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Agence nationale pour la gestion des déchets radioactifs

Cigeo Project

Industrial Centre for the reversible deep geological disposal of radioactive waste in the Meuse/Haute-Marne area

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Key dates

1991 The "Bataille Act" was passed, setting out three research areas for the most highly radioactive waste.

1994-1996 Geological investigations conducted by Andra to identify suitable geological sites.

1998 The Meuse/Haute-Marne site was selected by the government for the construction of an underground research laboratory.

2000 Construction of Andra's Underground Research Laboratory in the Meuse/Haute-Marne began.

2005 Andra concluded that deep geological disposal in Meuse/Haute-Marne is feasible and safe in the "2005 file".

2005 Public debates on handling the most highly radioactive waste

2006 Vote on the law of 28 June adopting reversible deep geological disposal as a solution for this type of waste.

2009 The government approved the 30 km² underground zone proposed by Andra for studying the siting of the Cigeo underground facility.

2012 Presentation of the conceptual design for the planned disposal facility, known as "Cigeo".

2013 Public debates on the Cigeo project organised by the National Public Debate Commission.

2016 Safety Options Report and the Retrievability Technical Options Report submitted to the ASN. Cigeo moved into the detailed design phase.

2016 Law of 25 July on the conditions for constructing Cigeo and for reversibility.

2019 Public debates on the French National Radioactive Materials and Waste Management Plan (PNGMDR).

2022 Decree establishing the Declaration of Public Utility for Cigeo.

2023 Construction licence application for Cigeo submitted.

Introduction

The Cigeo project managed by the French National Radioactive Waste Management Agency (Andra) aims to protect both people and the environment from the risks inherent in long-lived high-level and intermediate-level waste in the long term.

In the 2000s, the French Parliament adopted the principle of deep geological disposal as the safest solution for this type of waste. France is not alone in opting for deep geological disposal: this is the preferred option at European and international level too.

The Cigeo project is the result of three laws passed in 1991, 2006 and 2016 and three public debates held in 2005, 2013 and 2019. It is also the fruit of over 30 years of regularly evaluated research, including more than 20 in Andra's underground research laboratory in the Meuse/Haute Marne region. This project meets the ethical imperative of removing the burden of managing this waste from future generations.

About Andra

Andra is the French National Radioactive Waste Management Agency. It works with commitment and responsibility to fulfil the activities in the general interest entrusted to it by the State on behalf of the French people: managing radioactive waste and making that waste safe for future generations.

History of the Cigeo project

More than **30 years of research**

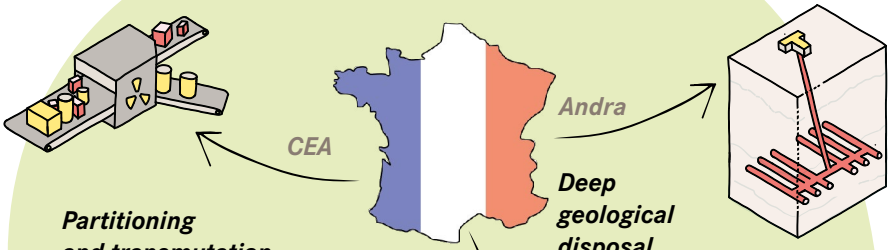
In 1991 the French parliament started to address the problem of managing radioactive waste, passing the "Bataille Act" on 30 December 1991. This Act set the main priorities for research into managing the most highly radioactive waste. **Three research areas were identified: partitioning and transmutation, long-term storage (two areas for which the CEA[1] was given responsibility) and deep geological disposal, assigned to Andra,** which has been conducting research at an underground research laboratory (see page 8).

Andra and the CEA submitted the results of fifteen years' research in these areas to the French government in 2005. On the basis of the files submitted to it, the French Nuclear Safety Authority (ASN) took the view that[2]:

- partitioning and transmutation technology was not sufficiently advanced and, in any case, could not be used to eliminate all of this waste;
- long-term storage did not constitute a permanent solution;
- **deep geological disposal was the only feasible permanent disposal solution.**

In 2006, on the basis of the scientific results, their review by the ASN and a public debate conducted in 2005, **the French parliament ratified the decision to opt for of deep geological disposal and tasked Andra with designing a disposal facility in the Meuse and Haute-Marne departments.** Research into partitioning and transmutation as well as storage is being pursued as complementary waste management options to disposal.

Three avenues of research



CEA

Partitioning and transmutation

This research was assigned to the CEA, which aimed to study the possibility of reducing the quantity and toxicity of radioactive waste.

Andra

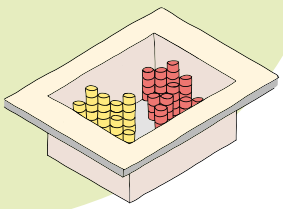
Deep geological disposal

This research area was assigned to Andra, which was asked to identify sites suitable for hosting a deep geological disposal facility and to study its safety and feasibility.

CEA

Long-term storage

This research, conducted by the CEA, aimed to study the surface or near-surface storage of waste for periods of around 300 years.



1. The French Alternative Energies and Atomic Energy Commission.
2. ASN Opinion of 1 February 2006 on research relating to the management of high-level long-lived waste (HLW-LL) carried out in the context of the law of 30 December 1991.

The Underground Research Laboratory and the choice of the **Meuse/Haute-Marne** site

