2020), are deducted from trade receivables.

The increase in the gross value of trade receivables in 2021 is principally explained by changes in market prices, amounting to €2.5 billion for EDF Trading and €5.1 billion for other Group subsidiaries including €2.3 billion for Edison (essentially relating to gas sales given the rise in market prices, and to a lesser extent the take-or-pay clauses included in some contracts).

13.3.1 Trade receivables due and not yet due

	31/12/2021			31/12/2020		
(in millions of euros)	Gross value	Provision	Net value	Gross value	Provision	Net value
TRADE RECEIVABLES	**23,326**	**(1,091)**	**22,235**	**15,722**	**(1,201)**	**14,521**
overdue by up to 6 months	1,285	(215)	1,070	1,249	(242)	1,007
overdue by 6-12 months	481	(136)	345	465	(193)	272
overdue by more than 12 months	978	(551)	427	851	(526)	325
Trade receivables due	**2,744**	**(902)**	**1,842**	**2,565**	**(961)**	**1,604**
Trade receivables not yet due	**20,582**	**(189)**	**20,393**	**13,157**	**(240)**	**12,917**

13.3.2 Assignment of receivables

Accounting principles and methods

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.

(in millions of euros)	31/12/2021	31/12/2020
Trade receivables assigned and wholly retained in the balance sheet	340	84
Trade receivables assigned and partly retained in the balance sheet	-	60
Trade receivables assigned and wholly derecognised	1,456	792

The Group assigned trade receivables for a total of €1,456 millions at 31 December 2021, mainly concerning Edison, EDF SA, Dalkia and Luminus (€792 million at 31 December 2020, mainly concerning Edison, EDF SA and Dalkia).

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.

13.3.3 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 €545 million at 31 December 2021 and €389 million at 31 December 2020 and mainly concern Framatome, Dalkia and EDF Renewables.

13.3.4 Other receivables

Details of other receivables are as follows:

(in millions of euros)	31/12/2021	31/12/2020
Prepaid expenses	1,485	1,457
Compensation for Public Energy Service charges (CSPE)	-	1,993
VAT receivables	2,051	1,988
Other tax receivables	348	248
Other operating receivables	14,405	3,247
OTHER RECEIVABLES	**18,289**	**8,933**
Non-current portion	2,092	2,015
Current portion	16,197	6,918
Gross value	18,344	9,013
Impairment	(55)	(80)

At 31 December 2021, other operating receivables include €9.8 billion of margin calls made in the trading activity (€0.6 billion in 2020), due to the commodity price rises observed in Europe in the second half of 2021. The amounts of margin calls recognised in assets cannot be netted with the margin calls recognised in liabilities (see note 13.5).

Other operating receivables also include €1,274 million of advances paid to suppliers (€1,045 million at 31 December 2020). Most of these advances concern nuclear fuel supply contracts in the France – Generation and Supply segment.

EDF's Public Service Charges

The amount of expenses to be compensated to EDF for 2021 is €5,472 million.

The amounts received in 2021 from the State's General Budget, totalled €8,085 million.

The surplus compensation principally results from changes in market prices between 2020 and 2021. The renewable electricity support charges to be compensated decreased significantly due to the rise in market prices in 2021, whereas the compensation received from the State (defined in the Finance Law for 2021 on the basis of 2020 market prices, which were particularly low) was very high.

Consequently, at 31 December 2021, EDF SA recognised an operating liability due to the State of €294 million (compared to a receivable of €1,974 million at 31 December 2020).

During 2021 EDF also bore an amount of €255 million in repayment of excess amounts received in 2016 under the former CSPE mechanism.

Finally, in accordance with decree 2016-158 of 18 February 2016 concerning compensation for public energy service charges, on 22 July 2021 the CRE published its decision 2021-230 of 15 July 2021 setting out a forecast of EDF's public service charges for 2022 (€7,620 million), a revised forecast of charges for 2021 (€7,142 million), and the actual charges recorded for 2020 (€8,034 million).

The compensation mechanism for public energy service charges in France is presented in note 5.4.1.

13.4 TRADE PAYABLES

(in millions of euros)	31/12/2021	31/12/2020
Trade payables – excluding EDF Trading	14,041	10,868
Trade payables – EDF Trading	5,524	1,032
TRADE PAYABLES	**19,565**	**11,900**

The increase in trade payables in 2021 is mainly explained by changes in market prices, and comprises €4.5 billion concerning EDF Trading and €3.2 billion for other Group subsidiaries including €1.5 billion for Edison (reflecting gas purchases made at market prices, which were higher this year).

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.

13.5 OTHER LIABILITIES

Details of other liabilities are as follows:

(in millions of euros)	31/12/2021	Including contract liabilities	31/12/2020	Including contract liabilities
Advances and progress payments received	2,114	1,635	1,788	1,344
Liabilities related to property, plant and equipment	4,368	-	4,196	-
Tax liabilities	5,093	-	4,532	-
Social charges	5,092	-	4,712	-
Deferred income on long-term contracts	3,146	3,110	3,290	3,233
Other deferred income[(1)]	997	592	827	430
Other	9,254	-	2,390	-
OTHER LIABILITIES	**30,064**	**5,337**	**21,735**	**5,007**
Non-current portion	4,816	3,107	4,874	3,092
Current portion	25,248	2,230	16,861	1,915

(1)Including the initial payment made under the Fessenheim compensation protocol (see note 5.4.3).

13.5.1 Advances and progress payments received

Advances and progress payments received comprise €642 million of payments made by the customers in Framatome's long-term contracts (€518 million at 31 December 2020).

13.5.2 Tax liabilities

At 31 December 2021, tax liabilities mainly include an amount of €562 million for the CSPE to be collected by EDF on energy supplied but not yet billed, less the CSPE tax collected on advances from customers who pay in regular monthly instalments (€502 million at 31 December 2020).

13.5.3 Deferred income on long-term contracts

EDF's deferred income on long-term contracts at 31 December 2021 comprises €1,746 million (€1,713 million at 31 December 2020) 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).

13.5.4 Other

Accounting principles and methods

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.

At 31 December 2021, other operating liabilities include €5.8 billion of margin calls made in the trading activity (€0.2 billion in 2020), reflecting commodity price rises observed in Europe in the second half of 2021. The amounts of margins calls recognised in liabilities cannot be netted with margin calls recognised in assets (see note 13.3.4).

Other liabilities at 31 December 2021 also include a €294 million operating liability due to the State in connection with the CSPE (compared to a receivable of €1,974 million at 31 December 2020, see note 13.3.4).

The final line of the table of other liabilities includes investment subsidies received during 2021, amounting to €536 million (€414 million in 2020).

13.5.5 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)	31/12/2020	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	31/12/2021
Advance payments received	**1,344**	1,277	(1,013)	(22)	(1)	14	36	**1,635**
Deferred income on long-term contracts	**3,233**	417	(519)	(1)	56	(88)	12	**3,110**
Other deferred income	**430**	488	(455)	(18)	-	138	9	**592**

These liabilities comprise the majority of advances and progress payments received, amounting to €1,635 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 €3,702 million (principally concerning the France – Generation and Supply segment). They thus total €5,337 million at 31 December 2021 (€5,007 million at 31 December 2020).

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 €11,697 million which have not yet been recognised. €1,093 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 14 EQUITY AND EARNINGS PER SHARE

14.1 SHARE CAPITAL

Accounting principles and methods

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.

At 31 December 2021, EDF's share capital amounts to €1,619,338,374 comprising 3,238,676,748 fully subscribed and paid-up shares with nominal value of €0.50, owned 83.88% by the French State, 14.77% by the public (institutional and private investors) and 1.32% by current and retired Group employees, with 0.03% held by EDF as treasury shares.

In June 2021, the payment of part of the dividend for 2020 in the form of a scrip dividend led to a €29 million increase in the share capital and an issue premium of €587 million following issuance of 57,908,528 new shares.

In December 2021, the payment of part of the interim dividend for 2021 in the form of a scrip dividend led to a €40 million increase in the share capital and an issue premium of €859 million following issuance of 80,844,641 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.

14.2 TREASURY SHARES

Accounting principles and methods

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.

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 2021, treasury shares deducted from consolidated equity represent 1,174,554 shares with total value of €14 million.

14.3 DIVIDENDS

At the General Shareholders' Meeting of 6 May 2021 it was decided to distribute an ordinary dividend of €0.21 per share in respect of 2020, 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 have held their shares continuously for at least 2 years at the year-end and still hold them at the dividend distribution date benefit from a 10% bonus on their dividends. The number of shares carrying an entitlement to the bonus dividend cannot exceed 0.5% of the Company's capital per shareholder. The bonus dividend amounts to €0.231 per share.

The French government opted for the scrip dividend for 2020. The amount of the cash dividend paid to shareholders who did not opt for the scrip dividend for 2020 amounts to €36 million.

On 4 November 2021, EDF's Board of Directors decided to distribute an interim dividend of €0.30 per share in respect of 2021, payable in new shares (scrip option) or cash on 2 December 2021. The total amount of the interim dividend was €947 million.

The French government opted for the scrip dividend for this 2021 interim dividend.

The amount of the cash dividend paid to shareholders who did not take the scrip option for this 2021 interim dividend amounts to €48 million.

14.4 PERPETUAL SUBORDINATED BONDS

Accounting principles and methods

Perpetual subordinated bonds ("hybrid" bond issue)

The perpetual subordinated bonds issued by the Group 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. 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.

14.4.1 Outstanding perpetual subordinated bonds at 31 December 2021

At 31 December 2021, perpetual subordinated bonds carried in equity amounted to €12,264 million (less net-of-tax transaction costs) (€11,290 million at 31 December 2020).

Issues and redemptions of perpetual subordinated bonds were recorded in equity at 31 December 2021 at the total net value of €972 million (see note 14.4.2).

On 22 January 2022 EDF exercised its option to redeem all the perpetual subordinated bonds issued in January 2014, totalling €267 million. Consequently EDF reclassified these equity instruments as financial liabilities at 31 December 2021 at the amount of €267 million, considering the redemption as certain (see note 18.3.2.1).

Interest paid by EDF to the bearers of perpetual subordinated bonds issued totalled €547 million in 2021 and €501 million in 2020. The resulting cash payout is reflected in a corresponding reduction in Group equity.

In January 2022, EDF paid interest of around €275 million to the bearers of perpetual subordinated bonds.

Perpetual subordinated bonds in the accounts of EDF

(in millions of currency units)

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	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%
EDF	09/2020	850	EUR	6.5 years	2.88%
EDF	09/2020	1,250	EUR	10 years	3.38%
EDF	05/2021	1,250	EUR	7 years	2.63%

14.4.2 Changes in perpetual subordinated bonds during 2021

Social hybrid notes issue

EDF launched on 26 May 2021 an issue of an Euro-denominated perpetual social hybrid notes for a total nominal amount of €1.25 billion with an initial coupon of 2.625% and a first redemption at the option of EDF on 1 June 2028.

EDF can redeem the social hybrid notes for cash at any time during the 60 days before the first interest reset date, which is expected to be in 7 years (i.e. in 2028), and before every coupon payment date thereafter.

The proceeds raised through the social hybrid notes will be dedicated to the financing of eligible projects including any capital expenditure engaged by EDF group and contracted with SMEs which contribute to the development or maintenance of EDF group's power generation or distribution assets in Europe and in the United Kingdom. In compliance with the social bond principles and the Sustainability Bond Guidelines of the ICMA (International Capital Market Association), this issuance of social hybrid notes is consistent with the commitments and the CSR (Corporate Social Responsibility) strategy of the Group in relation to the responsible development of local areas and the development of industrial sectors.

The settlement date occurred on 1st June 2021, on which date the social hybrid notes is admitted to trading on the regulated market of Euronext Paris.

This issue was recorded in equity upon reception of the proceeds, total net value of €1,239 million.

14.5 CONVERTIBLE GREEN BONDS *(OCEANES)*

Accounting principles and methods

***OCEANEs* (bonds convertible into new shares and/or exchangeable for existing shares)**

OCEANE bonds, which are convertible by remittal of a fixed number of shares in exchange for a fixed amount of cash (the "fixed-for-fixed" rule) give rise to recognition of a debt component and an equity component, in accordance with IAS 32.

The debt-equity proportions remain constant even if there is a change in the likelihood that the conversion option will be exercised.

The debt component is measured by the discounted future cash flows method using a discount rate applicable to a comparable market bond with no conversion option. The equity component corresponds to the difference between the fair value of the bond and the fair value of the debt component.

Issue expenses are allocated between the debt and equity components in the same proportions as the initial allocation.

On 8 September 2020, EDF made an issuance of Green Bonds convertible into new shares and/or exchangeable for existing shares (*OCEANEs Vertes*) with the nominal amount of €2,400 million and an issue value of €2,569 million. These bonds are recorded at an amount of €2,389 million net of expenses and taxes in "Financial loans and borrowings" and €126 million in "Equity". The key features of this issue are presented in note 18.3.2.2.

14.6 NON-CONTROLLING INTERESTS (MINORITY INTERESTS)

14.6.1 Details of non-controlling interests

	31/12/2021			31/12/2020	
(in millions of euros)	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%	2,567	(307)	2,526	(91)
NNB Holding Ltd.	33.5%	6,305	(39)	4,716	1
EDF Investissements Groupe SA	7.54%	518	11	515	11
Luminus SA	31.4%	381	(30)	400	(5)
Framatome	24.5%	86	(22)	115	(26)
Other non-controlling interests		**1,921**	**102**	**1,321**	**75**
TOTAL		**11,778**	**(285)**	**9,593**	**(35)**

Non-controlling interests in EDF Energy Nuclear Generation Ltd., 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 EDF Investissements Groupe correspond to the investment held by Natixis Belgique Investissements.

Non-controlling interests in Luminus correspond to the investments held by Belgian local authorities.

Non-controlling interests in Framatome, 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.

Other non-controlling interests principally consist of the minority interests in Sizewell C Holding Co., owned 80% by the Group *via* EDF Energy and 20% by CGN, 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 €165 million at 31 December 2021 (€202 million in 2020).

14.6.2 Key financial indicators for EDF Energy Nuclear Generation Ltd.

The key financial indicators (100% basis) for EDF Energy Nuclear Generation Ltd. are as follows:

(in millions of euros)	31/12/2021	31/12/2020
Non-current assets	25,784	23,317
Current assets	3,868	4,399
Total assets	**29,652**	**27,716**
Equity	12,837	12,630
Non-current liabilities	16,352	14,741
Current liabilities	463	345
Total equity and liabilities	**29,652**	**27,716**
Sales	1,842	3,091
Net income	(1,535)	(455)
Gains and losses recorded directly in equity	**906**	**(735)**
Net cash flow from operating activities	84	982
Net cash flow from investing activities	(420)	(380)
Net cash flow from financing activities	(11)	(335)
Cash and cash equivalents – opening balance	**585**	**329**
Net increase/(decrease) in cash and cash equivalents	(347)	267
Effect of currency fluctuations	42	(11)
Other	-	-
Cash and cash equivalents – closing balance	**279**	**585**
Dividends paid to non-controlling interests	2	68

14.7 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)	2021	2020
Net income attributable to ordinary shares	5,113	650
▪ *EDF net income from continuing operations*	*5,114*	*804*
▪ *EDF net income from discontinued operations*	*(1)*	*(154)*
Payments on perpetual subordinated bonds	(547)	(501)
Net income used to calculate earnings per share	**4,566**	**149**
▪ *from continuing operations*	4,567	*303*
▪ *from discontinued operations*	*(1)*	*(154)*
Cancellation of the effect of dilutive instruments	2	1
Net income used to calculate diluted earnings per share	**4,567**	**150**
▪ *from continuing operations*	*4,568*	*304*
▪ *from discontinued operations*	*(1)*	*(154)*
Average weighted number of ordinary shares outstanding during the year	**3,138,060,309**	**3,106,323,609**
Effect of dilutive instruments	**222,574,780**	9,149,131
Average weighted number of diluted shares outstanding during the year	**3,360,635,089**	**3,115,472,740**
Earnings per share (in euros):		
BASIC EARNING PER SHARE	**1.46**	**0.05**
DILUTED EARNINGS PER SHARE	**1.36**	**0.05**
BASIC EARNINGS PER SHARE OF CONTINUING OPERATIONS	**1.46**	**0.10**
DILUTED EARNINGS PER SHARE OF CONTINUING OPERATIONS	**1.36**	**0.10**
BASIC EARNINGS PER SHARE OF DISCONTINUED OPERATIONS	**-**	**(0.05)**
DILUTED EARNINGS PER SHARE OF DISCONTINUED OPERATIONS	**-**	**(0.05)**

On 8 September 2020, EDF issued unsecured senior Green Bonds convertible into new shares and/or exchangeable for existing shares of the Company (*OCEANEs Vertes,* see note 18.3.2.2). The diluted earnings per share incorporates the impact of conversion of these bonds and adjustment of the conversion/exchange ratio following capital increases undertaken during the year.

NOTE 15 PROVISIONS RELATED TO NUCLEAR GENERATION AND DEDICATED ASSETS

Accounting principles and methods

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 operations, based on independent expert reports, or contractor quotes. The various assumptions are reviewed for each closing of the accounts.

In the case of decommissioning provisions for power plants in operation, adjustments are recorded *via* fixed assets.

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

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;
- in the income statement in all other cases.

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;
- costs relating to fuel in the reactor when the reactor is shut down (provisions for last cores). These correspond to the cost of the fuel stock in the reactor that is not totally spent at the time of the final reactor shutdown and cannot be reused due to technical and regulatory constraints, the cost of processing for that fuel, and the cost of removal and storage of the resulting waste.

Obligations can vary noticeably depending on each country's legislation and regulations, and the technologies and industrial scenarios involved.

The breakdown between current and non-current provisions related to nuclear generation is as follows:

	31/12/2021			31/12/2020		
(in millions of euros)	**Current**	**Non-current**	**Total**	**Current**	**Non-current**	**Total**
Provisions for the back-end of the nuclear cycle	1,359	28,155	**29,514**	1,430	26,137	**27,567**
Provisions for decommissioning and last cores	1,346	33,912	**35,258**	723	32,196	**32,919**
Provisions related to nuclear generation	**2,705**	**62,067**	**64,772**	**2,153**	**58,333**	**60,486**

The breakdown of provisions by company is shown below:

	EDF	EDF Energy	Belgium	Total
(in millions of euros)	**Note 15.1**	**Note 15.2**	**Note 15.3**	
Provisions for spent fuel management	11,819	1,401	-	13,220
Provisions for waste removal and conditioning	-	639	-	639
Provisions for long-term radioactive waste management	14,233	1,415	7	15,655
PROVISIONS FOR THE BACK-END OF THE NUCLEAR CYCLE AT 31/12/2021	26,052	3,455	7	29,514
Provisions for the back-end of the nuclear cycle at 31/12/2020	**24,622**	**2,938**	**7**	**27,567**
Provisions for nuclear plant decommissioning	17,730	12,595	434	30,759
Provisions for last cores	2,660	1,839	-	4,499
PROVISIONS FOR DECOMMISSIONING AND LAST CORES AT 31/12/2021	20,390	14,434	434	35,258
Provisions for decommissioning and last cores at 31/12/2020	**20,200**	**12,342**	**377**	**32,919**
PROVISIONS RELATED TO NUCLEAR GENERATION AT 31/12/2021	46,442	17,889	441	64,772
Provisions related to nuclear generation at 31/12/2020	**44,822**	**15,280**	**384**	**60,486**

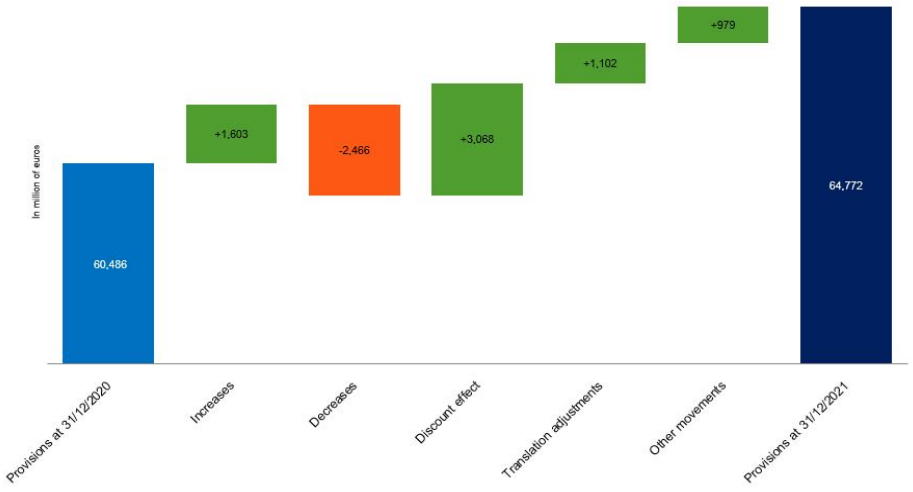
The movement in provisions for the back-end of the nuclear cycle, provisions for decommissioning and provisions for last cores breaks down as follows:

(in millions of euros)	31/12/2020	Increases	Decreases	Discount effect	Translation adjustments	Other movements	31/12/2021
Provisions for spent fuel management	12,608	1,205	(1,470)	601	90	186	13,220
Provisions for waste removal and conditioning	546	4	-	38	39	12	639
Provisions for long-term radioactive waste management	14,413	132	(227)	932	82	323	15,655
Provisions for the back-end of the nuclear cycle	**27,567**	**1,341**	**(1,697)**	**1,571**	**211**	**521**	**29,514**
Provisions for nuclear plant decommissioning	28,036	262	(428)	1 397	750	742	30,759
Provisions for last cores	4,883	-	(341)	100	141	(284)	4,499
Provisions for decommissioning and last cores	**32,919**	**262**	**(769)**	**1,497**	**891**	**458**	**35,258**
PROVISIONS RELATED TO NUCLEAR GENERATION	**60,486**	**1,603**	**(2,466)**	**3,068**	**1,102**	**979**	**64,772**
Current portion	2,153						2,705
Non-current portion	58,333						62,067

The change in provisions related to nuclear generation in 2021 is mainly due to:

- a 10bp decrease in the real discount rate in France: the corresponding effects are included in the "Discount effect" (€617 million) for provisions adjusted *via* profit and loss, and in "Other movements" (€495 million) for changes in provisions backed by assets (assets associated with provisions and underlying assets) (see note 15.1.1);
- extension of the depreciation period of 1300MW-series power plants: the corresponding effects at 1 January 2021 are included in "Other movements" (€(1,031) million) for changes in provisions backed by assets (assets associated with provisions and underlying assets), and in "Increases" (€15 million) for provisions adjusted *via* profit and loss (see note 15.1.1);
- revision of the assumptions used in valuing liabilities for nuclear plant decommissioning in the United Kingdom: the corresponding effects are included in "Other movements" (€1.2 billion) for changes in provisions backed by the receivable representing amounts due from the Nuclear Liabilities Fund (NLF) and the British government in the United Kingdom (see note 15.2.3).

Details of the change in provisions related to nuclear generation in 2021 are as follows:



15.1 PROVISIONS RELATED TO NUCLEAR GENERATION AND DEDICATED ASSETS IN FRANCE

15.1.1 Nuclear provisions

In France, the provisions established by EDF SA for the nuclear generation fleet result principally 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 above:

- EDF books provisions to cover all obligations related to the nuclear facilities it operates;
- EDF also holds dedicated assets for secure financing of long-term obligations (see note 15.1.2).

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 described in note 1.3.4.2.

Details of changes in provisions for the back-end of the nuclear cycle, decommissioning and last cores in France are as follows:

(in millions of euros)	Notes	31/12/2020	Increases	Decreases	Discount effect	Other movements	31/12/2021
Provisions for spent fuel management	15.1.1.1	11,322	1,185	(1,282)	505	89	11,819
- amount unrelated to the operating cycle		*1,297*	*366*	*(15)*	*89*	*(11)*	*1,726*
- amount outside the scope of the Law of 28 June 2006		*1,076*	*42*	*(36)*	*54*	-	*1,136*
Provisions for long-term radioactive waste management	15.1.1.2	13,300	126	(227)	854	180	14,233
Provisions for the back-end of the nuclear cycle		**24,622**	**1,311**	**(1,509)**	**1,359**	**269**	**26,052**
Provisions for nuclear plant decommissioning	15.1.1.3	17,489	262	(186)	649	(484)	17,730
Provisions for last cores	15.1.1.4	2,711	-	-	83	(134)	2,660
Provisions for decommissioning and last cores		**20,200**	**262**	**(186)**	**732**	**(618)**	**20,390**
PROVISIONS RELATED TO NUCLEAR GENERATION		**44,822**	**1,573**	**(1,695)**	**2,091**	**(349)**	**46,442**
***Provisions related to nuclear generation within the scope of the Law of 28 June 2006*[(1)]**		***43,746***	***1,531***	***(1,659)***	***2,037***	***(349)***	***45,306***
***Provisions related to nuclear generation outside the scope of the Law of 28 June 2006*[(1)]**		***1,076***	***42***	***(36)***	***54***	-	***1,136***

[(1)]Scope of application of the law of 28 June 2006 on the sustainable management of radioactive materials and waste and its application decrease concerning secure financing of nuclear expenses. The provisions that do not fall within the scope of this law are provisions for the back-end of the nuclear cycle concerning non-EDF installations (see below).

