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CREDIT OPINION
4 November 2022

Update

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RATINGS

Electricite de France

Domicile	Paris, France
Long Term Rating	Baa1
Type	LT Issuer Rating
Outlook	Negative

Please see the ratings section at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

Contacts

Celine Cherubin +33.1.5330.3366
VP-Sr Credit Officer
celine.cherubin@moodys.com

Neil Griffiths-Lambeth +44.20.7772.5543
Associate Managing Director
neil.griffiths-lambeth@moodys.com

Yanis Sallami +33.1.5330.3435
Associate Analyst
yanis.sallami@moodys.com

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Electricite de France

Update to credit analysis

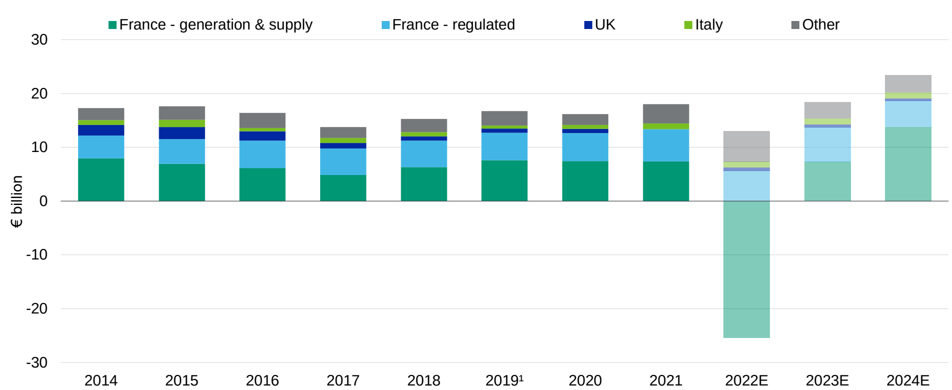
Summary

Electricite de France's (EDF, Baa1 negative) credit quality is underpinned by the scale and breadth of its activities across the energy value chain in France, which accounted for 74% of 2021 EBITDA; the growing earnings contribution from its domestic regulated activities and renewables business, which together accounted for around 37% of group EBITDA in 2021; and its geographical diversification, with sizeable market shares in Italy and the UK. These positives are balanced by a gradual decline in the availability of its nuclear fleet in France, driven by stricter safety requirements, ageing reactors and corrosion defects; a significant capital spending programme that results in negative free cash flow (FCF) in a context of substantial rise in leverage in 2022; its fixed-cost merchant power generation in France and the UK, which exacerbates exposure to power price volatility; and the risk associated with the construction of new nuclear reactors in France and the UK.

On 21 February 2022, we downgraded EDF's issuer and senior unsecured ratings to Baa1 from A3, following its announcement of an action plan to mitigate the effect of low nuclear output over 2022-23 and the consequences of an increase in the ARENH (*Accès régulé à l'électricité nucléaire historique*) cap in 2022[1]. The rating action concluded the review for downgrade initiated on 17 January 2022.

Exhibit 1

Lower-than-expected nuclear output, supplemented with government's actions to protect consumers from rising power prices, will severely hit generation and supply activities in France in 2022



2022-24 estimates represent Moody's forward view, not the view of the issuer.
[1] Application of IFRS 16 from 2019.
Sources: Company reports and Moody's Investors Service

The Baa1 rating incorporates two notches of uplift for potential extraordinary government support, given the company's 83.88% ownership by the Government of France (Aa2 stable). In the absence of further measures to support EDF's financial flexibility and operating profitability, the renationalisation plan initiated by the government in October 2022, to be completed by year-end, will not result in a change in our assessment of a high dependence on and support from the government (See Renationalisation would be credit positive, subject to the scale of additional financial support, published on 7 July 2022).

Credit strengths

» Status as the leading electric utility in France

» Regulated activities and geographical diversification, which support cash flow stability

» Support from the French government, given its 83.88% ownership in the company, potentially reinforced by the expected renationalisation

Credit challenges

» Incremental risks associated with the ageing nuclear fleet, resulting in longer outages, higher maintenance costs and an unprecedented short generation/long supply position in a context of high power prices

» Significant capital spending programme, which results in persistently negative FCF

» Political decisions to protect consumers in France until the end of 2023, which could lead to further measures detrimental to EDF's economic interests

» Limited visibility around the expected restructuring given the change in management, political considerations and uncertainties around the nuclear reform

» High volumes of fixed-cost, low-emission merchant power generation in France and the UK, exacerbates EDF's exposure to power price volatility

» Construction risk associated with the ongoing Flamanville 3 and HPC nuclear power plant projects in France and the UK, supplemented with the development of six (potentially 14) new European pressurised reactors (EPRs) by 2050

Rating outlook

The negative rating outlook reflects the risk of lower-than-expected nuclear output, including as a result of corrosion defects. The extent of these defects and impact on earnings - in a very high and volatile - power price environment is still uncertain. Operational challenges and execution risks in measures intended to bolster credit quality increase the risk of key credit metrics falling below levels commensurate with the baa3 Baseline Credit Assessment (BCA) over 2023-24, which include funds from operations (FFO)/net debt at least in the mid- to high-teen percentages.

The negative outlook further takes into account the lack of visibility around economic regulation of nuclear operations in France. EDF will need financial relief to support the development of new capacity, including construction of six (potentially 14) new EPRs in France by 2050, in addition to the targeted 60 gigawatts (GW) of renewable capacity by 2030.

Factors that could lead to an upgrade

Upward rating pressure is not anticipated over the next 18-24 months, given the negative outlook. Nevertheless, we could change the outlook to stable if EDF appears likely to restore and maintain a track record of substantial nuclear output with metrics expected to be in line with our guidance for the current rating, including FFO/net debt at least in the mid- to high-teen percentages.

Factors that could lead to a downgrade

The ratings could be downgraded if EDF's credit metrics appear likely to remain persistently below the guidance for a Baa1 rating; a change in the group's relationship with the French government were to lead us to remove the uplift for government support; or we downgraded France's government rating significantly.