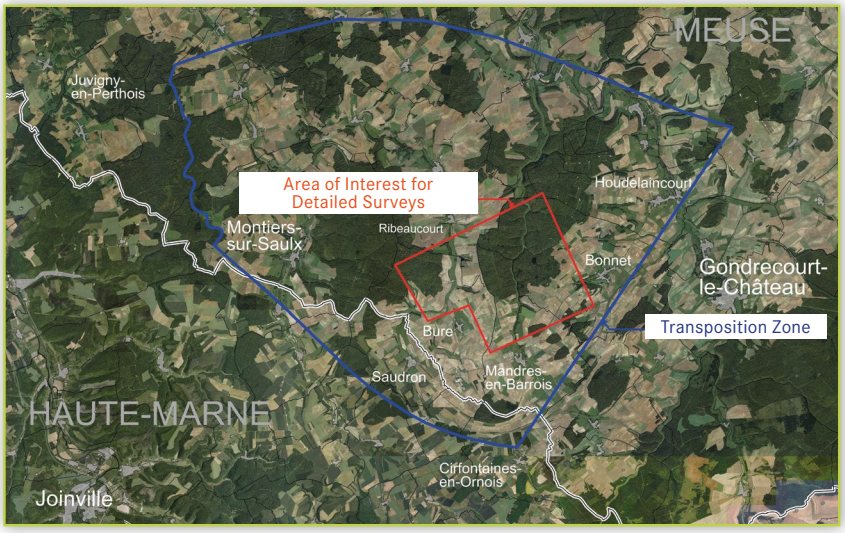
In 1994, investigations were carried out at four candidate sites (in Gard, Vienne, Meuse and Haute-Marne) for the purpose of setting up an underground research laboratory for studying the feasibility of deep geological disposal. Preliminary studies showed that the geology of the Meuse and Haute-Marne sites, now merged into a single site, was particularly suitable.

In 2000, construction of the Underground Research Laboratory began at this site, on the border of the two departments. Situated at a depth of 490 metres and consisting of a network of over two kilometres of drifts so far, this research facility has been used for scientific and technological research carried out directly within the Callovo-Oxfordian argillite stratum and, in 2005, led to the conclusion that deep geological disposal was feasible. The Laboratory is still used to conduct studies and experiments for the design of Cigeo.

In 2005, an area of 250 km², around the Underground Research Laboratory, known as the "transposition zone", was identified as having the same geological profile as the laboratory: the clay layer is stable and its properties would allow for the long-term containment of radioactivity.

In 2009, Andra proposed an underground area covering 30 km² located within the transposition zone to the French government: the zone of interest for detailed surveys (ZIRA). This zone was defined on the basis of both scientific criteria related to the safety and geology of the site and criteria identified by local elected officials and local residents during a consultation. The ZIRA was approved by the French government after opinions were issued by the ASN and the National Assessment Board, and after consulting elected officials and the Local Information and Oversight Committee (CLIS) for the Underground Research Laboratory.

If Cigeo is licensed, the underground facility will be built in this zone.



CALLOVO-OXFORDIAN ARGILLITE

The geological stratum chosen as the location of the Cigeo underground facility is an argillaceous sedimentary stratum that is 160 million years old: Callovo-Oxfordian argillite. This layer is 145 m thick and located at a depth of between 400 and 600 m. Thanks to its properties, particularly its stability and very low permeability, this layer is suitable for a deep disposal facility and therefore studied.

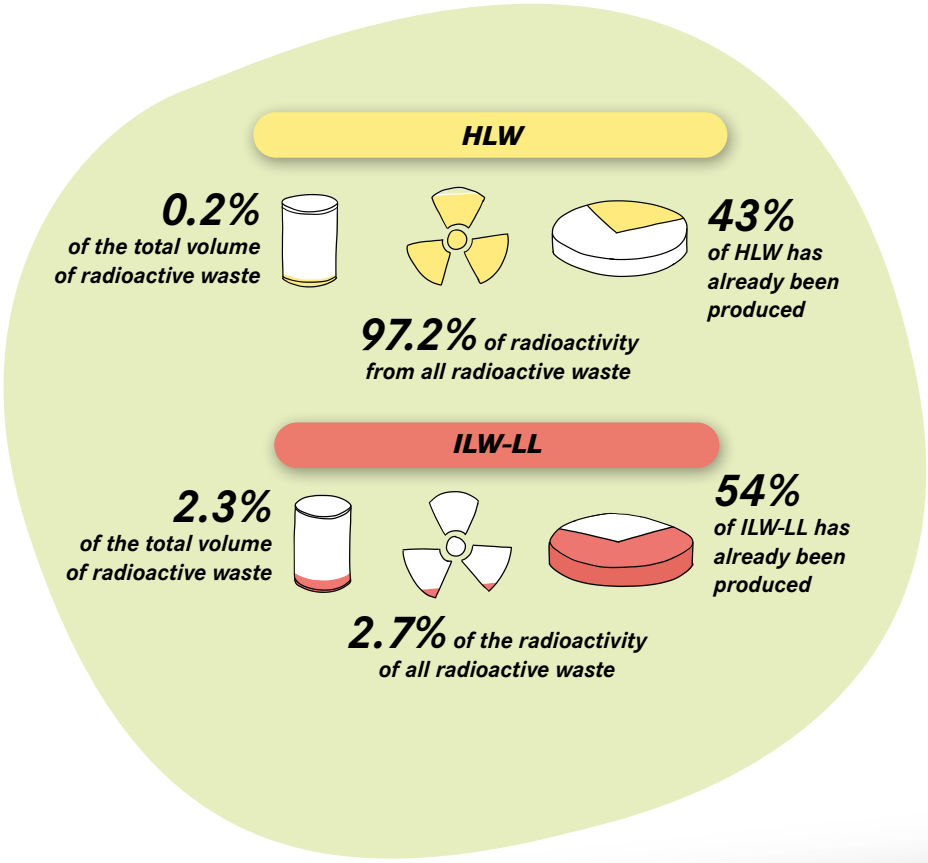
Waste requiring **long-term handling**

Radioactive waste is mainly generated by nuclear power production, but also by industry and by the health, research and defence sectors.

The vast majority of such waste is managed at existing facilities: 90% of the total volume of radioactive waste produced in France each year is currently disposed of on the surface at Andra's disposal facilities in the Manche and Aube regions (very low-level waste and low-level and intermediate-level short-lived waste).

However, high-level waste (HLW) and intermediate-level long-lived waste (ILW-LL) cannot be disposed of in surface or near-surface facilities because of the inherent risks and the fact that such waste remains hazardous for a very long time (tens or hundreds of thousands of years).

This waste accounts for a small percentage of the total volume and the vast majority of the radioactivity of all radioactive waste. At present, 54% of ILW-LL and 43% of HLW has already been generated.



WHAT IS THIS WASTE?

HLW is mainly the result of reprocessing spent fuel from nuclear power plants. It is incorporated into a molten glass paste which is poured into stainless steel waste packages.