The discount effect comprises the €1,474 million cost of unwinding the discount, and the €617 million effects of the change in the real discount rate in 2021 which were recorded in the income statement for provisions with no related assets (cost of unwinding the discount).

The change in EDF SA's provisions related to nuclear generation is mainly explained by the extension of the depreciation period of 1300MW-series power plants, which had an impact of €(1,016) million at 1 January 2021 (see note 1.4.1), distributed as follows: €(916) million on provisions for decommissioning, €(214) million on provisions for last cores, and €114 million on provisions for long-term radioactive waste management.

This impact on provisions related to nuclear generation principally results from timing differences in payment outflows (the discount effect on provisions), and also includes a minor revision of estimates to reflect the increase in decommissioning waste to be sent for interim or final storage in certain years, which requires industrial solutions to smooth the waste dispatch flows.

The €(1,016) decrease in provisions related to nuclear generation is presented as follows :

- €(1,031) million in "Other movements" for changes in the provisions backed by assets;
- €15 million in "Increases" for provisions adjusted via profit and loss.

"Other movements" also include the €495 million effects of the change in the real discount rate at 31 December 2021 for provisions backed by assets.

Concerning non-EDF installations:

- EDF, COGEMA (now Orano Recyclage) 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 Recyclage) 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 Orano Recyclage 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.

15.1.1.1 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, to recycle the separated plutonium in the form of MOX fuel (Mixed OXide of plutonium and uranium) and recycling of reprocessed 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 management cover the following services to be provided by Orano Recyclage:

- 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 are revised annually.

Negotiations are currently in process with Orano Recyclage, notably concerning the amendment for the current period 2016-2023. At 31 December 2021, EDF used its best estimate of the costs to be incurred under this contract considering progress on the discussions with Orano. An additional provision of €267 million was recognised to cover the increase in processing costs for EDF associated with the various Orano projects, notably in view of changes concerning the new fission product concentrators.

In 2018, the Board of Directors approved resumption of reprocessed uranium recycling (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. The 50-year operating life for the 1300MW-series plants – reflected in the financial statements at 30 June 2021 by extension from 40 to 50 years of the depreciation period for the relevant units – which will entail industrial adaptations to allow enriched reprocessed uranium fuel to be loaded into 1300MW reactors, and attainment of the significant industrial milestones for resumption of uranium recycling, particularly commissioning the Tenex residual waste vitrification plant during the second half of 2021, confirm that all the industrial, regulatory and economic conditions for resumption of uranium recycling are now fulfilled. Consequently, from an accounting perspective, a portion the provision related to storage of uranium from reprocessing was partly recovered, for an amount €476 million based on a 50-year operating life for the units concerned).

Furthermore, the temporary storage of spent fuel is a key issue for the back-end of the nuclear cycle. Usage forecasts for Orano's intermediate storage facilities at La Hague for spent fuel from EDF's generation fleet suggest that the pools at La Hague could be saturated by 2030. Consequently, the long-term storage capacity for spent fuel is to be increased by construction of a centralised fuel storage pool under EDF's supervision (see below). Commissioning of the new pool is scheduled for 2034 and it will be operated by EDF. The following measures will also be taken to address storage needs.

For the period until the centralised storage pool is built, studies of transitional solutions were launched by Orano and EDF in 2019 in association with the ASN. The preferred solution is densification of the existing pools at Orano's La Hague site (with a related provision of €168 million at 31 December 2020 for this plan). A supplementary solution would be to use a dry storage facility for MOX fuel (Mixed OXide of plutonium and uranium) and reprocessed uranium.

Production issues at Orano's Melox plant are affecting the pace of reprocessing in the short and medium term, and the lower level of recycling has increased the quantities requiring storage in the medium term. As a result the provisions were increased in 2021 by €362 million in consideration of both these industrial solutions, based on a forecast storage capacity

of approximately 3,100 tonnes as opposed to a situation involving neither densification nor dry storage.

Provisions for spent fuel management also cover long-term storage of spent fuel that cannot currently be recycled in existing industrial facilities or under construction: plutonium fuel (MOX) or uranium fuel derived from processing, and fuel from Creys-Malville and Brennilis until fourth-generation reactors become available. Dedicated assets are held in association with this provision, which is unrelated to the operating cycle as defined by the law of 2006 (see note 15.1.2). The provision is founded on a scenario involving construction, managed by EDF (as nuclear operator), of a centralised underwater storage site at La Hague. This project was presented during the public debate on the National Plan for Managing Radioactive Matter and Waste (PNGMDR) in 2019-2020, and is subject to a specific public consultation organised by France's National Public Debate Commission (CNDP) that began on 22 November 2021. This consultation was suspended on 3 February 2022, to take time to reinforce consultation practices so as to better cover the Manche county and the themes raised. The procedure will continue from 20 June to 8 July 2022.

15.1.1.2 Provisions for long-term radioactive waste management

Provisions for long-term radioactive waste management concern the following future expenses:

- 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;
- characterisation, processing, conditioning and interim storage of radioactive waste resulting from decommissioning and certain operating waste and final storage of this radioactive waste;
- 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 in particular 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)	Storage centre	31/12/2021	31/12/2020
Very low-level and low and medium-level waste	Very low-level waste: CIRES -Morvilliers (ANDRA) Low and medium-level waste: CSA - Soulaines (ANDRA)	3,093	2,856
Long-lived low-level waste	Project under examination: Soulaines (ANDRA)	394	365
Long-lived medium and high-level waste	Geological storage centre (Cigéo project)	10,746	10,079
PROVISIONS FOR LONG-TERM RADIOACTIVE WASTE MANAGEMENT		**14,233**	**13,300**

Very low-level and low and medium-level waste

Very low-level waste and low and medium-level waste come from nuclear facilities in operation or in the process of being decommissioned:

- very low-level waste mainly comes from nuclear plant decommissioning, and generally takes the form of metals (large components, piping , support structures, etc.) or rubble (concrete, earth, etc.). This type of waste is stored at surface level at the Morvilliers storage centre managed by ANDRA commissioned in 2003;
- low and medium-level waste (gloves, filters, resins, materials, etc.) is stored at surface level at the Soulaines storage centre managed by ANDRA, commissioned in 1992 .

The cost of removing, processing and storing short-lived waste (very low-level and low and medium-level) is assessed on the basis of:

- current contracts with transporters, and ANDRA for operation of the existing storage centres;
- the costs of the plant run by the subsidiary Cyclife France (the Centraco site at Marcoule, commissioned in 1999) for processing some of this waste that can be melted prior to storage in the ANDRA's centres;
- an estimate of the cost of a centralised facility for temporary storage, segmentation and conditioning of major components like steam generators;
- the preliminary plans for temporary storage and segmentation of control rod cluster guide tubes prior to their long-term storage.

In 2019, the inventory assumptions were updated by a time series analysis of past waste removal and better characterisation of future volumes, leading 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).

In 2020, the assumptions concerning the shares of costs were reassessed, to reflect the long-term distribution between the three producers concerned of fixed storage costs for very low-level waste and low and medium-level waste. All the effects of this cost-share updating work have led to a €179 million increase in the provision (with an unfavourable effect of €50 million on the income statement, while the rest of the change was recognised *via* adjustments to fixed assets).

Also, since 31 December 2020, to ensure consistency with the most recent official breakdown of nuclear expenses attached to the amended ministerial order of 21 March 2007 on secure financing of nuclear expenses, the provision established for very low-level and low and medium-level waste also covers the treatment, conditioning and interim storage of waste; many of these operations were previously included in the provisions for nuclear plant decommissioning and waste removal and conditioning (reclassification of €979 million applied at 31 December 2020).

In 2021, in addition to changing the technical assumptions underlying provisions so as to reflect the impacts of extending the depreciation period for 1300MW-series plants (the modified timing of waste production from decommissioning results in an increase in decommissioning waste to be sent to storage in some years and industrial solutions are required to smooth the waste dispatch flows), the industrial scenario for management of decommissioning waste prior to storage was optimized by introducing prior processing to reduce the volumes stored. This had no significant impact on provisions.

Finally, for very low-level waste, in February 2020, following the public debate of 2019-2020 concerning the French National Plan for the Management of Radioactive Matter and Waste (PNGMDR), the conclusions of the Ministry for the Ecological and Inclusive Transition and the ASN opened up the possibility of a change in regulations that would allow recycling of very low-level metal waste after processing: "The Government will make changes to the regulatory framework applicable to the management of very low-level waste, in order to introduce a new possibility of targeted exceptions, allowing recycling, after fusion and decontamination and on a case by case basis, of very low-level radioactive metallic waste". The new regulations (issued in decrees by the Minister for the Ecological Transition) were published in the *Journal officiel* on 15 February 2022. Amid these developments, EDF is continuing its ongoing studies for construction of a segmentation and fusion facility to process and recycle very low-level radioactive metallic waste resulting from dismantling operations in France and other countries. This project, called Technocentre, is led by EDF in collaboration with Orano, with a target commissioning date of 2031.

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 were planned under the 2016-2018 period of the National Plan for the Management of Radioactive Matter and Waste (PNGMDR), concerning both the feasibility of this storage centre and the search for additional waste management solutions. The ASN's opinion on management of this waste, issued on 6 August 2020 after the work done over the period 2016-2018, and the orientations proposed by the head of the PNGMDR in the current elaboration phase of the fifth edition of the PNGMDR, set a horizon of 2023 for definition by ANDRA of several reference management scenarios, and of the needs for complementary concepts and the production of a file (equivalent to a Summary Preliminary Plan or *avant-projet sommaire* - APS) presenting the technical and safety options selected for storage of long-lived low-level waste.

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, based on the 2011 inventory).

In 2012 ANDRA carried out preliminary conceptional studies for the Cigéo geological storage project.

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 divergences in the valuation of technical optimisations and their induced effects. 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.

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.

In April 2016 ANDRA sent the ASN a safety option report (DOS). The law of 11 July 2016 clarified the concept of reversibility.

On 11 January 2018, the ASN issued its opinion on the DOS. It considered that the Cigéo 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.

The detailed design review by a group of independent experts, organised at the request of the DGEC, reported its conclusions at the end of 2020. While issuing a generally favourable opinion for the ANDRA's submission, the group made a certain number of recommendations for finalisation of the detailed design studies and the application for authorisation to create the centre, calling for closer involvement of EDF, Orano and the CEA on these matters.

Under the schedule prepared by ANDRA, the application to develop Cigéo (classified as a basic nuclear facility), previously due to be made in 2021, should now be made in 2022. This will delay the granting of authorisation by an equivalent period, and it is now expected in 2025. However, producers are still currently working on the hypothesis that the first waste packages will be received in 2031.

In August 2020 ANDRA filed an application for a *Déclaration d'utilité publique* (DUP) officially recognising the public utility of the Cigéo storage centre. This was examined by the government departments and subjected to a public inquiry from 15 September to 23 October 2021, and the inquiry commissioners issued an unreservedly favourable opinion on 20 December 2021. Publication of the DUP decree, which will automatically confer compatibility on the planning documents, is expected in early 2022.

Finally, the French finance law for 2021, published in the *Journal officiel* of 30 December 2020, includes a change to the tax treatment of this project (based on storage tax instead of the standard tax regime). The associated measures remain to be defined and managed by the Government to prevent any cost increase for the Cigeo project.

Also, since 31 December 2020, to ensure consistency with the most recent official breakdown of nuclear expenses attached to the amended ministerial order of 21 March 2007 on secure financing of nuclear expenses, the provision established for very low-level and low and medium-level waste also covers the conditioning and interim storage of low and medium-level waste at the ICEDA storage facility (*installation de conditionnement et d'entreposage des déchets activés*). These nuclear expenses were previously covered by the provisions for waste removal and conditioning.

This facility, constructed at the Bugey power plant, received its first waste packages in September 2020 after the ASN authorised its commissioning on 28 July 2020. The ASN's decision approving and governing the conditioning of long-lived medium-level waste into packages at the ICEDA facility was formally received on 19 July 2021. At the end of 2021 the first waste packages were sealed, in compliance with the authoriations granted and the commissioning schedule.

15.1.1.3 Decommissioning provisions for nuclear power plants

EDF bears full technical and financial responsibility for decommissioning of the basic nuclear facilities (*installations nucléaires de base*, INB) it operates. The final shutdown and decommissioning process is governed by legal provisions and regulations set out in Articles L. 593-20 to L 593-25 and R.593-65 to R.593-74 in the Environmental Code. It involves the following operations for each INB:

- a definitive 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 of the INB, which takes place during its operating phase, 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);

- a dismantling plan compiled by the operator and sent to the minister in charge of nuclear safety, which after examination by the authorities and a public inquiry, leads to a decree prescribing dismantling that authorises the start of dismantling operations;
- key-stage progress reviews submitted for the ASN's approval, with a safety file specific to the dismantling operations to be performed;
- an internal control process concerning significant changes introduced by the operator in the case of operations that must be declared to or approved by the ASN;
- finally, once these operations are complete, declassification of the facility, which removes 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 dismantling operations concern mainly plants that were constructed and operated before the nuclear fleet currently in operations, known as "first-generation" plants, and the Superphenix plant and Irradiated Materials Workshop. 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 at Chooz, 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 plant has the specificity of being located in a cave, making this a unique operation, generating experience that is not immediately transposable and involves specific challenges.

Based on the ongoing decommissioning operations at permanently shut-down plants (particularly the experience gained from the Chooz PWR), the studies conducted for the Summary Preliminary Plan for the two 900MW reactors at Fessenheim, and the preparatory work for dismantling of Fessenheim, it was possible at the end of 2021 to establish a detailed reference estimate of future decommissioning costs for the nuclear fleet currently in operation ("second-generation" plants). However, 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 associated with the scale effect.

At Fessenheim, the two pressurised water reactors were shut down definitively on 22 February 2020 and 30 June 2020 respectively, in accordance with the law and before the end of their technical operating life. The Consolidated Preliminary Plan (*avant-projet consolidé* or APC) was finalised in late 2018, with more in-depth studies and derisking of the Summary Preliminary Plan (*avant-projet sommaire* or APS). The dismantling plan was sent to the ASN in September 2019 together with the declaration of the permanent shutdown of this INB. The studies conducted in 2019 and 2020 focused on preparing the dismantling plan, which was sent to the ASN on 2 December 2020. After the filing date, the ASN will examine the documents for a period of 3 to 5 years. 2021 was marked by the complete defueling of reactor 1, preparations for decontamination of the primary circuit which will take place in 2022, dispatch of the first operating waste to the ICEDA facility, and dispatch of the uppermost parts of the steam generators to the subsidiary Cyclife Sweden for processing, in line with the objectives of the work and studies done in preparation for decommissioning of Fessenheim.

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).

Details of changes in decommissioning provisions for nuclear power plants are as follows:

(in millions of euros)	31/12/2020	Increases	Decreases	Discount effect	Other movements	31/12/2021
Provisions for decommissioning nuclear plants in operation	12,775	-	(7)	396	(484)	12,680
Provisions for decommissioning permanently shut-down nuclear plants	4,714	262	(179)	253	-	5,050
DECOMMISSIONING PROVISIONS FOR NUCLEAR POWER PLANTS	**17,489**	**262**	**(186)**	**649**	**(484)**	**17,730**

Other movements in provisions for decommissioning nuclear plants in operation include the impact of extension of the depreciation period for 1300MW-series plants, which is partly offset by the effects of the change in the real discount rate at 31 December 2021.

For nuclear power plants currently in operation (PWR pressurized water reactor plants with 900MW, 1,300MW and N4 reactors)

Until 2013, provisions were estimated based on a 1991 study by the French Ministry of Trade and Industry, which set an estimated benchmark cost for decommissioning expressed in €/MW, confirming the assumptions defined in 1979 by the PEON Commission. These estimates had been confirmed from 2009 by a detailed study of decommissioning costs conducted by EDF at the representative site of Dampierre (four 900MW units), and its results were corroborated by an intercomparison with the study carried out by consultants La Guardia, based mainly on the Maine Yankee reactor in the US.

In 2014 the Dampierre study was reviewed by EDF to make sure that the previous calculations were still valid in view of recent developments and experience, both internationally and internally. For this revision, the decommissioning provisions for plants in operation were based on costs resulting from the Dampierre study, in order to incorporate best estimates and experience 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 series and mutualisation effects used to arrive at the estimate are explained below.

Series effects (effects of work for the first-of-a-kind site on the following sites of the same series) 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.

Mutualisation effects (effects between units in the same site, whether in operation or being decommissioned) are of several different types:

- 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 dismantled twice;
- certain costs are not higher when two or four reactors are dismantled on the same site. This is usually the case for surveillance costs, common equipment, and the cost of maintaining safe operating conditions on the site.

Due to mutualisation effects, dismantling a pair of reactors on the same site costs less than dismantling 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.

Series and mutualisation effects reduce the estimated decommissioning cost by 10% and 6% respectively compared to an estimate that ignores these effects. Series and mutualisation effects vary depending on the series: they are greater when there are more units in a series (series effect) and more units on a site (mutualisation effect), leading to a combined effect (series and mutualisation effect) of over 16% for the 900MW series.

In particular, series and mutualisation effects explain why it is not appropriate simply to compare the average dismantling cost per reactor between the French fleet and other countries' nuclear fleets.

In contrast, the estimates 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 this approach resulted in a prudent estimation method.

For reasons of prudence, the estimate also includes an assessment of risks and uncertainties as follows:

- incorporation of uncertainties relating to each "elementary" block of costs, series effects, mutualisation effects, transposition coefficients and fleet expenses;
- incorporation of risks, corresponding to the completion risks (which are identifiable and quantifiable, but only contingent). An initial register of risks on the Fessenheim project was drawn up in 2021 based on the ongoing

studies, and detailed assessment of these risks is continuing for one first-of-a-kind 900MW reactor on the Fessenheim site that has no specificities. Until the results are released, the financial impact of the risks and opportunities is included *via* a flat-rate increase.

The above method for assessing risks and uncertainties leads to an overall margin of some 15.7% for the whole fleet (19.5% for the first 900MW unit).

Since its in-depth revision in 2016 this cost estimate has been reviewed annually. The reviews have led to non-significant annual adjustments.

In 2021, to take account of the impacts of the longer depreciation period for 1300MW-series plants, the sequence of operations for dispatching waste from decommissioning was adapted to reflect the increase in decommissioning waste to be sent for interim storage in certain years.

Also, the reference cost for decommissioning of the first 900MW units was updated following preliminary studies conducted in preparation for the decommissioning of Fessenheim, and experience gained at the beginning of the pre-dismantling phase. This update also incorporates optimisation of the industrial scenario for management of decommissioning waste before storage, involving prior processing to reduce the volumes stored. Extrapolation of these elements to the whole PWR fleet has a limited impact on the provisions for decommissioning nuclear plants in operation: they are increased by €149 million *via* adjustment to balance sheet assets.

EDF confirms its analyses through an international intercomparison, taking care to identify and characterise a number of factors that could distort direct comparisons, for example differences in the scope concerned by the cost estimate, or national and regulatory contexts.

Based on the estimates of the different types of cost, the benchmark cost to completion (in 2021 euros) for decommissioning of the first two 900MW units (Fessenheim) amounts to approximately €0.8 billion, giving an average of €0.4 billion per initial 900MW unit, compared to an average cost of €0.36 billion for the entire PWR fleet, including the series and mutualisation effects described above.

For permanently shut-down nuclear power plants

Decommissioning of shut-down reactors involves pilot operations corresponding to four different technologies, each with clear specificities: a PWR reactor at Chooz A located in a cave, UNGG (natural uranium graphite gas-cooled) reactors at Bugey, Saint-Laurent and Chinon, a heavy water reactor at Brennilis, a sodium-cooled fast neutron reactor at Creys-Malville, and the first-of-a-kind second-generation PWR reactor at Fessenheim.

The decommissioning costs are based on contractor quotes, which take account of accumulated industrial experience, unforeseeable and regulatory developments, and the latest available figures. They have been revised annually since 2015. 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 note 15.1.1.2 “Long-lived low-level waste”). 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 a higher estimated cost due to the induced operating charges.

Updating the industrial decommissioning scenario for permanently shut-down power plants, particularly UNGG plants, led to a €590 million increase in the provision at 31 December 2015.

The review of decommissioning provisions for permanently shut-down plants in 2016 led to non-significant adjustments, apart from one increase of €125 million for a specific installation (the Irradiated Materials Workshop at Chinon). In 2017 and 2018, this annual review gave rise to non-significant adjustments.

The amended industrial scenario for dismantling of the UNGG reactors 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 allowed 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 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 asked for work on the five reactors after the first-of-a-kind reactor to be brought forward slightly and begin no later

than 2055.

In view of the ASN's draft decisions, the nuclear provisions were increased in 2019 by a total €108 million: €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 ASN's decisions concerning dismantling of UNGG reactors were published on 17 March 2020 and did not contradict the principles of the draft decisions of 2019. Consequently, the nuclear provisions for decommissioning of UNGG plants were not subjected to any particular reestimation in 2020, and they reflect the best estimate of the industrial and technical scenario.

In 2020, the annual review of the cost estimates for decommissioning of permanently shut-down plants led to a €45 million increase in provisions due to critical path delays following suspension of work during France's first lockdown phase, and a major unforeseen event associated with suspension of segmentation work on vessel internals at Chooz A. The costs for decontamination of civil engineering work were also updated, leading to a €43 million increase in provisions for the entire scope of permanently shut-down plants.

In 2021, the annual review of the cost estimates for decommissioning of permanently shut-down plants led to a €77 million increase in provisions following revision of the industrial decommissioning strategy for Chooz A. That strategy has shifted to a full continuous decommissioning scenario, dropping the period of cave runoff water surveillance between the end of installations dismantling and the start of final dismantling and decontamination work, as it is no longer necessary as the quality of the water means this is no longer necessary. Also, the cost estimate for decommissioning of the APEC Fuel Storage Workshop at Creys-Malville – a facility operated by EDF with the principal activity of storing fuel from the Superphénix reactor – was updated based on Summary Preliminary Plan studies conducted in 2020-2021, leading to a €61 million increase in provisions.

Finally, in accordance with its powers under article 594-4 of the Environment Code, in June 2020 the DGEC commissioned an external audit of the valuation of dismantling operations for EDF's permanently shut-down nuclear facilities (a UNGG facility and management of low-level long-lived waste, Superphenix and Brennilis), conducted by a consortium of specialist firms. This audit took place from December 2020 to July 2021, and the audit report was posted on the Ministry for the Ecological Transition website in November 2021. Its conclusions (confirming the ASN's observations during its inspection of complex project management, the conclusions of which were released in the first quarter of 2021) highlights "an organization with a structural focus on execution of dismantling projects", an "annual estimation and revision process [that] is robust, and provides good traceability for the assumptions used and the original data", and "a long-term industrial approach to overcome the small number of technological challenges that remain". Finally, the report states that apart from a non-significant correction (taken into account in the 2021 provisions), "the provisions are coherent with the basic scenarios or the projects and cover the full scope of expenses for the scope audited", and of "adequate sizing" through testing the sizing of EDF's expenses and provisions.

At 31 December 2021, the gross amounts estimated under year-end economic conditions (amounts still to be spent) and the present value of those amounts are as follows, presented by type of reactor technology:

	31/12/2021	
(in millions of euros)	**Costs based on year-end economic conditions**	**Amounts in provisions at present value**
Pressurised water reactor - PWR - Chooz A	288	259
Pressurised water reactor - PWR – Fessenheim[(1)]	829	707
Natural uranium graphite gas-cooled reactors – UNGG - Bugey, Saint Laurent, Chinon	5,478	3,136
Heavy water reactor – Brennilis	323	284
Sodium-cooled fast neutron reactor – Superphenix at Creys Malville	534	479

[(1)]excluding interim storage and processing of steam generators

Provisions for decommissioning of permanently shut-down nuclear plants also cover dismantling costs for related facilities such as the APEC Fuel Storage Workshop at Creys-Malville and the BCOT Operational Hot Unit at Tricastin.

Compared to decommissioning costs for the PWR technology, the cost at completion (all costs both settled and remaining) for decommissioning of the other reactors is higher, to different extents depending on their specific characteristics:

- costs are around twice as high for Brennilis (completion cost of approximately €0.88 billion for one reactor) due to its compactness, the fact that the core is encased in concrete and thus difficult to access, the absence of a fuel pool, which complicates remote-controlled segmentation, and the presence of zircaloy (a fire hazard), meaning that segmentation work takes longer and must be more closely supervised;
- costs are around twice as high for UNGG reactors (completion cost of approximately €6.6 billion for six reactors), because they require removal of 20 times more material than a PWR due to their size, and contain graphite which is hard to access and requires special handling such that specific remote-controlled equipment must be developed;

- costs are around four times as high for Creys-Malville (completion cost of approximately €1.8 billion for one reactor), due to processing of sodium for which elimination is very sensitive, and the size of the facilities, especially the reactor (with a vessel 20 times bigger than the vessel of the 1300MW PWR).