Key indicators

Exhibit 2
Electricite de France

	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	2022 - 2024 (E)
(CFO Pre-W/C + Interest) / Interest Expense	5.3x	4.8x	5.4x	5.6x	7.0x	7.7x	-190x to 20x
(CFO Pre-W/C) / Net Debt	18.5%	17.7%	21.3%	19.4%	22.4%	20.9%	-18% to 17%
RCF / Net Debt	17.4%	16.8%	19.7%	18.6%	21.6%	20.2%	-19% to 16%

All figures and ratios are calculated using Moody's estimates and standard adjustments. Moody's forecasts (f) or projections (E) are Moody's opinion and do not represent the views of the issuer. Periods are financial year-end unless indicated.
These ratios do not take into account the fair value of EDF's stake in RTE included in the company's dedicated assets.
Source: Moody's Investors Service

Profile

With net installed generation capacity of 122.6 GW as of 30 June 2022, Electricite de France (EDF) is one of Europe's largest integrated utilities, providing electricity generation, distribution and supply services. The group is organised along the following business lines:

» Generation and supply in France, where it is the dominant power generator and supplier

» Regulated supply in France, which primarily includes electricity distribution through its subsidiary, Enedis

» UK, through EDF Energy Holdings Ltd (EDF Energy, Baa3 negative), which is the country's largest generator operating the UK nuclear fleet

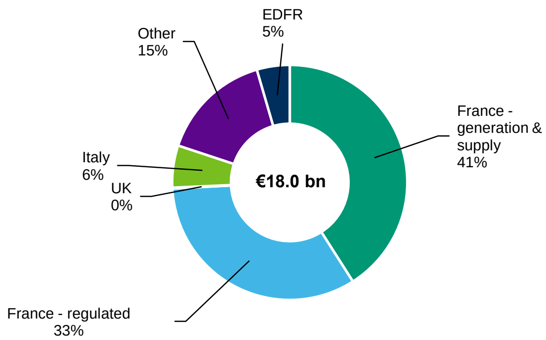
» Italy, where it is the third-largest generator through Edison S.p.A. (Edison, Baa3 negative)

» Other international, which mainly consists of operations in Belgium, where EDF Luminus is the second-largest electricity group, and in the Netherlands

» EDF Renouvelables (EDFR), the group's wholly owned investment vehicle for renewables, excluding hydro

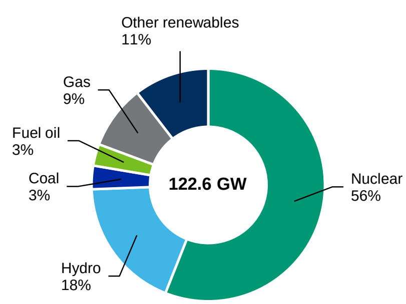
» Other activities, which include Framatome, EDF Trading Limited (Baa3 negative) and energy services through Dalkia

Exhibit 3
Generation and supply, and regulated business in France accounted for 74% of EDF's 2021 EBITDA
EBITDA split by business segment in 2021



Sources: Company reports and Moody's Investors Service

Exhibit 4
EDF's installed capacity includes mostly nuclear and hydro
Net consolidated capacity split by fuel (as of 30 June 2022)



Sources: Company's reports and Moody's Investors Service

EDF is listed on Euronext Paris, with a market capitalisation of around €46.4 billion as of 4 November 2022. It is 83.88% owned by the French government, which submitted a tender offer for the rest of the capital on 4 October 2022 at a €12/share price.

Detailed credit considerations

Lower-than-expected nuclear availability, in addition to increased ARENH cap, will substantially strain EDF's financial flexibility over the coming years

A number of factors will hurt EDF's financial performance for 2022. These include the increase in the ARENH cap decided by the government in January and, more importantly, several downward revisions of French nuclear output since the beginning of the year (See Further cut in anticipated nuclear output is credit negative, published on 20 May 2022), in the context of high power prices as a result of the gas crisis in Europe and EDF's predominance in the French generation mix. The action plan announced on 18 February 2022 to mitigate the strain on the group's financial flexibility, and partially executed as of October 2022, appears to likely fall short. As a result, we expect EDF's net debt to rise significantly as of year-end 2022.

With government's decision to continue protecting end customers from high power prices over 2023 and absent additional measures to restore financial solidity, including new regulation for domestic nuclear activities, we expect EDF to report negative FCF over 2023-24.

At the beginning of 2022, the French government announced an increase in the volume of electricity that EDF must sell under the ARENH mechanism by 20 terawatt hours (TWh) to 120 TWh over April to December 2022. This measure, inter alia, aimed to limit the increase in regulated tariffs until February 2023 to 4%. While EDF has to sell more electricity to alternative suppliers, the group has reduced its nuclear output estimate, expecting in November a total ranging from 275-285 TWh in 2022, compared with the 360 TWh produced in 2021. The reduction follows extended outages at EDF's French nuclear reactors because of weld and corrosion defects, supplemented with strikes in October, which slowed the recommissioning of 19 nuclear plants following maintenance works.

The ARENH changes and lower-than-budgeted output will result in significant costs for EDF. In accordance with its hedging policy, the group had sold forward substantially all of its anticipated 2022 output at a Moody's-estimated price of close to €55 per megawatt hour (MWh). For the year 2022, it has to now buy up to around 60 TWh of electricity at prevailing market prices to meet its obligations, and sell a total of 20 TWh in 2022 at €46.2/MWh and the rest of the power at hedged prices. The planned increase in the ARENH ceiling will also weigh on future regulated tariffs by reducing the contribution of merchant-exposed volumes in the tariff calculation.

According to EDF's last updated estimates in October 2022, the combination of the above-mentioned factors will reduce its 2022 EBITDA by around €42 billion, based on power price curves as of 13 September 2022. These significant losses capture €32 billion driven by the drop in nuclear output, €4 billion by the ARENH cap increase and €6 billion as a result of the tariff freeze.

The plan announced by EDF, designed early 2022, appears to underestimate the magnitude of the losses that will affect the company's financial solidity. It included a €3.1 billion capital increase completed in April 2022, aiming to demonstrate the French government's continuing commitment towards EDF, and a €3 billion disposal programme over 2022-24, although the group has still not indicated any target assets, excluding US activities run by EDF Trading. Following more than €14 billion of disposals closed over 2017-21, this programme will likely involve mainly core assets, which could further affect EDF's credit quality. The action plan also includes a scrip dividend over the next two years, consistent with the dividend policy followed over 2017-21.

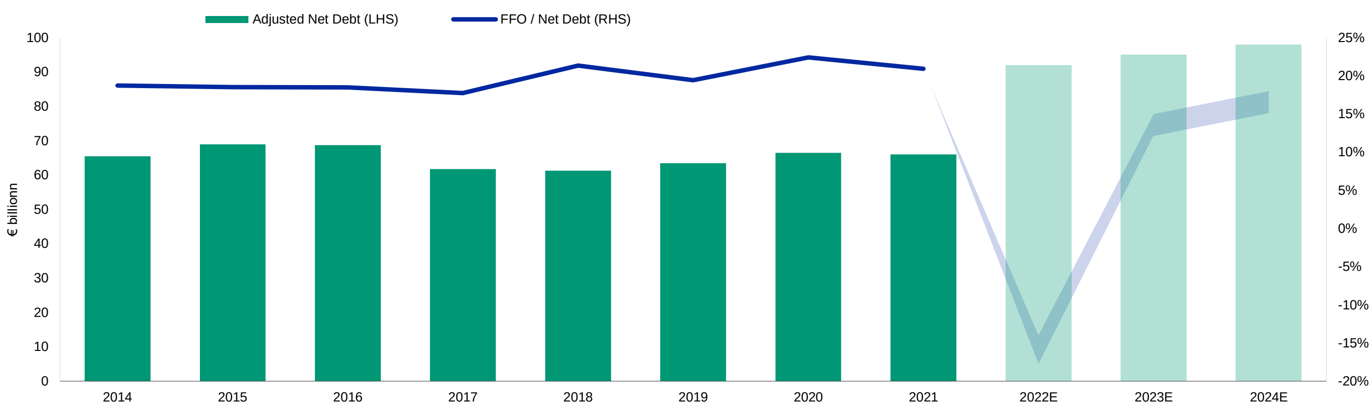
EDF's performance was very weak in the first half of the year, confirming the above-mentioned adverse factors, with EBITDA of €2.7 billion, down from €10.6 billion in H1 2021. The overall impact on EBITDA of the additional ARENH volume allocated to alternative suppliers is estimated by the company at -€6.1 billion and the drop in nuclear output at -€7.2 billion in H1 2022. EDF almost stabilised net debt at €42.8 billion as of June 2021, reflecting the €3.1 billion capital increase and a favourable change in working capital. On a Moody's-adjusted basis, net debt was €70 billion, slightly higher than at year-end 2021. End of October 2022, when EDF reported its sales for the first nine months of 2022, the group has still not committed to an EBITDA guidance in 2022 but confirmed its target of net financial debt/EBITDA to "slightly higher than 3x by 2023".