ILW-LL waste is more varied. It includes structural components that surround fuel assembles and residue from operating and maintenance of nuclear facilities. This waste is compacted or conditioned in a matrix (cement, glass or bitumen) and placed in metal or concrete packages.

▶ Radioactive waste metal from spent fuel reprocessing

The Cigeo project is designed on the basis of a reference inventory which includes all HLW and ILW-LL that has been and will be produced by existing nuclear facilities until they are decommissioned (nuclear power plants, research centres, etc.).

Waste that will be produced by nuclear facilities currently being built (Flamanville EPR, ITER and the Jules Horowitz experimental reactor) has also been taken into account. This amounts to around 10,000 m³ of HLW and 73,000 m³ of ILW-LL, i.e. around 83,000 m³ of radioactive waste in total.

This waste is currently stored in interim surface facilities at the sites where it was produced (mainly La Hague, Bugey, Marcoule and Cadarache), pending its disposal in Cigeo.

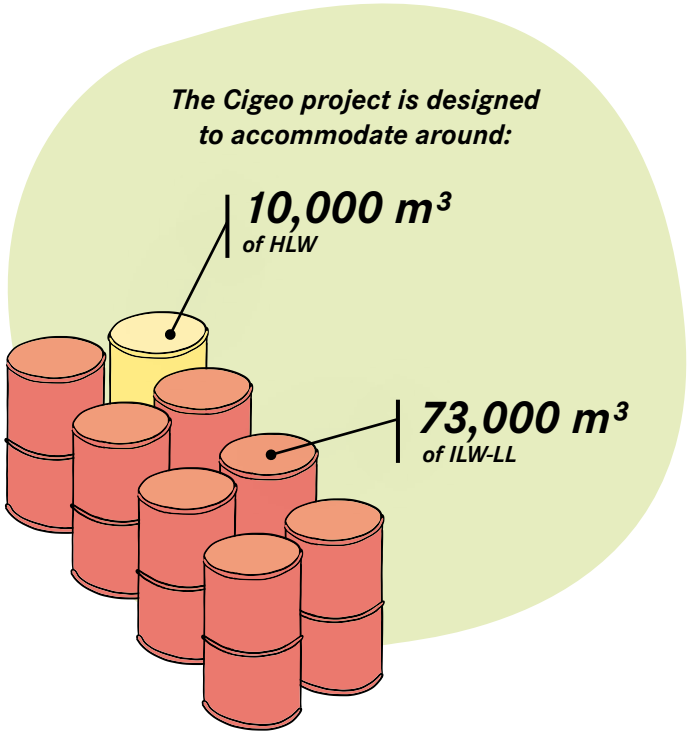
AN ADAPTABLE DISPOSAL FACILITY

Andra is looking at the possibilities for disposing of other waste for which there is no disposal solution or which is currently considered to be recoverable material rather than waste (e.g. spent fuel).

▶ Fuel assemblies used in nuclear reactors

▶ Mock-up of an ILW-LL package

▶ Mock-up of a HLW package



Why opt for **deep geological disposal?**

▶ A drift in Andra's Underground

The danger posed by radioactive waste diminishes over time because the radioactivity contained in it decays. However, some radioactive waste will remain hazardous for hundreds of thousands of years.

The principle of deep disposal is to confine this waste and isolate it from humans and the environment over these very long time scales.

The disposal facility's depth and design, and the type of rock in which it is located, as well as the geological stability, mean that the waste can be isolated from human activity and natural events on the surface (e.g. erosion and glaciation) in the very long term. Once closed, the facility will not require any further human intervention: the safety of the site is described as "passive". The geological stratum delays and reduces migration of the radioactive substances (contained in the waste) to the surface.

All the countries that use nuclear energy have chosen deep geological disposal as a safe, permanent means of managing their most highly radioactive waste in the very long term.

ETHICAL RESPONSIBILITY

Since deep disposal offers a safe management method for the long term, it meets the ethical objective of not passing responsibility for waste produced by activities from which we benefit every day on to future generations.

AND WORLDWIDE?

Most countries that use nuclear energy have started or are planning to opt for deep geological disposal as a permanent means of managing their most highly radioactive waste.

Finland and Sweden stand alongside France as the most advanced countries in this field. Both countries will dispose of their spent fuel in a granite formation. The Finish geological disposal site is planned at a depth of 437 m, on Olkiluoto island; construction is underway and commissioning is planned for around 2025. Sweden is planning to construct a geological disposal site at an approximate depth of 500 m, in Forsmark; construction was authorised by the Swedish government early 2022 and commissioning is planned for around 2030/2035.

Other countries which generate power using nuclear plants (Canada, Switzerland, Belgium, the United Kingdom, Germany, China, Russia, etc.) are planning to start operations at geological disposal sites post-2040.

Safety at the heart of Cigeo

The main purpose of Cigeo is to protect humans and the environment from the danger inherent in the most highly radioactive waste, while keeping the burden this places on future generations to a minimum.

Cigeo is designed to remain safe during its construction and its operation, which will last for around a hundred years, and after its closure.

Cigeo's safety relies to a large extent on the geological stratum in which the underground facilities will be built. This geological formation was deposited over a hundred million years ago. The containment properties of the layer can slow down the migration of the radionuclides in the radioactive waste to the surface.

Its safety also relies on design decisions such as:

- **the general layout of the disposal facility,** for example, the separation of nuclear areas from work areas;
- **the facilities and structures:** e.g. the methods used for excavating and lining the drifts and disposal cells;
- **the materials used:** such as non-flammable materials and substances;
- **the requirements** regarding waste package characteristics and inspections;
- **the instrumentation and sensors** used to monitor changes in the disposal facility and also to detect any problems;
- **the structure** to be set up during operations: e.g. the use of automated or remote-controlled devices and machinery.

To ensure that the disposal facility will be safe, Andra based its design on methods and analyses from the nuclear industry as well as from sectors that involve underground work (mining, tunnelling, etc.) and international feedback.

▶ Checking radioactive waste packages

ASN OPINION ON THE SAFETY OPTIONS FOR CIGEO

In its opinion of 11 January 2018, the French Nuclear Safety Authority (ASN) stated that "overall, the project has attained a satisfactory level of technological maturity at the Safety Options Report stage".

