PROJECT OWNER SUMMARY REPORT

Project for a first pair of EPR2 reactors at the Penly NPP site (Normandy), as part of EDF's proposed building programme for new nuclear reactors in France

INTRODUCTION

EDF has submitted for public consultation a project for a first pair of EPR2 reactors at the Penly NPP site (Normandy), as part of its proposed programme to build new nuclear reactors in France.

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For EDF, embarking on a programme to build new nuclear reactors is one of the conditions for achieving carbon neutrality by 2050 and securing for the French population long-term electricity supplies at a cost that is affordable. Nuclear energy is a low-carbon and dispatchable energy that complements renewables and has a small land footprint given the power generated.

The nuclear sector has long been preparing to carry out this ambitious and essential programme. As the third largest sector in France, it has invested heavily in strengthening its industrial expertise and enhancing its pool of skills; today, it recruits and trains thousands of professionals across France, thus greatly contributing to the vitality of the regions.
The construction programme for three pairs of EPR2 reactors, which EDF as industry leader has put forward, and the project for a first pair of units at Penly, have been submitted for public consultation under the aegis of the National Public Consultation Committee (CNDP).

This consultation has a local aspect aiming at the project's integration in the Penly region, and a national aspect centred on the proposed industrial programme. This is in addition to the government's forthcoming consultation on energy choices, and will provide an **opportunity for the public to contribute to the project owner's decision-making process at a stage when all the options remain on the table.**

EDF sees the public consultation as an opportunity to set out in detail its proposed programme of new reactors and its project for a first pair of EPR2 reactors at Penly. It will make possible discussions on the appropriateness of the submitted programme and project, on alternatives and conditions for implementation, and will give rise to proposals for the host region.

Nuclear energy is a low-carbon and dispatchable energy that complements renewables and has a small land footprint given the power generated.

EDF, owner of the project submitted for public consultation

EDF is the owner of the project to build a first pair of EPR2 reactors at Penly, and the nuclear energy leader for the proposed programme of six new nuclear reactors that is being submitted for public consultation. EDF is a world leader in low-carbon electricity generation, with a diversified energy mix drawing on nuclear energy and renewable energies (hydropower, wind power and solar power in particular).

In keeping with its ambition of **"building a net-zero energy future and, thanks to electricity and innovative solutions and services, combining the survival of the planet with wellbeing and economic development",** EDF is aligned with the Government's target of carbon neutrality by 2050.
EDF is currently operating 56 reactors, has reached the pre-operation phase for the Flamanville **EPR** reactor, and is dismantling 11 decommissioned reactors.

WHAT ARE THE ENERGY REQUIREMENTS **UNDERLYING EDF'S PROPOSED INDUSTRIAL PROGRAMME?**

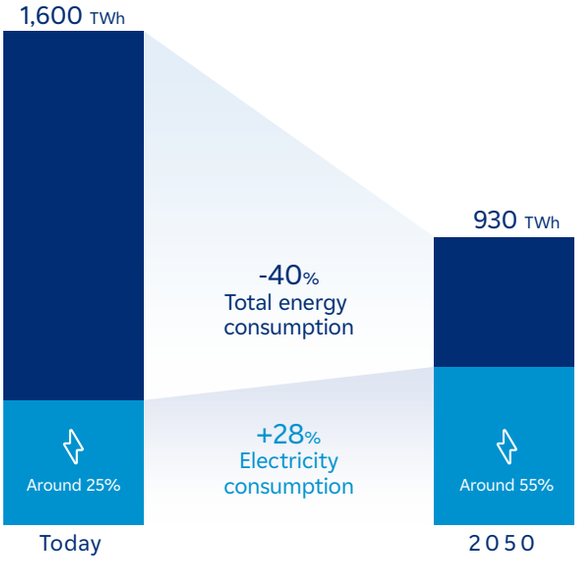
For EDF, the industrial programme of new reactors addresses the increasing electricity needs envisaged in the National Low-Carbon Strategy. It harnesses the benefits of this technology to bolster the French energy transition, and it maintains the skills needed to safeguard the French nuclear sector and thus ensure national energy self-sufficiency.

A GROWING NEED FOR LOW-CARBON ELECTRICITY

In order to achieve a net-zero energy system by 2050, the National Low-Carbon Strategy (SNBC) currently in force calls for both a 40% decrease in national energy use and an exit from fossil fuels. Attaining these objectives requires the **mass electrification of energy uses** (replacing CO2 emitting energies with electricity), **contingent on the production of low-carbon electricity** and the development of new sectors for non-electrifiable uses (heavy goods transportation, for example).

A 40% decrease in national energy use and an exit from fossil fuels

SHARE OF ELECTRICITY IN TOTAL ENERGY CONSUMPTION IN FRANCE, BASED ON THE NATIONAL LOW-CARBON STRATEGY



Based on data in Figure 2 "Total energy consumption in France under the National Low-Carbon Strategy", and on page 11 of the document "Energy futures 2050[1]- principal results".

1. https://assets.rte-france.com/prod/public/2021-12/Futurs-Energetiques-2050-principaux-resultats.pdf

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FOR EDF, RENEWABLE AND NUCLEAR ENERGIES ARE THE CORNERSTONES OF THE 2050 FRENCH ELECTRICITY MIX

At the request of the Government and as a means to inform future energy choices, the French public electricity transmission network operator RTE, as part of its legally constituted public service mission, has produced a prospective study on the future of the electricity system: "Energy futures 2050". This study, the results of which were published at the end of 2021, aimed to *"develop and assess several possible ways of developing the electricity system to achieve carbon neutrality"* by combining different scenarios for changing electricity demand and production. All the scenarios were subject to a technical, economic, environmental and societal analysis. **This analysis confirmed that there was an urgent need to exit fossil fuels and reduce end-consumption, while increasing the proportion of low-carbon electricity in the energy mix, which will necessarily have to be based on the extensive development of renewable energies.**

In order to meet these challenges, RTE has set out six scenarios for changes in the energy production mix, all compatible with achieving carbon neutrality by 2050. They can be split into two major categories:

> **scenarios without the construction of new nuclear reactors**, achieving 100% renewable electricity between 2050 and 2060 depending on the opportunities for continued safe operation of some of the existing nuclear reactors. These scenarios offer alternatives to EDF's proposed industrial programme.

> **scenarios based on energy mixes sustainably combining renewable and nuclear energies,** characterised by the development of a programme to build new EPR2 design reactors, on different scales and timelines.