The following progress has been made on decommissioning work:

- Chooz A: the reactor was shut down in 1991 and nuclear dismantling began in 2007 after the dismantling decree was issued. The final stage of dismantling began in 2016 and involves segmentation, conditioning and removal of reactor vessel internals, followed by dismantling of the vessel itself. These operations are due to be completed in 2024. Under the new full continuous decommissioning scenario, the plant should be declassified by late 2035 (not 2047 as previously expected).
- UNNG reactors: these six reactors were shut down between 1973 and 1994 and received their dismantling decrees between 2008 and 2010 (except for Chinon A1 and A2). Fuel removal and circuit draining have been completed for all these reactors, and dismantling operations are in process for the conventional and nuclear buildings in the periphery of the “reactor caissons”. Following the ASN’s decision of 2020, applications for dismantling permits will be submitted for all these reactors in 2022, to obtain new decrees allowing continuation of dismantling operations according to an “in-air” strategy. Opening of the top part of the first UNGG reactor caisson – Chinon A2 – is expected in 2033: the initial extractions of vessel internals and graphite blocks are due to start in 2040 and last 14 years. In parallel, the other UNGG sites are finalising their work to put the sites into a safe storage configuration (by 2035). A safe storage configuration state means that 80% of surfaces have been dismantled and the reactor caissons awaiting dismantling are safe: this will allow sufficient progress on the first reactor in this series to gain experience and ensure safety for the other five operations. Opening of the caissons after the first UNGG decommissioning is scheduled to take place in or after 2055;
- Creys Malville: this plant was shut down in 1998 and received its dismantling decree in 2006. The following key stages have been completed: removal of the fuel, dismantling of the machine room, drainage of the circuits, processing and elimination of the sodium used for cooling in all circuits, filling the reactor vessel, opening and extracting the vessel caps, and the start of dismantling of the core vessel cap (which weighs several hundred tonnes). The next stages are dismantling the vessel internals (due to be completed in 2026), electromechanical dismantling in the reactor building, then decontamination (dismantling should end in 2038);
- Brennilis: this plant was shut down in 1985 and received a partial dismantling decree in 2011 allowing dismantling of all installations peripheral to the "reactor block”. The following key stages have been completed: removal of the fuel, dismantling of the machine room, the fuel building, auxiliary buildings, heat exchangers and the effluent treatment station. The next stages are examination of the application for full dismantling authorisation, with a view to obtaining a dismantling decree in 2022 that would enable EDF to dismantle the reactor block (the end of these operations is currently forecast at 2040). The public inquiry began on 15 November as planned, and will last 7 weeks. The inquiry commissioner is expected to issue his opinion in mid-February 2022.

15.1.1.4 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 (“front-end” expenses);
- the cost of fuel processing, and waste removal and storage operations (“back-end” expenses). 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 provisions from the commissioning date and an asset associated with the provision is recognised. In a decision of 11 December 2020, France’s Council of State challenged the tax-deductibility of the consequences of immediate recognition of a provision for dismantling of the last core (“front-end” last core expenses) (see note 17.3.1).

In 2020 after the Fessenheim plant was definitively shut down, €99 million of the provision for last cores, concerning the two reactors at Fessenheim, was reversed with a corresponding reduction in the inventories of non-irradiated fuel in the reactor at the time of the shutdown, and in parallel, provisions for spent fuel management and long-term radioactive waste management were recognised for the cost of processing this fuel and storage of the waste that will result.

In 2021, apart from the effects of extending the depreciation period for 1300MW-series plants at 1 January 2021 (see note 1.4.1), there were few changes in provisions for last cores.

15.1.1.5 Discount rate, inflation and sensitivity analyses

Calculation of the discount rate and inflation rate

The methodologies used to determine the discount rate changed as follows from 31 December 2020:

The discount rate is based on an interest rate curve, which comprises a sovereign yield curve constructed on year-end market data for liquid horizons (OAT bond 0-20 year curve) and then converging, using an interpolation curve, towards the very long-term rate UFR (Ultimate Forward Rate) - with yields that become close to the UFR after 50 years – plus a curve of the spread of corporate bonds rated A to BBB. Based on the disbursements expected to meet nuclear obligations, a single equivalent discount rate is deduced by applying the discount rates from the interest rate curve constructed in this way to each flow as appropriate to its maturity. This single discount rate is then applied to the forecast disbursement schedules for the costs of the obligations, to determine the provisions.

The UFR was defined by the European Insurance and Occupational Pensions Authority (EIOPA) for very long-term insurance liabilities that will involve disbursements beyond market horizons. The UFR calculated for 2021 is 3.46%. This is used in the calculation methodology, in compliance with the decision by the French authorities, which in the ministerial order of 1 July 2020 amending the order of 21 March 2007 on secure financing of nuclear expenses (see below) changed the formula of the regulatory ceiling for the discount rate, such that it now refers to the UFR instead of the arithmetic 48-month average of the TEC 30-year rate. The UFR is considered more relevant for nuclear provisions in view of the very long-term maturities. The sovereign yield curve at 31 December 2021 indicates rates in a range of [-0.6%;0.6%] ([-0.6% ;0.2%] in 2020) for outflows between 0 and 20 years, [0.6% ;3.1%] ([0.2%;3.2%] in 2020) for outflows between 20 and 50 years, and a rate moving towards 3.46% (3.51%in 2020) for outflows after 50 years.

This change in calculation methodology for the discount rate provides the best assessment of the time value of money with regard to nuclear provisions, which are characterised by very long-term disbursement outflows, well beyond market horizons. This assessment is largely achieved through:

- use of an interest rate curve based on observed year-end market data with liquid horizons, converging over non-liquid horizons towards a very long-term rate with no cycle effect, i.e. yield data for all the maturities associated with nuclear provisions;
- use of a very long-term rate (calculated UFR) produced by an independent body and now adopted by the French authorities in setting the formula for regulatory ceiling, to take account of long trends in yield movements, in coherence with the distant disbursement horizon;
- references of the bond spread to include corporate bonds rated A to BBB by ratings agencies, in order to construct a robust spread curve since there are few AA-rated bonds, particularly on long maturities, whereas most “Investment Grade” bonds are BBB-rated bonds and the great majority of them have longer maturities.

The inflation assumption is based on an inflation curve constructed by reference to inflation-indexed market products and economic forecasts, in long-term coherence with the inflation assumption underlying the UFR (2%), which leads to an inflation assumption of 1.7% at 31 December up by 50 base points from 31 December 2020, particularly reflecting break-even inflation rates.

The discount rate determined is thus 3.7% at 31 December 2021, assuming inflation of 1.7% (3.3% - mainly relating to the sovereign yield curve – and 1.2% at 31 December 2020), i.e. a real discount rate of 2.0% at 31 December 2021 (2.1% at 31 December 2020).

Regulatory discount rate limit

The discount rate must comply with two regulatory limits. Under the decree of 1 July 2020 on secure financing for nuclear expenses (which codified and updated the initial decree of 23 February 2007 as part of the Environmental Code) and the ministerial order of 1 July 2020 on secure financing for nuclear expenses (which amended the initial ministerial order of 21 March 2007), it must be lower than:

- a regulatory maximum, expressed in real value, i.e. net of inflation; this value is equal to the unrounded value representative of expectations concerning the real long-term interest rate, as used for the calculation of the Ultimate Forward Rate (UFR) applicable at the date concerned published by the European Insurance and Occupational Pensions Authority (EIOPA), plus 150 bp. This maximum is applicable from 2024. Until 2024, the maximum is the weighted average of 2.3% and the above calculation. The weighting applied to the 2.3% rate is set at 50% for 2020, 25% for 2021, 12.5% for 2022 and 6.25% for 2023;
- and the expected rate of return on assets covering the liability (dedicated assets).

The maximum discount rate calculated by reference to the UFR in application of the order that took effect on 1 July 2020 is 2.80% at 31 December 2021 (2.66% at 31 December 2020).

The real discount rate used in the financial statements at 31 December 2021, calculated by the method presented above, is 2.0%.

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.

Provisions related to nuclear generation within the scope of the Law of 28 June 2006	31/12/2021		31/12/2020	
(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	16,121	10,683	18,998	10,246
- amount unrelated to the operating cycle	*3,282*	*1,726*	*2,727*	*1,297*
Long-term radioactive waste management	36,779	14,233	35,580	13,300
BACK-END NUCLEAR CYCLE EXPENSES	**52,900**	**24,916**	**54,578**	**23,546**
Decommissioning of nuclear plants in operation	20,479	12,680	19,693	12,775
Decommissioning of shut-down nuclear plants	7,718	5,050	7,400	4,714
Last cores	4,349	2,660	4,258	2,711
DECOMMISSIONING AND LAST CORE EXPENSES	**32,546**	**20,390**	**31,351**	**20,200**
PROVISIONS RELATED TO NUCLEAR GENERATION within the scope of the law of 28 June 2006		***45,306***		***43,746***

The cumulative disbursements of nuclear expenses (based on gross values at year-end economic conditions) are distributed as follows:

Provisions related to nuclear generation within the scope of the Law of 28 June 2006	31/12/2021		
	Costs based on year-end economic conditions		
(in millions of euros)	Disbursement expected within 10 years	Disbursement expected after 10 years[(1)]	Total
Spent fuel management	7,846	8,275	16,121
- amount unrelated to the operating cycle	*540*	*2,742*	*3,282*
Long-term radioactive waste management	5,116	31,663	36,779
BACK-END NUCLEAR CYCLE EXPENSES	**12,962**	**39,938**	**52,900**
Decommissioning of nuclear plants in operation	347	20,132	20,479
Decommissioning of shut-down nuclear plants	2,903	4,815	7,718
Last cores	262	4,087	4,349
DECOMMISSIONING AND LAST CORE EXPENSES	**3,512**	**29,034**	**32,546**

(1)Over a 20-year and 50-year horizon, 20% and 41% respectively of cumulative disbursements (at year-end economic conditions) will concern long-term radioactive waste management provisions, and 32% and 96% respectively will concern decommissioning provisions.

This approach can be complemented by estimating the impact of a change in the discount rate on the present value.

The following table reports these details for the main components of EDF's provisions for the back-end of the nuclear cycle, decommissioning of nuclear plants and last cores:

At 31 December 2021

(in millions of euros)	Amounts in provisions at present value	Sensitivity to discount rate			
		Balance sheet provisions		Pre-tax net income	
		+ 0.10%	- 0.10%	+ 0.10%	- 0,10 %
Back-end nuclear cycle expenses:					
- spent fuel management	11,819	(120)	124	102	(107)
- long-term radioactive waste management	14,233	(472)	504	385	(413)
Decommissioning and last core expenses:					
- decommissioning of nuclear plants in operation	12,680	(291)	299	-	-
- decommissioning of shut-down nuclear plants	5,050	(88)	91	88	(91)
- last cores	2,660	(54)	55	-	-
TOTAL	**46,442**	**(1,025)**	**1,073**	**575**	**(611)**
Amount covered by dedicated assets	***34,276***	***(917)***	***963***	***515***	***(548)***

15.1.2 EDF's dedicated assets

15.1.2.1 Regulations

Articles L. 594-1 and following of France's Environment Code and their 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 in France's Environment Code.

The Decree of 1 July 2020 codified the regulatory obligations concerning dedicated assets in articles D594-1 and following of the Environment Code, complemented by the ministerial order of 21 March 2007 amended by the order of 1 July 2020. These documents define the list of eligible assets, which is largely based on France's Insurance Code and mainly includes unlisted assets. In particular, they authorise allocation to dedicated assets of the shares of CTE, which has held 100% of the capital of RTE since 31 December 2017 (see note 15.1.2.2 below).

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).

Since the decree of 1 July 2020, EDF is no longer obliged to add to dedicated assets when the coverage rate of obligations, determined by the ratio of the assets' realisable value to the amount of the provisions concerned, is above 100%, and withdrawals from assets are not authorised unless that rate is above 120%. The decree also increased the maximum period for allocating funds to dedicated assets in the event of undercoverage, subject to authorisation by the administrative authority, to 5 years (instead of 3 years previously).

15.1.2.2 Strategic allocation and composition of dedicated assets

Given the regulations governing dedicated assets, they form 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.

Several changes have been made to this strategic allocation in order to pursue the diversification into unlisted assets, particularly in 2010 when the shares in RTE (now held *via* CTE) were allocated to dedicated assets, and in 2013 when an unlisted asset portfolio (consisting of infrastructures, real estate and debt or equity funds) was set up. This portfolio is managed by EDF SA's "EDF Invest" Division.

On 29 June 2018 the Board of Directors validated the principle of 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 by 2025.

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 and French general-purpose investment funds (FIVGs), managed by independent asset management companies. They take the form of open-end funds and "reserved" funds located in France, established for the company. The reserved funds are owned by EDF and are not consolidated as EDF does not participate in management of these funds and provides no financial support for them.

The value of the assets of the reserved investment funds amounts to €13,106 million at 31 December 2021 (€10,422 million at 31 December 2020). These funds mainly consist of 16 listed funds with total value of €12,153 million (at 31 December 2020, 13 listed funds with total value of €9,742 million).

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.

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 mainly managed by EDF Invest (see yield assets below).

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).

Yield assets

The yield assets managed by EDF Invest consist mainly of assets related to investments in infrastructures and real estate, made either directly by EDF Invest or by investment funds under delegated management arrangements.

Through unlisted investment funds, EDF Invest also manages growth assets and fixed-income assets.

At 31 December 2021, the assets managed by EDF Invest represent a total realisable value of €8,626 million, including €7,908 million of yield assets. Yield assets particularly include:

- 50,1% of the Group's shares in CTE, amounting to €3 343 million at 31 December 2021 (€2,788 million at 31 December 2020), presented in investments in associates in the consolidated balance sheet;
- the Group's investments in Madrileña Red de Gas (MRG), Géosel, Thyssengas, Aéroports de la Côte d'Azur, Energy Assets Group, Nam Theun Power Company, companies that own wind and solar power plants (in the United States, Canada, and the United Kingdom) and companies that own real estate assets (Central Sicaf, Ecowest, Korian & Partenaires Immobilier, Issy Shift, 92 France), presented in investments in associates in the consolidated balance sheet;
- the Group's investments in Teréga, Porterbrook, Autostrade per l'Italia, Q-Park and companies that own wind farms in the United Kingdom, presented in debt and equity securities in the consolidated balance sheet.

15.1.2.3 Changes in dedicated assets in 2021

As the coverage of provisions by dedicated assets was above 100% at 31 December 2020 (103.6%), EDF had no obligation to add to the dedicated asset portfolio in 2021, and no allocation was made in 2021 (compared to allocations of €797 million in 2020 in compliance with EDF's regulatory obligation for 2020). The coverage rate of provisions at

31 December 2021 is 109.3%.

2021 was another extremely favourable year on the equity markets. The economic environment remained very dynamic despite concerns triggered by the emergence of several variants of the Covid-19 virus. Vaccination campaigns in the developed countries limited the pandemic's impact on economic activity and contributed to the equity market performance.

Equity indexes rose significantly over the year, driven by a very good performance on the US market, then the European market, while other zones were less dynamic. More unusually, the biggest rises were registered by mega-caps, which progressed in all zones except the emerging countries.

As the economy recovered, the bond markets suffered due to rising rates. German 10-year rates, for example, rose by +0.4% to -0.2% and American rates rose by +0.6% to 1.5%. However, this rise remained moderate compared to the increase in inflation. The central banks still managed to reassure the markets by stressing that this development was temporary, which meant that monetary support policies would only be withdrawn gradually.

EDF Invest continued to extend its portfolio of unlisted assets in smart meters *via* an additional investment in Energy Assets Group in the United Kingdom (the percentage ownership remains unchanged), in the French telecommunications sector *via* acquisition of a minority shareholding (as part of a consortium) in the fibre optics operator Orange Concessions, in real estate in France and Germany *via* acquisition of minority shareholdings and shares in diversified unlisted investment funds.

Positive changes in the fair value of the dedicated asset portfolio (investment funds, equities) amounting to €2,739 million were recognised in the financial result in 2021 (see note 8.3), compared to positive changes amounting to €1,218 million in 2020.

Negative changes in the fair value of the bonds in the dedicated asset portfolio amounting to €(244) million were recognised in OCI in 2021 (see note 18.1.2), compared to positive changes amounting to €62 million in 2020.

Withdrawals from dedicated assets in 2021 totalled €389 million, equivalent to payments made in respect of the long-term nuclear obligations to be covered during the year (€431 million in 2020).

15.1.2.4 Valuation of EDF's dedicated assets

EDF's dedicated assets are included in the Group's consolidated financial statements at the following values:

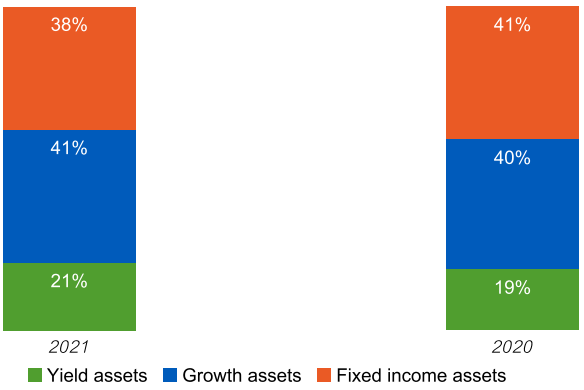
(in millions of euros)	Consolidated balance sheet presentation	31/12/2021		31/12/2020	
		Book value	Realisable value	Book value	Realisable value
Yield assets (EDF Invest)		**5,626**	**7,908**	**4,677**	**6,420**
CTE	Investments in associates[1]	1,478	3,343	1,378	2,788
Other associates	Investments in associates[2]	2,567	2,923	1,974	2,252
Other unlisted assets	Debt and equity securities and other net assets[3]	1,581	1,642	1,309	1,364
Derivatives	Fair value of derivatives	-	-	16	16
Growth assets		**15,320**	**15,320**	**13,692**	**13,692**
Equities (investment funds)	Debt securities	14,815	14,815	13,174	13,174
Unlisted equity funds (EDF Invest)	Debt securities	519	519	330	330
Derivatives	Fair value of derivatives	(14)	(14)	188	188
Fixed-income assets		**14,226**	**14,226**	**13,736**	**13,736**
Bonds	Debt securities	13,007	13,007	12,371	12,371
Unlisted debt funds (EDF Invest)	Debt securities	199	199	155	155
Cash portfolio	Debt securities	1,016	1,016	1,185	1,185
Derivatives	Fair value of derivatives	4	4	25	25
TOTAL EDF DEDICATED ASSETS		**35,172**	**37,454**	**32,105**	**33,848**

[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 €1,457 million and the value of the share in equity of other controlled companies.

The structure of the dedicated asset portfolio in 2021 and 2020 is as follows (in realisable value):



15.1.3 Coverage of EDF's long-term nuclear obligations

The Group's long-term nuclear obligations in France concerned by the regulations for dedicated assets related to nuclear generation are included in the EDF group's consolidated financial statements at the following values:

(in millions of euros)	31/12/2021	31/12/2020
Provisions for spent fuel management – portion unrelated to the operating cycle as defined in the regulations	1,726	1,297
Provisions for long-term radioactive waste management	14,233	13,300
Provisions for nuclear plant decommissioning	17,730	17,489
Provisions for last cores – portion for future long-term radioactive waste management	587	590
PRESENT COST OF LONG-TERM NUCLEAR OBLIGATIONS	**34,276**	**32,676**
REALISABLE VALUE OF DEDICATED ASSETS	**37,454**	**33,848**
REGULATORY COVERAGE RATE	**109.3%**	**103.6%**

At 31 December 2021, by the regulatory calculations provisions are 109.3% covered by dedicated assets. The potential regulatory caps on the realisable value of certain investments set in the Environment Code were not applicable at 31 December 2021.

At 31 December 2020, by the regulatory calculations provisions were 103.6% covered by dedicated assets. Again, the regulatory caps were not applicable.

15.2 EDF ENERGY'S NUCLEAR PROVISIONS

The specific financing terms for long-term nuclear commitments 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 €17,889 million at 31 December 2021;
- in the assets, EDF Energy reports receivables corresponding to the amounts payable under the restructuring agreements by the Nuclear Liabilities Fund (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 18.1.3) at the amount of €15,986 million at 31 December 2021 (€13,034 million at 31 December 2020).

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)	31/12/2020	Increases	Decreases	Discount effect	Translation adjustments	Other movements	31/12/2021
Provisions for spent fuel management	1,286	20	(188)	96	90	97	1,401
Provisions for waste removal and conditioning	546	4	-	38	39	12	639
Provisions for long-term radioactive waste managemen	1,106	6	-	78	82	143	1,415
Provisions for the back-end of the nuclear cycle	**2,938**	**30**	**(188)**	**212**	**211**	**252**	**3,455**
Provisions for nuclear plant decommissioning	10,170	-	(242)	739	750	1,178	12,595
Provisions for last cores	2,172	-	(341)	17	141	(150)	1,839
Provisions for decommissioning and last cores	**12,342**	**-**	**(583)**	**756**	**891**	**1,028**	**14,434**
PROVISIONS RELATED TO NUCLEAR GENERATION	**15,280**	**30**	**(771)**	**968**	**1,102**	**1,280**	**17,889**

"Other movements" include the changes in nuclear liabilities with a corresponding adjustment in the amount of reimbursements receivable from the NLF and the British government, and the change in the provision for last cores *via* an adjustment to fixed assets.

The overall change of the "other movements" regarding Provisions for decommissioning for an amount of €1.2 billions mainly results from the unexpected early end of generation at Dungeness B in June 2021 (see note 15.2.3).

15.2.1 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 in order to stabilise British Energy's financial position. These agreements were amended and restated on 5 January 2009 as part of the acquisition of the British Energy Generation Limited by the Group. 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 €101 million at 31 December 2021;
- £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.

On 23 June 2021 EDF and the UK government signed an update to the Restructuring Agreements. The changes and clarifications to the Agreements confirm the recovery of qualifying costs and stipulate that once the AGR stations have finished defueling under EDF Energy responsibility, they will transfer to the NDA which will be responsible for subsequent decommissioning activities. These amended agreements have no consequences in the Group financial statements at 31 December 2021.

In addition, in early 2020 EDF Energy carried out phase 1 of the Decommissioning Plan Submission (DPS 20) which was an update to the defueling liability. This phase of the DPS 20 was approved by the NDA in June 2021.

In November 2021, EDF Energy submitted Integrated Plan (IP) 22 to the Non-Nuclear Liabilities Assurance team (NLA) which updated the defueling cost estimates submitted in 2020. This was approved in December 2021.

In February 2022, EDF Energy will submit phase 2 of the Decommissioning plan submission (DPS 21) to the NLA. The DPS 21 will include updates for all the other decommissioning activities for the AGR plants, decommissioning of Sizewell B and an update to the Uncontracted Liability Discharge Plan (UCLDP).

15.2.2 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 the AGR 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.

	31/12/2021		31/12/2020	
(in millions of euros)	Costs based on year-end economic conditions[(1)]	Amounts in provisions at present value	Costs based on year-end economic conditions[(1)]	Amounts in provisions at present value
Spent fuel management	2,725	1,401	2,318	1,286
Waste removal and conditioning	2,154	639	1,875	546
Long-term radioactive waste management	5,126	1,415	3,724	1,106
BACK-END NUCLEAR CYCLE EXPENSES	**10,005**	**3,455**	**7,917**	**2,938**

(1)The costs based on year-end economic conditions include spent fuel and associated waste management over the operating life of the reactors (including future load fuel for Sizewell B only); the provisions are based on the fuel committed to date.

15.2.3 Provisions for nuclear plant decommissioning

Provisions for decommissioning of nuclear plants 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, the Restructuring Agreements updated in June 2021 provide that once the AGR power plants have finished defueling that they will transfer to the NDA for subsequent decommissioning activities.

The signature of these agreements has no immediate accounting consequences for decommissioning provisions or the receivable representing reimbursements to be made by the NLF and the UK government. Nuclear decommissioning liabilities and the associated assets will be derecognised during the agreement's operational implementation phase.

In early 2020, EDF Energy submitted phase 1 of the decommissioning plan submission (DPS 20) which was an update to the defueling liability. This led to a €1.9 billion increase in the provision at 31 December 2019, 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. This phase of the DPS 20 was approved by the NDA in June 2021.

In November 2021, EDF Energy submitted Integrated Plan (IP) 22 to the NLA which updated the defueling cost estimates. The updated cost estimate represents an increase of €0.9 billion in the provision compared to 2020. This increase is mainly explained by the unexpected early end of generation at Dungeness B in June 2021, previously expected to be 2028, leading in particular to a longer defueling duration (and hence an increase in costs) due to the unplanned nature of this

shutdown.

Furthermore, in 2021 EDF Energy updated the cost estimates relating to phase 2 of the decommissioning plan submission (DPS 21) which includes the other decommissioning activities for the AGR plants, decommissioning of Sizewell B and an update to the Uncontracted Liability Discharge Plan. The updated cost estimate represents an increase in the provision of €0.2 billion which includes the upward effects of the unexpected early end of generation at Dungeness (previously planned for 2028) and the new assumptions regarding the closure of Heysham 2 and Torness AGR plants, scheduled for 2028 (previously 2030), as well as the downward effect of extension of the depreciation period of Sizewell B (PWR plant) at December 31, 2021. P hase 2 will be submitted to the NLA at the end of February 2022.