Andra had submitted the Safety Options Report for Cigeo to the ASN in April 2016. This report presented the main safety decisions guiding the project design, based on several decades of regularly reviewed scientific and technical research. The Safety Options Report was primarily produced to firmly establish the principles, methods and main design decisions necessary for the forthcoming safety demonstration, which will be presented in the construction licence application. This application was examined by the ASN, backed by the French Institute for Radiation Protection and Nuclear Safety (IRSN), multidisciplinary advisory committees and an international review coordinated by the International Atomic Energy Agency (IAEA).

Safety at Cigeo **during the operating phase**

For every risk identified during the operating phase, several lines of defence will be included in the disposal facility design to prevent or neutralise that risk.

For example, to prevent fire breaking out, the presence of flammable objects in the nuclear zone is kept to a minimum: petrol engines are therefore prohibited. If fire does break out despite these preventive measures, steps have been taken to limit its impact: enhanced monitoring to detect fire, extinguisher systems, the organisation of an emergency response, easy evacuation due to the disposal facility layout, fire-resistant disposal containers, etc.

Another example is that, to prevent the risks associated with co-activity, i.e. excavation work being carried out at the same time as operating activities, the two activities will be strictly separated. They will be carried out in physically separate areas, with separate access and independent ventilation systems.

THE IMPACT OF CIGEO DURING OPERATIONS AND POST-CLOSURE

Cigeo will release radioactivity. In the vicinity of the facility, during operations, the impact of these releases will be limited to 0.001 mSv/year. This is well below the regulatory limit for any nuclear operation (1 mSv/year) and natural exposure to radioactivity (3 mSv/year on average in France).

According to safety assessments, following the closure of the disposal facility, the long-term impact will remain much lower than that of natural radioactivity, even under degraded conditions (e.g. intrusion).

Closure of Cigeo and very long-term safety

To ensure waste disposed of for very long periods of time is kept safe without the need for human intervention, the underground structures at Cigeo will need to be closed off.

This closure will be carried out gradually, in accordance with a special licensing process.

Before the final closure of Cigeo, initial repository zone closure operations will be carried out: operating equipment will be dismantled and drift closure structures (backfills, seals) will be constructed so that the geological barrier can play its containment role.

To ensure that the disposal facility will remain safe no matter what happens, all phenomena that could degrade performance and jeopardise safety are taken into account (earthquake, erosion, intrusion, etc.) and their consequences are evaluated. Studies have shown, for example, that Cigeo would withstand the strongest earthquake that is geologically possible in the layer in which it is located.

Cigeo and **reversibility**

The law of 25 July 2016 defines reversibility as *"the capability for future generations to either continue building and operating consecutive phases of a disposal facility or to review the decisions made in the past and modify the management solutions"*.

A democratic process

The Cigeo project is the outcome of a lengthy democratic process involving the passing of **three laws in 1991, 2006 and 2016, and three national public debates in 2005, 2013 and 2019** with the result that solutions for managing the most hazardous radioactive waste were identified collectively.

Following the public debates on Cigeo in 2013, Andra made a commitment to ensuring greater public involvement in decisions about disposal (see pages 21-22).

Regular assessments and milestones

Since research into deep geological disposal began, as a result of the Law of 31 December 1991, all the studies done by Andra have been regularly reviewed by French and international safety and scientific authorities.

Before construction can begin, the project must be examined by the French Nuclear Safety Authority (ASN) and a construction licence must be granted by decree. Permission must also be granted by the ASN for the first radioactive waste packages to be received during the industrial pilot phase. Finally, the law of 25 July 2016 provides for a further law to be passed at the end of the industrial pilot phase. Regular safety assessments will then be carried out by the ASN, and a series of parliamentary approvals will also be required.

Research and Continuous Improvement

Andra has been conducting research into deep geological disposal and Cigeo for more than 30 years. **This R&D, aimed at continuously improving knowledge, will continue throughout Cigeo's operating phase in order to incorporate the latest scientific and technological advances.**

Memory

Once the disposal facility is closed, safety must be ensured passively and must not require any human intervention. Nevertheless, surveillance will be maintained and **action will be taken to preserve and pass on a memory of the facility for as long as possible, for at least 500 years, as required by the ASN.**

Stepwise development

Given the long operating life of Cigeo (over 100 years), not all the facilities will be built from the outset. Following an initial construction phase, **they will be deployed progressively, in parallel with operating at the disposal facility.** This will promote the reversibility of the disposal facility and enable integration of all improvements made possible by scientific and technical progress and feedback.

An industrial pilot phase at the start of operating

The industrial pilot phase will begin during the construction of Cigeo and will continue when operation begins. In particular, it will be used **to carry out tests under real conditions** and will include "inactive" operations, such as equipment tests, as well as "active" operations, i.e. operations in the presence of waste packages (once the licence has been granted).

Retrievability

Technical measures were included from the Cigeo design phase to facilitate the possible retrieval of waste packages during the operating phase, expected to last around a hundred years (linings to limit cell deformation, robots for retrieving packages, sensors to monitor changes, testing, etc.), should future generations decide to retrieve them. Beyond a hundred years, the disposal facility will be monitored to assess its behaviour and decide whether or not to extend the retrievability period.

Master Plan for Operations

The Master Plan for Operations (PDE) sets out the "reference" inventory and progressive development for Cigeo, the objectives of the industrial pilot phase and the options afforded thanks to reversibility in terms of managing the project. This document forms the basis for reversibility: **operational changes to Cigeo operations decided by future generations will be recorded in this document.** In December 2022, Andra produced an initial edition of the document, which will be subject to change for the entire duration of the Cigeo development phase, in consultation with the public.

