



FIRST GENERATION DECOMMISSIONING PROGRAMME

2014

Internal accessibility



DECOMMISSIONING: A RESPONSIBILITY

Decommissioning is part of the French regulatory, financial and governance framework

- ❑ Nuclear **operators** are **responsible** for the operations necessary to decommission the site (its removal from the list of 'Basic Nuclear Installations (BNI)')
- ❑ EDF is financially and technically responsible for decommissioning its plants.
- ❑ EDF **accrues** the amounts needed to meet these obligations and **amasses dedicated assets** to secure their financing.
 - for the first generation facilities: € 2.1 billion*
 - for the 58 PWRs: € 10.9 billion*

For your information, the (2013 figures*) forecasts are:

- long-term management of radioactive waste: € 7.5 billion*,
- spent fuel management: € 9.8 billion*,
- last core € 2.3 billion*,

*2013 figures

DECOMMISSIONING: A RESPONSIBILITY

Decommissioning is part of the French regulatory, financial and governance framework

- The law of 13 June 2006 on **transparency and security in the nuclear field (the TSN law)** is now fully codified in the Environmental Code in Articles L 593-1 et seq.
 - The TSN law and the Energy Program Act of 18 June 2006 on the sustainable management of radioactive materials and waste now encompass the financing of radioactive waste management and dismantling
 - The TSN law defines the obligations of operators on transparency and information

DECOMMISSIONING POLICY AND STRATEGY

French dismantling strategy

- ❑ Since 2001 EDF has adopted a **strategy of dismantling as soon as possible after final shutdown**. This strategy has been upheld in law in 2006 and 2012. This is called immediate dismantling.
- ❑ This strategy is benefits in terms of safety and efficiency, the environment and sustainable development, socio-economics and waste management.
- ❑ The difficulties stem from the legal uncertainty of the regulatory framework, and the lack of availability of outlets.



ASN referral letter of 13 February 2014 :

'Assessment of the adequacy of EDF's dismantling strategy presented in its briefing published in September 2013

- Dismantling Strategy Advisory Committee in the first half of 2015; mid-term meeting in September 2014
- Coupled with the Waste Strategy Advisory Committee

DECOMMISSIONING PROGRAMME IN PROGRESS

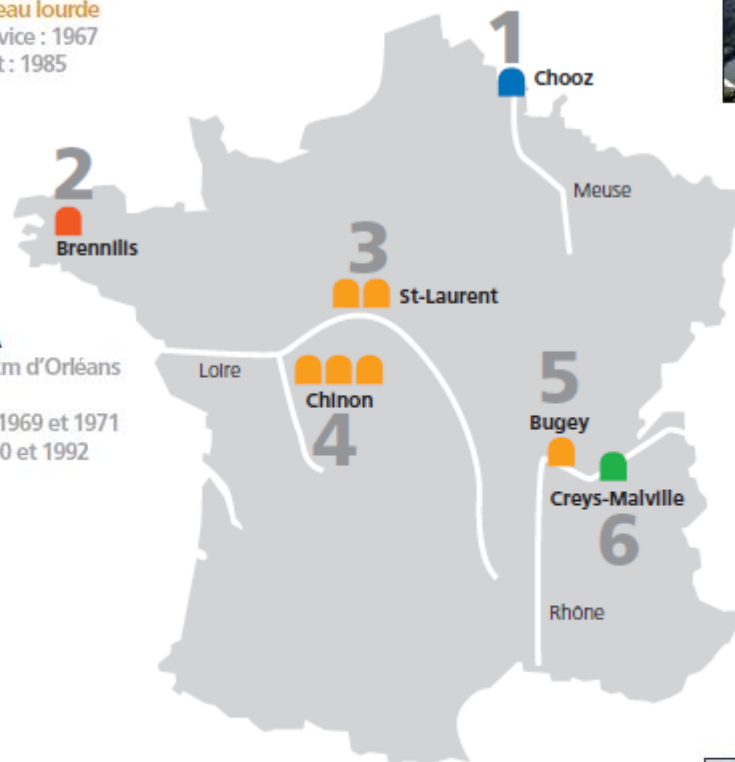
9 FIRST GENERATION REACTORS



2 - Brennilis
 Finistère, à 70 km de Brest
Réacteur à eau lourde
 Mise en service : 1967
 Date d'arrêt : 1985



1 - Chooz
 Ardennes, à 60 km de Charleville-Mézières
Réacteur à eau pressurisée
 Mise en service : 1967
 Date d'arrêt : 1991