	31/12/2021		31/12/2020	
(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	19,864	12,494	18,175	10,069

15.2.4 Discounting of EDF Energy's provisions related to nuclear generation

The method used to determine the discount rate changed as follows from 31 December 2020:

- Like the discount rate for nuclear provisions in France, the discount rate for EDF Energy's provisions is now based on an interest rate curve, which comprises a sovereign yield curve constructed on year-end market data for liquid horizons (UK gilt 0-20 year yield) and then converging, using an interpolation curve, towards the very long-term rate UFR (Ultimate Forward Rate) plus a curve of the spread of corporate bonds rated A to BBB. Based on expected disbursements corresponding to nuclear obligations, a single equivalent discount rate is deduced from the curve constructed in this way. This single discount rate is then applied to the forecast disbursement schedules for the costs of the obligations, to determine the provisions.
- The inflation assumption is based on an inflation curve constructed by reference to economic forecasts and inflation-indexed market products, in long-term coherence with the inflation assumption underlying the UFR (2%).

Determined under this method, the real discount rate for calculation of all EDF Energy's nuclear provisions is unchanged overall. In particular, the real discount rate used to calculate provisions for the back-end of the nuclear cycle and decommissioning of nuclear plants is 1.9%, the same as at 31 December 2020.

15.3 NUCLEAR PROVISIONS IN BELGIUM

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 €272 million at 31 December 2021 (€265 million at 31 December 2020);
- 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 18.1.3) at the value of €282 million at 31 December 2021 (€263 million at 31 December 2020). 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.

Other provisions related to nuclear generation in Belgium correspond to liabilities covered by provisions that are not part of the mechanisms described above.

NOTE 16 PROVISIONS FOR EMPLOYEE BENEFITS

Accounting principles and methods

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.

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.

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.

French entities covered by the IEG system

Entities belonging to the specific IEG (electricity and gas) sector system, namely EDF, Enedis, 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.

After the financing reform for the IEG sector system took effect on 1 January 2005 (law of 9 August 2004), pension provisions were recognised by IEG companies 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 the system affiliation 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 (which mainly depends on the marginal production cost and taxes). 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.

French and foreign subsidiaries not covered by the special IEG system

Regarding pension obligations in the United Kingdom, EDF Energy had three principal defined-benefit pension plans at 1 January 2021:

- the British Energy Generation Group (BEGG) plan, of which the majority of members are current or retired employees of the Nuclear Generation business. The BEGG plan was closed to new members in August 2012;
- the EDF Energy Generation and Supply Group (EEGSG) plan, 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 remained open to new employees until 1 January 2021.

From 30 June or 31 Décember 2021, depending on the option chosen, employees were transferred from the EEGSG, EEPS and BEGG defined-benefit plans to their replacement, a new defined-contribution plan called "my Retirement Plan" and the old plans were closed.

The closed plans were merged into a single plan called "EDF Group of the ESPS" (EDFG). This plan will remain in force for rights vested up to the closing date of the previous plans. The corresponding obligations will be adjusted for changes in discount and inflation rates, but will no longer be affected by new members or wage increases.

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

16.1 GROUP PROVISIONS FOR EMPLOYEE BENEFITS

(in millions of euros)	31/12/2021	31/12/2020
Provisions for employee benefits – current portion	792	879
Provisions for employee benefits – non-current portion	21,716	22,130
PROVISIONS FOR EMPLOYEE BENEFITS	**22,508**	**23,009**

16.1.1 Breakdown of the change in the provision by geographical area: obligations, fund assets, net liability

(in millions of euros)	France[1]	United Kingdom	Other	Total
Obligations at 31/12/2020	**35,489**	**10,117**	**952**	**46,558**
Net expense for 2021	1,237	356	40	1,633
Actuarial gains and losses	110	(356)	7	(239)
Employer's contributions to funds	-	-	-	-
Employees' contributions to funds	-	3	1	4
Benefits paid[2]	(1,336)	(408)	(28)	(1,772)
Changes in scope of consolidation	-	-	(57)	(57)
Translation adjustment	-	698	-	698
Other movements[4]	(64)	-	(5)	(69)
Obligations at 31/12/2021	**35,436**	**10,410**	**910**	**46,756**

(in millions of euros)	France[1]	United Kingdom	Other	Total
Fund assets at 31/12/2020	**(13,470)**	**(11,406)**	**(398)**	**(25,274)**
Net expense for 2021	(119)	(196)	(4)	(319)
Actuarial gains and losses	(287)	(859)	(22)	(1,168)
Employer's contributions to funds	-	(247)	(26)	(273)
Employees' contributions to funds	-	(3)	(1)	(4)
Benefits paid	465	408	7	880
Changes in scope of consolidation	-	-	(2)	(2)
Translation adjustment	-	(821)	-	(821)
Fund assets at 31/12/2021	**(13,411)**	**(13,124)**	**(446)**	**(26,981)**

(in millions of euros)	France[1]	United Kingdom	Other	Total
Net employee benefit liability at 31/12/2020[2]	**22,019**	**(1,289)**	**554**	**21,284**
Net expense for 2021	1,118	160	36	1 314
Actuarial gains and losses	(177)	(1,215)	(15)	(1,407)
Employer's contributions to funds	-	(247)	(26)	(273)
Employees' contributions to funds	-	-	-	-
Benefits paid	(871)	-	(21)	(892)
Changes in scope of consolidation	-	-	(59)	(59)
Translation adjustment	-	(123)	-	(123)
Other movements[4]	(64)	-	(5)	(69)
Net employee benefit liability at 31/12/2021	**22,025**	**(2,714)**	**464**	**19,775**
Including:				
Provisions for employee benefits				*22,508*
Non-current financial assets[3]				*(2,733)*

[1]France comprises the two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 16.2).
[2]The net liability at 31 December 2020 comprised €23,009 million for the provisions for employee benefits and €(1,725) million of non-current financial assets, giving a net liability amount of €21,284 million.
[3]At 31 December 2021, EDF Energy recognised surplus funding on its EDFG pension scheme.
[4]Including €(67) million relating to the change in the method for attribution of benefits (see note 1.2.3).

Actuarial gains and losses on obligations in 2021

Actuarial gains and losses on obligations amount to €(239) million for 2021, including:

- €110 million in France as a result of:
  - the €(3,099) million change in the discount rate,
  - the €(540) million change in experience adjustments,
  - the €151 million change in the ARRCO-AGIRC agreement,
  - the €3,598 million change in the inflation rate;
- €(356) million in the United Kingdom, essentially associated with changes in the discount and inflation rates (see note 16.1.2).

Actuarial gains and losses on obligations amount to €3,293 million for 2020, including:

- €2,356 million in France as a result of:
  - the €2,695 million change in the discount rate;
  - the €(604) million change in the inflation rate;
- €896 million in the United Kingdom, essentially associated with changes in the discount and inflation rates.

Actuarial gains and losses on fund assets in 2021

Actuarial gains and losses on fund assets amount to €(1,168) million for 2021. They mainly result from a €(859) million change in the United Kingdom and a €(287) million change in France due to a very good performance on the bond markets.

Net employee benefit liability at 31 December 2021

The net liability at 31 December 2021 amounted to €19,775 million, including:

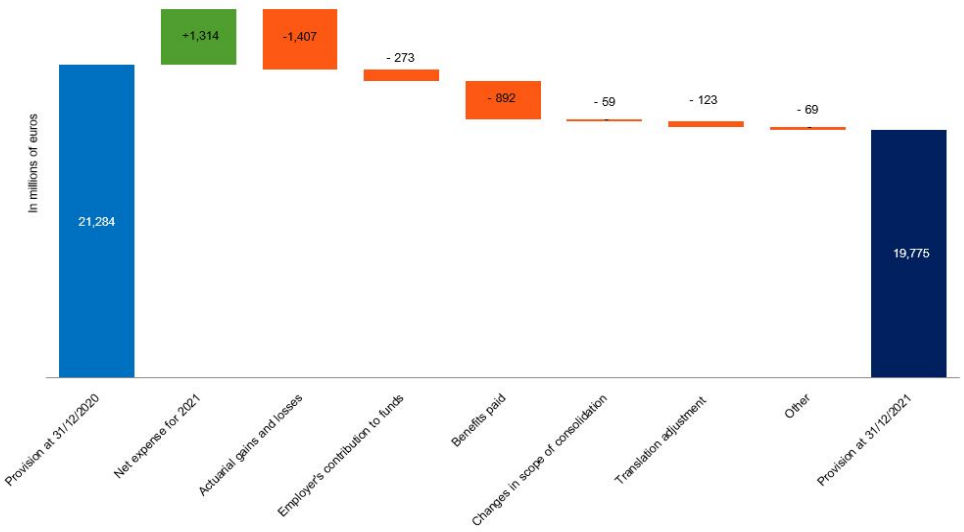
- €22,025 million in France;
- €(2,714) million in the United Kingdom, reflecting recognition by EDF Energy of surplus funding on its EDFG pension scheme (as explained in the accounting principles and methods below), totalling €2,733 million compared to €1,725 million at 31 December 2020. This surplus funding, which increased due to the good performance by fund assets, is recognised in balance sheet assets under “non-current financial assets".

Developments in the United Kingdom

Following the closure of the EEGSG, EEPS and BEGG defined-benefit pension plans and their replacement by a new defined-contribution plan (see “Accounting principles and methods” above) at 31 December 2021, restatement of this plan at 31 December 2021 led to a €35 million decrease in pension obligations due to the lower past service cost, recognised in “Personnel expenses”.

Employees were granted a transition bonus in connection with this change, recognised in "Personnel expenses" at the amount of €(82) million.

Changes in the net liability in 2021 were as follows:



16.1.2 Actuarial assumptions and sensitivity analyses

The following actuarial assumptions are used:

	France		United Kingdom	
(in %)	31/12/2021	31/12/2020	31/12/2021	31/12/2020
Discount rate/rate of return on assets[1]	1.30%	0.90%	1.90%	1.45%
Inflation rate	1.70%	1.20%	2.95%	2.53%
Wage increase rate[2]	2.80%	2.30%	2.70%	2.37%

[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 increase in the discount rate essentially relates to the increase in risk-free rates observed in 2021.

Changes in the economic and market parameters used have led the Group to set the nominal discount rate at 1.30% at 31 December 2021 (0.90% at 31 December 2020).

The inflation assumption is based on an inflation curve constructed from economic forecasts and inflation-indexed market products.

As a result of changes in the economic and market parameters, the assumed average inflation rate used as the Group's benchmark for Euro zone countries is 1.70% at 31 December 2020 (1.2% at 31 December 2020).

The wage law used to calculate obligations refers to wage increases observed over the period 2015-2018 (adjusted for non-recurring effects), which are comparable to the wage increases observed in the last two years.

The mortality table used to calculate obligations is based on the INSEE 2013-2070 generation table (produced by the French statistics office), corrected for differences in mortality between the general French population and the population covered by the IEG regime.

In the United Kingdom, 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.

Sensitivity analyses on the amount of the obligations are as follows:

	31/12/2021	
(in millions of euros)	France	United Kingdom
Impact of a 25bp increase or decrease in the discount rate	(1,785) / 1,939	(545) / 614
Impact of a 25bp increase or decrease in the inflation rate	1,826 / (1691)	552 / (492)
Impact of a 25bp increase or decrease in the wage increase rate	1,844 / (1,721)	n.a.

n.a. : not applicable.

16.1.3 Breakdown by geographical area of post-employment and other long-term employee benefits

(in millions of euros)	2021 France	2021 United Kingdom	2021 Other	2021 Total
Current service cost	(793)	(223)	(25)	(1,041)
Past service cost	-	35	-	35
Actuarial gains and losses – other long-term benefits	(123)	-	(6)	(129)
Net expenses recorded as operating expenses	**(916)**	**(188)**	**(31)**	**(1,135)**
Interest expense (discount effect)	(321)	(168)	(9)	(498)
Return on fund assets	119	196	4	319
Net interest expense included in financial result	**(202)**	**28**	**(5)**	**(179)**
EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT	**(1,118)**	**(160)**	**(36)**	**(1,314)**
Actuarial gains and losses – post-employment benefits	(110)	356	(7)	239
Actuarial gains and losses on fund assets	287	859	22	1,168
Actuarial gains and losses	**177**	**1,215**	**15**	**1,407**
Translation adjustments	**-**	**123**	**-**	**123**
GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY	**177**	**1,338**	**15**	**1,530**

(in millions of euros)	2020 France	2020 United Kingdom	2020 Other	2020 Total
Current service cost	(663)	(262)	(28)	(953)
Past service cost	-	-	-	-
Actuarial gains and losses – other long-term benefits	(146)	-	-	(146)
Net expenses recorded as operating expenses	**(809)**	**(262)**	**(28)**	**(1,099)**
Interest expense (discount effect)	(432)	(194)	(11)	(637)
Return on fund assets	160	215	3	378
Net interest expense included in financial result	**(272)**	**21**	**(8)**	**(259)**
EMPLOYEE BENEFIT EXPENSES RECORDED IN THE INCOME STATEMENT	**(1,081)**	**(241)**	**(36)**	**(1,358)**
Actuarial gains and losses – post-employment benefits	(2,356)	(896)	(41)	(3,293)
Actuarial gains and losses on fund assets	1,204	1,179	7	2,390
Actuarial gains and losses	**(1,152)**	**283**	**(35)**	**(903)**
Translation adjustments	**-**	**(58)**	**1**	**(57)**
GAINS AND LOSSES ON EMPLOYEE BENEFITS RECORDED DIRECTLY IN EQUITY	**(1,152)**	**225**	**(34)**	**(960)**

In 2021, actuarial gains and losses on post-employment benefits and other long-term employee benefits recognised in profit and loss amount to €110 million (€(129) million for long-term employee benefits and €239 million for post-employment benefit obligations), including:

- €356 million in the United Kingdom;
- €(233) million in France (€(123) million for long-term employee benefits and €(110) million for post-employment benefit obligations). These actuarial gains and losses relate to changes in the discount rate, the inflation rate and experience adjustments (see note 16.1.2 and the table below).

The actuarial gains and losses on obligations generated over 2020 amount to €(2,502) million in France and are mainly associated with changes in the discount rate, the inflation rate and experience adjustments.

The actuarial gains and losses on obligations in France are as follow:

(in millions of euros)	2021	2020
Experience adjustments	437	(355)
Changes in demographic assumptions	1	-
Changes in financial assumptions [1]	(671)	(2,147)
ACTUARIAL GAINS AND LOSSES ON OBLIGATIONS	**(233)**	**(2,502)**
Including:		
Actuarial gains and losses on post-employment benefits	*(110)*	*(2,356)*
Actuarial gains and losses on other long-term benefits	*(123)*	*(146)*

[1] Financial assumptions mainly concern the discount rate, inflation rate and wage increase rate.

16.2 FRANCE (REGULATED ACTIVITIES, AND GENERATION AND SUPPLY)

The two operating segments "France – Generation and Supply" and "France – Regulated activities" (see note 4.1) 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.

16.2.1 Breakdown of obligations by type of beneficiary

(in millions of euros)	31/12/2021	31/12/2020
Current employees	18,463	20,477
Retirees	16,973	15,012
OBLIGATIONS	**35,436**	**35,489**

16.2.2 Provision for employee benefits by nature

At 31 December 2021

(in millions of euros)	Obligations	Fund assets	Provisions in the balance sheet
Provisions for post-employment benefits at 31/12/2021	**33,813**	**(13,411)**	**20,402**
Including:			
Pensions [1]	26,196	(12,620)	13,576
Benefits in kind (electricity/gas)	4,925	-	4,925
Retirement gratuities	897	(776)	121
Other	1,795	(15)	1,780
Provisions for other long-term employee benefits at 31/12/2021	**1,623**	**-**	**1,623**
Including:			
Annuities following work-related accident and illness, and invalidity	1,362	-	1,362
Long service awards	230	-	230
Other	31	-	31
PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2021	**35,436**	**(13,411)**	**22,025**

(1) Mainly EDF SA's fund assets (53% of pension obligations were covered by funds at 31 December 2021).

At 31 December 2020

(in millions of euros)	Obligations	Fund assets	Provisions in the balance sheet
Provisions for post-employment benefits at 31/12/2020	**33,893**	**(13,470)**	**20,423**
Including:			
Pensions [1]	25,951	(12,671)	13,280
Benefits in kind (electricity/gas)	5,294	-	5,294
Retirement gratuities	941	(784)	157
Other	1,707	(15)	1,692
Provisions for other long-term employee benefits at 31/12/2020	**1,596**	**-**	**1,596**
Including:			
Annuities following work-related accident and illness, and invalidity	1,339	-	1,339
Long service award	225	-	225
Other	32	-	32
PROVISIONS FOR EMPLOYEE BENEFITS AT 31/12/2020	**35,489**	**(13,470)**	**22,019**

(1) Mainly EDF SA's fund assets (53% of pension obligations were covered by funds at 31 December 2020).

16.2.3 Fund assets

For France, fund assets, managed under an asset/liability model, amount to €13,411 million at 31 December 2021 (€13,470 million at 31 December 2020) 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:

- 67% in a hedging pocket consisting of bonds, designed to replicate variations in the obligation caused by changes in interest rates;
- 33% in a growth asset pocket consisting of international equities.

Fund assets break down as follows:

(in millions of euros)	31/12/2021	31/12/2020
FUND ASSETS	**13,411**	**13,470**
Assets funding special pension benefits	**12,620**	**12,671**
Including (%)		
Listed equity instruments (shares)	33%	34%
Listed debt instruments (bonds)	67%	66%
Assets funding retirement gratuities	**776**	**784**
Including (%)		
Listed equity instruments (shares)	33%	37%
Listed debt instruments (bonds)	67%	63%
Other fund assets	**15**	**15**

At 31 December 2021, the equities held as part of fund assets are distributed as follows:

- approximately 64% of the total are shares in North American companies;
- approximately 19% of the total are shares in European companies;
- approximately 17% 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 2020.

At 31 December 2021, the bonds held as part of fund assets are distributed as follows:

- approximately 63% of the total are AAA and AA-rated bonds;
- approximately 37% of the total are bonds with A, BBB and other ratings.

Around 64% 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 + 3% in 2021.

16.2.4 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	1,305	1,297
One to five years	4,402	4,221
Five to ten years	5,171	4,626
More than ten years	41,036	25,292
CASH FLOWS RELATED TO EMPLOYEE BENEFITS	**51,914**	**35,436**

At 31 December 2021, the average duration of employee benefit commitments in France is 21.5 years.

16.3 UNITED KINGDOM

The United Kingdom segment chiefly comprises EDF Energy.

16.3.1 Breakdown of obligations by type of beneficiary

(in millions of euros)	31/12/2021	31/12/2020
Current employees	5,837	5,702
Retirees	4,573	4,415
OBLIGATIONS	**10,410**	**10,117**

16.3.2 Fund assets

Pension obligations in the United Kingdom are partly covered by the external fund EDFG which resulted from the merger at 31 December 2021 of the three funds BEGG, EEGSG et EEPS and has a present value of €13,124 million at 31 December 2021 (€11,406 million at 31 December 2020).

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)	31/12/2021	31/12/2020
BEGG pension fund[(1)]	n.a.	8,585
EEGSG pension fund[(1)]	n.a.	1,585
EEPS pension fund[(1)]	n.a.	1,236
EDFG pension fund[(1)]	13,124	n.a.
FUND ASSETS	**13 124**	**11,406**
Including (%)		
Listed equity instruments (shares)	10%	11%
Listed debt instruments (bonds)	60%	61%
Real estate properties	5%	6%
Cash and cash equivalents	5%	4%
Other	20%	18%

n.a. : not applicable.

(1) In 2021, these three plans were closed and merged into a single plan called "EDF Group of the ESPS" (EDFG).

At 31 December 2021, the equities held as part of fund assets are distributed as follows:

- approximately 58% of the total are shares in North American companies;
- approximately 21% of the total are shares in European companies;
- approximately 21% of the total are shares in companies in the Asia-Pacific zone and emerging countries.

At 31 December 2021, the bonds held as part of fund assets are distributed as follows:

- approximately 76% of the total are AAA and AA-rated bonds;
- approximately 24% of the total are bonds with A, BBB and other ratings.

Around 76% 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 5 percentage points higher than at 31 December 2020.

16.3.3 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	428	416
One to five years	1,847	1,769
Five to ten years	2,598	2,289
More than ten years	11,135	5,936
CASH FLOWS RELATED TO EMPLOYEE BENEFITS	**16,008**	**10,410**

The average weighted duration of funds in the United Kingdom is 23.3 years at 31 December 2021.

NOTE 17 OTHER PROVISIONS AND CONTINGENT LIABILITIES

		31/12/2021			31/12/2020		
(in millions of euros)	Notes	Current	Non-current	Total	Current	Non-current	Total
Other provisions for decommissioning	17.1	95	1,872	**1,967**	120	1,744	**1,864**
Other provisions	17.2	3,245	3,570	**6,815**	2,675	3,630	**6,305**
OTHER PROVISIONS		**3,340**	**5,442**	**8,782**	**2,795**	**5,374**	**8,169**

17.1 OTHER PROVISIONS FOR DECOMMISSIONING

The breakdown by company is as follows:

(in millions of euros)	EDF	EDF Energy	Edison	Framatome	Other	Total
OTHER PROVISIONS FOR DECOMMISSIONING AT 31/12/2021	**770**	**123**	**188**	**443**	**443**	**1,967**
Other provisions for decommissioning at 31/12/2020	**772**	**128**	**172**	**412**	**380**	**1,864**

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 2021 reflects the most recent known cost estimates and includes rehabilitation costs for generation sites.

Provisions for decommissioning notably include €161 million for Basic nuclear facilities (INB) in France, in the amounts of €97 million for Framatome and €64 million for Cyclife France. Dedicated assets have been set aside to cover these provisions as required by the regulations.

Dedicated assets of Framatome and Cyclife France

The dedicated assets of Framatome and Cyclife France (formerly SOCODEI) relating to Basic nuclear facilities (INB) in France have realisable values of €109 million in Framatome and €63 million in Cyclife France and the degree of coverage of provisions according to the regulations is 111% for Framatome and 98% for Cyclife France (by administrative prescription of 22 November 2021, Cyclife must by the 2022 year-end return to a coverage ratio of at least 100%).

17.2 OTHER PROVISIONS

Details of changes in other provisions are as follows:

(in millions of euros)	31/12/2020	Increases	Decreases		Changes in scope	Other changes[1]	31/12/2021
			Utilisations	Reversals			
Provisions for contingencies related to subsidiaries and investments	**801**	236	(465)	-	-	13	**585**
Provisions for tax liabilities (excluding income tax)	**166**	3	(55)	(2)	(1)	1	**112**
Provisions for litigation	**392**	68	(50)	(88)	1	4	**327**
Provisions for onerous contracts and losses on completion	**1,890**	267	(156)	(354)	1	3	**1,651**
Provisions related to environmental schemes	**1,192**	1,957	(1,578)	(8)	-	9	**1,572**
Other provisions for contingencies and losses	**1,864**	1,343	(549)	(163)	2	71	**2,568**
TOTAL	**6,305**	**3,874**	**(2,853)**	**(615)**	**3**	**101**	**6,815**

[1] *Other changes principally concern foreign exchange effects resulting from the rise of the pound sterling against the euro.*

Provision for onerous contracts

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 supplied;
- 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.

Provisions for onerous contracts are mainly attributable to the Group's LNG activities (long-term LNG purchase contracts and a long-term regasification contract with Dunkerque LNG).

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 related to environmental schemes

Provisions related to environmental schemes include provisions to cover shortfalls in greenhouse gas emission rights, renewable energy certificates and energy savings certificates, based on the assigned obligations (see notes 5.4.3, 10.2, 20.1 and 20.2.1).

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 2021, a provision of €1,156 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 (see note 10.2).

One of the main features of the fourth period (2021-2030) of the European Union **greenhouse gas emission quota system** (SEQE-EU or EU-ETS) is to achieve the emission reduction targets set in the 2030 Climate and Energy framework, and the EU's contribution to the Paris Climate Agreement adopted in 2015. One key step was accelerating annual quota reductions to 43 million tonnes per year.

In the EDF group, the entities concerned by this European system are EDF, Edison, Dalkia, PEI and Luminus. Free emissions quota allocations for the Group stopped in 2020.

The volume of emissions at 31 December 2021 stood at 17 million tonnes (19 million tonnes for 2020, including EDF Energy).

Actual greenhouse gas emissions amounted to €380 million at 31 December 2021 (€260 million at 31 December 2021, including EDF Energy) and are included in provisions in the balance sheet.

In 2021, the Group surrendered 16 million tonnes in respect of emissions generated in 2020 under the EU ETS (in 2020 it surrendered 21 million tonnes in respect of emissions generated in 2019, including EDF Energy).

Now that Brexit has taken place, the United Kingdom is no longer a member of the European system (EU ETS) and has set up its own system (UK ETS - Emissions Trading Scheme). The UK ETS, which uses a bidding system, covers the same sectors as the EU ETS and operates under generally similar rules, with comparable accounting treatment.

The volume of EDF Energy's emissions at 31 December 2021 stood at 2 million tonnes (3 million tonnes for 2020). Actual greenhouse gas emissions amounted to €36 million at 31 December 2021 (€83 million at 31 December 2021) and are included in provisions in the balance sheet.

In 2021, EDF Energy surrendered 3 million tonnes in respect of emissions generated in 2020 under the UK ETS (in 2020 it surrendered 5 million tonnes in respect of emissions generated in 2019).

Other provisions for contingencies and losses

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.

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

17.3 CONTINGENT LIABILITIES

Accounting principles and methods

A contingent liability is:

- a potential obligation arising from past events, which will only be confirmed by the occurrence (or non-occurrence) of one or more uncertain future events that are not completely within the entity's control, or
- a present obligation arising from past events that is not recognised in the financial statements because an outflow of resources representing economic benefits is unlikely to be necessary to extinguish the obligation, or because the amount of the obligation cannot be measured reliably.