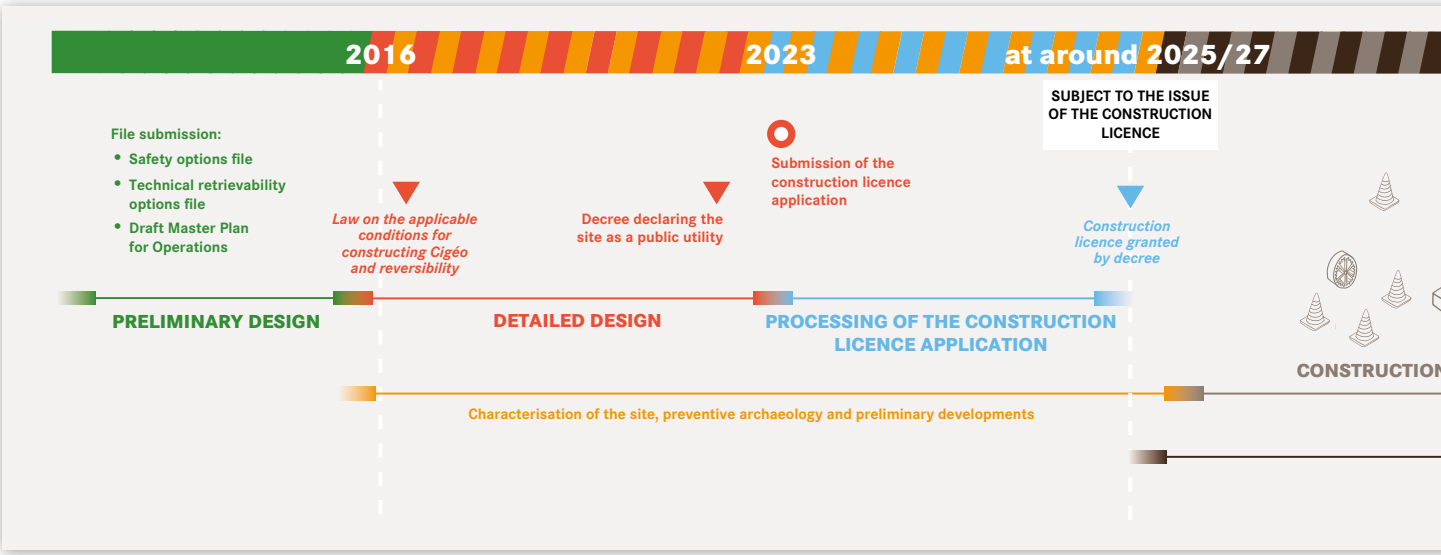
Adaptability

The facilities at Cigeo will be adaptable so that future generations can, for example, **modify existing equipment, build new structures or dispose of other French waste for which no disposal solution exists.**

Facilities at Cigeo

Cigeo, a disposal facility, will consist of surface facilities located in two areas (the "Ramp" zone and the "Shaft" zone), and an underground facility with surface-to-bottom connections and disposal sections. This underground facility will be deployed gradually over a period of more than 100 years, at a depth of 500 metres. The disposal zones will cover a surface area of approximately 15 km².

Provisional **timetable** for Cigeo



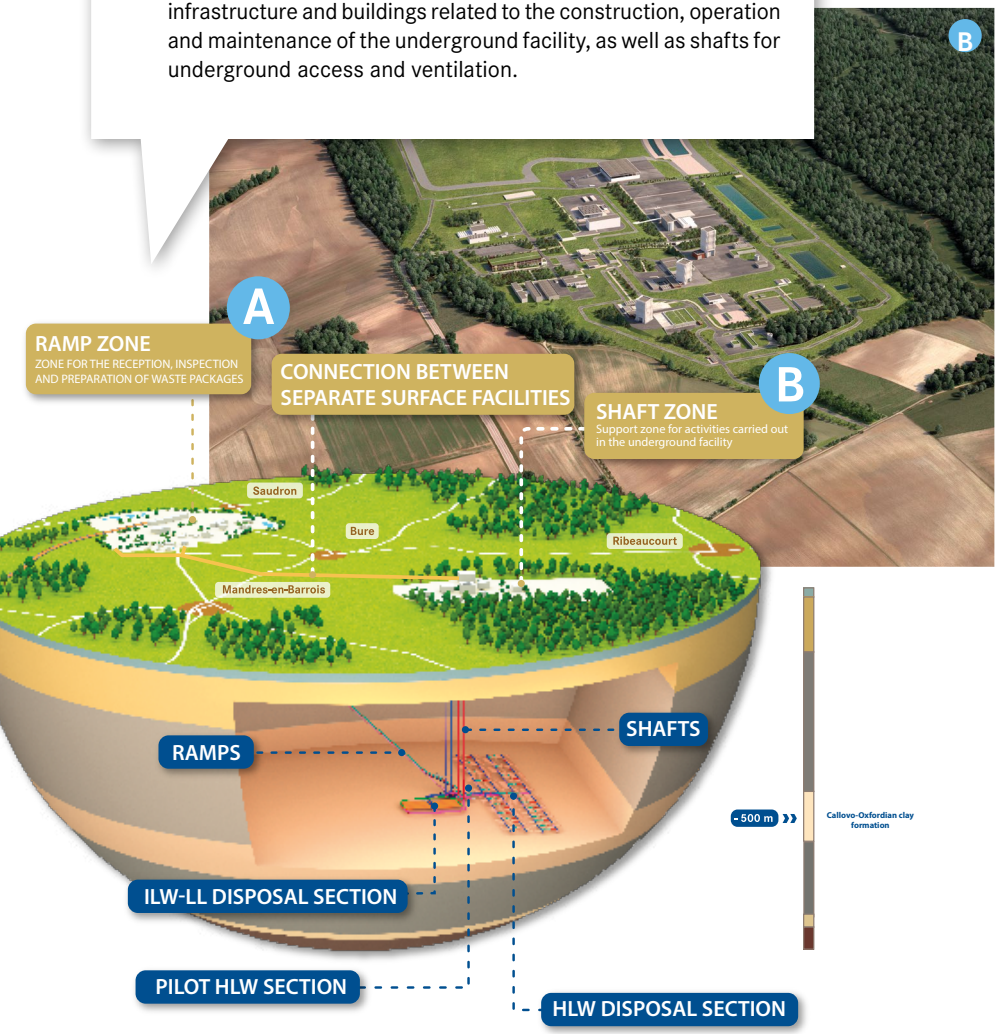
Surface facilities

A The Ramp zone

This consists of a rail terminal for receiving the convoys of radioactive waste, a building for the reception, inspection and preparation of packages, buildings to house workshops and offices and an open-access area for the public.