3 - Saint Laurent A
 Loir-et-Cher, à 35 km d'Orléans
2 réacteurs UNGG
 Mises en service : 1969 et 1971
 Dates d'arrêt : 1990 et 1992



5 - Bugey 1
 Ain, à 40 km de Lyon
Réacteur UNGG
 Mise en service : 1972
 Date d'arrêt : 1994



4 - Chinon A
 Indre-et-Loire, à 45 km de Tours
3 réacteurs UNGG
 Mises en service 1963, 1965 et 1966
 Dates d'arrêt : 1973, 1985 et 1990

-  Réacteur à eau lourde
-  Réacteur à eau pressurisée
-  Réacteur UNGG (Uranium Naturel Graphite Gaz)
-  Réacteur à neutrons rapides

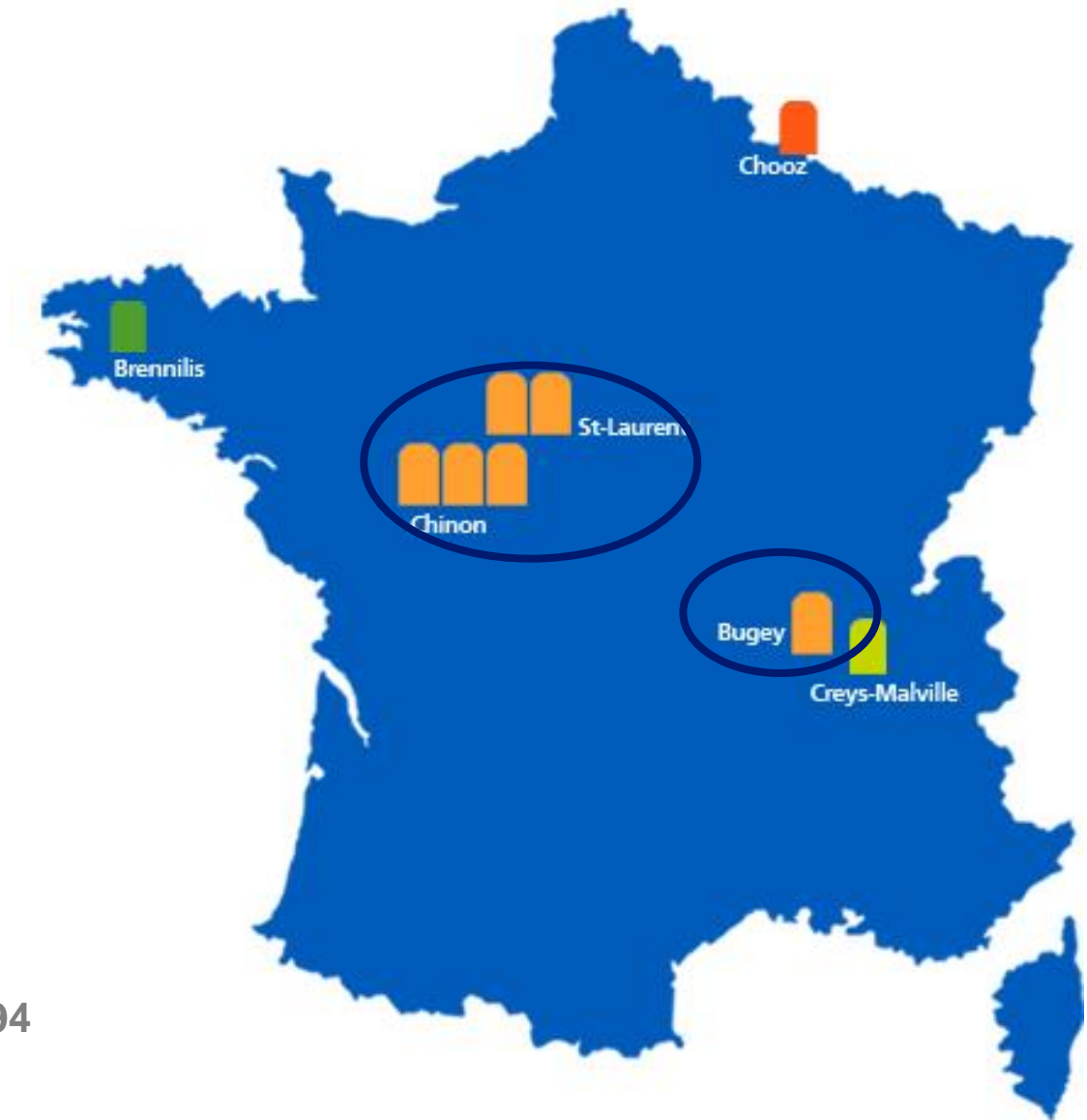


6 - Creys-Malville
 Isère, à 75 km de Lyon
Réacteur à neutrons rapides
 Mise en service : 1986
 Date d'arrêt : 1998