For EDF, whose analysis in what follows does not commit RTE, a comparison of the different scenarios shows that the energy mixes based on both the development of renewable energies and a solid base of nuclear energy have **several economic and industrial advantages over the energy mixes composed exclusively of renewable energy sources.**

There is an urgent need to exit fossil-fuel energies and reduce end-consumption, while increasing the proportion of low-carbon electricity in the energy mix.

The mixed energy source scenarios deliver an economic advantage compared to the 100% renewable configurations. They are also predicated on realistic rates of development of renewable energies and associated infrastructure. In the case of an energy mix with a high proportion of intermittent renewable energy sources, this would require technological modifications to the French electricity system to ensure effective operation.

Lastly, in tandem with an acceleration of the development of renewable energies, the launching of a new nuclear programme now would keep electricity system development options open for decades to come.

IN THE OPINION OF EDF, THE RENEWED DEVELOPMENT OF NUCLEAR POWER WOULD MAKE A SIGNIFICANT CONTRIBUTION TO THE ENERGY TRANSITION AND ENERGY SELF-SUFFICIENCY

For EDF, balanced energy mixes based on nuclear and renewable sources are the best means of achieving carbon neutrality by 2050 against a background of climate change.

Nuclear energy has allowed France to be a step ahead with the decarbonisation of its energy mix. By continuing to develop the nuclear sector, the country will be able to meet the increased demand for electricity while also **contributing to the stability of the electricity transmission system.** With emissions of 4 grams of CO_2 per kilowatt-hour generated (according to a study carried out by EDF[2]), **the existing French nuclear fleet produces low-carbon dispatchable energy that complements intermittent energy sources** like solar and wind power. Reactors can adjust to variations in consumer demand and renewable energy production on a daily, weekly and yearly basis. Nuclear energy is also a **resource-efficient and space-efficient** solution, for the power generated and the operating lifetime of the plants.

Finally, this programme offers **a key to French energy self-sufficiency.**

The launching of a new nuclear programme now would keep electricity system development options open for decades to come.

What are the alternatives to the project submitted for public consultation?

In order to reach carbon neutrality by 2050, the first alternative is **not to proceed with the proposed nuclear programme,** a strategy which EDF considers to be a more costly and less robust solution, and less likely to safeguard the balance of the French electricity system.

In the context of the deployment of the proposed programme, other alternatives would be to **build only one reactor at Penly, rather than two, or to opt for only one pair of reactors instead of the 3 pairs being considered** for the industrial programme as a whole.

However, operating experience has highlighted the importance of the next-in-kind series effect to benefit from expertise, to reduce costs, and to optimise timescales.

There are **technological alternatives to the EPR2 model.** However, for EDF, the EPR2 delivers optimal reactor technology for this generation of reactors, and is the most reliable and the safest yet.

Nuclear energy has allowed France to be a step ahead with the decarbonisation of its energy mix.

1 kWh = 4 g of CO_2

Every kWh generated by the French nuclear fleet operated by EDF emits the equivalent of 4 g of CO_2, according to EDF's life cycle assessment (lca)[2], compared to fossil fuels, which produce between 400 and 1,000 g of CO_2.

EDF source: https://www.edf.fr/sites/groupe/files/2022-06/edfgroup_acv-4_plaquette_20220616.pdf

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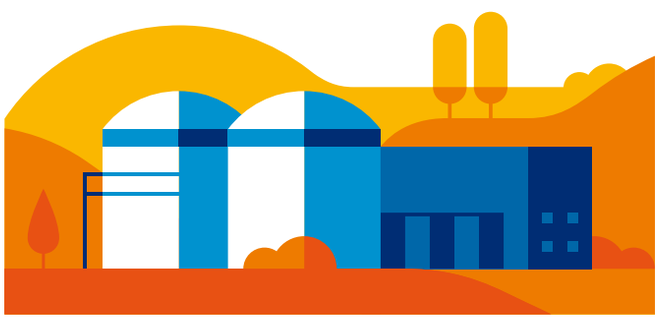
WHAT IS THE INDUSTRIAL PROGRAMME FOR **NEW REACTORS PUT FORWARD BY EDF?**

EDF has submitted an industrial programme for three pairs of new "EPR2" design reactors, an optimised model that factors in the learning from the EPRs that are under construction or were recently built. Beyond the reactor model itself, it is the programme's intrinsic strengths and the engagement of a remodelled nuclear sector that must guarantee timetable and cost control.



3 pairs of EPR2 reactors, delivering 10 GWe of additional installed capacity.

A **2035-2037** commissioning timetable for the first pair and **mid-2040** for the last pair.

A minimum of 60 years of low-carbon electricity **generation.**

THE OPPORTUNITIES AFFORDED BY AN INDUSTRIAL PROGRAMME

EDF is proposing to undertake an industrial programme for three pairs of EPR2 reactors, with the purpose of replicating the best practices that underpinned the successful construction in record time of the existing fleet in the 1970s: the construction of pairs of reactors and the serial effect in particular. The Flamanville EPR has indeed demonstrated the limitations of a single-reactor approach.

EDF proposes to undertake an industrial programme for three pairs of EPR2 reactors, to replicate the best practices that have underpinned the success of the existing fleet.

THE ABILITY OF THE FRENCH SECTOR TO IMPLEMENT THE PROPOSED PROGRAMME

Having the appropriate skills to deliver the EPR2 industrial programme to a high-quality standard, on budget and on time, constitutes a key challenge for the French nuclear sector.

To this end, the Flamanville EPR project (where the difficulties encountered were analysed by the industry leader Jean-Martin Folz in his 2019 report[3]) and the other EPR projects worldwide are all valuable sources of operating experience to be drawn on for the launch of a nuclear industrial programme.

3. Report by Jean-Martin Folz: https://www.economie.gouv.fr/rapport-epr-flamanville

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THE EXCELL PLAN: 5 KEY FOCUS AREAS

*The excell plan nuclear excellence

In 2018, the nuclear sector players created the French Nuclear Industry Association (GIFEN). This association has 310 company members (as of June 2022), including key players in the sector, large companies, as well as VSEs and SMEs, professional bodies, and organisations. For more information: **www.gifen.fr**

Among other things, the lessons learned gave rise to the Excell Plan designed **to reinforce excellence in the French nuclear sector.** The involvement of all the sector's stakeholders has led to concrete measures (the opening of a welding college, for example) that address two of the main issues spotlighted by the Flamanville EPR project: expertise in the technical skills needed across the entire subcontracting and procurement chain, as well as the erosion of skills and the challenges of long-term mobilisation of resources.