We estimate that EDF's FFO/net debt will decline significantly to around -14% to -18% in 2022. In the face of a sharp drop in earnings, EDF has little flexibility to adjust spending mainly related to the maintenance and development of nuclear and distribution assets. Over 2023-24, we expect a recovery in EDF's credit metrics, with FFO/net debt in the 12%-17% range, compared with the guidance for the current baa3 BCA of mid- to high-teen percentages. However, huge uncertainties remain, including the group's ability to meet its 2023-24 nuclear output targets and the extent to which EDF will have to contribute to the 15% tariff cap announced by the French government for 2023 (See Energy tariff increases in early 2023 to ease financial pressure, but uncertainties remain, published on

21 September 2022), in addition to the financial support to Industrial &Commercial (I&C) customers the government will extend, resulting in a €10 billion cost.

Exhibit 5

EDF's credit metrics will weaken significantly in 2022 as a result of the ARENH cap increase and the reduction in nuclear output



The 2022 and 2023 estimates represent Moody's forward view, not the view of the issuer.

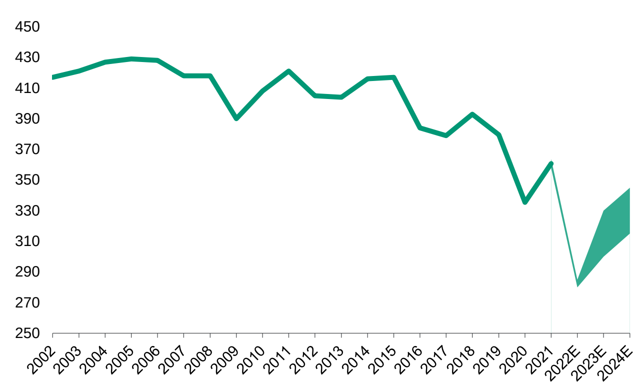
Sources: Moody's Financial Metrics™ and Moody's Investors Service

EDF expects nuclear output to recover to 300-330 TWh in 2023 with a further slight increase in 2024 to 315-345 TWh. This estimate is, however, substantially lower than initial projections of 340-370 TWh in 2023, reflecting necessary outages to address the corrosion defects. The ongoing review of these defaults, which will be completed in 2025, could result in further outages detrimental to EDF's credit metrics, as illustrated in 2022. Still lower production would further increase earnings volatility while confirming the sustained, gradual decline in EDF's nuclear fleet availability to the obvious detriment of credit quality.

EDF's nuclear output has gradually declined over the last 10 years, by around 100 TWh, or one-quarter of the early 2010 levels, as Exhibit 6 illustrates, although the fleet scale has remained broadly unchanged at 61.4 GW as of September 2022, excluding the Fessenheim nuclear plant's shutdown completed in 2020 (1.8 GW). This decline in output has resulted from the underestimation of planned outages' length for 10-year inspections, weather constraints during heatwaves, staff protection measures during the pandemic and detection of new defects.

Exhibit 6

Net output of pressurised water reactor (PWR) fleet in France in TWh

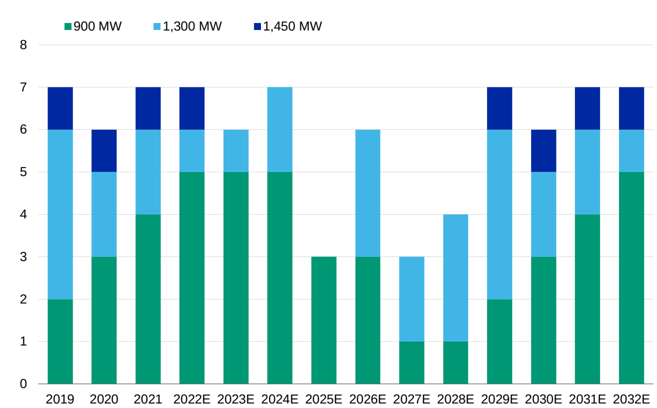


Sources: Company reports and Moody's Investors Service

Exhibit 7

Current high levels of maintenance will weigh on the output

Number of 10-year inspections by reactor type as of 30 June 2022



Source: Company reports

In addition to the uncertainties around the future nuclear output, we also see a risk of the ARENH cap being revised in 2023 as well. According to the French Energy Climate law, promulgated in 2019 and amended by the Parliament in August 2022, the ARENH ceiling can be raised to 120 TWh, at the French government's discretion, at a price of €49.5/MWh. Such a decision would be supported by the French regulator Commission de Régulation de l'Energie (CRE), which has advocated a rise in the ARENH cap to 150 TWh (former legal cap) since July 2020[2]. This would be credit negative as well, in particular if the power prices remain high because EDF will miss market opportunities, because it will be forced to sell a larger portion of its nuclear output at a low price; and the company will have to source externally a portion of the power supplied to its own customers.

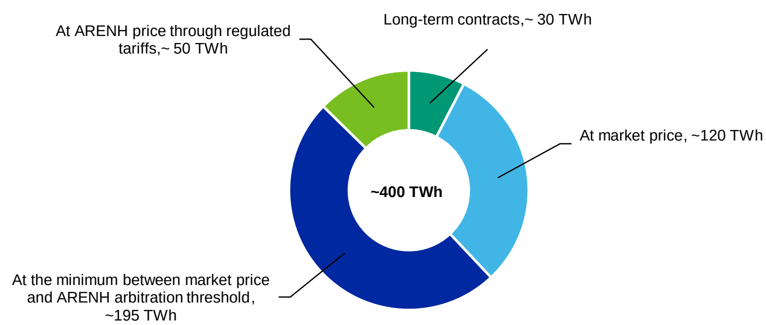
Fixed-cost generation fleet exposed to volatile power prices

We estimate that commodity-exposed activities account for 35%-40% of EDF's EBITDA. Around 120 TWh of EDF's domestic electricity sales were directly exposed to market prices in 2021 (see Exhibit 8), which is 10 TWh higher than in 2020. In addition, power generation in the UK and Italy is fully exposed to wholesale prices. Although EDF typically hedges by selling forward a substantial proportion of its outright power generation two to three years ahead of delivery, the company retains exposure to market prices as hedges roll off. Capacity payments mitigate only a part of EDF's commodity price exposure.

