The Meuse/Haute-Marne Centre and Cigéo Project
Long-term management of radioactive waste

- **Andra's responsibilities**: To find, implement and ensure safe management solutions for all radioactive waste in France in order to protect current and future generations from the hazards posed by such waste.

- **Public industrial and commercial establishment (EPIC)** with a staff of 650 employees.

- **Under the supervision** of the Ministries for Energy, the Environment and Research.

- **Independent** from waste producers.
Radioactive waste production

Over 1200 producers

- Research: 27.7%
- Nuclear power: 58.8%
- Defence: 9.4%
- Industry other than nuclear power: 3.6%
- Medical: 0.6%
5 radioactive waste categories

<table>
<thead>
<tr>
<th>Volume of waste</th>
<th>Radioactivity level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2% HA</td>
<td>94.9%</td>
</tr>
<tr>
<td>2.9% MA-VL</td>
<td>4.9%</td>
</tr>
<tr>
<td>5.9% FA-VL</td>
<td>0.14%</td>
</tr>
<tr>
<td>59.6% FMA-VC</td>
<td>0.03%</td>
</tr>
<tr>
<td>31.3% TFA</td>
<td>0.0001%</td>
</tr>
</tbody>
</table>

90% of radioactive waste already has a disposal solution
Very low level waste

Industrial facility for grouping, storage and disposal

Radioactive waste volume: 31.3%
Radioactivity level: 0.0001%
Low and intermediate level short-lived waste

Aube disposal facility

Manche Center (in closure phase)

Radioactive waste volume

Radioactivity level

59.6 %

0.03 %

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Low level long-lived waste

LL-LL waste project

5.9% FA-VL 0.14% Radioactive waste volume Radioactivity level

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High level and intermediate level long-lived waste

Cigéo
Industrial Center for Geological Disposal

Radioactive waste volume | Radioactivity level
0.2 % | HA | 94.9 %
2.9 % | MA-VL | 4.9 %
Radioactive waste for Cigéo

High-level (HL) and Intermediate level long-lived waste (IL-LL)
HL and II-LL waste resulting from spent-fuel recycling

IL-LL
72 000 m³
compacted “waffles” in stainless-steel canister

HL
12 000 m³
vitrified fission products
Current storage

62% of IL-LL and 30% of HL has already been produced and stored in production sites

Inside a storage Hall (Orano, La Hague)
The story of Cigéo

Industrial Center for a deep Geological Disposal
The story of Cigéo project from 1991

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The 1991 Act

3 management options:

• Transmutation (CEA)
• Long-term storage (CEA, Andra)
• Deep geological disposal (Andra)

15 years of investigations
The 1991 Act

1994: Geological surveys on 4 sites approved by the Government

1998: The Meuse/Haute-Marne site is selected

2000: Construction of the Underground Laboratory
The URL today

- 1000 boreholes
- 1 million of data per day
- 18 400 measurement points
The story of Cigéo project from 1991

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15 years of investigations to validate the rock

- Assessment by experts and the parliament of the selected criteria for the transposition zone
  - Continuous, homogeneous and thick formation
  - Very low permeability and containment property of the rock
  - Faultless formation and low seismicity
  - Absence of exceptional natural resources
The story of Cigéo project from 1991

The 2006 planning act

- **Planning Act** to design and to implement a repository

- **Technological tests:**
  - Cell excavation; support and sealing tests; development of technological demonstrators (robots and disposal containers)
Reversibility

2016 Law defining terms of Cigéo creation

“Reversibility is the ability, for successive generations, to continue the construction and the exploitation of the repository, or to reassess the choices defined previously and change management solutions”
The story of Cigéo project from 1991

- **1991**: Paving the way for the Cigéo project
  - **1993**: Proposal to the Government and to the Parliament
  - **1994**: Geophysical and geological studies
  - **1998**: The Minister's decision to set up an underground laboratory

- **2001**: Publication of a report on the socio-economic, technical and environmental aspects

- **2002**: Definition of the waste management process

- **2009**: Proposal by Andra and objection to the Government

- **2013**: Proposal amended by the Parliament

- **2016**: Senate's report on the Cigéo project and the National Radioactive Waste Management Committee's report

- **2019**: Submission of the final report of the Cigéo project

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The story of Cigéo project from 1991
Cigéo project
Cigéo installations

Package receipt, inspection and preparation

Excavation work support zone

CMHM underground research laboratory

HLW0 repository zone

Shaf ts

Logistics support zone

CMHM

ILW-LL repository zone

HLW1/HLW 2 repository zone

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Reception area
Digging area
IL-LL waste disposal cell

26 cells
Length: 500m
Ø 8.4m
HL waste disposal cell

1000 cells
Length: 150m
Ø 0,9m
Le parcours des déchets
Forecast schedule

Assessment and authorisation steps

Assessors:
- ASN (Nuclear Safety Authority)
- IRSN (Institute for Radiological Protection and Nuclear Safety)
- CNE (National Assessment Board)
- Local authorities (selected by decree)

Reviews submitted to:
- OPESCT (Parliamentary Office for the Evaluation of Scientific and Technological Choices)

OPESCT evaluation submitted to:
- National Assembly and Senate

Construction and pilot phase authorization is issued by decree by the State Council
Progressive underground construction
Progressive underground construction
Progressive underground construction
Thank you

Any questions?