The strong support of the host regions, across the different local authority levels, is a decisive factor in the choice of host sites for the pairs of EPR2 reactors.

THE SELECTION OF HOST SITES FOR THE THREE PAIRS OF EPR2 REACTORS

In its proposal, EDF plans for the construction of the first pair of EPR2 reactors at Penly NPP (Normandy), a coastal site. In the second phase, the two following pairs could be built at Gravelines NPP (Hauts-de-France region), another coastal site, and at Bugey or Tricastin NPP (Auvergne-Rhône-Alpes region), both riverside sites. All the suggested construction sites are either within or in the direct vicinity of an existing nuclear site.

The selection of these sites was based on a range of technical criteria, in particular cooling capacity, seismic hazard, the environmental sensitivity of the area, the ability to transmit the electricity that is generated, as well as the amount of land available.

Aside from these technical criteria, the strong support of the host regions, across the different local authority levels, is a decisive factor in the choice of host sites for the pairs of EPR2 reactors.

If the programme for six reactors and the Penly project are approved, when the time comes, the future host sites will be put forward as new projects to be submitted to the National Public Consultation Committee for rulings on the debate or consultation that is to take place beforehand.

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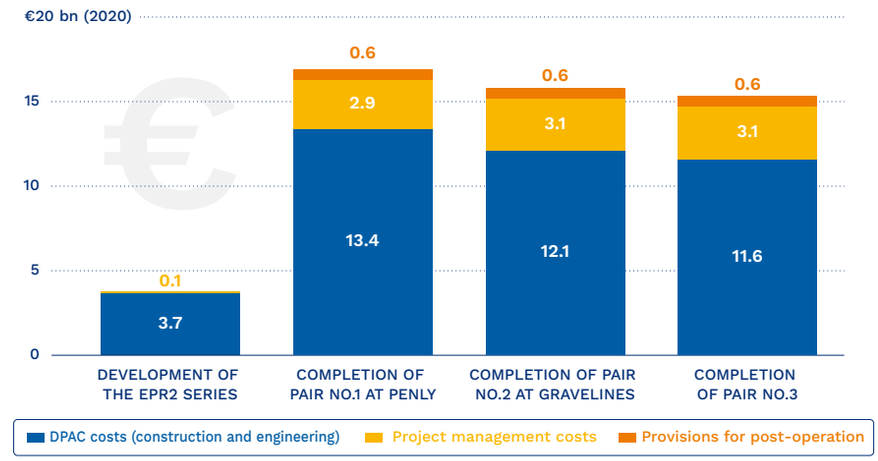
€20 51.7 bn

is the total cost of the programme to build 3 pairs of EPR2 reactors in France that has been put forward by EDF.

DISTRIBUTION OF THE COST OF A STANDARD SERIES OF 3 PAIRS OF EPR2 REACTORS EXCLUDING FINANCING COSTS



Source : EDF (2021) (DPAC = Design, Procurement, Assembly, Commissioning)

PROGRAMME COST AND FUNDING

The estimated cost of the programme covers both:
> the EPR2 standardised series design and development costs for the implementation of the series of reactors;
> the construction and engineering costs of building each pair of reactors;
> the project owner costs (chiefly for preliminary works, pre-operation, first fuel loading, etc.) ;
> and provision for projected expenses after the operating phase (decommissioning and management of the last fuel).

The construction and engineering costs factor in the next-of-a-kind efficiencies gained by building a series of 3 standardised pairs of reactors, as well as the benefits of common plant shared by each pair of reactors.

The financing and regulation plans are currently being discussed by the Government and EDF, and are yet to be finalised.

As stated in the Government paper *"Travaux relatifs au nouveau nucléaire"* (preparations for new nuclear)[4], further work is needed on the detail of the financing and regulation arrangements for this mechanism. This should consider the legal feasibility, particularly in terms of European law, of the regulated price level, of the cost to the community (taxpayers and consumers), and of the capacity of the different schemes to motivate the project lead to control costs and timescales. The conclusions should then be submitted to the European Commission to ensure the compatibility of the aid that will be granted.

4. *https://www.ecologie.gouv.fr/sites/default/files/2022.02.18_Rapport_nucleaire.pdf*

THE EXPECTED OUTCOMES OF THE INDUSTRIAL PROGRAMME FOR THREE PAIRS OF EPR2 REACTORS

The plan for new pairs of EPR2 reactors would also **consolidate the nuclear sector, the third largest industrial sector in France after the automotive and aeronautical sectors,** with 3,600 companies and 220,000 qualified and non-outsourceable jobs throughout France.

The programme for three pairs of EPR2 reactors would create jobs across the whole nuclear sector and in a wide range of specialisms: engineering, construction, services, manufacturing, processing and operation.

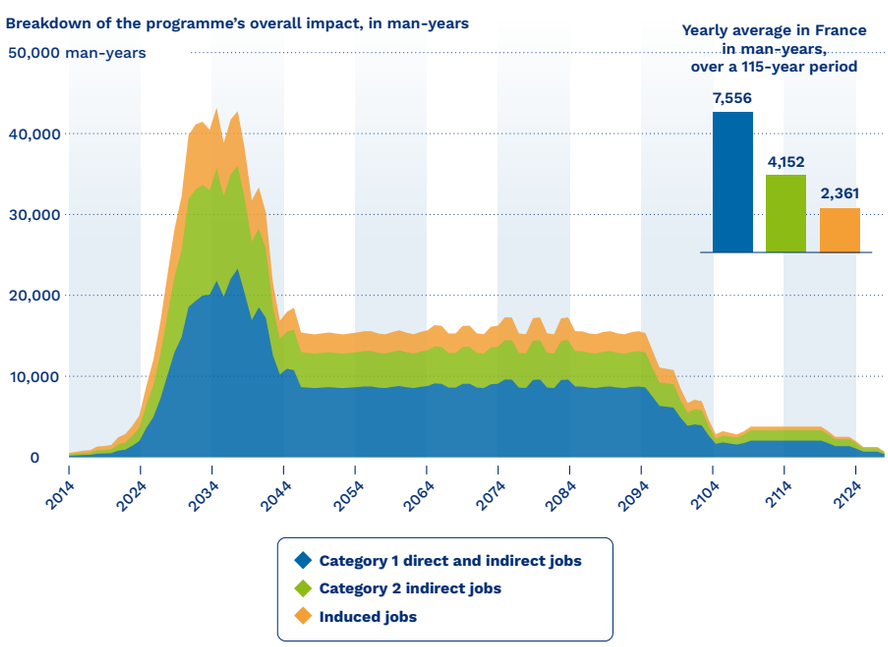
It would generate **up to 30,000 jobs a year during the construction phase, and around 10,000 jobs a year during operation.**

The nuclear sector contributes directly to reducing the trade deficit, primarily by decreasing the import and use of fossil fuels.