UNGG REACTORS

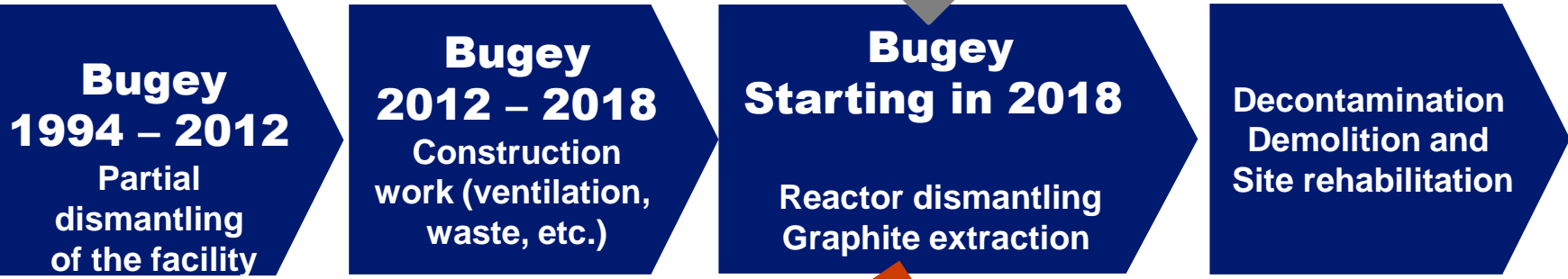
■ 6 UNGG reactors:

- ❑ Chinon A1 (70 MW): 1963-1973
- ❑ Chinon A1 (200 MW): 1965-1985
- ❑ Chinon A1 (480 MW): 1966-1990
- ❑ Chinon A1 (480 MW): 1969-1990
- ❑ Chinon A1 (515 MW): 1971-1992
- ❑ Bugey 1 (540 MW): 1972-1994

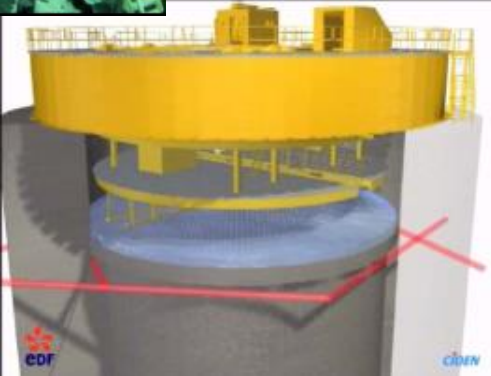
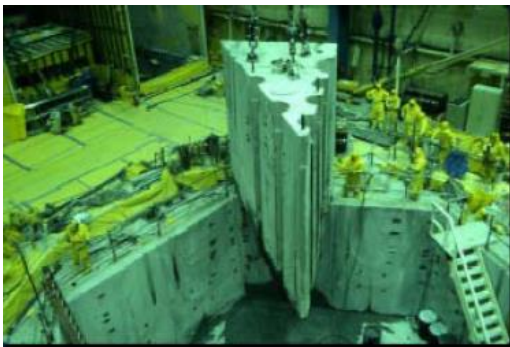
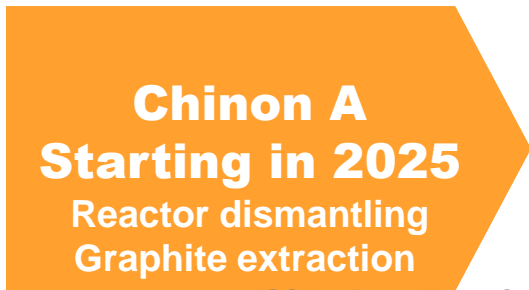