B The Shaft zone

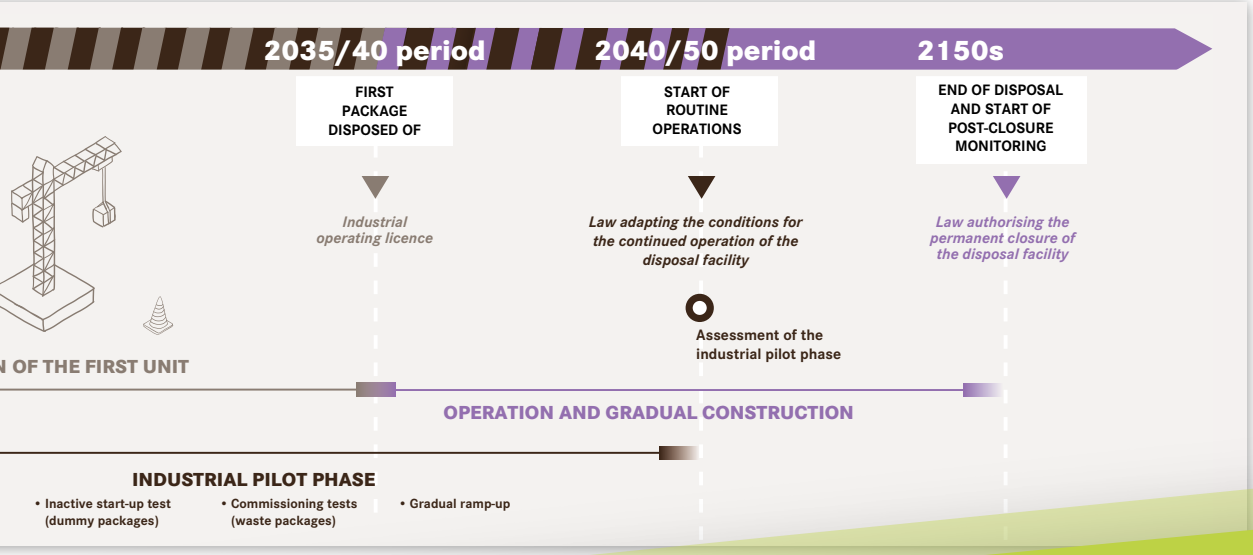
Located directly above the repository, this is the zone from which the underground work will be carried out. It will include infrastructure and buildings related to the construction, operation and maintenance of the underground facility, as well as shafts for underground access and ventilation.



FUNDING BY THE WASTE PRODUCERS

As part of a responsible approach, the design, construction, operation and closure of Cigeo is funded by current generations so that the burden is not passed on to future generations. This means that provisions are set aside by the three waste producers concerned (EDF, the CEA and Orano) and are regularly updated.

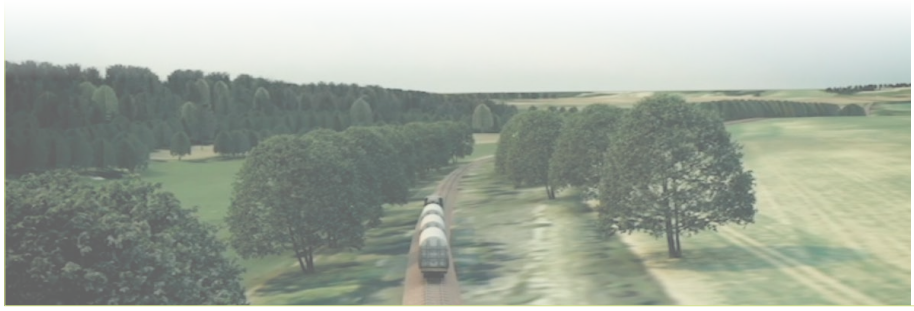
In January 2016, the French ministry in charge of Ecology, sustainable development and energy set a target cost of 25 billion euros for this project. This cost is based on Andra's costing records and on opinions issued by ASN and waste producers. The French Court of Auditors (Cour des comptes) estimated that the cost of managing all radioactive waste, including reprocessing and decommissioning, was between 1 and 2% of the total cost of power production over the entire operating life of a reactor.



How Cigeo **will operate**

TRANSPORTING WASTE PACKAGES TO THE CIGEO DISPOSAL FACILITY

HLW and ILW-LL packages primarily arrive at the Cigeo disposal facility for disposal by train from the source sites, where they are currently stored. Bringing the packages in by train requires a rail connection to be built between Gondrecourt-le-Château and the disposal facility Ramp Zone: i.e. the private siding (ITE). Only a few ILW-LL packages will be brought in on lorries by road.



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CHECKING AND PREPARING WASTE PACKAGES

Waste packages are checked before being position in disposal containers, if required:

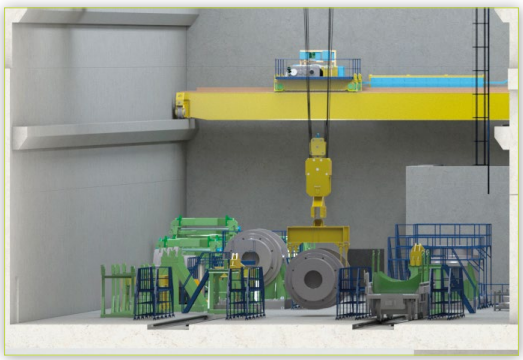
- welded steel containers several centimetres thick for HLW packages;
- very thick concrete cubes for ILW-LL packages.

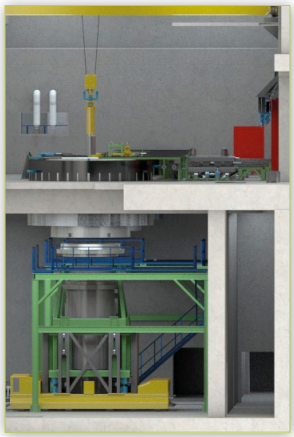
2

3

RECEPTION OF WASTE PACKAGES

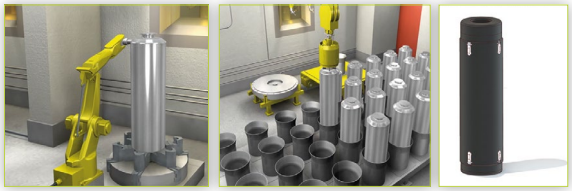
When the transport packages arrive at the disposal facility, they are subject to acceptance. The waste packages are unloaded from their transport package in buildings at the surface.