It would secure existing jobs and create new opportunities for younger generations. These direct and indirect jobs would also have positive effects on the economy as a result of job creation and tax revenues.

These jobs, the great majority in France, would be distributed around the country, with a significant share in the department hosting each pair of reactors and in neighbouring departments.

ESTIMATED JOB CREATION WITH THE PROGRAMME FOR 3 PAIRS OF EPR2 REACTORS



The programme for three pairs of EPR2 reactors would generate

30,000 jobs a year during the construction phase.

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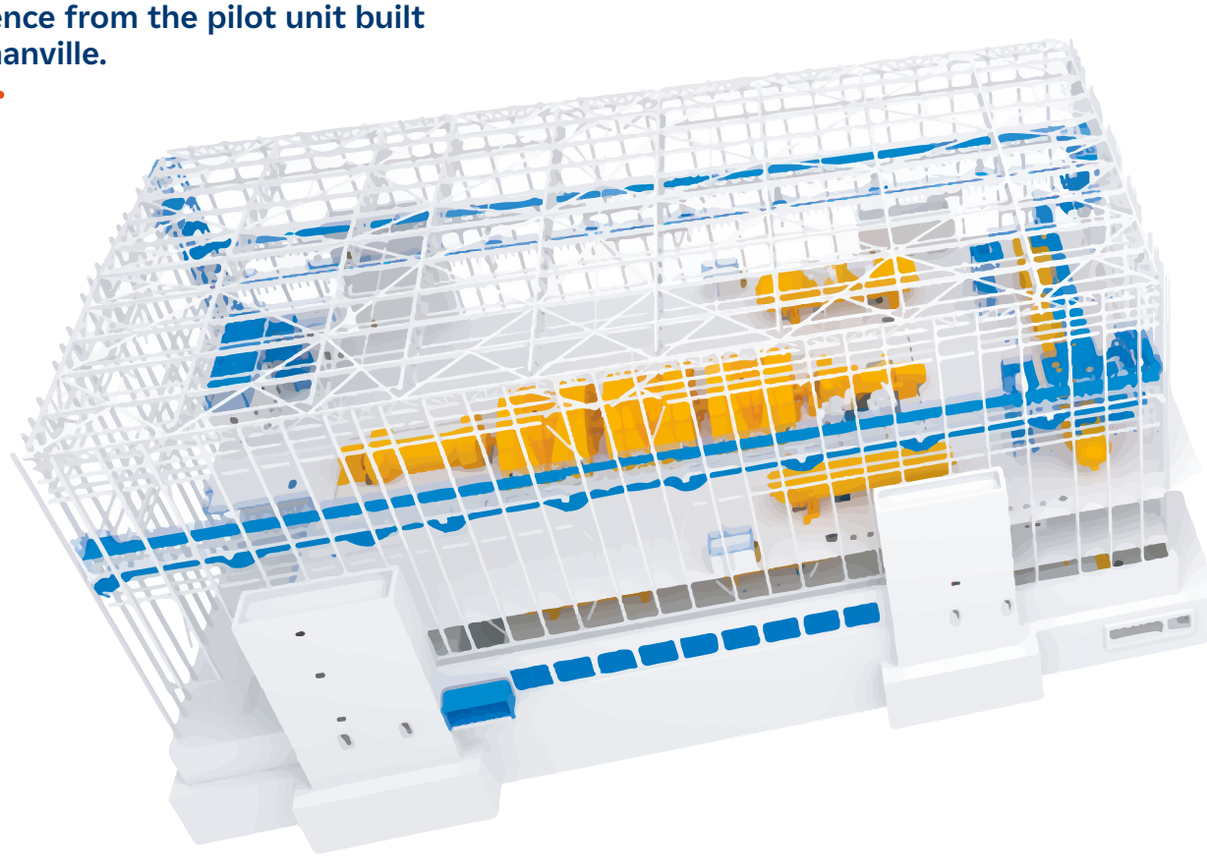
WHAT IS AN **EPR2 REACTOR?**

The EPR2 is a 3rd generation reactor, an optimised design that builds on the strengths of the EPR, first and foremost a high safety level. Designed to be operated for a minimum of 60 years, mitigation against the impacts of climate change is embedded in its design. Its electrical power output of around 1,670 MWe means that a pair of EPR2 reactors generates enough electricity to cater for the current needs of Normandy.

For its new reactor, EDF has opted for **pressurised water reactor technology,** the most common design used worldwide. The 56 reactors in operation in France and the Flamanville EPR now being commissioned are all PWRs. The EPR is a "3rd generation" pressurised water reactor with a safe and certified design, primarily based on French technology, its performance an improvement on the previous generation. Its construction was approved by the safety authorities in four countries: France, Finland, China and the United Kingdom.
The EPR2 is part of the strategy to industrialise **the EPR product,** fully incorporating the operating experience from the pilot unit at Flamanville. The focus is on facilitating the construction of the new reactors. The reactor design has been streamlined and optimised for **greater construction efficiency.** Likewise, the preparations and programming of the reactor build take place at the design stage, harnessing in particular the cutting-edge digital processes needed to control complex industrial projects. Lastly, **the best available techniques are selected, particularly with regard to the environment.** All these factors contribute to quality control, as well as reduced environmental impact, cost and construction time.

The EPR2 is part of the strategy to industrialise the EPR product, fully incorporating the operating experience from the pilot unit built at Flamanville.