The principal contingent liabilities at 31 December 2021 are the following:

17.3.1 Tax inspections

EDF

For the period 2008 to 2019, EDF was notified of proposed tax adjustments, notably concerning the tax-deductibility of certain long-term liabilities. In two rulings made in 2017 and one 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, but the Minister appealed. In a decision of 11 December 2020 the Council of State overturned the Versailles court's decision and sent the case back before the same court. On 17 June 2021 the Court found against the Company and cancelled the first-instance judgements that had been in its favour. In execution of this decision, EDF paid €374 million in July 2021, and €85 million for the years 2014 and 2015. The Company has lodged an appeal against this decision before the Council of State.

EDF had recognised a net tax liability of €510 million in its 2020 financial statements in connection with this dispute. In view of the above payments, this liability was reduced to €41 million at 31 December 2021.

For the years 2012 to 2019, the French tax authorities notified the Company of certain recurrent tax reassessments concerning the *Cotisation 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 was approximately €310 million. EDF International contested this reassessment.

In judgements of 2 July 2019 for the period 2009-2013 and 30 January 2020 for the year 2014, Montreuil Administrative Court confirmed the tax reassessments. EDF International therefore paid the tax in execution of these decisions, but also appealed against them. In a ruling of 25 January 2022, Versailles administrative court found in favour of EDF International and cancelled the first-instance judgments, thus nullifying the notified reassessments. This ruling has no consequences for the 2021 financial statements, as the total amounts already paid will be refunded to the company in 2022.

17.3.2 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.

17.3.3 Litigation with photovoltaic producers

Announcements in France in 2010 of a cut in purchase tariffs for photovoltaic electricity (the PV purchase tariff) triggered an upsurge in connection applications submitted to distribution network operators. By a decree of 9 December 2010 (the "moratorium decree") the French 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 tariff. The decision setting that tariff was issued on 4 March 2011, and significantly reduced the PV purchase tariffs. 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 relating to the photovoltaic moratorium have been definitively barred.

In response to an application for a preliminary ruling, on 15 March 2017 the Court of Justice of the European Union (CJEU) confirmed that the decisions of 10 July 2006 and 12 January 2010 setting the PV purchase tariffs constituted State aid that had been implemented without prior notification to the European Commission, and was therefore illegal. The CJEU concluded that it was now up to the national courts to take the appropriate action.

On 18 September 2019, the Court of Cassation issued several decisions rejecting claims concerning both Enedis and EDF, judging the aid illegal because it had not been notified; consequently, the prejudice of producers who could not benefit from that aid is deemed not legally reparable. Since then, further Court of Cassation decisions have essentially confirmed its ruling of 18 September 2019 and rejected producers' appeals founded on state aid arguments.

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. In view of the favourable developments in cases before the Court of Cassation, EDF and Enedis decided to apply for this case to be removed from the court list on 17 February 2021, to suspend the procedure and draw up the final list of cases still outstanding.

17.3.4 ARENH dispute – *Force majeure*

In the crisis caused by the Covid-19 pandemic, some suppliers applied to the President of the Paris Commercial Court in 2020 for an emergency order suspending ARENH deliveries either totally, or partially, equivalent to the decline in electricity consumption by their customer portfolio during the crisis, citing the *force majeure* clause contained in the master ARENH agreement signed with EDF.

On 20, 26 and 27 May 2020, after summary proceedings the Paris Commercial Court issued provisional rulings on the applications for suspension of ARENH contracts made by four alternative suppliers (Total Energies, Gazel, Alpiq and Vattenfall). The urgent application judge ruled that *force majeure* was established, and ordered the suspension of deliveries for three of the applicants (Total Energies, Gazel, and Alpiq). EDF appealed against this ruling. On 28 July 2020, the Paris Court of Appeal upheld these Commercial Court decisions. On 24 September 2020 EDF filed an appeal before the Court of Cassation. Total Energies is the only remaining party in the ongoing proceedings.

Meanwhile, as a precautionary measure to protect its rights, on 2 June 2020 EDF notified the energy suppliers Alpiq, Gazel and Total Energies of the termination of their ARENH contracts. By an order of 1 July 2020, the president of the Paris Commercial Court declared this termination null and void. EDF appealed against that decision. On 19 November 2020, the Paris Court of Appeal overturned the Commercial Court's order and stated that there were no grounds for summary proceedings, thus restoring the effects of the termination.

Further summary proceedings were initiated in late September 2020 by Ohm Energie, seeking a suspension of payments due for ARENH volumes, claiming that deliveries had been continued illegally by EDF since it had requested suspension of ARENH deliveries from April to June 2020 due to *force majeure*. On 23 October 2020 the Paris Commercial Court rejected all of Ohm Energie's claims.

In parallel, seven cases concerning the substance of the matter have been brought by suppliers, claiming compensation from EDF for the prejudice caused by its allegedly unlawful refusal to apply the *force majeure* clause. The suppliers concerned are Hydroption, Vattenfall, Priméo Energie Grands Comptes and Priméo Energie Solutions, Arcelor Mittal Energy, Plüm Energy et Entreprises et Collectivités, TotalEnergies and Ekwateur.

On 13 April 2021, the Paris Commercial Court issued a first judgement on the merits in the Hydroption case, ordering EDF to pay the claimant €5.88 million in damages. The court considered that the conditions for *force majeure* were fulfilled and concluded that in continuing its ARENH deliveries against Hydroption's wishes EDF had committed a breach of contract for which it could be held liable. On 15 October 2021, the Paris Court of Appeal overturned the Commercial Court's judgement insofar as it considered EDF liable and ordered it to pay damages to Hydroption, considering that the exemption clause of *force majeure* was not established, and that EDF was not obliged to satisfy a request for suspension of the contract. On 2 December 2021, the Toulon Commercial Court placed Hydroption SAS in liquidation. The liquidator has not taken an appeal to the Court of Cassation.

The Paris Commercial Court issued two more judgements on the merits on 30 November 2021, in the Total Energies and Ekwateur cases, ordering EDF to pay these companies damages totalling several dozen million euros.

The other cases are still ongoing.

17.3.5 Edison

Sale of Ausimont (site de Bussi)

Several legal actions before the civil, administrative and criminal courts were begun following the sale by Edison of the Ausimont SpA industrial complex to Solvay Solexis SpA in 2002. The following 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 to remove waste that was on the land concerned. Edison first appealed against this order before Pescara regional administrative court, and then before the Italian Council of State. In April 2020 the Council of State rejected the claim and Edison, considering the ruling unfair and unlawful, filed applications for its annulment before the Italian Court of Cassation, the Italian Council of State and the European Court of Human Rights (ECHR). The application before the Council of State has been rejected, while the case before the ECHR is still in process.

    Edison has nonetheless begun work to make the site safe in agreement with the competent Public Administrations. In particular, Edison has completed the prevention measures (covering) of the polluted areas, reactivated the pump and stock system for the shallow waters and conducted further deep inspections on the soils. Furthermore, the Company has recently submitted a plan to the Ministry for the Environment for the first phase of environmental remediation relating to the disposal and management of waste.

    On 11 June 2021 the Council of State published a ruling rejecting the appeal by the Ministry for the Environment against the decision of the Abruzzo regional administrative court concerning annulment of the award of the integrated contract for remediation work in these areas to the Belgian company Dec Deme.

    Edison, which had already started the aforementioned work to make these areas safe and clean following the decision of the Council of State of April 2020, is currently discussing the cleanup and waste removal operations under its responsibility with the relevant bodies.

- 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 challenged this order before the Pescara regional administrative court and the proceedings are ongoing. While awaiting the court's decision, Edison has signed a transitional agreement with the current owners to define the practicalities for the transfer and management of existing power plants and the environmental remediation activities;

- one arbitration case: in 2012, arbitration proceedings were launched by Solvay SA and Solvay Specialty Polymers Italy SpA (the purchaser of Ausimont) for violation by Edison of the representations and warranties in environmental matters concerning the Bussi and Spinetta Marengo sites contained in the sale agreement.

  At the end of June 2021, the Arbitral Tribunal partial award, largely granting the claims asserted by Solvay Specialty Polymers Italy in relation to the environmental warranties made by Montedison under the sale contract for Ausimont signed in 2001, ordered Edison to pay compensation of €91 million for the period from May 2002 (closing date) to December 2016.

  Edison's appeal to the Swiss federal court of Lausanne was rejected in January 2022. Sentence enforcement proceedings are now in progress before the Milan Court of Appeal.

  The Arbitral Tribunal postponed the quantification of the damages suffered by Solvay Specialty Polymers Italy in the period after December 2016 and the legal fees incurred by the parties to a further phase of the arbitration, unless the parties reach an agreement in this respect. The award carries a dissenting opinion by one of the members of the Arbitral Tribunal.

- 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 and are currently in the provisional investigation phase.

Mantua - criminal and environmental proceedings

Criminal proceedings

The Public Prosecutor's Office of Mantua has decided to initiate criminal proceedings against some executive directors working or having worked for Edison since 2015 and some of Edison's representatives, due to alleged environmental offences, also on the basis of Legislative Decree 231 of 2001, which allegedly occurred in certain areas of the Mantua petrochemical plant. Such orders of the Province of Mantua were confirmed by the Council of State's ruling of April 2020 as described below. These proceedings are ongoing.

The Mantua petrochemical plant - which Edison (as the successor of Montedison) has not owned or managed since 1990 - is subject to a large-scale and complex program of environmental clean-up and restoration activities which also regarded all of the areas targeted by the procedure initiated by the Public Prosecutor. The ENI group has initiated these activities. After the transfer of the clean-up projects to Edison in June of last year, following the previously mentioned ruling of the Council of State, Edison is carrying out large part of the activities.

Environmental procedure

Over the past few years, the Italian province of Mantua notified Edison of eight orders to rehabilitate the land and the whole Mantua petrochemical site sold by Montedison to the ENI group in 1990, despite two settlement agreements concerning these environmental issues signed by ENI and the Italian Ministry for the Environment.

Edison appealed against all these rulings before the Brescia Division of the Lombardy regional administrative court, but lost its appeal in August 2018. Edison then took the matter to the Italian Council of State, which rejected Edison's appeal in a ruling of 1 April 2020 confirming the first-instance decisions. Edison pursued its appeal before the ECHR, and the proceedings are ongoing.

However, as mentioned above, Edison has already begun cleanup work on the site, taking over from the previous operators and conducting a series of tenders.

17.3.6 Investigations by France's Competition Authority ("ADLC")

France's Competition Authority (the ADLC) is currently investigating the EDF group in relation to four separate matters.

The first, relating to the commercial practices of EDF and some of its subsidiaries in the energy services markets, follows a complaint filed on 17 October 2016 by Xélan. Following this complaint, the ADLC conducted search and seizure operations at the premises of EDF and several of its subsidiaries on 22 and 23 November 2016. This investigation is still ongoing.

The second investigation follows a complaint filed by Engie on 19 June 2017 relating to EDF's commercial practices regarding retail electricity and gas sales, and specifically the circumstances in which EDF gave electricity suppliers, upon request, access to its file of customers paying the regulated "Green" and "Yellow" tariffs from the end of 2015, when these tariffs were about to be discontinued. Documents collected during search and seizure operations in November 2016 were used in the Engie proceedings. On 27 May 2021 EDF, Dalkia, Dalkia Smart Building, Citelum and Cham were notified of the

ADLC's objections concerning the markets for retail electricity and gas supply, multi-technique management/maintenance and energy optimisation services, and energy control measures leading to issuance of energy savings certificates. The ADLC's decision is awaited, after a meeting was held before the ADLC's panel in November 2021.

The third investigation follows an ex-officio referral to the ADLC on 4 November 2019 and concerns the formation of a partnership for heat network operations. On 3 May 2021 EDF, Dalkia, Electricité de Strasbourg, ES Services Energétiques and EDEV were notified of the ADLC's objections and responded on 16 July 2021. This procedure, which allows both sides to present their arguments, will continue in 2022.

The fourth investigation, relating to EDF's pricing policy for its electricity supply offers to non-residential customers with a connection capacity of less than 36kVa, follows a complaint by Plüm Energie dated 14 September 2020. This complaint was accompanied by an application for precautionary interim measures, intended to make the ADLC take urgent action. On 18 February 2021, the ADLC rejected Plüm's application for interim measures. The investigation on the merits of the complaint is ongoing.

Finally, in a decision of 18 January 2022 the ADLC dismissed a complaint and application for interim measures made against EDF by ANODE (the national association of retail energy operators). This complaint concerned EDF's refusal to provide access to the database of non-residential customers concerned by discontinuation of the "blue" regulated sales tariffs, who were switched automatically to a follow-on market-price contract at 31 December 2020. However the ADLC considered that ANODE's arguments were not backed up by sufficient evidence proving the existence of the alleged practices. This decision is open to appeal for a one-month period from its notification to the parties.

Should the ADLC conclude in any of these investigations, after examining the merits of the matter, that anti-competitive practices have been involved, the possible penalties in application of article L. 464-2 of the French Commercial Code include a fine of up to 10% of the Group's worldwide sales excluding taxes.

A provision was recognised at 31 December 2021.

NOTE 18 FINANCIAL ASSETS AND LIABILITIES

Accounting principles and methods

Financial assets comprise equity instruments (particularly non-consolidated investments), debt securities, loans and receivables at amortised cost, derivative assets (see note 18.7) and cash and cash equivalents (see note 18.2).

The classification and measurement of financial instruments depend on the business model and the instruments' contractual characteristics. They are carried at amortised cost, fair value through other comprehensive income (OCI), or fair value through profit and loss.

Financial liabilities comprise loans and other financial liabilities, bank credit and derivative liabilities (see note 18.7).

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.

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 the Group derecognises the debt and recognises a new liability when the new terms are substantially different; otherwise, the book value is recalculated. In either case, the impacts of the debt renegotiation are recorded in profit and loss.

18.1 FINANCIAL ASSETS

Accounting principles and methods

Financial assets comprise debt and equity securities. The accounting treatment applied depends on their contractual characteristics and business model

Financial assets carried at fair value through OCI with or without recycling

Financial assets carried at fair value through OCI comprise:

- non-consolidated investments for which the Group has irrevocably opted 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.

At each reporting date, they are adjusted to fair value based on quoted prices where possible, or using the discounted future cash flow method or by reference to external sources otherwise. Changes in the fair value of these instruments are recorded directly in OCI with recycling (for debt securities) or OCI with no recycling (for equity instruments) in the income statement.

Financial assets carried at fair value through profit and loss

Financial assets carried at fair value through profit and loss comprise:

- assets acquired from inception with the intention of resale in the short term;
- derivatives not classified as hedges (derivatives held for trading) (see note 18.7);
- equity instruments (non-consolidated investments) which the Group has not irrevocably opted to classify as at fair value through OCI with no recycling;
- debt securities that do not meet the requirements of the SPPI test, regardless of their business model. This chiefly concerns shares in investment funds.

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 reporting date, they are adjusted to fair value based on quoted prices where possible, or using recognised valuation techniques such as the discounted cash flow method or reference to external sources otherwise. Changes in the fair value of these instruments are recorded in the income statement under the heading “Other financial income and expenses".

Financial assets carried at amortised cost

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.

The 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 are not eligible for classification at amortised cost are carried at fair value through profit and loss, and recorded in “Other financial income and expenses” in the income statement.

Impairment model

The impairment model is based on expected credit loss (ECL). 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 year-end.

The threshold indicating a significant increase in credit risk is reached when the counterparty ceases to be rated “Investment Grade”. The significant increase in the default risk may lead to reassessment of the ECL 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

18.1.1 Breakdown between current and non-current financial assets

Current and non-current financial assets break down as follows:

	31/12/2021			31/12/2020		
(in millions of euros)	Current	Non-current	Total	Current	Non-current	Total
Instruments at fair value through OCI with recycling	10,519	5,810	16,329	13,044	5,696	**18,740**
Instruments at fair value through OCI with no recycling	37	253	290	34	228	**262**
Instruments at fair value through profit and loss	2,855	25,369	28,224	2,556	22,807	**25,363**
Debt and equity securities	***13,411***	***31,432***	***44,843***	***15,634***	***28,731***	***44,365***
Trading derivatives – Positive fair value	20,061	-	20,061	5,038	-	**5,038**
Hedging derivatives – Positive fair value	4,522	5,388	9,910	1,625	3,814	**5,439**
Loans and financial receivables[1]	1,943	18,789	20,732	1,235	15,070	**16,305**
CURRENT AND NON-CURRENT FINANCIAL ASSETS	39,937	55,609	95,546	23,532	47,615	71,147

[1]Including impairment of €(299) million at 31 December 2021 (€(432) million at 31 December 2020).

The increase in the positive fair value of trading derivatives (+€15.0 billion) is explained by an increase in the value of derivatives used in the trading activity, principally associated with commodity market price movements observed in 2021, and to a lesser extent the higher volumes contracted.

18.1.2 Debt and equity securities

Details of debt and equity securities

Financial assets are monitored and managed by the Group with two main objectives:

- **dedicated assets set aside in France for secure financing of nuclear plant decommissioning expenses and long-term storage expenses for radioactive waste, as required by article L. 594 of France's Environment Code.** These assets consist of diversified investments in bonds, monetary and equity investment funds, and equity investments held by EDF Invest. The general management policy for dedicated assets and a breakdown of the portfolio is presented in note 15.1.2;
- **assets managed according to a liquidity-oriented policy** ("liquid assets"). These are financial assets consisting of funds or interest rate instruments with initial maturity of over three months that are readily convertible into cash. EDF's monetary investment funds included in liquid assets amount to €2,597 million at 31 December 2021 (€2,441 million at 31 December 2020).

Details of debt and equity securities are shown in the table below:

	31/12/2021				31/12/2020
(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	6,299	-	24,714	**31,013**	**28,398**
Liquid assets	9,927	-	2,810	**12,737**	**15,028**
Other assets[1]	103	290	700	**1,093**	**939**
TOTAL	16,329	290	28,224	44,843	44,365

[1]Investments in non-consolidated companies.

Changes in debt and equity securities

(in millions of euros)	31/12/2020	Net increases	Changes in fair value	Changes in scope	Translation adjustments	Other	31/12/2021
Instruments at fair value through OCI with recycling	**18,740**	(2,357)	(276)	7	178	37	**16,329**
Instruments at fair value through OCI with no recycling	**262**	6	16	1	1	4	**290**
Instruments at fair value through profit and loss	**25,363**	(338)	3,200	55	15	(71)	**28,224**
TOTAL DEBT AND EQUITY SECURITIES	**44,365**	**(2,689)**	**2,940**	**63**	**194**	**(30)**	**44,843**

Changes in fair value recorded in equity

Changes in the fair value of debt and equity securities were recorded in equity (EDF share) over the period as follows:

	2021			2020		
(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	(202)	-	42	224	-	162
Liquid assets	(81)	-	21	(29)	-	13
Other assets	-	15	-	-	(34)	-
DEBT AND EQUITY SECURITIES [(3)]	**(283)**	**15**	**63**	**195**	**(34)**	**175**

(1)+ / ( ): increase / (decrease) in equity (EDF share).
(2)+ / ( ): increase / (decrease) in income (EDF share).
(3)Excluding associates and joint ventures.

In 2021, gross changes in fair value recorded in OCI with recycling principally concern EDF (€(346) million, including €(244) million for dedicated assets). In 2020, gross changes in fair value recorded in OCI with recycling principally concern EDF (€20 million, including €62 million for dedicated assets).

No significant impairment was recorded in 2021.

18.1.3 Loans and financial receivables

Loans and financial receivables consist of the following:

(in millions of euros)	31/12/2021	31/12/2020
Amounts receivable from the NLF	15,986	13,034
Loans and financial receivables – other	4,746	3,271
LOANS AND FINANCIAL RECEIVABLES	**20,732**	**16,305**

At 31 December 2021 loans and financial receivables mainly include:

- amounts representing reimbursements receivable from the Nuclear Liabilities Fund (NLF) and the British government for coverage of long-term nuclear obligations, totalling €15,986 million at 31 December 2021 (€13,034 million at 31 December 2020), discounted at the same rate as the provisions they finance (see note 15.2);
- other loans and financial receivables notably include:
  - the overfunding of EDF Energy's EDFG pension scheme by €2,733 million at 31 December 2021, compared to €1,725 million at 31 December 2020 (see note 16.1.1),
  - an amount of €282 million representing the advance payments made by Luminus to Synatom to cover long-term nuclear obligations (€263 million at 31 December 2020 and see note 15.3). 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,
  - loans made by EDF Renewables in the course of its project development activity, mainly in connection with wind farms in France, the United Kingdom and North America, amounting to €525 million at 31 December 2021 compared to €382 million at 31 December 2020.

Changes in loans and financial receivables

(in millions of euros)	31/12/2020	Net increases	Discount effect	Changes in scope	Translation adjustments	Other	31/12/2021
Loans and financial receivables	**16,305**	137	943	(19)	1,140	2,226	**20,732**

Other changes in loans and financial receivables principally correspond to the changes in the receivable representing amounts reimbursable by the Nuclear Liabilities Fund (NLF) and the British government, and the surplus funding of EDF Energy's EDFG pension scheme.

18.2 CASH AND CASH EQUIVALENTS

Accounting principles and methods

Cash and cash equivalents comprise immediately available liquidities and very short-term investments that are readily convertible (e.g. in monetary funds) 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. These items are held to cover short-term obligations rather than for short-term investments or other purposes. When they mature in more than 3 months, they are included in Liquid assets in Debt and equity securities (see note 18.1.2).

"Cash equivalents" are recorded at fair value, with changes in fair value included in the heading "Other financial income and expenses".

Cash and cash equivalents include the following amounts recorded in the balance sheet:

(in millions of euros)	31/12/2021	31/12/2020
Cash	9,178	5,832
Cash equivalents	741	438
CASH AND CASH EQUIVALENTS	**9,919**	**6,270**

Cash restrictions

Cash and cash equivalents include €198 million of cash subject to restrictions at 31 December 2021 (€242 million at 31 December 2020) (see note 1.3.5).

18.3 FINANCIAL LIABILITIES

Accounting principles and methods

Loans and other financial liabilities are carried at amortised cost, adjusted for changes in the value of the risks hedged when they are covered by a fair value hedge (see note 18.7). Interest expenses are calculated at the effective interest rate and recorded in the income statement in "Cost of gross financial indebtedness" over the duration of the loan or financial liability.

18.3.1 Breakdown between current and non-current financial liabilities

Current and non-current financial liabilities break down as follows:

	31/12/2021			31/12/2020		
(in millions of euros)	Non-current	Current	Total	Non-current	Current	Total
Loans and other financial liabilities	54,334	15,072	**69,406**	54,066	11,525	**65,591**
Trading derivatives - negative fair value[(1)]	-	22,027	**22,027**	-	5,125	**5,125**
Hedging derivatives - negative fair value[(1)]	2,209	7,915	**10,124**	1,833	959	**2,792**
FINANCIAL LIABILITIES	**56,543**	**45,014**	**101,557**	**55,899**	**17,609**	**73,508**

[(1)] See note 18.7.

The increase in the negative fair value of trading derivatives (+€16.9 billion) is explained by the increase in the value of derivatives used in the trading activity, principally associated with the changes in commodity market prices observed in 2021, and to a lesser extent the increase in volumes contracted.

18.3.2 Loans and other financial liabilities

18.3.2.1 Changes in loans and other financial liabilities

(in millions of euros)	Bonds	Loans from financial institutions	Other financial liabilities	Lease liability	Accrued Interest	Total
Balances at 31/12/2020	**50,196**	**3,297**	**6,571**	**4,307**	**1,220**	**65,591**
Increases	1,867	938	4,135	764	119	**7,823**
Decreases	(3,426)	(769)	(422)	(729)	(188)	**(5,534)**
Translation adjustments	531	77	201	50	1	**860**
Changes in scope of consolidation	-	148	(26)	(2)	-	**120**
Changes in fair value	74	1	(19)	-	-	**56**
Other changes [(1)]	-	(2)	552	(53)	(7)	**490**
BALANCES AT 31/12/2021	**49,242**	**3,690**	**10,992**	**4,337**	**1,145**	**69,406**

[(1)] Other movements include the reclassification at 1 January 2021 of short positions relating to margin calls on derivatives, which were previously netted and included in other financial liabilities, amounting to €281 million, and the commitment to redeem perpetual subordinate bonds amounting to €267 million (see note 14.4.1).

The principal **bond**-related operations of 2021 were:

- a senior bond issue on November 2021 with gross value of €1.8 billion (see note 18.3.2.2);
- bond redemptions of €3.4 billion during the year, comprising €2.0 billion in January 2021 and €1.4 billion in April 2021.

At 31 December 2021, EDF's **other financial liabilities** include negotiable debt instruments amounting to €5,117 million, and an amount of €1,695 million recognised in respect of the cash received for debt securities transferred to banks under repurchase agreements. These operations do not affect the net indebtedness.