UNGG programme

Graphite waste route



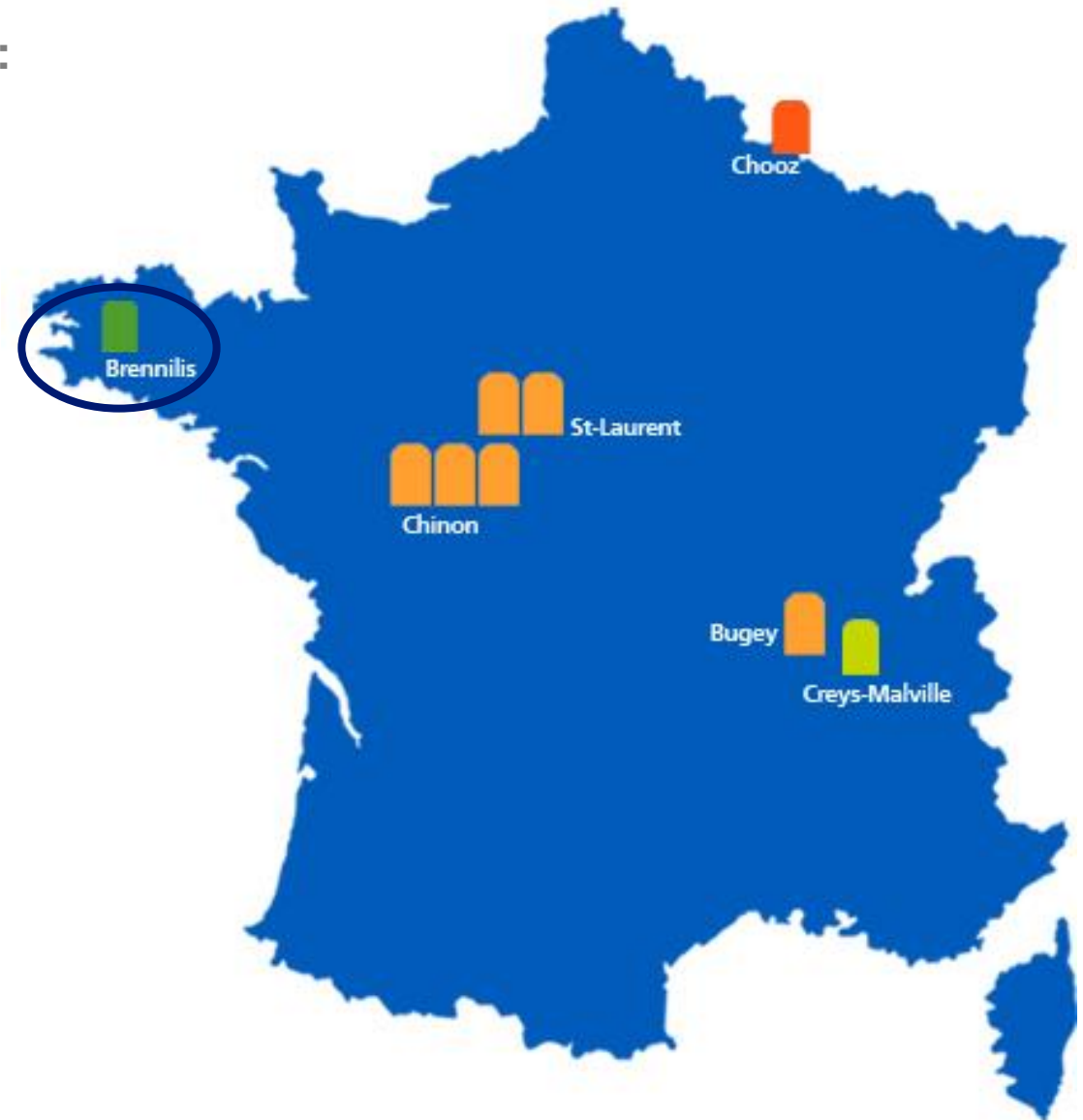
Feedback



BRENNILIS

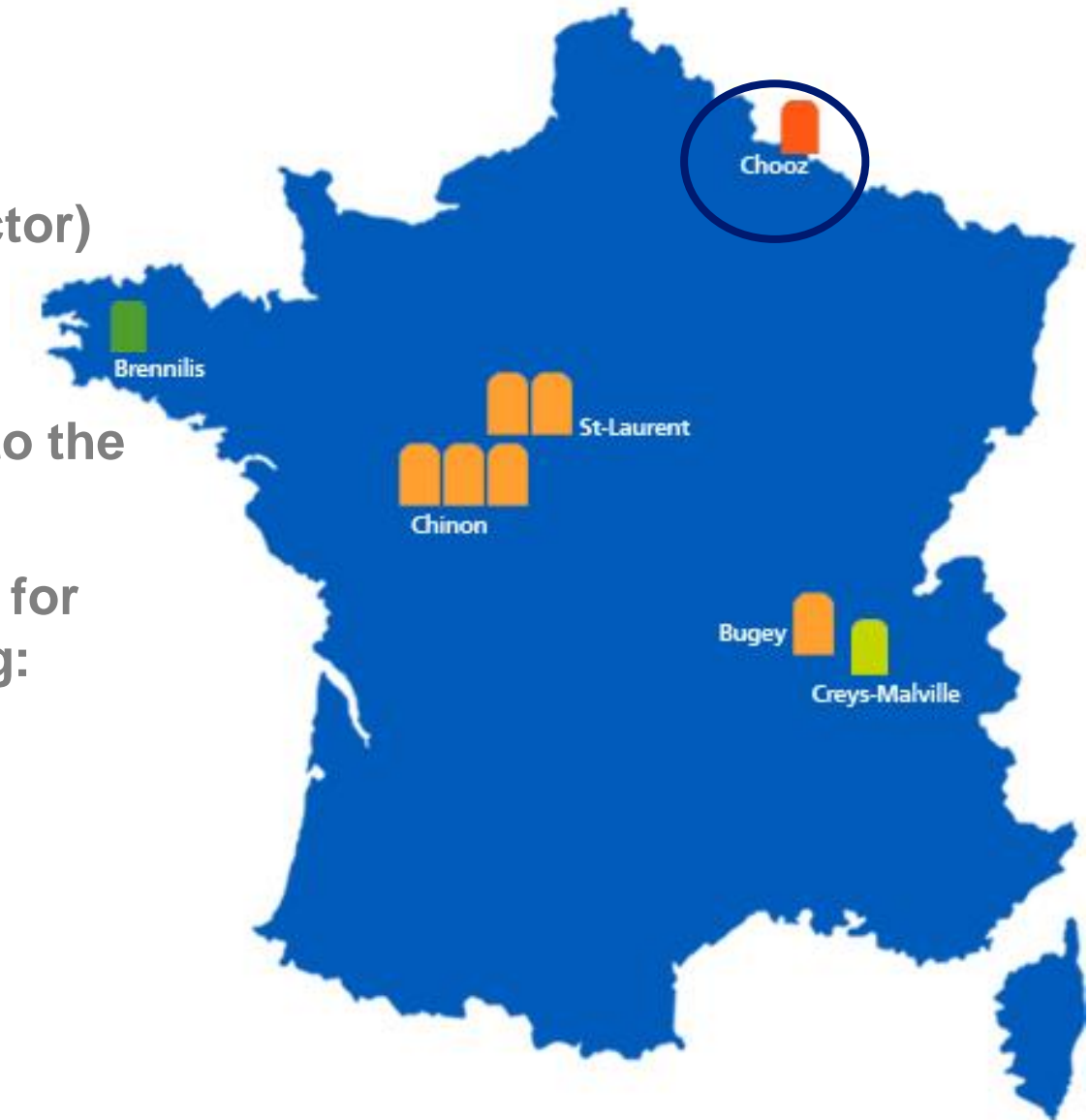
■ 1 heavy water reactor (HWR):
(70 MW): 1967-1985
(EDF/CEA)

- 50% of the site had been decommissioned by 2007
 - ✓ Conventional buildings
 - ✓ Nuclear buildings outside the reactor containment
- Start of dismantling: 1997
- 2007: Authorization decree cancelled.
Work resumed in 2011



CHOOZ A

- First French PWR (pressurized water reactor) power plant .
305 MW, 1967-1991
- Built in caves dug into the hill
- Authorization decree for complete dismantling: 2007