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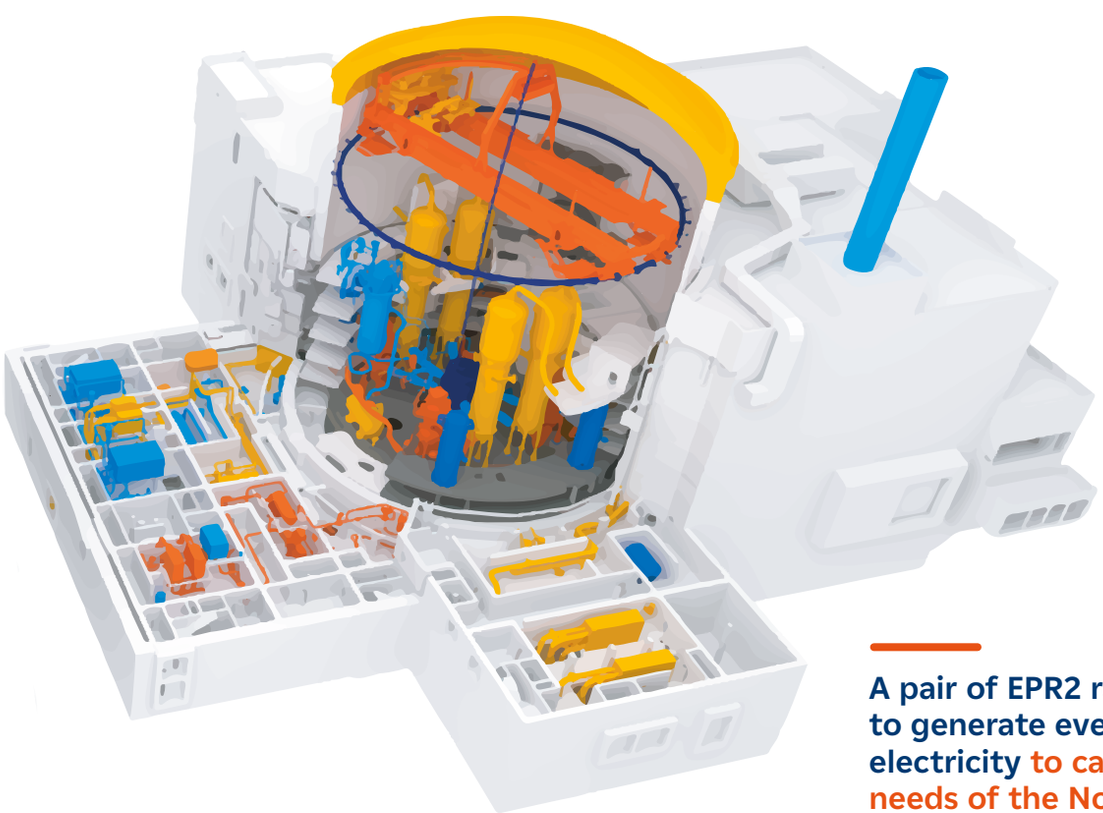
The EPR2 electrical power output of **around 1,670 electrical megawatts** means that a pair of EPR2 reactors generates every year enough electricity to cater for the current needs of the Normandy region, or to put it another way, half of the electricity consumption of the Île-de-France region.

The EPR2 reactor design is based on the same principles of nuclear safety and industrial safety as in the French nuclear fleet currently in operation, along with additional new provisions already adopted for the Flamanville EPR. **The EPR2 safety level is therefore among the highest in the world.** The safety design choices were submitted well in advance to the Nuclear Safety Authority (ASN[5]).

The EPR2 safety level is among the highest in the world.

Furthermore, the EPR2 reactor is designed to be **resilient to climate change throughout its operating lifetime of at least 60 years.** Its design takes into account changes in external factors resulting from climate change, especially air and water temperatures, coastal water levels and river flow rates.

The EPR2 can operate with 30% MOX fuel derived from reprocessed spent fuel.
The radioactive waste that will be generated during the operation and decommissioning of the six EPR2 reactors will be similar to the waste produced by the existing fleet. If the EPR2 programme goes ahead, the resultant radioactive waste will be accounted for in the inventories of future waste. This will be done by including the data in the waste produced by the six EPR2 reactors in a future version of the National Radioactive Materials and Waste Management Plan (PNGMDR[6]), a regulatory document that is revised every 5 years.



A pair of EPR2 reactors will be able to generate every year enough electricity to cater for the current needs of the Normandy region or, to put it another way, half of the electricity consumption of the Île-de-France region.

5. ASN ruling on the Safety Options File (DOS): https://www.asn.fr/content/download/166010/file/2019-AV-0329.pdf
6. https://pngmdr.debatpublic.fr/pngmdr/description-du-plan

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WHAT IS THE PENLY PROJECT FOR A PAIR OF EPR2 REACTORS?

The first pair of EPR2 reactors is expected to be built at Penly NPP, alongside two reactors commissioned in the early 1990s. This coastal site is highly suitable, as it ensures both an optimal location and a limited environmental impact in a region where the nuclear power sector is fully able to meet the challenges of such a large-scale project.

PENLY NUCLEAR POWER PLANT

A HIGHLY SUITABLE SITE, AT THE HEART OF A REGION AT THE CUTTING-EDGE ENERGY PRODUCTION

Penly NPP is a highly suitable host site for the first pair of EPR2 reactors. It was originally **designed to host four high-power reactors,** with land set aside for this purpose. In addition, its coastal location makes the design and construction of the cooling systems easier. The site is well known to EDF, which considered it a potential host site for the EPR in 2006. This project gave rise to a public consultation but was dropped by government decision.

The project fits perfectly in a region that has a highly developed nuclear sector and is actively engaged in developing multi-energy systems, including several offshore wind farms. **The nuclear sector alone accounts today for more than 22,000 direct and indirect jobs in the Normandy area.**

Beyond Normandy's intrinsic advantages, many economic leaders and industry players in the Seine-Maritime department and broader region have long supported, and continue to call for, a new project at Penly. This support was a determining factor in the selection of this host site for the programme's first reactor pair.