A breakdown of the issuance and repayments of borrowings as 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	31/12/2021
Issuance of borrowings	1,867	938	4,135	-	3	**6,943**
Repayments of borrowings	(3,426)	(769)	(422)	(729)	186	**(5,161)**

18.3.2.2 Principal borrowings of the Group

The Group's principal borrowings (excluding Green Bonds and OCEANEs) at 31 December 2021 are as follows:

Type of borrowing *(in millions of currencies)*	Entity	Issue[1]	Maturity	Issue amount	Currency	Rate
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%
Euro MTN	EDF	11/2010	11/2025	750	EUR	4.00%
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%
Bond	EDF	01/2010	01/2040	850	USD	5.60%
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	700	USD	6.00%
Bond	EDF	01/2014	01/2114	1,350	GBP	6.00%

[1] *Date funds were received.*

At 31 December 2021, the Group's principal Green Bonds (see note 20.3.1) are as follows:

Type of borrowing *(in millions of currencies)*	Entity	Issue	Maturity	Issue amount	Currency	Rate
Bond (Green Bond)	EDF	10/2015	10/2025	1,250	USD	3.63%
Euro MTN (Green Bond)	EDF	10/2016	10/2026	1,750	EUR	1.00%
Euro MTN (Green Bond)	EDF	11/2021	11/2033	1,850	EUR	1.00%

On 23 November 2021, the Group raised €1.75 billion from a senior bond issue that will mature on 29 November 2033 and has a fixed coupon of 1%.

On 8 September 2020, EDF made an offering of Green Bonds convertible into new shares and/or exchangeable for existing shares (*OCEANEs Vertes*). The key features of this issue are as follows:

Type of borrowing *(in millions of currencies)*	Entity	Issue	Maturity	Issue amount	Currency	Rate
OCEANEs Vertes Green Bonds	EDF	09/2020	09/2024	2,400	EUR	0%

Holders of these bonds have the right to convert them into new EDF shares and/or exchange them for existing EDF shares.

The conversion and/or exchange ratio was set at one share per bond, subject to the standard adjustments including anti-dilution and dividend protections as described in the terms of the issue. For the 2020 dividend distribution to EDF shareholders, the conversion/exchange rate was raised to 1.018 EDF share per bond from 7 June 2021, and when the interim dividend for 2021 was paid, the conversion/exchange ratio was raised to 1.042 EDF share per bond from

2 December 2021.

The bonds may be redeemed prior to maturity at the option of the Company, subject to certain conditions.

Unless previously converted, exchanged, redeemed or repurchased and cancelled, the bonds will be redeemed at nominal value when they reach maturity.

18.3.3 Loans and financial liabilities by maturity, currency and interest rate

18.3.3.1 Maturity of loans and financial liabilities

(in millions of euros)	Bonds	Loans from financial institutions	Other financial liabilities	Lease liability	Accrued Interest	Total
Less than one year	2,845	512	10,270	654	790	**15,071**
From one to five years	11,039	1,877	335	2,071	122	**15,444**
More than five years	35,358	1,301	387	1,612	233	**38,891**
LOANS AND OTHER FINANCIAL LIABILITIES AT 31/12/2021	**49,242**	**3,690**	**10,992**	**4,337**	**1,145**	**69,406**

The non-discounted lease liability matures as follows:

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
NON-DISCOUNTED CONTRACTUAL CASH FLOWS	**4,899**	**722**	**2,217**	**1,960**	**4,883**

18.3.3.2 Breakdown of loans and other financial liabilities by currency

The breakdown of loans and other financial liabilities by currency includes the effect of derivatives classified as hedges (of debts in foreign currencies and net investments in foreign subsidiaries) under IFRS 9.

At 31 December 2021

	31/12/2021				
	Initial debt structure		Impact of hedging instruments	Debt structure after hedging	
(in millions of euros)	amount	% of debt	amount	amount	% of debt
Euro (EUR)	38,003	55%	11,119	49,122	71%
American dollar (USD)	18,128	26%	(12,910)	5,218	7%
Pound sterling (GBP)	10,018	14%	2,410	12,428	18%
Other	3,257	5%	(619)	2,638	4%
LOANS AND OTHER FINANCIAL LIABILITIES	**69,406**	**100%**	**-**	**69,406**	**100%**

At 31 December 2020

	31/12/2020				
	Initial debt structure		Impact of hedging instruments	Debt structure after hedging	
(in millions of euros)	amount	% of debt	amount	amount	% of debt
Euro (EUR)	36,241	55%	11,798	48,039	73%
American dollar (USD)	16,735	26%	(10,958)	5,777	9%
Pound sterling (GBP)	9,996	15%	537	10,533	16%
Other	2,619	4%	(1,377)	1,242	2%
LOANS AND OTHER FINANCIAL LIABILITIES	**65,591**	**100%**	**-**	**65,591**	**100%**

18.3.3.3 Breakdown of loans and other financial liabilities by type of interest rate

The breakdown of loans and other financial liabilities by type of interest rate includes the effect of derivatives classified as hedges under IFRS 9.

Floating-rate loans indexed on the LIBOR USD that have not yet been "switched" to the interbank interest rate benchmark reform (see note 1.2.1) amount to a total €224 million before derivatives, and €17 million including the effect of derivatives.

At 31 December 2021

	31/12/2021				
	Initial debt structure		Impact of hedging instruments	Debt structure after hedging	
(in millions of euros)	amount	% of debt	amount	amount	% of debt
Fixed rates	64,335	93%	(15,434)	48,901	70%
Floating rates	5,071	7%	15,434	20,505	30%
LOANS AND OTHER FINANCIAL LIABILITIES	**69,406**	**100%**	**-**	**69,406**	**100%**

At 31 December 2020

	31/12/2020				
	Initial debt structure		Impact of hedging instruments	Debt structure after hedging	
(in millions of euros)	amount	% of debt	amount	amount	% of debt
Fixed rates	60,667	92%	(15,217)	45,450	69%
Floating rates	4,924	8%	15,217	20,141	31%
LOANS AND OTHER FINANCIAL LIABILITIES	**65,591**	**100%**	**-**	**65,591**	**100%**

A large portion of the EDF group's fixed-rate loans is swapped to variable rates.

18.3.4 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.

Four borrowings with a combined total of €1,150 million contain a rendez-vous 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 2021 as a result of any Group entity's failure to comply with contractual clauses concerning loans.

18.4 UNUSED CREDIT LINES

In 2019, EDF signed 3 renewable credit lines, each one for €300 million, respectively with BBVA, the Crédit Agricole group and 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.

On 30 October 2020 EDF and Standard Chartered Bank signed a €200 million renewable credit facility. The cost of this facility will be indexed on three EDF group sustainability KPIs: EDF's direct CO_2 emissions, electrification of its light vehicle fleet, and use of online consumption monitoring tools by its French residential customers (see note 20.3.3).

On 23 December 2021 EDF announced the syndication of a new €1.5 billion revolving credit facility with an initial maturity of three years. The cost of this facility will be indexed on four Group ESG KPIs, with a particular focus on its social responsibility.

This new credit line, in which 9 European and North American relationship banks are participating, reaffirms the central role of sustainable finance tools in EDF's financing strategy.

At 31 December 2021, the Group has unused credit lines with various banks totalling €13,039 million (€11,110 millions at 31 December 2020), including €9,348 million of credit lines indexed on ESG criteria.

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1-5 years	> 5 years	
CONFIRMED CREDIT LINES	13,039	1,719	10,899	421	11,110

18.5 FAIR VALUE OF FINANCIAL INSTRUMENTS

Accounting principles and methods

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. deduced from observable prices);
- level 3 (non-observable data): data that are not observable on a market, including observable data that have been significantly adjusted.

The distribution of financial assets and liabilities in the balance sheet by level is as follows:

At 31 December 2021

(in millions of euros)	Balance sheet value	Fair value	Level 1 Unadjusted quoted prices	Level 2 Observable data	Level 3 Non-observable data
Equity securities	1,889	1,889	3	1,413	473
Debt securities	42,954	42,954	2,607	40,225	122
Hedging derivatives	9,910	9,910	153	9,757	-
Trading derivatives	20,061	20,061	249	19,349	463
Cash equivalents	741	741	34	707	-
Financial assets carried at fair value	**75,555**	**75,555**	**3,046**	**71,451**	**1,058**
Receivables from the NLF	15,986	15,986	-	15,986	-
Other loans and financial receivables	4,746	4,746	-	4,746	-
Financial assets carried at amortised cost	**20,732**	**20,732**	**-**	**20,732**	**-**
Hedging derivatives	10,124	10,124	4	10,120	-
Trading derivatives	22,027	22,027	322	21,216	489
Financial liabilities carried at fair value	**32,151**	**32,151**	**326**	**31,336**	**489**
Loans and other financial liabilities	69,406	78,114		78,114	
Financial liabilities carried at amortised cost	**69,406**	**78,114**	**-**	**78,114**	**-**

Level 3 debt and equity securities are principally non-consolidated investments carried at historical value.

At 31 December 2020

(in millions of euros)	Balance sheet value	Fair value	Level 1 Unadjusted quoted prices	Level 2 Observable data	Level 3 Non-observable data
Equity securities	1,563	1,563	24	1,121	418
Debt securities	42,802	42,802	2,423	40,337	42
Hedging derivatives	5,439	5,439	59	5,372	8
Trading derivatives	5,038	5,038	289	4,057	692
Cash equivalents	438	438	343	95	-
Financial assets carried at fair value	**55,280**	**55,280**	**3,138**	**50,982**	**1,160**
Receivables from the NLF	13,034	13,034	-	13,034	-
Other loans and financial receivables	3,271	3,271	-	3,271	-
Financial assets carried at amortised cost	**16,305**	**16,305**	**-**	**16,305**	**-**
Hedging derivatives	2,792	2,792	1	2,791	-
Trading derivatives	5,125	5,125	290	4,645	190
Financial liabilities carried at fair value	**7,917**	**7,917**	**291**	**7,436**	**190**
Loans and other financial liabilities	65,591	75,680	-	75,680	-
Financial liabilities carried at amortised cost	**65,591**	**75,680**	**-**	**75,680**	**-**

Level 3 debt and equity securities are principally non-consolidated investments carried at historical value.

18.6 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.

A more detailed description of these risks and the sensitivity analyses required by IFRS 7 can be found in section 7 of the management report, “Financial Information – Management and control of market risks”.

- **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.

- **Energy market risks**

  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.

- **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.

  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 13.3.1.

18.7 DERIVATIVES AND HEDGE ACCOUNTING

Accounting principles and methods

The Group uses derivatives such as swaps and forward contracts to hedge its interest rate, foreign exchange, energy and commodity risks.

In accordance with IFRS 9, hedge accounting can be applied to derivatives when they meet certain eligibility criteria. Some derivatives classified as “own use” are excluded from application of IFRS 9.

Derivatives not covered by IFRS 9: "own use" contracts

Forward purchase and sale contracts for physical delivery of energy or commodities are considered to fall outside the scope of application of IFRS 9 when they are 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 these 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 normal business as an integrated electricity operator, and are thus outside the scope of IFRS 9.

Measurement and recognition of derivatives

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.

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.

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, particularly regarding the existence of formal documentation from their inception and compliance with hedge effectiveness requirements.

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 defined 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:

- fair value hedge;
- cash flow hedge;
- net foreign investment hedge.

Hedge categories

Fair value hedge

This is a hedge of 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 profit and loss and offset by corresponding variations in the fair value of the hedging instrument. Only the ineffective portion of the hedge has an impact on profit and loss.

Some loans and financial liabilities, and some commodity contracts, are covered by a fair value hedge. In such cases their balance sheet value is adjusted for changes in fair value attributable to the hedged risks (foreign exchange, interest rate and price risks).

Cash flow hedge

This is a hedge of 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 hedging instrument'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 profit and loss.

When the hedged cash flows materialise, 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 non-financial asset acquired.

Net foreign investment hedge

This is a hedge of 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 hedging instrument'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 profit and loss.

This risk is hedged in the EDF Group level either by matching it with debts in the same currency, or by using derivatives.

Trading derivatives

Trading derivatives comprise:

- derivatives subscribed for economic hedging that do not qualify as hedges for accounting purposes; changes in the value of these instruments are reported in profit and loss. When the derivatives are used for economic hedging of negotiable debt instruments and purchased bonds, they are included in "Other financial income and expenses". When the derivatives are used for economic hedging of generation and supply operations, they are included in "Net changes in fair value on Energy and Commodity derivatives, excluding trading activities" (see note 6);
- derivatives used in trading activities; changes in the fair value of these instruments are included in sales (see note 5.1).

18.7.1 Breakdown of hedging and trading derivatives

The fair value of hedging and trading derivatives reported in the balance sheet breaks down as follows:

(in millions of euros)	Notes	31/12/2021	31/12/2020
Positive fair value of hedging derivatives	18.1.1	9,910	5,439
Negative fair value of hedging derivatives	18.3.1	(10,124)	(2,792)
FAIR VALUE OF HEDGING DERIVATIVES		**(214)**	**2,647**
Positive fair value of trading derivatives	18.1.1	20,061	5,038
Negative fair value of trading derivatives	18.3.1	(22,027)	(5,125)
FAIR VALUE OF TRADING DERIVATIVES		**(1,966)**	**(87)**

The fair value of hedging and trading derivatives by type of risk hedged is shown below:

(in millions of euros)	Notes	31/12/2021	31/12/2020
Hedging derivatives - interest rate risk	18.7.2	3,613	3,149
Hedging derivatives - foreign exchange risk	18.7.3	407	(733)
Hedging derivatives - commodity risks	18.7.4	(4,234)	231
FAIR VALUE OF HEDGING DERIVATIVES		**(214)**	**2,647**
Trading derivatives - interest rate risk	18.7.2	(27)	(25)
Trading derivatives - foreign exchange risk	18.7.3	(45)	4
Trading derivatives - commodity risk	18.7.4	(1,894)	(66)
FAIR VALUE OF TRADING DERIVATIVES		**(1,966)**	**(87)**

The fair value of hedging derivatives by type and purpose of hedge is shown below:

(in millions of euros)	Notes	31/12/2021	31/12/2020
Fair value hedges of loans and liabilities		3,148	3,724
Cash flow hedges of loans and liabilities		614	(1,738)
Sub-total	19.2	**3,762**	**1,986**
Fair value hedges of commodity contracts		(492)	6
Cash flow hedges of commodity contracts		(3,564)	170
Sub-total		**(4,056)**	**176**
Net foreign investment hedges		94	280
Fair value hedges of dedicated assets		(14)	205
FAIR VALUE OF HEDGING DERIVATIVES		**(214)**	**2,647**

18.7.2 Interest rate derivatives

The Group is exposed to the risk of fluctuations in interest rates that can affect the value of its loans and financial liabilities, its assets (liquid assets and dedicated assets), and its future financial expenses.

The Group hedges its exposure to changes in the fair value of fixed-rate debts, many of which are converted to floating rates. The derivatives used for these hedges are fixed/floating interest rate swaps and cross-currency swaps, with changes in fair value recorded in profit and loss symmetrically to changes in the value of the hedged debts.

The Group also hedges its floating-rate debt against future changes in interest rates by using floating/fixed interest rate swaps for cash flow hedges.

Details of interest rate derivatives used in a hedging relationship or designated as trading derivatives are shown below:

	Notional at 31/12/2021				Notional at 31/12/2020	Fair Value	
(in millions of euros)	<1 year	1-5 years	>5 years	**Total**	**Total**	**31/12/2021**	31/12/2020
Fixed rate payer/floating rate receiver	47	1,317	4,540	**5,904**	5,923	**264**	(144)
Floating rate payer/fixed rate receiver	1,659	5,682	13,648	**20,989**	20,678	**2,976**	4,143
Floating rate/floating rate	-	1,021	1,413	**2,434**	2,308	**69**	3
Fixed rate/fixed rate	60	638	8,668	**9,366**	9,598	**304**	(853)
Interest rate *swaps*	**1,766**	**8,658**	**28,269**	**38,693**	**38,507**	**3,613**	**3,149**
INTEREST RATE DERIVATIVES - HEDGING	**1,766**	**8,658**	**28,269**	**38,693**	**38,507**	**3,613**	**3,149**
Interest rate operations	-	-	**518**	**518**	**515**	**-**	**8**
Interest rate swaps	**398**	**328**	**280**	**1,006**	**1,124**	**(27)**	**(33)**
INTEREST RATE DERIVATIVES - TRADING	**398**	**328**	**798**	**1,524**	**1,639**	**(27)**	**(25)**

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 currency derivatives (see note 18.7.3).

18.7.3 Currency derivatives

The Group is exposed to the risk of exchange rate fluctuations due to the diversification of its businesses, supply contracts in foreign currencies for goods and services, and its geographical locations. These fluctuations can affect the Group's translation differences recognised in equity, balance sheet items, financial expenses, equity and net income.

There are several types of hedged item:

- Liabilities in foreign currencies, for which cross-currency swaps are used in cash flow hedge;
- Financial assets subscribed in foreign currencies;
- Purchases of commodities and fuels, for which the Group hedges the associated foreign exchange risk;
- Net investments in subsidiaries in foreign currencies.

Details of currency derivatives used in a hedging relationship or designated as trading derivatives are shown in the following tables. The notional value of cross-currency swaps is included both in this note and the note on interest rate hedging derivatives (see note 18.7.2).

At 31 December 2021

	Notional amount to be received at 31/12/2021				Notional amount to be given at 31/12/2021				Fair value
(in millions of euros)	<1 year	1-5 years	>5 years	**Total**	<1 year	1-5 years	>5 years	**Total**	**31/12/2021**
Forward exchange transactions	3,251	652	-	**3,903**	3,273	629	-	**3,902**	**-**
Swaps	23,421	6,506	17,195	**47,122**	23,362	6,311	16,921	**46,594**	**406**
Options	553	119	-	**672**	556	113	-	**669**	**1**
CURRENCY DERIVATIVES - HEDGING	**27,225**	**7,277**	**17,195**	**51,697**	**27,191**	**7,053**	**16,921**	**51,165**	**407**
Forward transactions	7,003	7,872	-	**14,875**	6,982	7,772	-	**14,754**	**84**
Swaps	24,729	4,018	263	**29,010**	24,810	4,048	257	**29,115**	**(128)**
Options	-	-	-	**-**	-	-	-	**-**	**-**
CURRENCY DERIVATIVES -TRADING	**31,732**	**11,890**	**263**	**43,885**	**31,792**	**11,820**	**257**	**43,869**	**(44)**

At 31 December 2020

	Notional amount to be received at 31/12/2020				Notional amount to be given at 31/12/2020				Fair value
(in millions of euros)	<1 year	1-5 years	>5 years	Total	<1 year	1-5 years	>5 years	Total	31/12/2020
Forward exchange transactions	1,480	91	-	**1,571**	1,473	91	-	**1,564**	**(1)**
Swaps	20,394	6,891	16,368	**43,653**	20,090	6,933	17,152	**44,175**	**(745)**
	355	-	-	**355**	326	-	-	**326**	**13**
CURRENCY DERIVATIVES - HEDGING	**22,229**	**6,982**	**16,368**	**45,579**	**21,889**	**7,024**	**17,152**	**46,065**	**(733)**
Forward transactions	3,389	6,490	-	**9,879**	3,380	6,491	-	**9,871**	**4**
Swaps	14,576	5,180	275	**20,031**	14,606	5,162	255	**20,023**	**-**
	10	-	-	**10**	11	-	-	**11**	**-**
CURRENCY DERIVATIVES - TRADING	**17,975**	**11,670**	**275**	**29,920**	**17,997**	**11,653**	**255**	**29,905**	**4**

The notional value of cross-currency swaps shown in this note is also included in the note on interest rate derivatives (see note 18.7.2).

18.7.4 Commodity derivatives

The Group is exposed 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.

The Group hedges its forecast sales and purchases of electricity, gas, and coal using futures, forwards, options and swaps, essentially through cash flow hedges.

Details of commodity derivatives used for hedging are as follows:

		31/12/2021					31/12/2020	
	Units of measure	Net notional				Fair value	Net notional	Fair value
(in millions of euros)		<1 year	1-5 years	>5 years	Total			
Electricity	TWh	(22)	(9)	-	**(31)**	**(3,808)**	(25)	35
Gas	Millions of therms	738	205	-	**943**	**(925)**	2,131	102
Oil products	Thousands of barrels	4,763	9,334	-	**14,097**	**166**	9,610	18
CO_2	Thousands of tonnes	3,147	4,077	-	**7,224**	**333**	7,925	76
Coal	Millions of tonnes	-	-	-	**-**	**-**	(1)	-
COMMODITY DERIVATIVES - HEDGING						**(4,234)**		**231**

The negative fair value of commodity derivatives used for hedging at 31 December 2021 (€4.2 billion) is mainly explained by the wider contractual market price/exercise price spread on electricity hedging instruments, and to a lesser extent on gas hedging instruments, due to the rise in commodity prices in 2021, particularly at the end of the year.

These factors also explain the difference in the fair value between 2021 and 2020, essentially concerning hedges undertaken for the France – Generation and Supply, United Kingdom and Italy segments.

Details of commodity derivatives used for trading are as follows:

		31/12/2021		31/12/2020	
	Units of measure	Net notional	Fair value	Net notional	Fair value
(in millions of euros)					
Electricity	TWh	(111)	(1,719)	(174)	(380)
Gas	Millions of therms	47,423	630	(6,803)	310
Oil products	Thousands of barrels	6,812	17	24,301	58
CO_2	Thousands of tonnes	(7,880)	(628)	3,355	(55)
Coal and freight	Millions of tonnes	-	(48)	1	(7)
Other commodities		-	(146)	-	8
COMMODITY DERIVATIVES - TRADING			**(1,894)**		**(66)**

These instruments mainly include contracts included in EDF Trading's portfolio.

18.7.5 Impact of hedging derivatives on comprehensive income

Changes in the fair value of hedging derivatives included in equity (EDF share) and profit and loss are detailed below:

	2021			2020		
(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	(98)	-	-	(24)	-	-
Exchange rate hedging	2 684	720	(38)	(850)	51	13
Net foreign investment hedging	(1,078)	(405)	-	661	-	-
Commodity hedging	(7,356)	(2,198)	(2)	644	430	(14)
HEDGING DERIVATIVES[3]	**(5,848)**	**(1,883)**	**(40)**	**431**	**481**	**(1)**

[1]+/( ): increase/(decrease) in equity (EDF share).
[2]+/( ): increase/(decrease) in net income (EDF share).
[3]Excluding associates and joint ventures.

The gross change in the fair value of hedging instruments recognised in equity (EDF share), including recycling, is €(3,965) million in 2021 (€(50) million in 2020).

In 2021 this change is explained by the gross fair value changes in net foreign investment hedges, amounting to €(673) million, and interest rate, exchange rate and commodity hedges, amounting to €(3,292) million (€(711) million in 2020 – see the consolidated statement of comprehensive income.

The amount transferred to operating profit before depreciation and amortisation in 2021 is (2,198) million in respect of commodity hedges comprises:

- €(1,242) million for electricity hedging contracts, mainly concerning the United Kingdom and the France - Generation and supply segments,
- €(938) million for gas hedging contracts, concerning the France - Generation and supply and United Kingdom segments,
- €(18) million for other hedging contracts.

18.7.6 Offsetting of financial assets and liabilities

Accounting principles and methods

A financial asset and financial liability must be netted if the entity currently has a legally enforceable right to do so and intends either to settle the net amount or to realise the asset and settle the liability simultaneously.

At 31 December 2021

			Balance with offsetting under IAS 32			Amounts covered by a general offsetting agreement but not offset under IAS 32		
(in millions of euros)	As reported in balance sheet	Balance without offsetting	Gross amount recognised (before offsetting)	Gross amount offset under IAS 32	**Net amount recognised after offsetting under IAS 32**	Financial instruments	Fair value of financial collateral	**Net amount**
Fair value of derivatives – assets	**29,971**	**3,948**	70,140	(44,117)	**26,023**	(1,645)	(8,309)	**16,069**
Fair value of derivatives – liabilities	**(32,151)**	**(5,316)**	(70,952)	44,117	**(26,835)**	1,645	5,996	**(19,194)**

At 31 December 2020

			Balance with offsetting under IAS 32			Amounts covered by a general offsetting agreement but not offset under IAS 32		
(in millions of euros)	As reported in balance sheet	Balance Without offsetting	Gross amount recognised (before offsetting)	Gross amount offset under IAS 32	**Net amount recognised after offsetting under IAS 32**	Financial instruments	Fair value of financial collateral	**Net amount**
Fair value of derivatives – assets	**10,477**	**2,956**	11,091	(3,570)	**7,521**	(1,672)	(2,797)	**3,052**
Fair value of derivatives – liabilities	**(7,917)**	**(2,927)**	(8,560)	3,570	**(4,990)**	1,672	568	**(2,750)**

NOTE 19 FINANCIAL INDICATORS

The financial indicators are not defined by the accounting standards and are not directly visible in the Group's financial statements. The principal financial indicators are the following.

19.1 NET INCOME EXCLUDING NON-RECURRING ITEMS

Net income excluding non-recurring items corresponds to the Group's share of net income (EDF net income) excluding non-recurring items, net changes in the fair value of energy and commodity derivatives (excluding trading activities), and net changes in the fair value of debt and equity instruments, net of tax.