Exhibit 8

Distribution of electricity sales[1] in France according to their market exposure in 2021

In TWh



[1] Sales excluding purchase obligation volumes and volumes under long-term supply contracts.

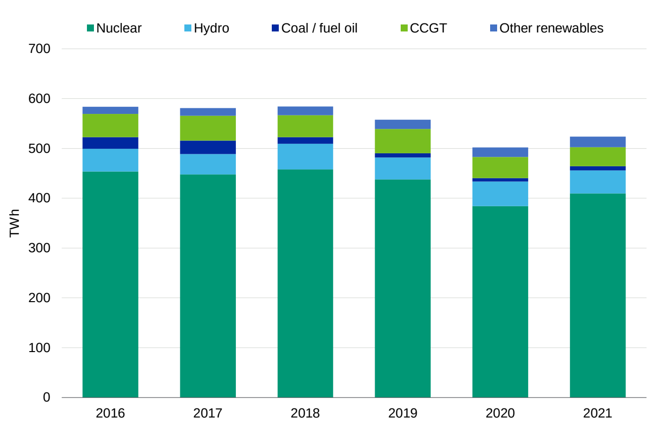
Sources: Company reports and Moody's Investors Service

EDF is particularly exposed to movements in wholesale power prices because its generation fleet is predominantly fixed cost. In 2021, 91% of its 523.7 TWh output was generated by nuclear and renewable assets.

Exhibit 9

Most of EDF's generation output ...

Output by technology

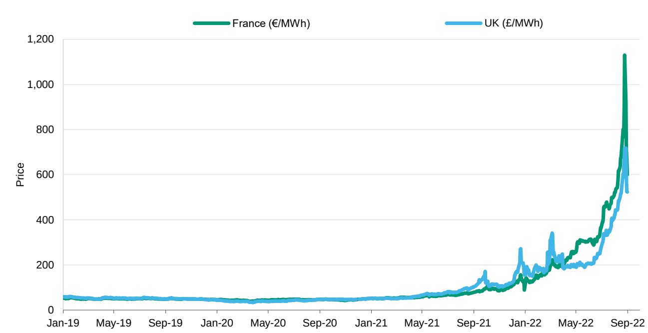


Sources: Company reports and Moody's Investors Service

Exhibit 10

... is exposed to volatile power prices

One-year forward baseload power price



Sources: FactSet and Bloomberg

Like other large European markets including the UK, forward baseload power prices in France have risen sharply since early 2021. The one-year forward price was around €600/MWh as of 1 September 2022, up 560% year over year, driven by high gas prices, unfavourable weather conditions affecting hydropower plants and the higher-than-expected drop in nuclear output.

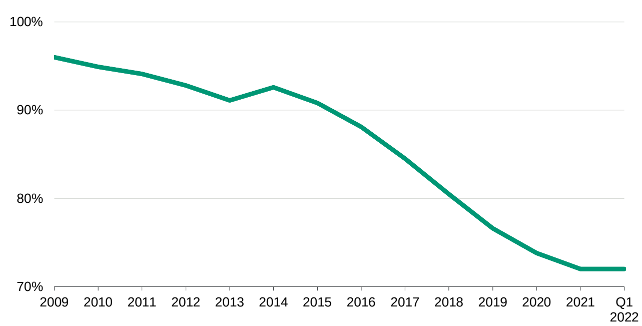
Forward wholesale power prices for 2024 and 2025 have averaged, respectively, €365/MWh and €203/MWh since the start of the year. Higher prices, if sustained, will benefit EDF's largely fixed-cost generation but are subject to historical hedges, the company's generation capacity, and the direct and indirect effects of the ARENH mechanism.

The leading electric utility in France, in a difficult operating environment

EDF is the leading electricity generator in France, with 92.5 GW of installed capacity as of the end of December 2021. The company's annual domestic generation (413 TWh in 2021 and 389 TWh in 2020, excluding French island activities, which represented 78% of the national power output and was mostly generated by nuclear and hydropower plants) historically matched its downstream position, which consists of 56% of the electricity consumption in France as of March 2022.

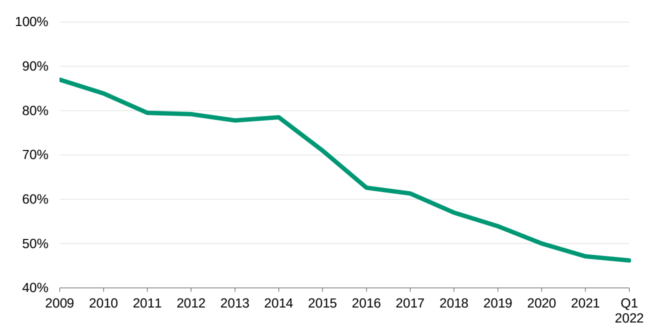
This balanced market position, combined with the predominantly regulated nature of electricity tariffs until 2015, historically underpinned the predictability of EDF's cash flow. However, growing competition in the supply market resulted in higher churn rates (see Exhibits 11-12) leaving EDF long generation. This trend was reversed in 2022 when rising procurement costs for alternative suppliers encouraged consumers to return to EDF's regulated tariffs. At the end of October 2022, the company reported a net gain of 939,000 customers, which applied for regulated tariffs over the last 12 months. As a result, EDF's downstream position will exceed its power output because of the limited nuclear generation over 2022-23, which could be further exacerbated if the ARENH volumes are raised to 120 TWh. This will be detrimental to EDF, increasing the tariff deficit borne by the group.

Exhibit 11
EDF was gradually losing market share in both the residential ...
Incumbent share of the residential electricity supply market in France



Source: CRE

Exhibit 12
... and nonresidential power supply markets in France but the trend has been reversing since Q2 2022
Incumbent share of the nonresidential electricity supply market in France



Source: CRE

Regulated activities and geographical diversification help cash flow stability

EDF's credit profile is supported by its regulated activities in France, which accounted for 33% of the group's EBITDA in 2021. These activities include, in addition to domestic electricity distribution through its subsidiary Enedis, regulated generation, and network and supply businesses in the French islands. These activities exclude EDF's 50.1% interest in France's transmission network owner and operator RTE, which is equity accounted.

Enedis' revenue benefits from a high degree of visibility under a regulatory framework that entered its sixth four-year regulatory period in August 2021 (TURPE 6). Under this framework, Enedis earns a return on regulated equity of 2.3% (nominal, pretax) and a 2.5% margin on its €53.7 billion regulated asset base. Although the return on capital depends little on interest rate trends and is stable at 2.5% since TURPE 4, the return on regulated equity decreased to 2.3% from 4% under the TURPE 6 regulatory framework to take into account the reduction in the risk-free rate and the corporate tax rate in France.