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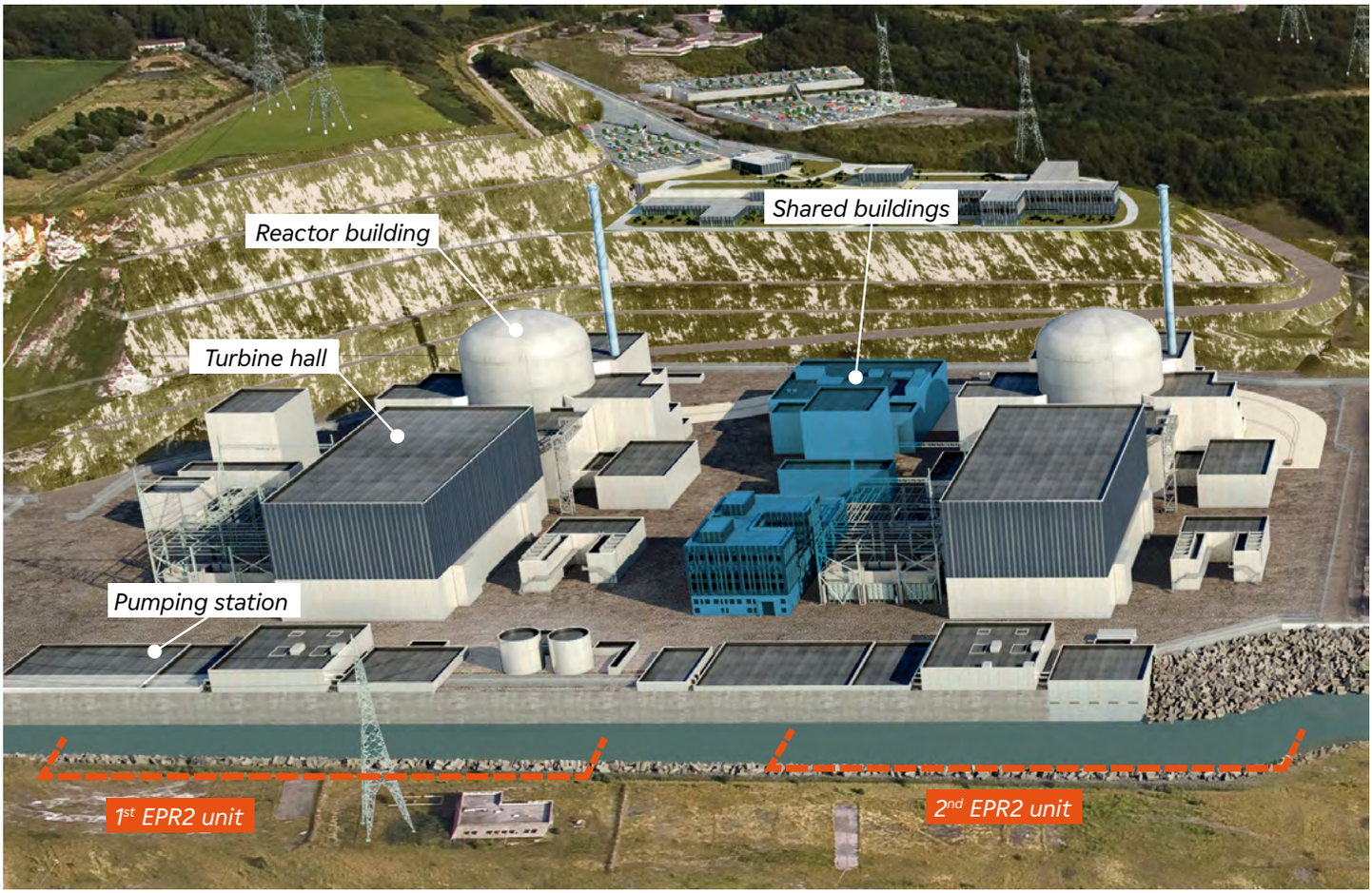
PREVIEW OF THE INSTALLATIONS DURING OPERATION



THE DISTINGUISHING CHARACTERISTICS OF THE PENLY PROJECT FOR A PAIR OF EPR2 REACTORS

The Penly EPR2 project consists of two production units, that is to say, two sets of buildings containing the nuclear reactor itself and a turbine hall in which the electricity is generated. Each reactor also has its own cooling water pumping station (seawater in the case of Penly).

Siting this new pair of EPR2 reactors in an existing nuclear site will derive benefit from common installations that can be shared by all four reactors.

Building a pair of reactors allows for the construction of shared buildings for the two units, including buildings for effluent treatment facilities, operations teams, and equipment storage. The project also provides for the construction of other annexes (storage building, access building, offices, canteen, training centre), as well as new parking areas for personnel.

Siting this new pair of EPR2 reactors in an existing nuclear site will derive benefit from common installations that can be shared by all four reactors (the two existing reactors and the two new EPR2 reactors), such as the freshwater supply and demineralised water production facilities, and the emergency control centre. This optimises the overall footprint of the installations.

The site was originally designed to host four high-power reactors, with land set aside for this purpose.

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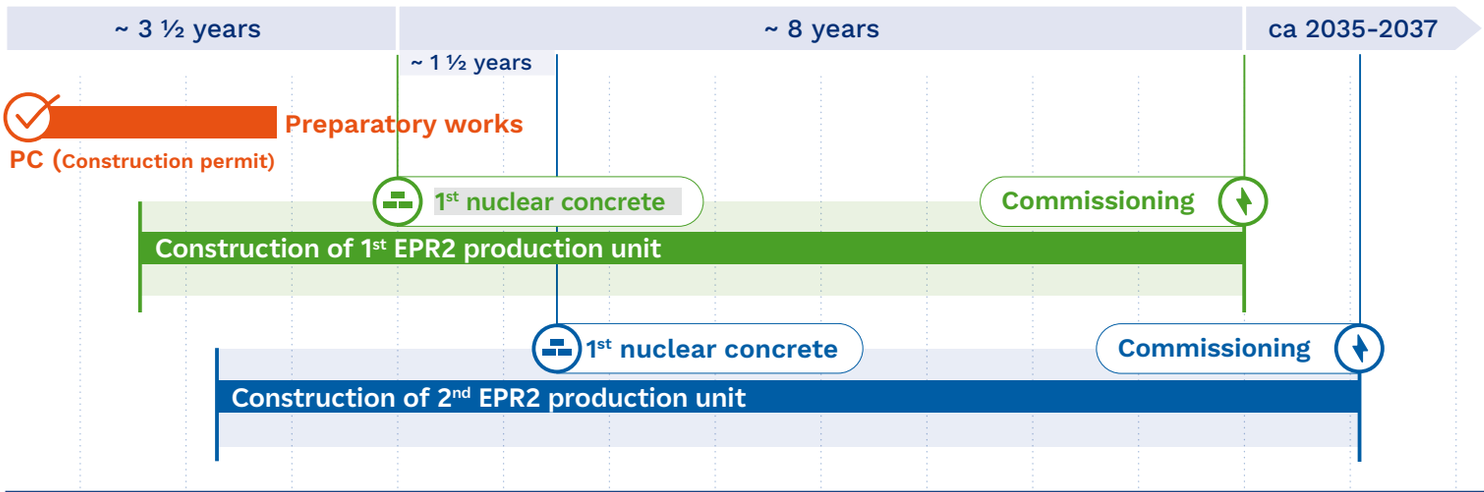
FORWARD PLANNING FOR A 2035-2037 COMMISSIONING DATE

PROJECTED CONSTRUCTION SCHEDULE



A SPOTLIGHT ON THE PRELIMINARY WORKS

The Penly EPR2 project will require extensive preliminary works. Owing to their higher power level, the EPR2 reactors have a larger land footprint than the existing reactors, so that **the cliff, which was previously modified to host the existing plant, will require further reshaping.**

As was the case when Penly's first production units were built, the waste material will be used first and foremost **to extend the platform out to sea**.