▶ Receiving and unloading transport containers for ILW-LL waste packages

Images for information only



Checking HLW packages

Checking ILW-LL packages

TRANSFERRING WASTE PACKAGES TO THE UNDERGROUND FACILITY

The cask is placed onto a funicular, which takes the waste packages down to the disposal level, at a depth of 500 metres. This transfer system is designed to be as safe as possible: the motors are located on the surface, the cart is stopped if a breakdown occurs, and the carts move at low speeds.

Transferring casks via the funicular

4 5 6

FITTING WASTE PACKAGES IN THE TRANSFER CASKS

The waste packages are then placed in a “cask” which protects from radiation during the transfer from the surface to the disposal cells in the underground facility.

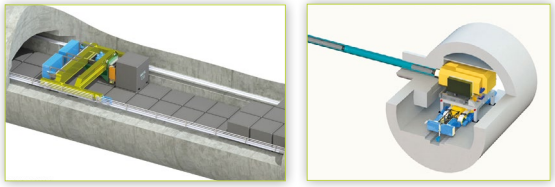
Transfer casks for ILW-LL and HLW packages

DISPOSING OF WASTE PACKAGES

The cask is positioned on a robotic transfer shuttle, which routes the waste packages to the disposal cells:

- the HLW packages are disposed of in microtunnels with a working diameter of approx. 60 cm and a length of about one hundred metres. They are pushed into the cell by a pusher robot;

the ILW-LL packages are disposed of in tunnels with a working diameter of about 8 metres and length of several hundred metres. Depending on the type of waste, the packages may be placed on the same level or stacked up to three levels.



Disposing of ILW-LL and HLW packages

Integrating Cigeo into the local area

Construction of the Cigeo facility will only begin after the publication of the construction licence decree expected by 2025/2027. However, these works must be prepared in advance, primarily with field studies and with local players within the framework of the regional development contract.

Ever more precise knowledge

Andra must launch field studies in order to improve its knowledge:

- **Geotechnical surveys** must be conducted at the surface facilities. These surveys consist, among other aspects, of drilling boreholes to a depth of about fifty metres to obtain data for calculating the foundations of the future buildings, and installing one metre-high pillars to serve as a topographical markers.
- In accordance with regulations, a **preventive archaeology** campaign must also be conducted at all sites. This campaign, which could be led by the French National Institute for Preventive Archaeological Research (INRAP), aims to verify whether the land contains any archaeological remains. Pits with a depth of approximately 1 m are dug for this purpose and examined by archaeologists (which may require clearing the sites).
- Environmental sampling and observations are carried out by Andra on the future Cigeo site and in the surrounding area. **The data obtained will be used in the Cigeo impact study** which Andra must submit with the construction licence application. For this impact study, Andra also relies on a support structure set up in 2007, the Perennial Observatory of the Environment (OPE).

▶ Preventive archaeology campaign

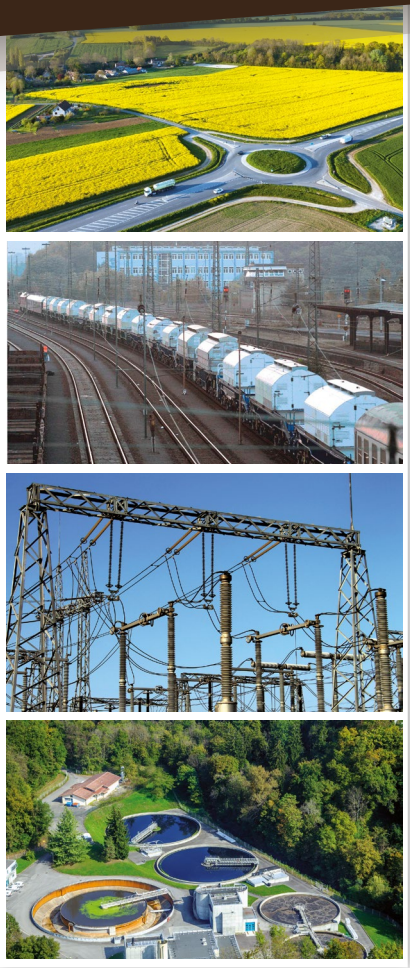
The OPE is responsible for studying the characteristics of and changes in all environments (water, air, soil, flora and fauna) and provides data for the drawing up an initial environment survey, which is necessary for the impact study. In 2013, *through* the OPE, Andra launched **a series of inventories specific to the two areas where the surface facilities will be sited** covering flora, fauna (birds, bats, insects, mammals, amphibians, reptiles) and habitats.

Preliminary **works**

Preparatory works must first be carried out so that the construction of Cigeo can begin immediately once the construction licence has been granted.

These works include work undertaken for securing the sites, for preparing and organising the platforms, for site clearance, earthworks and the construction of support utilities for the construction of the disposal facility.

Other connection operations (water, power, roads, railways) owned by entities other than Andra, are also required for the future construction and operation of the disposal facility. These operations will start after the specific authorisations required for these works, managed or overseen by Andra, have been obtained.



▶ Examples of site development work

Power supply

Project owner:
RTE

The construction of a substation and underground lines able to supply power to Cigeo, as well as any other industrial facilities developed in the vicinity.

Water supply

Project owner:
Haut Ornain SIVU and Échenay SIAEP

Water supply must meet the needs of site workers (catering, toilets, etc.) and cover the works (concrete mixing, fire resources, etc.).

Road and rail connections

- *Rerouting departmental road RD 60/960*

Project owner:
Haute-Marne departmental council

This new road bypasses the Ramp zone and ensures that the departmental road can stay open to traffic.

- *Upgrading railway line 027000*

Project owner:
SNCF Réseau

This rail connection is part of the national network and is currently closed. It will connect Gondrecourt-le-Château to the Paris-Strasbourg line.