Exhibit 13
Regulatory framework TURPE 6
A remuneration mechanism based on a guaranteed return

Parameter	Turpe 6 (August 2021-July 2025)
Method	Margin on RAB, return on regulatory equity and allowance for cost of debt, revenue cap with incentives
Length of the regulatory period	4 Years
RAB calculation	Net accounting value of in-use assets
Allowed returns	2.5% margin on RAB, 2.3% return on regulatory equity
Incentive regulation	Targets raised, notably quality of service
Annual tariff indexation	Annual tariff indexation includes 0.31% remuneration above inflation.

Sources: EDF and CRE

EDF's activities outside France accounted for around 15% of EBITDA in 2021. Around 50% of that is generated by its nuclear plants in the UK and the growing renewables business of EDFR (12.6 GW of net installed capacity as of June 2022 [excluding hydro], with a further 4.3 GW net capacity under construction), which should provide some support to the group's earnings outside France. Around 95% of EDFR's revenue comes from long-term contracts, with an average remaining life of 13 years.

Significant capital spending programme leads to execution risk and negative FCF

EDF faces a substantial capital investment programme over the coming years, which we estimate at €17 billion-€20 billion annually through 2024, with significant and largely non-discretionary spending required to maintain and upgrade its distribution network and nuclear fleet in France. The latter is estimated at €33 billion over 2022-28 and reflects the age of the fleet, which is more than 33 years on average, as well as EDF's strategy to extend its life span to 50 years (or more); the group's ongoing programme to reduce unplanned outages; and more stringent nuclear safety requirements after the Fukushima incident. This estimate excludes the costs associated with the repair work in 2022-23 resulting from the corrosion defects.

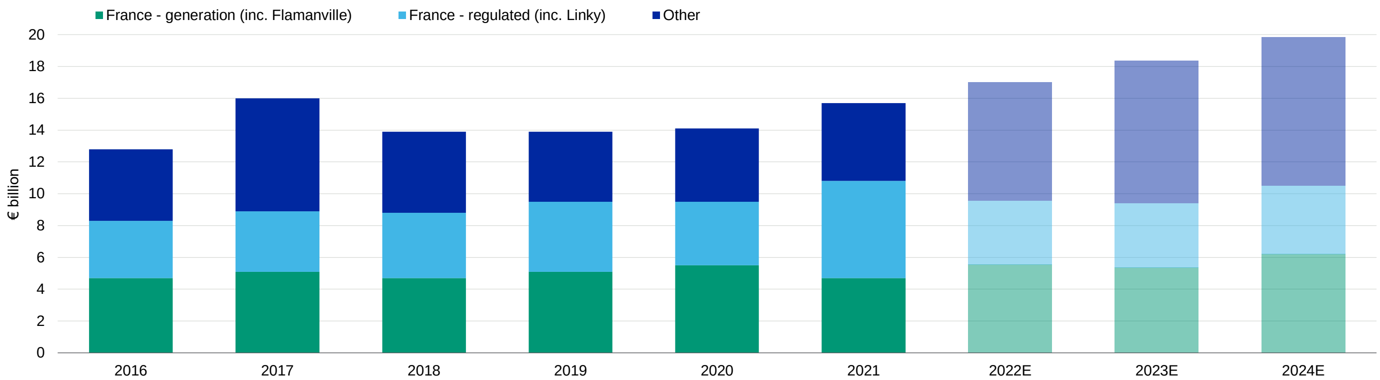
Other significant projects (excluding new nuclear reactor constructions, discussed below) include the accelerated expansion of renewable capacity through EDFR unveiled in February 2021, comprising the upgraded objective of doubling the renewable installed capacity to 60 GW by 2030 from around 34.1 GW in 2020 (including hydro), compared with the 50 GW initially stated.

Since Q4 2019, and at the request of the French government, EDF has been assessing the feasibility of constructing new EPRs in the country by 2040. The government confirmed in February 2022, ahead of the Flamanville nuclear power plant's commissioning, the plan to build six (potentially 14) new EPRs by 2050, starting in 2028. The first commissioning will likely take place in 2035. In addition, the closing of 14 nuclear reactors at their 40th anniversary is no longer considered and the plan is to extend their life span as long as possible.

As a result, the government will amend the current *Programmation pluriannuelle de l'energie* (PPE), published in February 2019, which will, however, keep outlining the government's aim to continue France's planned transformation into a carbon-neutral economy. The new plan is likely to increase targets with regard to offshore wind and solar capacities, alongside the larger nuclear fleet.

Implications for EDF's credit profile will depend on the arrangements, including the support from the French government, with regard to, among other things, exposure to nuclear construction risk, tariff regime, financing structure and financial costs, given the company's constrained financial flexibility.

Exhibit 14
EDF's capital spending is likely to remain high
Net investments, excluding the asset disposal programme



The 2022-24 estimates represent Moody's forward view, not the view of the issuer.
Sources: Company reports and Moody's Investors Service

Ongoing new nuclear projects increase construction risk and cost

In France, EDF began the construction of the 1.6 GW Flamanville 3 nuclear plant in 2007, with commercial operations scheduled for 2012 and an estimated total cost of €3.3 billion. However, there have been a series of cost overruns and delays in the life of this first EPR project in France.

In July 2019, commissioning of the nuclear reactor was delayed once again, by three years, after the discovery of issues with eight welds in the vessel. Before the pandemic, the power plant was scheduled to come into service in 2023, with fuel loading planned for year-end 2022. Additional remedial costs will total €1.5 billion, increasing the final construction cost to €12.4 billion, or three times the initial budget.

In January 2022, EDF rescheduled the commissioning date of the Flamanville 3 project from year-end 2022 to Q2 2023. The estimated cost at completion increased by €0.3 billion to €12.7 billion. The operations remaining to be carried out before the commissioning of Flamanville 3 have been delayed by the pandemic. At the end of October 2022, EDF highlighted that further overrun risks remain high.

EDF began construction of the 3.2 GW Hinkley Point C plant (HPC) in early 2017. HPC will only be the fifth plant in the world that will use the EPR technology. The total construction cost of the HPC project, of which 66.5% will be funded by EDF and the remaining 33.5% by its partner China General Nuclear Power Corporation (CGN, A2 stable), was revised upward for the third time in May 2022 to £25 billion-£26 billion (in 2015 prices) from a previous estimate of £21.5 billion-£22.5 billion in September 2019 (see Electricite de France: New cost overrun and potential delay at Hinkley Point are credit negative, published on 26 September 2019); the initial construction cost estimate was £18.1 billion. Cost increases reflect difficult ground conditions, extra costs to implement the completed functional design, and a slowdown in work because of the pandemic and staff protection measures.

The increasing cost estimates illustrate the execution risks that EDF and CGN face in constructing the power station. In addition, EDF's balance sheet will have to suffer the financial implications of a very long construction phase because the investment will not generate any cash flow until the power plant is operational.

Need for further support recognised by the French government

Given the 83.88% stake held by the French government, we consider EDF a government-related issuer under our methodology. Accordingly, and based on our expectation of support in case of financial distress, the A3 rating factors in two notches of uplift from the group's BCA of baa3.