The installations will be built on the new land that is created, and this additional space will ensure that the build can take place safely, under appropriate conditions, avoiding the need to transport materials, and minimising the consumption of farmland.

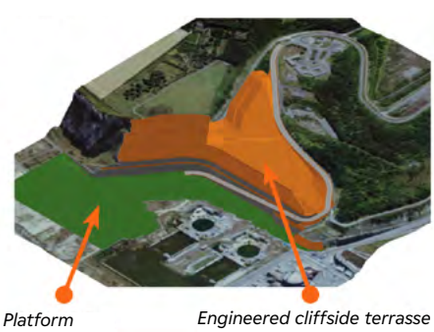
Local recycling of some of this waste material may be considered, in consultation with the regional authorities, and in keeping with the principles of a circular economy.

This will be followed by phases of civil engineering works, including the construction of the water intake and outfall structures, by the electromechanical assembly of equipment inside buildings, and then by the testing phase (hydrostatic tests and start-up tests).

REPROFILING THE CLIFF

Current view of the cliff

3D simulation of the cliff reprofiling project



Siting this new pair of EPR2 reactors in an existing nuclear site will derive benefit from common installations that can be shared by all four reactors.

Commissioning is expected to take place in 2035-2037.

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VIEW OF THE CONSTRUCTION SITE OF THE PAIR OF EPR REACTORS IN THE UNITED KINGDOM IN MAY 2022

A PROJECT DRIVEN BY A REQUIREMENT OF SUSTAINABILITY

The Penly EPR2 project was designed to minimise its environmental impact and to factor in the effects of climate change. It will conserve water resources by limiting the consumption of freshwater drawn from the Yères river, by using alternative water supply solutions (rainwater, water from the local water treatment plant, etc.) and by recycling water during the construction phase.

The construction project itself will rely on optimised logistics to reduce transportation and associated greenhouse gas emissions. Its impact on terrestrial and marine biodiversity will be limited, thanks to its siting on a manmade plot of land, by reduced land use, and by the avoidance, as far as possible, of ecologically significant habitats (clifftops, humid areas and chalky grassland), and thanks to carefully designed water intake and outfall structures.
The project also provides for environmental compensation schemes, which will be adapted to the habitats and species that are impacted, and will be aligned with the local authorities' sustainable development strategies.

The Penly EPR2 project was designed to minimise its environmental impact and to factor in the effects of climate change.

The "Major construction project" process is also designed to encourage the use of local labour.

SOCIO-ECONOMIC BENEFITS FOR THE REGION

Elected representatives and local communities have high expectations of a project that is firmly embedded in the region, of a site that fits into the landscape, and of the promise of local socio-economic benefits, both in the immediate vicinity of the coastal town of Petit-Caux and in localities across the whole Normandy region.
Local officials and institutions have therefore drawn up a **regional action plan for Normandy, to prepare for the construction and medium-term operation of the EPR2 reactors,** assuming that the project will go ahead. This initiative paves the way for the "Major construction project" process to be implemented with all stakeholders for the co-construction of a regional project. Its function will be to integrate, through joint solutions, the construction site requirements (accommodation, collective transport, catering facilities) and their effects on local infrastructures (roads, public amenities), while also preparing for the post-construction phase.
This process is also designed to encourage the use of local labour in a construction site that will reach a peak workforce of over 7,000 during the civil engineering and electromechanical assembly works. Meeting this challenge will require an enhanced regional training offer that fits in with the national policy to enhance nuclear sector skills.

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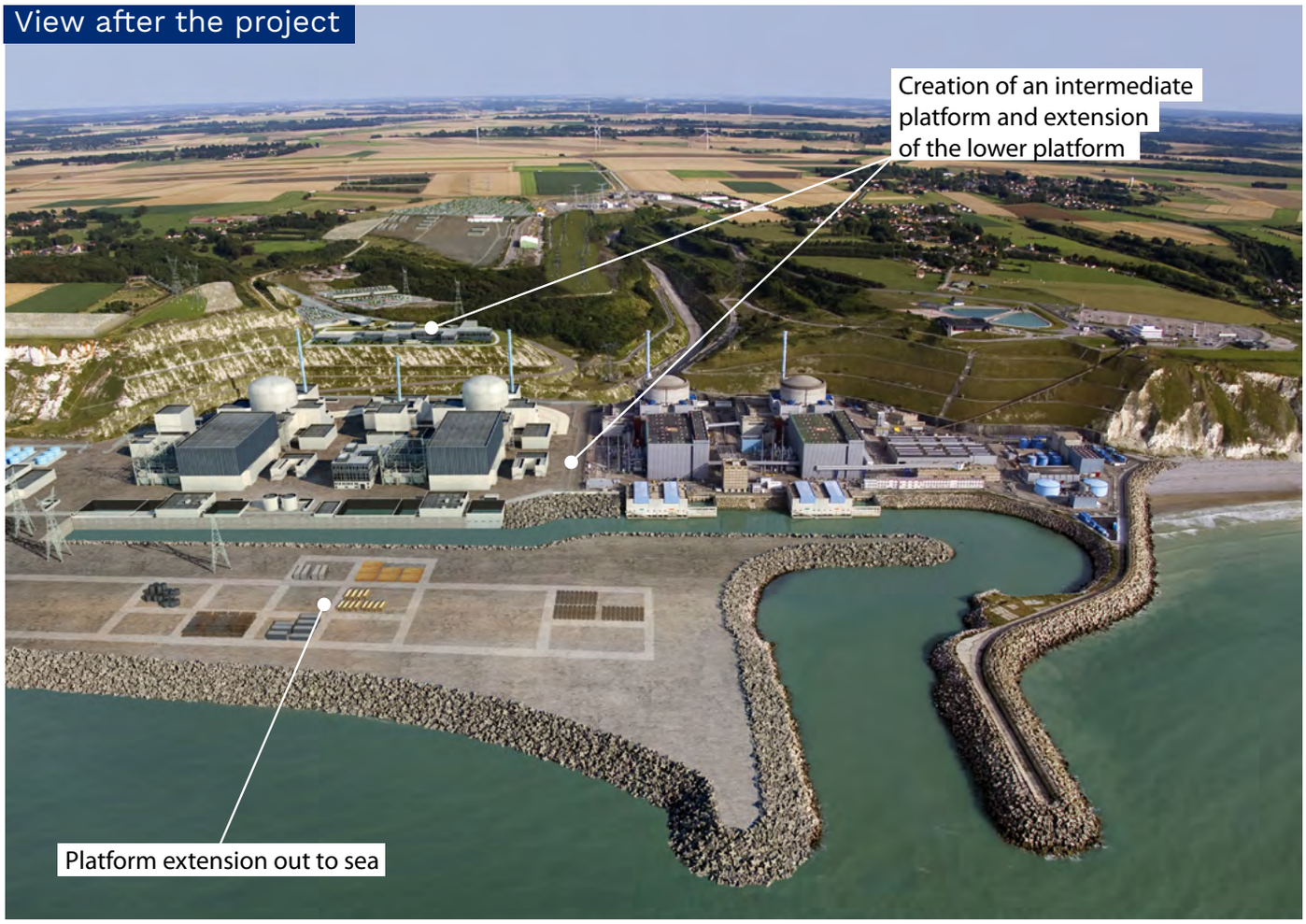
View before the project