The following tables show the transition from EDF net income to net income excluding non-recurring items:

At 31 December 2021

(in millions of euros)	Notes	2021			
		Gross value	Income taxes	Non-controlling interests	EDF net income
Net income					**5,113**
Changes in the fair value of debt and equity instruments[1]	8.3	**(2,804)**	**776**	**3**	**(2,025)**
Net changes in fair value on Energy and Commodity derivatives, excluding trading activities	6	**215**	**(66)**	**-**	**149**
Impairment [2]		**872**	**(177)**	**(87)**	**608**
- impairment of fixed assets	10.8.1 and 10.8.2	*653*	*(177)*	*(87)*	*389*
- impairment of investments in associates and joint ventures	12.3	*219*	*-*	*-*	*219*
Other items		**1,054**	**(152)**	**(30)**	**872**
- other operating income and expenses	7	*1,123*	*(220)*	*(30)*	*873*
- tax revaluation of assets in Italy		*-*	*(103)*	*-*	*(103)*
- increase in the income tax rate in the UK	9.2	*-*	*359*	*-*	*359*
- recognition of deferred tax assets in the United States	9.2	*-*	*(191)*	*-*	*(191)*
- other		*(69)*	*3*	*-*	*(66)*
NET INCOME EXCLUDING NON-RECURRING ITEMS					**4,717**

[1]Including fair value hedges of dedicated assets and changes in the fair value of debt and equity instruments comprised in investments in associates and joint ventures.

[2]In 2021, impairment includes €(445) million concerning assets of the Dungeness power plant.

The net income excluding non-recurring items amounts to €4,717 million at 31 December 2021, down by €2,748 million compared to 2020.

At 31 December 2020

(in millions of euros)	Notes	2020 Gross value	Income taxes	Non-controlling interests	EDF net income
Net income					**650**
Changes in the fair value of debt and equity instruments[1]	8.3	**(1,248)**	**377**	**(2)**	**(873)**
Net changes in fair value on Energy and Commodity derivatives, excluding trading activities	6	**175**	**(51)**	**-**	**124**
Impairment		**1,111**	**(156)**	**(111)**	**844**
- impairment of fixed assets	*10.8.1 et 10.8.2*	*799*	*(156)*	*(102)*	*541*
- impairment of investments in associates and joint ventures	*12.3*	*195*	*-*	*(6)*	*189*
- impairment of Edison's E&P operations (application of IFRS 5)	*3.2.2*	*117*	*-*	*(3)*	*114*
Other items		**809**	**414**	**1**	**1,224**
- other operating income and expenses	*7*	*487*	*(153)*	*1*	*335*
- tax litigations	*9.2*	*-*	*537*	*-*	*537*
- change of income tax rate in the UK	*9.2*	*-*	*121*	*-*	*121*
- accelerated depreciation of thermal power plants in France	*10.3*	*250*	*(80)*	*-*	*170*
- other		*72*	*(11)*	*-*	*61*
NET INCOME EXCLUDING NON-RECURRING ITEMS					**1,969**

[1] *Including fair value hedges of dedicated assets and changes in the fair value of debt and equity instruments comprised in investments in associates and joint ventures.*

19.2 NET INDEBTEDNESS

Net indebtedness comprises total loans and financial liabilities, less cash and cash equivalents and liquid assets. Liquid assets are financial assets consisting of funds or 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.

Net indebtedness are as follows:

(in millions of euros)	Notes	31/12/2021	31/12/2020
Loans and other financial liabilities	18.3.2	69,406	65,591
Derivatives used to hedge liabilities	18.7.1	(3,762)	(1,986)
Cash and cash equivalents	18.2	(9,919)	(6,270)
Debt and equity securities – liquid assets	18.1.2	(12,737)	(15,028)
Net indebtedness of assets held for sale	3.2.1	-	(17)
NET INDEBTEDNESS		**42,988**	**42,290**

The Group's net indebtedness amounts to €42,988 million at 31 December 2021 (€42,290 million at 31 December 2020). The ratio of net indebtedness to operating profit before depreciation and amortisation at 31 December 2020 is 2.39.

NOTE 20 SUSTAINABLE DEVELOPMENT AND CLIMATE ACTION

Introduction and background

Following the adoption in May 2020 of its ***raison d'être***, **"To build a net zero energy future with electricity and innovative solutions and services, to help save the planet and drive wellbeing and economic development"**, and in line with its CAP2030 strategy, the Group revised the architecture of its Corporate Social Responsibility (CSR) commitments. 16 CSR commitments were defined around four key issues: Carbon neutrality and Climate, Preserving the planet's resources, Wellbeing and Solidarity, and Responsible development. This CSR grid is applied to all projects in the commitment phase, to make sure they are aligned with the Group's *raison d'être*.

The **Group's financial statements** reflect issues relating to climate change and sustainable development through the dimensions presented below: implementation of its investment and divestment strategy and a sustainable financing strategy; expenditure incurred specifically in response to environmental issues, particularly under applicable laws and

regulations; and the valuation methods used for the Group's assets and liabilities.

Concerning **regulations**, on 10 December 2021 the European Union adopted the Delegated Act supplementing article 8 of European regulation 2020-852 of 18 June 2020 which aims to classify economic activities based on their contribution to the achievement of environmental objectives. This **"Taxonomy regulation"** is part of the European strategy to promote emergence of sustainable finance that contributes to attainment of carbon neutrality by 2050, particularly by encouraging capital inflows into sustainable investments. It is applicable from 31 December 2021 and requires groups subject to the non-financial reporting obligation, as is the case for the EDF group, to publish three new indicators: the share of sales, capital expenditure and operating expenditure associated with European taxonomy-eligible, then taxonomy-aligned economic activities. The laws applicable at 31 December 2021 do not cover nuclear electricity generation, which is a dominant activity for the Group, nor do they cover activities relating to natural gas. After several months of debate, a draft Delegated Act specifically for nuclear and gas operations was sent to the 27 member states of the European Union on 31 December 2021 for a consultation period that ended on 21 January 2022. The final Delegated Act was published on 2 February 2022 and must be approved or rejected by the European Parliament within four months.

The results of the Group's work to establish these three indicators are presented in the Group's report on its non-financial performance, in section 3.8.3 "Details on the taxonomy" of the 2021 Universal Registration Document.

20.1 REGULATORY EXPENSES

The regulatory frameworks and accounting principles for greenhouse gas emission rights, renewable energy certificates and energy savings certificates are presented respectively in notes 5.4.3, 10.2 and 17.2.

20.1.1 Greenhouse gas emission rights

EU Emissions Trading System (EU ETS)

The European Union's Emissions Trading System (EU ETS) exists to fight climate change and reduce greenhouse gas emissions.

This system, which applies in all EU countries, sets an annual cap on emissions. Businesses (including EDF) receive or buy emission quotas, then the following year surrender to the European Commission a number of greenhouse gas emission rights corresponding to their Scope 1 emissions for the year elapsed, such as direct greenhouse gas emissions from production of the goods sold (e.g. electricity, heat, steel, paper, etc). Fines are payable if there is a shortfall (€110 per tonne of CO_2 not covered by quotas, and an obligation to cover these amounts by quota the following year).

The cap is being progressively reduced in order to bring down the total emissions in Europe.

The legislative framework of the EU-ETS for the fourth trading period (2021-2030) has been tightened up to achieve the emission reduction targets set in the 2030 Climate and Energy framework, and the EU's contribution to the Paris Climate Agreement adopted in 2015 (which set a general target of a 40% cut in emissions compared to 1990 levels for the whole EU)[1]. One key step was accelerating annual quota reductions to 43 million tonnes per year (2.2% below the allocations for 2010).

The European Commission also presented a package of proposals on 14 July 2021 entitled "Fit for 55", intended to bring the European Union closer to the augmented target of cutting CO2 emissions by at least 55% (compared to 1990 levels) by 2030. The quota system is likely to change after a process of negotiation in the European institutions that is expected to last between 12 and 18 months.

In the EDF group, the entities concerned by application of these European regulations are EDF, Edison, Dalkia, PEI and Luminus. The Group no longer receives free emissions quota allocations.

The volume of emissions at 31 December 2021 stood at 17 million tonnes (19 million tonnes for 2020 including EDF Energy).

Actual greenhouse gas emissions amounted to €380 million at 31 December 2021 (€260 million at 31 December 2021 including EDF Energy) and are included in provisions in the balance sheet.

In 2021, the Group surrendered 16 million tonnes in respect of emissions generated in 2020 under the EU ETS (in 2020 it surrendered 21 million tonnes in respect of emissions generated in 2019, including EDF Energy).

British Emissions Trading Scheme (UK ETS)

Now that Brexit has taken place, the United Kingdom is no longer a member of the European system (EU ETS) and has set up its own system (UK ETS - Emissions Trading Scheme). The UK ETS, which uses a bidding system, covers the same sectors as the EU ETS and operates under generally similar rules, with comparable accounting treatment.

1 The current EU ETS allocations trajectory does not yet include changes to be made in application of the Fit for 55 package.

The volume of emissions at 31 December 2021 stood at 2 million tonnes (3 million tonnes for 2020). Actual impacts of greenhouse gas emissions amounted to €36 million at 31 December 2021 (€83 million at 31 December 2021) and are included in provisions in the balance sheet.

In 2021, EDF Energy surrendered 3 million tonnes in respect of emissions generated in 2020 under the UK ETS (in 2020 it surrendered 5 million tonnes in respect of emissions generated in 2019).

20.1.2 Renewable energy certificates (green certificates)

To encourage use of renewable energy produced from renewable sources, every EU member state has set itself national targets for consumption of electricity from renewable sources. Guarantee of Origin certificates prove the renewable origins of the electricity, which transits through the grid. They are sold by operators of renewable energy plants and bought by customers who want to use renewable-source electricity.

There are two ways for States to meet their targets:

- incorporating the costs of these certificates into the sale price for electricity (this is the approach taken in France);
- introducing an obligation to surrender a certain volume of renewable energy certificates depending on the level of sales to customers (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 sales (EDF Renewables);
- obligated electricity producers when the obligation applies to generation;
- electricity producers who are also sellers of electricity when the obligation applies to energy sales (EDF Energy, Edison and Luminus).

A provision of €1,156 million was recognised at 31 December 2021 concerning the obligations for renewable energy certificates to be surrendered at that date, essentially by EDF Energy (United Kingdom) and Luminus (Belgium). A large portion of these obligations are covered by purchased certificates recorded in intangible assets.

Although the United Kingdom is no longer a member of the European Union, it is still concerned by this system.

20.1.3 Energy savings certificates

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

In France, the Law of 13 July 2005 introduced a system of energy savings certificates, imposing energy savings obligations on suppliers of energy (electricity, gas, heat, cold, domestic fuel oil and fuel for vehicles) with sales above a certain level. At the end of the period concerned, obligated actors are required to present energy savings certificates that correspond to their obligatory energy savings, otherwise sanctions apply. These certificates are obtained in return for energy savings operations conducted directly or indirectly, or purchased from other obligated or “eligible” economic actors.

Initially planned for the period 2018-2020, the fourth period of France’s energy savings certificates scheme was extended by one year (by law no. 2019-1147 of 8 November 2019 on Energy and the Climate) (see note 5.4.3). This fourth period (2018-2021) ended on 31 December 2021. Decree 2021-712 on the fifth period of the energy savings certificates scheme (2022-2025) was published in the *Journal officiel* of 5 June 2021.

Despite a substantially higher energy savings target in the fourth period, the EDF group is on track to meet its obligation by the time the authorities finalise the energy savings certificate accounts for the fourth period, and should even begin the fifth period (1 January 2022 – 31 December 2025) with advance stocks.

To meet this obligation, three sources are available to the EDF group: supporting consumers in energy efficiency operations (in 2021, for example, 222,000 renovation projects were completed), funding State-approved energy savings programmes, and purchasing certificates from eligible actors.

In the United Kingdom for example, EDF Energy helps companies explore and develop solutions by enabling them to save energy, carbon and costs, particularly through its Powershift flexibility platform.

20.2 VALUATION OF ASSETS AND LIABILITIES

20.2.1 Provisions for contingencies and losses incorporating environmental issues

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. Obligations can vary noticeably depending on each country’s legislation and regulations, and the technologies and industrial scenarios

involved. Details of these provisions are provided in notes 15 and 17.

Provisions related to environmental schemes include provisions for greenhouse gas emission rights, renewable energy certificates and energy savings certificates. In 2021, these provisions totalled €1,572 million (€1,192 million in 2020, see note 17.2).

Contingent liabilities also exist in connection with environmental litigation, such as the dispute concerning the Ausimont SpA industrial complex. These liabilities are described in note 17.3.

20.2.2 Valuation of assets

Climate issues are taken into account in valuing long-term assets through impairment testing. The long-term scenarios used for electricity prices in countries where the Group does business are consistent with the trajectories of European decarbonisation targets, particularly as set in the Paris climate agreement (see note 10.8).

The Group controls and operates thermal (gas-fired, coal-fired, oil-fired) electricity generation plants principally in France and Italy, to a smaller extent in Brazil and Belgium, and to a now marginal degree in England (since the sale of West Burton B in 2021, see note 3.1). The net book value of the assets concerned is €5.0 billion at 31 December 2021, including €4.1 billion for assets in France and €0.8 billion for assets in Italy.

In mainland France, the electricity generated by EDF's fleet of thermal power plants (CCGT, CT, and coal, with net book value of €1.9 billion) accounted for around 2.59% of EDF's total electricity output in 2021. These plants operate in semi-baseload and peak periods and are used to variable degrees throughout the year, playing a significant role in system security when there are tensions on the supply-demand balance.

With the end of coal-fired generation in application of the Multi-year energy programme, the coal-fired plant at Le Havre (0.6GW) was closed at 1 April 2021 (see note 10.3) and the Cordemais plant is due to cease operations in 2026 at the latest.

EDF is modernising its fleet of natural gas CCGT plants (Blénod, Martigues, Bouchain) to reduce air emissions of CO_2, NOx and SO_2. The Bouchain plant in particular produces CO_2 emissions of around 360g/kWh on average.

In the island territories, electricity is principally generated by an oil-fired fleet (with net book value of €2.2 billion), and to a smaller degree hydroelectric plants and renewable energy plants. Where required by the Multi-year energy programme, EDF intends to operate new plants running on liquid biomass, or to convert its existing plants to run on bioliquid.

In Italy, Edison's thermal fleet consists of CCG plants. In keeping with the "National plan for energy and the climate" supporting development of gas-based electricity generation and its integration with renewable energy generation, in 2019 Edison started to build the first new-generation CCG plant at the Marghera Levante site (780 MW). This was followed in 2020 by the start of work on a 760MW greenfield project at Presenzano (in Campania), using the same technology, for low environmental impact (CO_2 emissions 40% below the national average, and a 70% reduction in NOx emissions). These two facilities should be commissioned in 2022 and 2023 respectively.

20.3 SUSTAINABLE FINANCING

20.3.1 Green Bonds

Since 2013 the Group has made six Green Bond issues for a value equivalent to €8.7 billion, in order to support its development in renewable energies. It has invested around €2.5 billion per year to such operations.

After the two Green Bond issues chiefly intended to finance the building of new wind and solar power projects by its subsidiary EDF Renewables (€1.4 billion in November 2013 and $1.25 billion in October 2015), the Group expanded its Green Bond Framework to finance investments in the renovation and modernisation of its hydropower assets in mainland France.

The new Framework was first applied to a €1.75 billion issue in October 2016 and then to a JPY 26 billion issue in two tranches in January 2017. The Group extended the scope of its Green Bond Framework further in early 2020 by opening it up to international hydropower assets, energy efficiency projects and biodiversity conservation projects.

On 8 September 2020, EDF made a landmark offering of unsecured senior Green Bonds convertible into new shares and/or exchangeable for existing shares of the Company (*OCEANEs Vertes*) maturing in 2024, for the nominal amount of approximately €2.4 billion.

On 23 November 2021, EDF launched a senior Green Bond issuance maturing in 2033, for a total amount of €1.75 billion with a fixed 1% coupon.

The Green Bonds are included in the group's borrowings, see note 18.3.2. Allocation of the funds raised by EDF's Green Bond issues is certified by one of the statutory auditors: see section 6.7 of the Universal Registration Document.

20.3.2 Social bonds (social hybrid notes)

On 26 May 2021 EDF launched an issue of Euro-denominated perpetual social hybrid notes with total nominal value of €1.25 billion and an initial coupon of 2.625% and a first redemption at the option of EDF on 1 June 2028.

The funds raised will be used to finance eligible projects, as defined in the EDF Group's Social Bond Framework. These projects include capital expenditure contracted with Small and Medium-Sized Enterprises (SMEs) which contributes to the development and maintenance of electricity generation and distribution assets in Europe (including the United Kingdom). To qualify for funding, SMEs must meet three criteria: (1) a workforce of fewer than 250 people; (2) annual sales of less than €50 million or a balance sheet total of less than €43 million; (3) a 25% or lower ownership interest in a group. Criterion (3) makes EDF's definition more restrictive than the EU definition.

The Social Bond Framework's compliance with the Social Bond Principles published by the International Capital Markets Association (ICMA) was validated by S&P Global in a Second Party Opinion published in May 2021. EDF's social bond programme is in line with the group's CSR objectives regarding responsible development of local areas and responsible development of industrial sectors.

A provisional impact report on these investments was published on the EDF group's website on 10 November 2021.

Allocation of the funds raised by EDF's social bonds is audited by one of its statutory auditors (see section 6.8 of the 2021 Universal Registration Document).

These perpetual social hybrid notes are recorded in equity (see note 14.4).

20.3.3 Credit lines indexed on ESG criteria

The EDF group is strongly committed to corporate social responsibility (CSR) and advocates closer ties between non-financial performance and financing strategy.

The credit lines indexed to the Group's sustainable development performance incorporate a cost adjustment mechanism.

EDF SA has a €4 billion "green" syndicated credit line with more than 20 banks that incorporate a margin adjustment mechanism linked to Group performance on three KPIs: direct CO_2 emissions, French residential customers' use of online consumption monitoring tools, and electrification of EDF's light vehicle fleet.

In December 2021 EDF also signed a new €1.5 billion "social" credit facility with 9 banks. The initial maturity is three years and the cost will be indexed on four KPIs focused on EDF's Fair and Inclusive Transition principles in favour of all stakeholders: employees, customers, suppliers and the communities where the Group operates.

At the end of 2021, the Group also signed 15 renewable bilateral credit lines indexed on ESG criteria (incorporating a cost adjustment mechanism based on the Group's performance on certain KPIs or its rating by a nonfinancial ratings agency), amounting to a total €3.84 billion.

At 31 December 2021, undrawn ESG-indexed renewable credit lines lines (including syndicated credit facilities), which were undrawn, totalled over €9.3 billion, or 72% of the EDF group's total undrawn credit facilities (see note 18.4).

The selected KPIs reflect the EDF group's major environmental commitments, principally cutting greenhouse gas emissions (CO_2) by 50% by 2030, closing down coal-fired plants in France and the United Kingdom with a view to achieving carbon neutrality by 2050, and completing electrification of the whole EDF group vehicle fleet by 2030. The focus on consumption monitoring tools reflects the Group's ambition to provide its customers with energy solutions appropriate to their needs.

20.4 CARBON-FREE INVESTMENTS

In 2021 the Group continued its programme of gross operating investments, which amounted to €18.3 billion and included €17.6 billion of gross investments in intangible assets and property, plant and equipment (see notes 4 and 10.7) and €0.7 billion of gross financial investments.

In 2021, nearly 94% of the Group's investments were in line with its net-zero trajectory (94% in 2020), with 50% of investments concerning the nuclear sector (51% in 2020). 40% of the Group's investments are aligned with the European sustainable taxonomy (43% in 2020 applying the method based on the March 2020 TEG (technical expert group) report. This notably covered investments in networks, renewable energy production (hydropower, solar power, wind power) and certain energy services (presented in the Group's report on its non-financial performance, in section 3.8.3 "Details on the taxonomy" of the 2021 Universal Registration Document).

Also, through its investments in new activities EDF is an actor in the energy transition. The Innovation and Pulse Programmes Division (DIPP) was set up in 2021 to bring out and develop new growth levers for the EDF group. It pursues that objective by investing in startups and venture capital funds dedicated to innovation (the EDF Pulse Ventures programme), and by developing intrapreneurial projects (the EDF Pulse Incubation programme). These programmes already existed in different forms and in the last ten years several subsidiaries have been opened by the Group, such as

Hynamics in 2019, a company that produces and sells low-carbon hydrogen produced by water electrolysis to meet the needs of the heavy-duty transport industry.

The Group's *raison d'être* is also expressed in the management policy for its portfolio of dedicated assets held to finance long-term nuclear expenses in France (€37.5 billion at 31 December 2021), and the introduction of a responsible investor's charter with three focal points (compliance with the United Nations' Principles for Responsible Investment; respect of the major international agreements on human rights; and annual reporting on responsible investments). This charter is applicable both to assets managed directly and assets managed by specialist companies under delegated management arrangements.

20.5 EXPENSES FOR PROTECTION OF THE ENVIRONMENT AND CLIMATE

The Group is continuing its commitments to address environmental issues, for example through the following actions.

20.5.1 Research and development (R&D)

Given the goal of carbon neutrality by 2050, and the fact that electricity is a major lever in action to decarbonise the French economy, R&D has a crucial role to play in the electricity, climate, digital and societal transition.

In 2021, the EDF group's total R&D budget amounted to €661 million, 99% of EDF's R&D budget is dedicated to achieving the net zero goal, and the energy system transition.

The R&D budget is particularly channelled into research into energy efficiency, uses of electricity as a substitute for fossil fuel-based energies, renewable energies and their insertion into the grid, energy storage and production, carbon-free hydrogen and its applications for decarbonising the economy, sustainable cities, the local impacts of climate change and other environmental issues such as biodiversity, water quality, and the mitigation of all forms of pollution.

Research concerning electricity storage, enhancement of energy performance diagnosis methods, improvement of techniques for urban heating and cooling networks, platforms for sharing studies relevant to the ecological transition, and increasing safety at nuclear power plants is supported by public subsidies, notably from the European Union.

Accounting principles and methods for R&D are presented in note 10.2.

20.5.2 Other expenses for protection of the environment and climate

Accounting principles and methods

Other expenses for protection of the environment and climate are identifiable expenses incurred to prevent, reduce or repair damage 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.

All of the Group's functions, employees, activities and projects are mobilised to fulfil EDF's objective of being an environmentally responsible company. Some of the actions concerned are presented below.

Action for biodiversity

The EDF group has been committed to action for biodiversity since 2006 with a dedicated policy, and today its biodiversity ambitions are reflected in formal commitments made through two initiatives, *Entreprises engagées pour la nature* (Committed companies for nature) and "Act4nature international". These voluntary commitments cover some twenty actions to reduce contributions to major pressure points on biodiversity (as identified by IPBES, the biodiversity equivalent of the IPCC), recreate biodiversity-friendly spaces and conditions, further improve and share knowledge, strengthen biodiversity governance and raise employee awareness.

In addition to these commitments, between 2013 and 2021, the Group undertook more than 55 operations (through EDF hydro and its hydropower activities) to facilitate fish migration at ecologically sensitive sites in mainland France ("list 2" sites

for the purposes of the national law on water and aquatic environments), installing fish passes and fish ladders and removing river weirs.

Action for employees and vehicle fleet electrification

Consistent with its ambitions for the environment and the climate, the Group works to raise awareness among its employees and educate them about environmental and sustainable development issues. In 2021 its "Environment and sustainable development" training offering comprising courses on environmental management, standards and regulations, and environmental analysis, provided 3,593 employees with 24,683 hours of training.

In addition, the rollout at Group level of the "Climate Collage" collaborative workshop, led in person or online by volunteer employees after internal training, gave 22,000 employees greater awareness of the issues of climate disruption.

As the first French Group to sign the EV100 initiative, EDF made a commitment to have a fully-electric light vehicle fleet by 2030. By the end of 2021 the worldwide fleet numbered close to 45,000 light vehicles (especially in Europe) and more than 17.3% were already electric (over 7,750 electric vehicles, an increase of more than 2,100 from 2020). Joining the EV100 initiative is also an encouragement for Group employees to control their energy consumption and reduce their carbon footprint, as it gives them access to competitive offers from car suppliers and offers for recharging services sold by EDF group subsidiaries.

For 2021, the vehicle fleet electrification indicator accounts for 20% of EDF SA's profit-sharing criteria and 10% of Enedis' profit-sharing criteria for their respective fleets.

NOTE 21 OFF-BALANCE SHEET COMMITMENTS

This note presents off-balance sheet commitments given and received by the Group at 31 December 2021. The amounts of commitments correspond to non-discounted contractual values.

21.1 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	31/12/2021	31/12/2020
Operating commitments given	21.1.1	54,268	42,235
Investment commitments given	21.1.2	16,996	16,494
Financing commitments given	21.1.3	5,837	5,536
TOTAL COMMITMENTS GIVEN		**77,101**	**64,265**

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.

21.1.1 Operating commitments given

Operating commitments given by the Group are as follows:

(in millions of euros)	31/12/2021	31/12/2020
Fuel and energy purchase commitments[(1)]	37,908	24,715
Operating contract performance commitments given	16,047	17,151
Operating lease commitments as lessee	313	369
TOTAL OPERATING COMMITMENTS GIVEN	**54,268**	**42,235**

[(1)] Excluding gas purchases and related services

21.1.1.1 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 2021, fuel and energy purchase commitments mature as follows:

(in millions of euros)	31/12/2021					31/12/2020
	Total	Maturity				Total
		<1 year	1 to 5 years	5 to 10 years	>10 years	
Electricity purchases and related services[1]	24,557	4,495	6,871	4,882	8,309	10,574
Other energy and commodity purchases[2]	346	82	159	105	-	308
Nuclear fuel purchases	13,005	1,585	5,620	4,337	1,463	13,833
FUEL AND ENERGY PURCHASE COMMITMENTS	**37,908**	**6,162**	**12,650**	**9,324**	**9,772**	**24,715**

[1]Including commitments given by controlled entities to joint ventures, amounting to €487 million at 31 December 2021 (€533 million at 31 December 2020).
[2]Excluding gas purchases and related services (see note 21.1.1.1.4).