Our government support expectation reflects the strategic importance of EDF to the French government as the owner and operator of France's nuclear power plants; the company's highly unionised and politically influential workforce, as reflected in the recent demonstrations against the restructuring plan; and the French government's track record of supporting strategically important entities, illustrated by the subscription to €3 billion of EDF's capital increase in March 2017 and €3.15 billion April 2022, and the government exercising its option to take EDF's dividend in shares until 2023.

Because of the political endorsement of EDF's capital spending programme (notably with respect to HPC, Linky smart meters, and the development of renewable and nuclear capacities) and its scale compared with its cash flow generation capacity, we expect the French government to continue to provide financial relief, as illustrated by the renationalisation of the company, confirming EDF's importance to France.

In July 2022, French Prime Minister Elisabeth Borne announced the government's intention to renationalise EDF, to provide the group with the financial means to develop new capacity in France, a credit positive. However, the implications of renationalisation for EDF's strategy and potential restructuring are still unclear (See Electricite de France: Renationalisation would be credit positive, subject to the scale of additional financial support, published on 7 July 2022). Subsequently, President Macron appointed Luc Remont as chairman and CEO of EDF, and the decision was approved by the French Parliament and the Senate on 26 October 2022. Remont's priorities will be to address the nuclear issues, define a new strategic road map (to be unveiled in Spring 2023) and propose a restructuring plan that is internally supported. He will replace Jean-Bernard Levy mid-November 2022.

Changes to the asymmetric ARENH mechanism will remain an essential prerequisite to the reorganisation of the group. Revision of nuclear regulations — including the ARENH mechanism, whose formal expiry date is year-end 2025 — will be integral to transforming the electricity sector in a cost-efficient manner while giving EDF financial capacity for necessary investments. In January 2020, the French government initiated a consultation about the new nuclear regulation, which may increase EDF's earnings visibility (see Electricite de France: Proposed new regulatory framework for nuclear power may increase earnings visibility, published on 30 January 2020). Since this consultation, the government has been conducting extensive discussions with the European Commission, which were suspended as a result of the French general elections. The negotiations, once resumed, will likely continue to focus on a fair assessment of the price of the power generated by EDF's existing nuclear fleet on the one hand and by the company's future nuclear reactors on the other; and the future corporate structure of EDF, whose vertical integration is strongly backed by the government, management and unions. The negotiations will occur in a context of parallel discussions around the European electric market design to address the energy crisis.

ESG considerations

Electricite de France's ESG Credit Impact Score is Moderately Negative CIS-3

Exhibit 15

ESG Credit Impact Score

CIS-3

Moderately Negative

For an issuer scored CIS-3 (Moderately Negative), its ESG attributes are overall considered as having a limited impact on the current rating, with greater potential for future negative impact over time. The negative influence of the overall ESG attributes on the rating is more pronounced compared to an issuer scored CIS-2.

Source: Moody's Investors Service

EDF's ESG Credit Impact Score is moderately negative (**CIS-3**), indicating that its ESG attributes are overall considered as having a limited credit impact, with greater potential for a future negative impact over time. This reflects highly negative social risks, following measures endorsed by the government to protect end-customers at the detriment of EDF's economic interests and lack of visibility around the form and timing of nuclear reform in France, whereas negotiations with the European Commission are suspended. EDF **CIS-3** also captures a moderately negative exposure to environmental and governance risks.

Exhibit 16
ESG Issuer Profile Scores

ENVIRONMENTAL	SOCIAL	GOVERNANCE
E-3	S-4	G-3
Moderately Negative	Highly Negative	Moderately Negative

Source: Moody's Investors Service

Environmental
EDF's exposure to environmental risks is moderately negative (**E-3** issuer profile score) driven by moderate exposure to physical climate risks associated with the group's French electricity distribution assets (which contributes to 33% of EBITDA in 2021) and to Waste and Pollution risks given the material costs associated with nuclear decommissioning and nuclear waste treatment, albeit largely covered by a sizeable dedicated asset portfolio. It also captures the exposure of the group's nuclear fleet (c. 60% of the total installed capacities in 2021) to moderate risks of water management, in the event of restricted access to water induced by regular heat waves over summers. The profile also incorporates a large investment programme to increase the share of power output from renewables (excluding hydro).

Social
Highly negative social risks for EDF (**S-4** issuer profile score) reflects the fundamental utility risk that demographics and societal trends could include public concerns over affordability, public expectation that utilities act as public service, utility's reputational risk. These pressures could turn into adverse political intervention, as evidenced by the decision of French government to protect end-customers at the detriment of EDF financial flexibility in an electoral context, which will result in a -c. €8bn impact on 2022 EBITDA. This also includes nuclear exposures and associated risk to public health.

Governance
EDF's governance risks are moderately negative (**G-3** issuer profile). This assessment takes into account neutral to low scores on financial strategy and risk management, management credibility and track record, organizational structure, compliance and reporting, which counterbalance the moderate risk associated with board structure policies and procedures, resulting from having a majority owner (French State owns over 83% of the capital). EDF's board has implemented measures to bolster its balance sheet including capital increases of €4 billion in 2016 and €3.1 billion in 2022, as well as scrip dividend over the last six years. At the same time, the company has also acted to support other parts of the nuclear industry to the detriment of its credit quality.

ESG Issuer Profile Scores and Credit Impact Scores for the rated entity/transaction are available on Moodys.com. In order to view the latest scores, please click here to go to the landing page for the entity/transaction on MDC and view the ESG Scores section.

Liquidity analysis
EDF's liquidity is underpinned by large holdings of cash and cash equivalents, and committed bank facilities. As of 30 June 2022, the group had €30.7 billion of cash and cash equivalents and liquid financial assets. In addition, unused committed credit facilities amounted to €12.0 billion, of which €0.17 billion mature within one year.

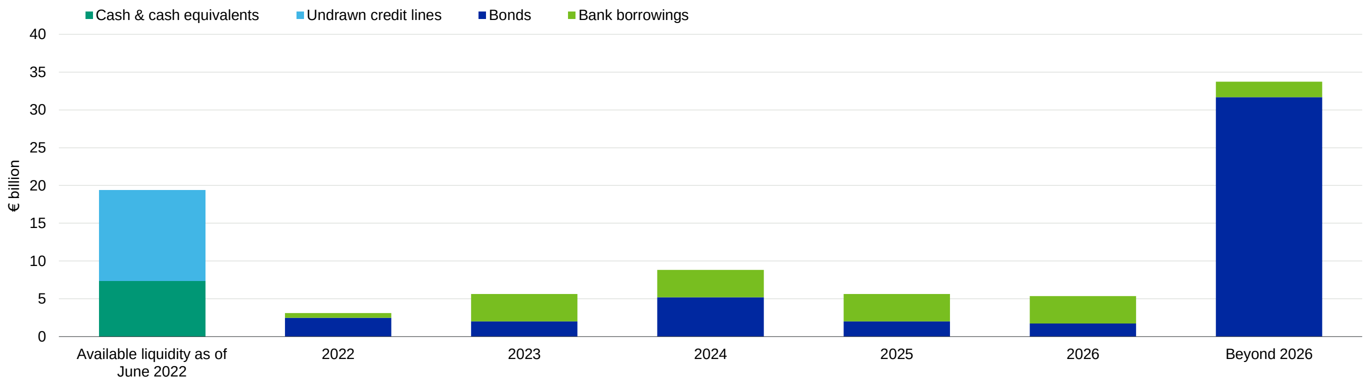
In addition, EDF's debt maturities are well spread, avoiding any significant concentration of refinancing risk.