View after the project



HOW WILL THE ELECTRICITY THAT IS GENERATED BE TRANSMITTED?

The electrical connection of the EPR2 production units being considered for Penly will be the responsibility of **RTE, the electricity transmission system operator, which, as part of its legally constituted public service mission, is responsible for connections and for offering all electricity producers fair conditions of access to the public power transmission system,** regardless of the type of installation that is connected. For this reason, RTE has joined EDF in submitting the Penly project to the National Public Consultation Committee.

The connection to the electricity network would involve building two 400 kV overhead lines (around 3 kilometres in length) for the transmission of the power generated by the two EPR2 reactors, and installing two underground cable systems, at a lower voltage, to power the internals of each reactor. At present, the connection cost is estimated at around **60 million euros.**
The construction of the new Navarre substation will be unaffected by whether or not the EPR2 reactors are built in the area, as the substation is primarily intended to replace Penly's ageing 400 kV substation, to which the two existing reactors are currently connected.

Furthermore, the Navarre substation is vital for the development of local projects that are essential for the electricity system. The connection would involve the installation of four bays for the four connections detailed above.

The construction of the new Navarre substation will be unaffected by whether or not the EPR2 reactors are built.

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WHAT ARE THE POSSIBLE **OUTCOMES OF THE PUBLIC CONSULTATION?**

Following the public consultation, in keeping with the Environment Code, EDF will have to reach a decision on its course of action in relation to the Penly EPR2 project, which it will set out in a document entitled a "Project owner ruling". This decision will be based on the report written by the Special Commission for the public consultation and on the report of the chairwoman of the National Public Consultation Committee.

Although this decision will set out EDF's formal position and response to any proposals or counterproposals submitted through the public consultation, **it does not supplant the decision that the Government will have to take on the future energy mix, and the role of nuclear energy.**

In any event, the industrial programme for new nuclear reactors will not be launched without the endorsement of the financing arrangements by the Government and the European Commission. If the project were to go ahead, EDF would seek several administrative authorisations, which would be examined by different authorities and would include as a minimum a public enquiry.

The public consultation would continue in parallel, under the aegis of guarantors designated by the National Public Consultation Committee, until the public enquiry into the applications for administrative authorisations.

In addition to this process stipulated by the Environment Code, EDF would wish to see ongoing discussions throughout the construction project, in accordance with procedures that are yet to be defined and that will take into account the expectations conveyed during the consultation.

The decision taken after the public consultation does not supplant the decision that the Government will have to take on the future energy mix, and the role of nuclear energy.

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GLOSSARY

Words highlighted in grey in this report are explained in this glossary

3rd generation: Generation 3 nuclear reactors are reactors that were designed from the 1990s onwards, incorporating the operating experience from previous designs, and the Chernobyl accident in particular.

ASN: Nuclear Safety Authority. An independent administrative authority tasked on behalf of the French Government with regulating nuclear safety and radiation protection in order to protect people and the environment.

CNDP: National Public Consultation Committee. An independent administrative authority entrusted with ensuring compliance with the public's right to information and participation in public projects and policies that impact the environment.

Decarbonation: action to reduce consumption of primary energy (unprocessed energy available from nature) that releases greenhouse gases (e.g. CO_2).

Dispatchability: An energy source is dispatchable if it can be modified at the request of a grid operator. This is the case for nuclear power plants, which can be started up or shut down on demand, or have adjustable power output.

Electricity mix: the proportion of various sources of energy used to produce electricity.

Energy mix: the proportion of various sources of primary energy (unprocessed energy available from nature) in the total energy consumption of a country.

Electrical power output of the EPR2: the electrical power output of the EPR2 model will be 1,670 megawatts electric, compared with the other reactors currently in operation in France (thirty-two 900 MWe reactors, twenty 1,300 MWe reactors, and four 1,450 MWe reactors).

First nuclear concrete: pouring the first concrete in the nuclear island raft is an important milestone in the start of actual construction work on the nuclear part of the facility.

EPR: European pressurised reactor.

Industrialisation: process that applies industrial techniques and processes to rationalise and increase productivity.

Low-carbon energy: Energy with very low CO_2 emissions. Nuclear energy falls into this category as it emits very little carbon per KWh generated, even over its entire life cycle.

MOX: Mixed oxide fuel is derived from reprocessed spent fuel from nuclear power plants. It is made up of both plutonium and "depleted" uranium.

PNGMDR: National Radioactive Materials and Waste Management Plan. Established and updated by the Government, it sets out the implementation principles for the sustainable management of radioactive materials and waste. The 5th edition of the plan (2022-2026) is pending approval and was submitted for public consultation.

Remodelled nuclear sector: following feedback from Flamanville, the nuclear industry has benefited from various reorganisation measures over the last few years, in particular the creation of the sector's strategic committee and the French Nuclear Industry Association (GIFEN).

Serial effect: efficiencies of scale and optimised processes and methods derived from producing several reactors in a series.

SNBC: National Low-Carbon Strategy. Its sets out France's roadmap for combating climate change and achieving carbon neutrality by 2050. It has precedence over other national and local planning documents.

Supply chain: commonly used in industry to mean all stakeholders working to guarantee and optimise the production of goods or services, at various stages in the chain of supply, from purchase of raw materials to delivery to the customer.

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