21.1.1.1.1 Electricity purchases and related services

Electricity purchase commitments at 31 December 2021 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.

The change over the year is mainly explained by the €12 billion increase in EDF Energy's purchase commitments due to higher electricity prices and the volumes involved, particularly after signature of the 15-year power purchase agreement with RWE (for renewable energy to be produced once the Sofia offshore wind farm off the British coast is commissioned). The €2 billion increase in EDF and Luminus' purchase obligations is explained by the rise in volumes and contract prices over the year.

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 54TWh for 2021 (59TWh for 2020), including 7TWh for co-generation (7TWh for 2020), 25TWh for wind power (31TWh for 2020), 11TWh for photovoltaic power (11TWh for 2020) and 4TWh for hydropower (4TWh for 2020).

21.1.1.1.2 Other energy and commodity purchases

Purchase commitments for other energies and commodities mainly concern purchases of biomass fuel used by Dalkia in the course of its business.

21.1.1.1.3 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.

21.1.1.1.4 Gas purchases and related services

Gas purchase commitments are principally undertaken by Edison and EDF. The volumes concerned for both entities at 31 December 2021 are as follows:

(in billions of m^3)	31/12/2021				31/12/2020
	Total	Maturity			Total
		<1 year	1 to 5 years	>5 years	
Edison	137	13	48	76	124
EDF	23	2	7	14	26

Gas purchase contracts

Edison has entered into agreements to import natural gas from Russia, Libya, Algeria, Azerbaijan and Qatar, for a total maximum volume of 13.4 billion m3 per year. The residual terms of these contracts vary between 1 and 23 years.

The contract with Algeria was renewed in 2019 for 1 billion m3 per year until 2027. The long-term contract for gas from Russia terminated in 2019 and Edison signed a new contract for 1 billion m3 for 2020, 2021, then for 2022.

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 m3 of natural gas per year) for a 20-year period from May 2020.

In 2020, EDF signed a new 5-year contract for 3 billion m3 from Norway.

Some contracts contain "take-or-pay" clauses committing the buyer to pay for a minimum volume of gas every year, whether or not it actually takes delivery of that volume.

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 signed a contract for LNG supplies from the United States (1 million tonnes per year). Deliveries under this contract will only start in 2023.

21.1.1.2 Operating contract performance commitments given

At 31 December 2021, these commitments mature as follows:

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1 to 5 years	> 5 years	
Operating guarantees given	8,693	3,019	2,270	3,404	9,185
Operating purchase commitments[1]	7,173	4,069	2,433	671	7,720
Other operating commitments	181	46	73	62	246
OPERATING CONTRACT PERFORMANCE COMMITMENTS GIVEN[2]	**16,047**	**7,134**	**4,776**	**4,137**	**17,151**

[1] *Excluding fuel and energy*

[2] *Including commitments given by controlled entities to joint ventures, amounting to €1,928 million at 31 December 2021 (€1,714 million at 31 December 2020).*

In the course of its business, the Group provides contract performance guarantees, generally through the intermediary of banks.

Operating guarantees given at 31 December 2021 mainly consist of guarantees given by EDF Renewables in connection with its development projects, Edison and EDF.

The change in these guarantees is essentially explained by the termination of the Group's guarantee covering the differential between the value of UK pension obligations under the Trustees' method and under IAS 19, following renegotiation leading to new agreements signed on 31 December 2021 and applied from January 2022. It also results from new EDF Renewables projects in development (particularly in the United States) and arrangement of new guarantees by Edison and Framatome in the course of their operational activities.

21.1.1.2.1 Operating guarantees given

Operating guarantees given are as follows:

(in millions of euros)	31/12/2021	31/12/2020
EDF Renewables	3,024	2,447
Edison	1,882	1,657
EDF	1,228	2,496
Framatome	1,087	573
EDF Energy	571	1,055
Other entities	901	957
TOTAL	**8,693**	**9,185**

21.1.1.2.2 Operating purchase commitments

Operating purchase commitments are as follows:

(in millions of euros)	31/12/2021	31/12/2020
EDF	3,360	3,524
Framatome	1,399	1,659
Enedis	794	845
EDF Renouvelables	544	391
EDF Energy	381	591
Other entities	695	710
TOTAL	**7,173**	**7,720**

21.1.1.3 Lease commitments as lessee

At 31 December 2021, lease commitments as lessee break down as follows:

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1 to 5 years	> 5 years	
LEASE COMMITMENTS AS LESSEE	**313**	**55**	**146**	**112**	**369**

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 2021 is €204 million (€191 million at 31 December 2020);
- 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 2021 is €109 million (€178 million at 31 December 2020).

21.1.2 Investment commitments given

At 31 December 2021, details of investment commitments are as follows:

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1 to 5 years	> 5 years	
Commitments related to acquisition of tangible and intangible assets	15,905	8,566	6,921	418	15,625
Commitments related to acquisition of financial assets	929	84	734	111	716
Other commitments related to investments	162	128	34	-	153
TOTAL INVESTMENT COMMITMENTS GIVEN[(1)]	**16,996**	**8,778**	**7,689**	**529**	**16,494**

[(1)] Including commitments given by controlled entities to joint ventures, amounting to €194 million at 31 December 2021 (€212 million at 31 December 2020).

21.1.2.1 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)	31/12/2021	31/12/2020
EDF	4,109	4,284
EDF Energy	6,346	5 966
Enedis	2,568	2,461
EDF Renouvelables	1,431	1,369
Framatome	520	462
Other entities	931	1,083
TOTAL	**15,905**	**15,625**

The increase in commitments given related to acquisition of tangible and intangible fixed assets is explained by the higher commitments given by EDF Energy (mainly due to the significant rise by the pound sterling against the euro), Enedis (higher purchase commitments for electric equipment combined with a decline in commitments for the Linky meter as its general rollout has now ended), and EDF Renewables (development of new projects in the United States, the United Kingdom and France, offset by progress and commissioning of solar power plants and wind farms, especially in the United States). The lower level of commitments given by Edison relates to progress on construction of the two new-generation CCGT power plants at Presenzano and Marghera Levante.

21.1.2.2 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 2021, the fair value of these trading derivatives is not significant.

The increase in commitments related to acquisition of financial assets notably reflects EDF's subscription in equal shares with the State to the *Fonds France Nucléaire* investment fund. EDF and the State each contributed €50 million to this fund, which has a target total investment of €200 million by 2023.

The purpose of the *Fonds France Nucléaire* fund is to invest to support growth by SMEs and intermediate-sized businesses in the nuclear industry, as part of the national recovery plan "France Relance", through which the French government is providing €470 million of funding for various aspects of the nuclear industry, from modernisation of industrial facilities and skill reinforcement to research and development.

Framatome finalised its acquisition of Rolls-Royce Civil Nuclear Instrumentation & Control (I&C) on 8 November 2021 (see note 3.1).

21.1.2.3 Other commitments related to investments

Other commitments given related to investments at 31 December 2021 mainly comprise guarantees given by EDF Norte Fluminense in connection with its 51% investment in CES, the company in charge of a hydroelectric dam on the Teles Pires river in Brazil.

21.1.3 Financing commitments given

Financing commitments given by the Group at 31 December 2021 comprise the following:

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1 to 5 years	> 5 years	
Security interests in real property	3,986	1,739	474	1,773	4,179
Guarantees related to borrowings	1,265	30	668	567	949
Other financing commitments	586	478	31	77	408
TOTAL FINANCING COMMITMENTS GIVEN[1]	**5,837**	**2,247**	**1,173**	**2,417**	**5,536**

[1] Including commitments given by controlled entities to joint ventures, amounting to €1,597 million at 31 December 2021 (€1,156 million at 31 December 2020). 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.

The guarantees given for borrowings are essentially guarantees provided by EDF Renewables for its project financing.

21.2 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	31/12/2021	31/12/2020
Operating commitments received[1]	21.2.1	9,065	8,108
Investment commitments received	21.2.2	609	132
Financing commitments received	21.2.3	18	31
TOTAL COMMITMENTS RECEIVED[2]		**9,692**	**8,271**

[1]Excluding commitments related to supplies of energy and related services (see note 21.2.1.4)
[2]Excluding commitments related to credit lines, which are described in note 18.4.

21.2.1 Operating commitments received

Operating commitments received by the Group at 31 December 2021 comprise the following:

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1 to 5 years	> 5 years	
Operating lease commitments as lessor	661	116	309	236	711
Operating sale commitments	6,360	1,704	3,372	1,284	5,903
Operating guarantees received	1,991	1,112	274	605	1,444
Other operating commitments received	53	25	16	12	50
OPERATING COMMITMENTS RECEIVED	**9,065**	**2,957**	**3,971**	**2,137**	**8,108**

21.2.1.1 Operating lease commitments as lessor

In 2021, the Group benefits from commitments as lessor in operating leases amounting to €661 million. These commitments mainly concern the Independent Power Projects (IPPs) and real estate leases.

21.2.1.2 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).

21.2.1.3 Operating guarantees received

Operating guarantees received principally concern Framatome, and relate to supply and technical assistance contracts for EDF's nuclear power plants with guarantees received from suppliers, particularly in connection with ARENH deliveries.

21.2.1.4 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, until 31 December 2025. This has concerned a maximum volume of 150TWh each year since 1 January 2020. (see note 23).

21.2.2 Investment commitments received

	31/12/2021				31/12/2020
	Total	Maturity			Total
(in millions of euros)		< 1 year	1 to 5 years	> 5 years	
INVESTMENT COMMITMENTS RECEIVED	**609**	**416**	**193**	**-**	**132**

The increase in investment and/or divestment commitments received is due to a guarantee received for a transfer of shares held by EDF under a repurchase agreement.

21.2.3 Financing commitments received

(in millions of euros)	31/12/2021				31/12/2020
	Total	Maturity			Total
		< 1 year	1 to 5 years	> 5 years	
FINANCING COMMITMENTS RECEIVED	18	2	16	-	31

NOTE 22 RELATED PARTIES

Accounting principles and methods

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.

Details of transactions with related parties are as follows:

(in millions of euros)	Associates and joint ventures		Joint operations		French State or State-owned entities[1]		Group Total	
	31/12/2021	31/12/2020	31/12/2021	31/12/2020	31/12/2021	31/12/2020	31/12/2021	31/12/2020
Sales	797	355	-	-	2,501	2,082	3,298	2,437
Energy purchases	4,196	3,885	2	1	2,441	2,114	6,639	6,000
External purchases	16	13	7	7	343	348	366	368
Financial assets	160	179	-	-	-	-	160	179
Other assets	844	495	-	-	630	593	1,474	1,088
Financial liabilities	-	-	-	-	-	-	-	-
Other liabilities	1,367	1,114	1	1	623	600	1,991	1,715

[1] *Excluding tax and social liabilities and the CSPE receivable.*

22.1 TRANSACTIONS WITH ENTITIES INCLUDED IN THE SCOPE OF CONSOLIDATION

Transactions with the principal associates (CTE (the company that owns RTE) and Taishan) are presented in note 12.

Transactions with other associates, joint ventures, and partner entities in joint arrangements with the Group mainly consist of sales and purchases of energy.

22.2 RELATIONS WITH THE FRENCH STATE AND STATE-OWNED ENTITIES

22.2.1 Relation with French State

The French State holds 83.88% of the capital of EDF at 31 December 2021, 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.

22.2.2 Relations with ENGIE

Enedis and GRDF share a common service function, defined by Article L. 111-71 of the French Energy Code. Its missions in the electricity and gas distribution sector are plant construction, site project management, network operation and maintenance, and metering operations. This service is not a legal entity in its own right.

Enedis and GRDF are bound by an agreement that defines their relations within this service function, its competences, 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.

Enedis and GRDF have been progressively reorganising their mixed activities for several years with a view to ending this agreement:

- in 2014 each entity became responsible for reading its own meters and doing work on its own meter panels;
- in 2018, certain support activities were separated (vehicles and machines, litigation and insurance, training and recruitment, office purchases) and two mixed entities were created, one for employment contracts, studies and medical/social matters, and the other for IT and telecoms.

In July 2021, on completion of work begun in 2020, the Governance board decided to begin a project to modernise the four remaining mixed entities: the IT and telecoms operator, the human resources and medical/social matters service, the national accounting unit and the "Serval" operational logistics unit. Following this decision a detailed investigation of the project was initiated, involving all the employees concerned, and employee consultation was begun.

Concerning the common service of LPG distribution and supply in the cities of Ajaccio and Bastia in Corsica, ENGIE informed EDF in October 2020 that it was considering terminating its LPG activities in Corsica.

Article 96 of France's Finance Law for 2022 allows the State to bear part of the costs associated with conversion of the LPG networks to electricity or renewable energies, for a maximum period of twenty years to be set by official order.

This measure currently has no impact for EDF. Ultimately, the prospect of ending LPG distribution operations and converting uses to electricity will need investments to reinforce the electricity distribution networks.

22.2.3 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 agreements were negotiated between EDF and Orano:

- for supplies of natural uranium: Orano Mining contracts;
- for fluoration and enrichment of natural uranium into uranium 235: an Orano Chimie-Enrichissement contract (formerly Orano cycle contract).

Back-end of the cycle

Relations between EDF and Orano Recyclage (formerly Orano Cycle) concerning transportation, processing and recycling of spent fuels are described in note 15.1.1.1.

22.3 MANAGEMENT COMPENSATION

The Company's key management and governance personnel are the Chairman and CEO, the members of the COMEX (Executive Committee) throughout 2021 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 €12.3 million in 2021 (€11.9 million in 2020). 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.

NOTE 23 SUBSEQUENT EVENTS

Exceptional regulatory measures and outlook for nuclear power generation in France

Exceptional regulatory measures

In view of the high increases in electricity market prices, France introduced a "tariff cap" limiting the raise in regulated sales tariffs to a maximum 4% (including taxes) at 1 February 2022 for residential customers compared to the tariffs in force at 1 August 2021. This tariff cap is founded on 2 articles of the Finance Law for 2022 (law 2021-1900 of 30 December 2021):

- Under article 29, a reduction in the TICFE tax (or CSPE) is applicable from 1 February 2022 for all customers (residential and business customers, on regulated-tariff or market-price contracts), although a legal minimum level must be maintained (€1/MWh for residential and small business customers). This reduction applies to quantities of energy delivered until 31 January 2023. The new TICFE tariffs have been set by decree.
- Under article 181, if the CRE, despite the reduction in the TICFE, proposes an increase in regulated sales tariffs for residential customers that exceeds 4% (including taxes) compared to the tariffs in force at 31 December 2021, as a dispensation from the Energy Code the French government may object to the proposal and through a joint decision by the Ministers for the Economy and Energy set the regulated sales tariffs, and tariffs for sales to the local distribution companies, at a lower level. If this happens, the law provides for a susequent catch-up adjustment of regulated sales tariffs in 2023, to be smoothed over twelve months, to cover the loss of income for EDF in 2022. The same article also introduces a mechanism to compensate for losses borne by local electricity distribution companies on regulated-tariff offers and electricity suppliers on market-price offers.

On 13 January 2022 the French government also announced further exceptional measures to limit the rise in electricity tariffs for consumers in 2022. Details of their practical implementation are still forthcoming, but one main step is attribution of an additional volume of 20TWh to the ARENH scheme for 2022, over the period 1 April to 31 December 2022, at the price of €46.2/MWh. This measure, announced in January 2022, has two effects for the Group: i) it is necessary to purchase these 20TWh of ARENH volume for delivery to other suppliers, with a very significant negative price effect given current market prices; ii) the increased ARENH portion in relation to the market-price portion in the “cost stacking” method used to calculate regulated sales tariffs for 2022 will induce a decrease in sales prices to customers on both regulated-tariff and market-price contracts.

The additional measures also concern extension of the 4% regulated tariff increase cap (including taxes) to non-residential customers who are still eligible for the regulated tariff in mainland France and non-interconnected zones.

In a press release of 13 January 2022, the Group acknowledged the measures announced by the French Government to limit the rise in electricity tariffs for 2022. The Group stated that the financial consequences could not be accurately determined at this stage. Based on the information available to the Group at the press release date, the impact of these measures on EDF’s 2022 EBITDA, compared to a situation in which they were not implemented, was estimated at around €8.4 billion based on market prices at 31 December 2021, and around €7.7 billion based on market prices at 12 January 2022. EDF stated that the final impact on EBITDA would depend on the market prices over the implementation period, and that it would release information as soon as possible and regularly on adjustments to this estimate. In the meantime it withdrew its 2022 Net Financial Debt / EBITDA guidance.

The Group also stated that it was going to consider appropriate measures to strengthen its balance sheet structure, and any steps that could protect its interests.

In a decision of 18 January 2022, the CRE proposed an increase of 35.4% including taxes (44.5% excluding taxes) in the “blue” tariffs for residential customers and 35.9% including taxes (44.7% excluding taxes) in the "blue" tariffs for non-residential customers from 1 February 2022. This proposed increase was driven primarily by the significant rise in prices on the energy market. If it had taken account of the maximum decrease in the TICFE confirmed by decree 2022-84 of 28 January 2022, this proposal would have been for a 20% increase (including taxes) in the “blue” tariffs for residential customers and a 20.9% increase (including taxes) in the “blue” tariffs for non-residential customers. In accordance with the tariff cap, this proposal was rejected by the ministers for the economy and energy, who set the increase in the “blue” tariffs for residential customers at 4% including taxes (24.3% excluding taxes) and the increase in the “blue” tariffs for non-residential customers at 4% including taxes (23.6% excluding taxes) through tariff orders of 28 January 2022, published in the *Journal officiel* of 30 January 2022 and implemented from 1 February 2022.

The CRE stated that the average price (excluding taxes) resulting from the new “blue” tariffs for residential customers in mainland France would have been €57.2/MWh under its tariff proposal, and will be €31.2/MWh in application of the tariff order of 28 January 2022. In accordance with article 181 of the Finance Law for 2022, the difference will be covered by a catch-up adjustment in 2023, and suppliers to residential customers on market-price contracts and the local distribution companies will be entitled to compensation from 1 February 2022. The CRE also stated that it would assess the impact of the additional ARENH volumes in 2022 at a later date; this should result in a reduction to the catch-up adjustment planned for 2023, and the supplier compensation provided for in article 181 of the Finance Law.

Various measures have also been taken by the British government in 2022 to limit the effects of the energy price crisis for UK consumers. On 3 February 2022 the British energy regulator OFGEM announced the new energy price cap for the Standard Variable Tariff (SVT), applicable from April 2022 for the following six months. The 54% increase announced is estimated to correspond to an average +£693 cost per year for a standard consumer profile. The British government announced parallel measures to reduce this burden for households: i) a £150 rebate on local taxes from April 2022, for 80% of households; ii) a £200 reduction on energy bills, to be applied by suppliers in October 2022, and subsequently paid by consumers in £40 instalments over 5 years from 2023. The associated costs will be financed by the state in the meantime.

Outlook for nuclear power generation in France

On 13 January 2022 EDF updated its estimated nuclear output in France for 2022 from 330-360TWh to 300-330TWh, following extension of outages for 5 of EDF's French nuclear reactors. During preventive maintenance checks on reactor 1 at the Civaux nuclear power plant, scheduled as part of its ten-year inspection, some defects were detected close to the welds on the pipes of the safety injection system (SIS) circuit. Preventive checks were then carried out on the Civaux 2, Chooz 1 and Chooz 2 reactors. They revealed similar defects at the Civaux 2 and Chooz 2 reactors. Checks and expert assessments of the Chooz 1 reactor are still in progress and will continue until a full assessment is completed. Preventive maintenance checks conducted during the ten-year inspection of reactor 1 at the Penly nuclear power plant also found similar defects on the SIS circuit.

Due to performance of checks, and the examination and implementation of technical solutions, EDF extended the maintenance outages of the Civaux 1, Civaux 2, Chooz 1, Chooz 2 and Penly 1 reactors. A control program for the entire nuclear fleet is under development, incorporating experience from the initial analyses as it is gained.

As part of its control programme on the French nuclear fleet, on 7 February 2022 EDF revised its 2022 nuclear output estimate from 300–330TWh to 295–315TWh, and stated that the 2023 French nuclear output estimate, currently 340–370TWh, would be updated as soon as possible.

On 11 February 2022, EDF updated its 2023 French nuclear output estimate from 340 – 370 TWh to 300-330 TWh. This estimate takes into account:

- a heavy industrial programme with 44 reactor outages for maintenance and inspection, including 6 ten-yearly inspections, plus 2 scheduled outages starting in 2022 that will continue into 2023;
- the continuation of the control and repair programme on the pipes potentially affected by the stress corrosion phenomenon, which is still ongoing.

The regulatory measures described above, and the new estimate of nuclear power output in France, will have significant effects on the Group's financial statements from 2022, but have no impact on the financial statements at 31 December 2021 (see particularly note 10.8 on France – Generation and Supply).

Exclusive Agreement to Acquire Part of GE Steam Power's Nuclear Activities

EDF and GE announced on 10 February 2022 that they had signed an exclusive agreement for EDF to acquire part of GE Steam Power's nuclear power activities. The proposed transaction would bring together GE's nuclear steam turbine technology and services expertise with EDF strengthening its commitment to the nuclear power sector, creating an industry-leading global steam turbine equipment and services provider within EDF Group. Today, GE Steam Power's nuclear steam turbines are installed in half of the world's nuclear power plants, including in all of EDF's nuclear plants in France.

The proposed transaction includes GE Steam Power's conventional island equipment for new nuclear power plants—including the world's most powerful steam turbine in operation, the Arabelle turbine - as well as maintenance and upgrades for existing nuclear power plants. The transaction would also include steam turbine technology for future nuclear plants, like the next generation of European pressurized reactors (EPR2) and small modular reactors (SMR).

GE would retain a services-focused Steam Power business and continue to provide best-in-class services for more than 100GW of nuclear turbine islands in the Americas region, and it also retains GE Hitachi Nuclear Energy, a leading lifecycle provider for reactor island which will deploy Canada's first commercial, grid-scale SMR. GE remains committed to the nuclear sector and continues to invest in next-generation technology, which plays an important role in today's energy transition.

The nuclear activities and teams in the scope of the proposed transaction are based in about fifteen countries, with nearly 70 percent of the workforce in France, including at GE Steam Power manufacturing sites like Belfort and La Courneuve.

Financial details of the proposed transaction were not disclosed. The proposed transaction is subject to consultation with employee representatives and other customary closing conditions, including regulatory reviews. The transaction is expected to close in the first half of 2023.

Launch of an action plan

As announced on 13 January 2022, EDF presented an action plan at the Board of Directors' meeting on 17 February 2022. This plan is designed to reinforce EDF's balance sheet structure in the context of the events of early 2022. It aims to continue the Group's strategy, founded on a balanced mix of nuclear and renewable energies, which develops energy efficiency services and which brings to customers even more innovations.

To finance this strategy, EDF plans to:

- submit a proposal to the Board of Directors as soon as possible, subject to market conditions, for a capital increase, maintaining preferential subscription rights. This would lead to the issuance of some 510 million new shares with total value of approximately €2.5 billion including the issue premium;
- propose a scrip option (payment in shares) for the 2022 and 2023 dividends.

  The French State, EDF's largest shareholder, has informed the Board of its position on these two points, which will be covered in a separate communication;
- complete disposals of around €3 billion in total in the years 2022-2023-2024.

NOTE 24 STATUTORY AUDITORS' FEES

The following table sets forth the fees paid for work done by the Statutory Auditors and their network during 2021:

(in thousands of euros)	Deloitte network		KPMG network	
	Amount (excluding taxes)	%	Amount (excluding taxes)	%
Audit –Statutory audit, certification, review of company and consolidated accounts				
EDF	2,840	27.9	2,942	15.9
Controlled entities[1]	5,033	49.4	14,276	77.3
Sub-total	**7,873**	**77.2**	**17,218**	**93.2**
Non-audit services[2]				
EDF	832	8.2	520	2.8
Controlled entities[1]	1,493	14.6	735	4.0
Sub-total	**2,325**	**22.8**	**1,255**	**6.8**
TOTAL	**10,198**	**100**	**18,473**	**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 2020

The following table sets forth the fees paid for work done by the Statutory Auditors and their network during 2020:

(in thousands of euros)	Deloitte network		KPMG network	
	Amount (excluding taxes)	%	Amount (excluding taxes)	%
Audit – Statutory audit, certification, review of company and consolidated accounts				
EDF	2,794	24.6	2,945	16.2
Controlled entities[1]	4,560[3]	40.1	13,503	74.2
Sub-total	**7,354**	**64.7**	**16,448**	**90.4**
Non-audit services[2]				
EDF	561	4.9	953	5.2
Controlled entities[1]	3,448	30.4	804	4.4
Sub-total	**4,009**	**35.3**	**1,757**	**9.6**
TOTAL	**11,363**	**100**	**18,205**	**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.