These sources of liquidity are sufficient for the group to meet its short-term financing needs, including debt maturities of €3.1 billion and capital spending, over the next 12 months.

Exhibit 17

EDF has a well-spread debt maturity profile

Debt maturity profile and available liquidity as of 30 June 2022



Sources: EDF and Moody's Investors Service

Methodology and scorecard

EDF is rated in accordance with the rating methodologies for Unregulated Utilities and Unregulated Power Companies, published in May 2017, and Government-Related Issuers Methodology, published in February 2020.

Exhibit 18

Rating factors

Electricite de France

Unregulated Utilities and Unregulated Power Companies Industry Grid [1]	FY ending 31, December 2021		Moody's 12-18 Month Forward View [2][3]	
Factor 1 : Scale (10%)	**Measure**	**Score**	**Measure**	**Score**
a) Scale (USD Billion)	Aaa	Aaa	Aaa	Aaa
Factor 2 : Business Profile (40%)				
a) Market Diversification	A	A	A	A
b) Hedging and Integration Impact on Cash Flow Predictability	A	A	Baa	Baa
c) Market Framework & Positioning	Baa	Baa	Baa	Baa
d) Capital Requirements and Operational Performance	Ba	Ba	B	B
e) Business Mix Impact on Cash Flow Predictability	Aa	Aa	Aa	Aa
Factor 3 : Financial Policy (10%)				
a) Financial Policy	Baa	Baa	Baa	Baa
Factor 4 : Leverage and Coverage (40%)				
a) (CFO Pre-W/C + Interest) / Interest (3 Year Avg)	6.7x	Baa	-190x to 20x	Caa - Aaa
b) (CFO Pre-W/C) / Net Debt (3 Year Avg)	20.9%	Baa	-18% to 17%	Caa - Ba
c) RCF / Net Debt (3 Year Avg)	20.1%	Baa	-19% to 16%	Caa - Baa
Rating:				
a) Scorecard indicated outcome		A3		Ba1 - A3
b) Actual Baseline Credit Assessment				baa3
Government-Related Issuer				**Factor**
a) Baseline Credit Assessment				baa3
b) Government Local Currency Rating				Aa2
c) Default Dependence				High
d) Support				High
e) Final Rating Outcome				Baa1

[1] All ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
[2] As of October 2022.
[3] This represents Moody's forward view, not the view of the issuer, and unless noted in the text, does not incorporate significant acquisitions and divestitures.
Sources: Moody's Investors Service and Moody's Financial Metrics™

Ratings

Exhibit 19

Category	Moody's Rating
ELECTRICITE DE FRANCE	
Outlook	Negative
Issuer Rating	Baa1
Senior Unsecured	Baa1
Jr Subordinate	Ba1
Commercial Paper	P-2
EDF ENERGY HOLDINGS LTD	
Outlook	Negative
Issuer Rating -Dom Curr	Baa3
EDF TRADING LIMITED	
Outlook	Negative
Issuer Rating	Baa3
EDISON S.P.A.	
Outlook	Negative
Issuer Rating	Baa3

Source: Moody's Investors Service

Appendix

Exhibit 20
Peer comparison
Electricite de France

	Electricite de France Baa1 Negative			ENGIE SA Baa1 Stable			RWE AG Baa2 Stable			E.ON SE Baa2 Stable			ENEL S.p.A. Baa1 Negative		
(in EUR million)	FYE Dec-19	FYE Dec-20	FYE Dec-21	FYE Dec-19	FYE Dec-20	FYE Dec-21	FYE Dec-19	FYE Dec-20	FYE Dec-21	FYE Dec-19	FYE Dec-20	FYE Dec-21	FYE Dec-19	FYE Dec-20	FYE Dec-21
Revenue	71,347	69,031	84,461	60,058	44,306	57,866	14,683	13,688	24,526	40,803	60,944	77,358	77,367	63,594	84,137
EBITDA	16,504	13,286	15,570	9,259	7,962	10,181	3,410	4,224	2,659	5,142	6,295	8,096	16,600	15,377	15,211
Total Assets	300,199	302,380	358,713	160,631	154,336	227,537	64,005	61,578	142,226	97,901	95,385	119,759	171,288	162,981	207,781
Total Debt	86,067	85,746	89,062	55,504	54,587	56,509	14,833	14,529	21,239	50,200	50,931	48,644	62,016	61,629	76,991
Net Debt	63,446	64,690	66,604	44,553	41,675	42,791	8,383	5,536	7,374	44,755	45,265	41,715	53,015	55,740	68,097
FFO / Net Debt	19.4%	22.4%	20.9%	18.6%	17.6%	20.4%	17.0%	68.4%	74.9%	7.6%	9.9%	15.6%	20.7%	21.4%	15.6%
RCF / Net Debt	18.6%	21.6%	20.1%	13.1%	16.3%	16.1%	10.2%	58.6%	64.8%	5.1%	6.5%	11.9%	13.0%	12.7%	8.2%
(FFO + Interest Expense) / Interest Expense	5.6x	7.0x	7.7x	7.0x	6.5x	8.1x	3.2x	6.7x	9.6x	2.6x	3.6x	4.5x	5.3x	6.2x	5.1x
Debt / Book Capitalization	62.6%	62.2%	60.7%	58.1%	60.1%	54.2%	42.4%	42.4%	52.6%	76.1%	78.8%	69.8%	52.2%	55.2%	60.8%

All figures and ratios are calculated using Moody's estimates and standard adjustments. FYE = Financial year-end. LTM = Last 12 months.
Source: Moody's Financial Metrics™

Exhibit 21
Adjusted debt breakdown
Electricite de France

(in EUR million)	FYE Dec-16	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-20	FYE Dec-21
As Reported Total Debt	65,195	56,846	59,188	67,380	65,591	69,406
Pensions	14,693	14,063	11,687	13,440	14,270	14,059
Leases	3,876	4,488	4,368	0	0	0
Hybrid Securities	5,048	5,048	5,051	4,605	5,645	6,132
Securitization	1,304	903	1,095	1,042	792	1,456
Non-Standard Adjustments	3,472	2,731	3,500	(400)	(552)	(1,991)
Moody's Adjusted Total Debt	93,588	84,079	84,889	86,067	85,746	89,062

Non-standard adjustments include, notably, nuclear provisions (net of dedicated assets), debt guarantees (€1.3 billion as of 31 December 2019), accrued interest (€1.3 billion as of 31 December 2019) and derivatives (€3.4 billion as of 31 December 2019), the last two being removed from debt as reported. All figures are calculated using Moody's estimates and standard adjustments.
Source: Moody's Financial Metrics™