Building Cigeo together and integrating it **in the local area**

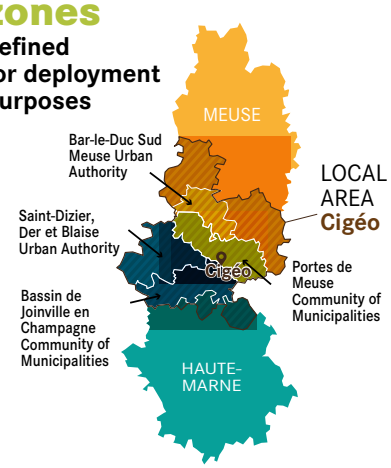
The Regional Development contract (CDT) is a roadmap for land-use planning and economic development in Cigeo's host region. This document, requested by the State, aims, for the area around Cigeo, to create an environment conducive to ensuring the success of the project, boosting growth in the region and improving quality of life for its inhabitants.

HUMAN DEVELOPMENT: JOBS

Cigeo represents an opportunity for the development of local employment: there will be an increase in the workforce during the period of site preparations. Initial construction will then require up to 2000 people. The workforce will stabilise at around 500/600 people during the gradual construction and operating phase. In addition to these direct jobs, Cigeo will generate indirect jobs (suppliers, service providers) and induced jobs (related to the spending by employees working at Cigeo), and this for more than a century.

3 geographic zones

defined for deployment purposes



4 strategic lines

Area 1
Carry out infrastructure improvements to support the construction of Cigeo

Area 2
Boost the socio-economic potential of the area surrounding the project

Area 3
Enhance the attractiveness of the two departments through core development measures for the region

Area 4
Preserve the economic and environmental excellence of the Meuse and Haute-Marne

over € 500 M in forecast funding

for lines 1 and 2, including nearly €200 million for Andra.

The funding for lines 3 and 4 will be specified once the licence to construct Cigeo has been granted.

24 signatories

The State, local authorities, public interest groups, industrial operators and industry advisory boards

64 projects

38 actions

to be carried out over the 2020-2024 period: development works prior to the construction of Cigeo and economic support measures. (**Area 1** and **Area 2**)

26 forward-looking lines of action

to be developed and finalised before the construction licence for Cigeo is granted: services for the population, enhancing the built and landscape heritage, creating sectors of excellence, etc. (**Area 3** and **Area 4**)

Building Cigeo with **the public**

The size of Cigeo and the ethical issues it raises make it a project of general interest to both current and future generations. For this reason, Andra has chosen to pursue an approach of openness to society and has been innovative in terms of public dialogue and consultation, making the issue of radioactive waste management exemplary in terms of environmental democracy.

Three laws and three national public debates

The Cigeo project is the outcome of a lengthy democratic process involving the passing of three laws (in 1991, 2006 and 2016) and three national public debates organised by the National Public Debate Commission (CNDP), with the result that solutions for managing the most hazardous radioactive waste were identified collectively.

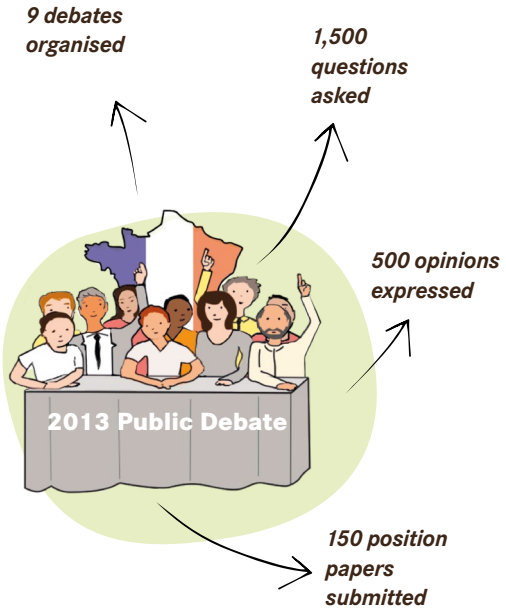
In 2005, the first national public debate was held on the basis of the first fifteen years of research. The public meetings highlighted the need to make an ethical and social choice between two options for managing HLW and ILW-LL: storage or geological disposal. The ASN felt that “deep geological disposal is the only disposal solution possible[1]”.

On the basis of this debate and the assessments carried out, in 2006 the French parliament opted for deep geological disposal but laid down a requirement of reversibility for at least 100 years.

In 2013, a second national public debate was held on the Cigeo project. Because of the difficulty of holding public meetings, the debate was held online, with more than 76,000 visits, 1500 questions and 500 opinions. A "citizens' conference" was also held for the first time as part of a public debate.

As part of the follow-up to the public debate, in response to the opinions and expectations expressed, Andra decided to make changes to the Cigeo project, particularly by including an industrial pilot phase at the start-up of the facility and fostering greater engagement with the public.

In 2016, the French parliament passed a third law (law of 25 July 2016) on the terms of construction of Cigeo and its reversibility.



PUBLIC DEBATE ON THE PNGMDR

In 2019, public meetings were held to discuss the Cigeo project as part of the public debates on the 5th edition of the French National Radioactive Materials and Waste Management Plan (PNGMDR).

1. ASN Opinion of 1 February 2006 on research relating to the management of high-level long-lived waste (HLW-LL), carried out in the context of the law of 30 December 1991.

Continued public participation for Cigeo

Further to the public debates in 2013, Andra agreed to work closely with society at large in future stages of the project. Since 2016, Andra has launched public participation actions at local and national level, and this approach was reinforced in 2018 with the publication of a roadmap and when the National Public Debate Commission (CNDP) appointed guarantors.

PUBLIC PARTICIPATION GUARANTORS

The CNDP appointed guarantors to support Andra's public participation process regarding Cigeo. They are tasked with ensuring the smooth running of the public participation part for Cigeo.

To this end, they must ensure that all members of the public affected by and interested in the project have access to the information they need and that they can share their observations and ask questions. They also ensure that any questions raised by the public are recorded and brought to the attention of Andra so that it can answer them and report on the progress of the project.

KEY FIGURES

Around **fifty** meetings

Around **2,000** participants

1st conference for citizens

@ **Follow all the public participation actions on concertation.andra.fr**

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