Exhibit 22
Adjusted EBITDA breakdown
Electricite de France

(in EUR million)	FYE Dec-16	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-20	FYE Dec-21
As Reported EBITDA	17,551	16,738	14,346	21,078	17,791	20,598
Unusual Items - Income Statement	(108)	(1,519)	186	(2,150)	(1,253)	(2,683)
Pensions	(408)	(403)	(476)	(321)	(232)	(225)
Leases	646	748	728	0	0	0
Securitization	51	36	41	34	17	25
Interest Expense - Discounting	(2,369)	(2,075)	(2,589)	(2,230)	(3,096)	(2,172)
Non-Standard Adjustments	243	151	242	93	59	26
Moody's Adjusted EBITDA	15,606	13,677	12,478	16,504	13,286	15,570

[1] Reported EBITDA includes other income and expenses.
All figures are calculated using Moody's estimates and standard adjustments.
Source: Moody's Financial Metrics™

Exhibit 23

Select historical Moody's-adjusted financial data

Electricite de France

(in EUR million)	FYE Dec-16	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-20	FYE Dec-21
INCOME STATEMENT						
Revenue	71,203	64,892	68,546	71,347	69,031	84,461
EBITDA	15,606	13,677	12,478	16,504	13,286	15,570
EBIT	7,132	4,538	3,156	6,484	2,332	4,840
Interest Expense	2,975	2,917	2,948	2,655	2,392	2,087
Net income	2,735	1,909	373	3,392	(350)	3,007
BALANCE SHEET						
Net Property Plant and Equipment	134,692	141,941	145,972	153,632	159,231	166,689
Total Assets	282,418	275,542	286,158	300,199	302,380	358,713
Total Debt	93,588	84,079	84,889	86,067	85,746	89,062
Cash & Cash Equivalents	24,916	22,357	23,593	22,621	21,056	22,458
Net Debt	68,672	61,722	61,296	63,446	64,690	66,604
Total Liabilities	255,312	240,183	248,043	260,137	262,786	315,036
CASH FLOW						
Funds from Operations (FFO)	12,693	10,943	13,085	12,314	14,461	13,911
Cash Flow From Operations (CFO)	11,648	12,391	13,428	13,806	12,960	11,736
Dividends	745	575	986	508	518	521
Retained Cash Flow (RCF)	11,948	10,368	12,099	11,806	13,943	13,390
Capital Expenditures	(14,344)	(14,856)	(16,217)	(16,189)	(15,473)	(16,929)
Free Cash Flow (FCF)	(3,441)	(3,040)	(3,775)	(2,891)	(3,031)	(5,714)
INTEREST COVERAGE						
(FFO + Interest Expense) / Interest Expense	5.3x	4.8x	5.4x	5.6x	7.0x	7.7x
LEVERAGE						
FFO / Debt	13.6%	13.0%	15.4%	14.3%	16.9%	15.6%
RCF / Debt	12.8%	12.3%	14.3%	13.7%	16.3%	15.0%
Debt / EBITDA	6.0x	6.1x	6.8x	5.2x	6.5x	5.7x
Net Debt / EBITDA	4.4x	4.5x	4.9x	3.8x	4.9x	4.3x

Source: Moody's Investors Service

Moody's related publications

Press Releases:

» Moody's downgrades EDF's issuer rating to Baa1; negative outlook, published on 21 February 2022

» Moody's reviews EDF's A3 ratings for downgrade, published on 17 January 2022

» Moody's changes outlook on EDF, EDFT, Edison and EDF Energy to stable; affirms ratings, published on 27 August 2021

» Moody's assigns Baa3 rating to EDF's social hybrid notes; negative outlook, published on 26 May 2021

» Moody's upgrades Edison to Baa2; negative outlook, published on 19 April 2021

» Moody's assigns Baa2 long-term issuer rating to EDF Energy Holdings Ltd, negative outlook, published on 9 March 2021

» Moody's assigns Baa3 rating to EDF's hybrid notes; negative outlook, published on September 2020

» Moody's changes outlook on EDF to negative, affirms ratings, published on 24 April 2020

Issuer Comments:

» Electricite de France: Renationalisation would be credit positive, subject to the scale of additional financial support, published on 7 July 2022

» Electricite de France: Further cut in anticipated nuclear output is credit negative, published on 20 May 2022

» Edison S.p.A.: Recent portfolio rotation announcements are credit positive, published on 15 January 2021

» Proposed new regulatory framework for nuclear power may increase earnings visibility, published on 30 January 2020

» Electricite de France: New cost overrun and potential delay at Hinkley Point are credit negative, published on 26 September 2019

» E&P sale accelerates strategic shift toward renewables, published on 5 July 2019

» Edison S.p.A.: Acquisition of EDF EN Italia renewable assets: a modest credit positive, published on 26 June 2019

Credit Opinions:

» Edison S.p.A.: Update following placement of ratings on review for downgrade, published on 4 February 2022

» EDF Energy Holdings Ltd: Update following placement of ratings under review for downgrade, published on 2 February 2022

» EDF Trading Limited: Update following placement of ratings under review for downgrade, published on 2 February 2022

Sector Comments:

» Regulated Electric & Gas Networks – Europe: 2022 outlook stable, with limited changes to key regulatory parameters, published on 10 January 2022

» Regulated Electric & Gas Networks - Great Britain: CMA draft ruling provides only modestconcessions to tough RIIO-2 determination, published on 31 August 2021

» Unregulated Utilities and Power Companies - UK: Re-approval of the UK capacity market is credit positive for generators, published on 24 October 2019

» Regulated Electric & Gas Networks – France: France's proposal to significantly cut allowed returns for gas transport and storage, published on 29 July 2019

Sector In-Depth:

- » Europe's electricity markets: In Europe, high energy prices will not derail the energy transition, 30 November 2021
- » Regulated Electric and Gas Utilities – Global: ESG considerations have an overall credit negative impact on utilities with generation, 1 June 2021
- » Energy Transition – Europe: Expansion of O&G in utilities' space credit positive for former, negative for latter, 12 November 2020
- » Electric Utilities – Global: Cybersecurity readiness depends on scale, business model and generation ownership, 4 November 2020
- » In France, concerns around nuclear availability highlight need to make renewables transition, published on 14 October 2020
- » In Italy, progress toward decarbonisation is accelerating, 14 October 2020
- » In Britain, net zero emissions target will create opportunities, require further and faster decarbonisation, 14 October 2020

Industry Outlook:

- » 2022 outlook stable as intervention risk, high capex overshadow earnings growth, 9 December 2021

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

Endnotes

1 **EDF 2021 Annual Results – Outlook and Action Plan**.

2 **The CRE recommends an ARENH reform**.

This publication does not announce a credit rating action. For any credit ratings referenced in this publication, please see the issuer/deal page on https://ratings.moodys.com for the most updated credit rating action information and rating history.

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