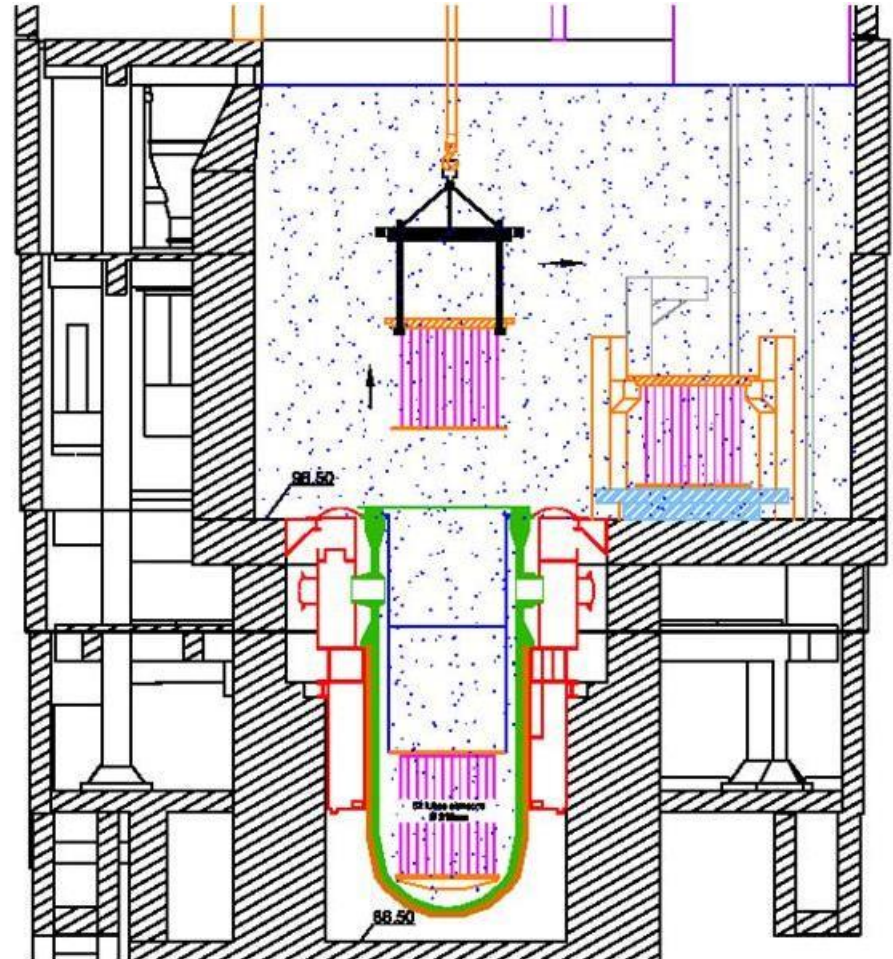
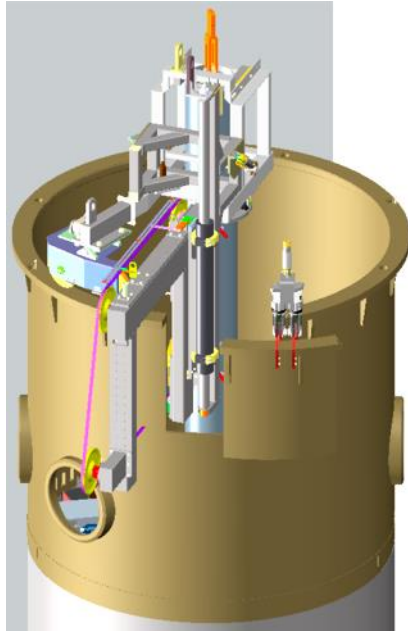
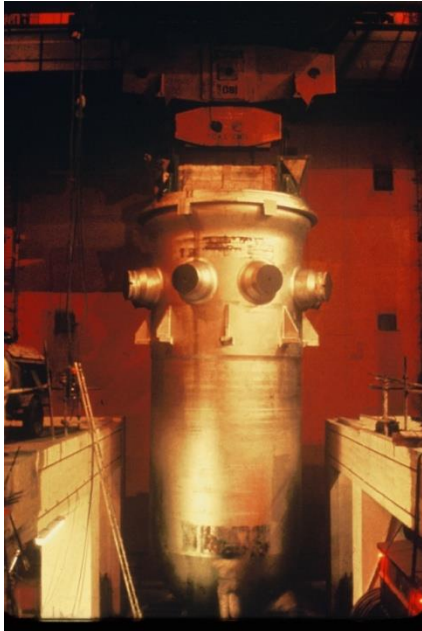
Key milestones in the first half of 2014

- April: Last two SGs sent to CIRES
- Completion of the dismantling of the primary circuit (excluding vessel) and dismantling of auxiliary equipment in the cave (excluding the bunker)



Work still to be done

- Dismantling of the vessel
 - Installation of construction site in November 2014
 - remove the cover: Q1 2016




CREYS MALVILLE

 Creys Malville (1200 MW)

1985-1998

 Fast neutron reactor

 5,500 t of Na

 Final shutdown as the result of a political decision



Work still to be done

Initial state

1999

2006

No more sodium

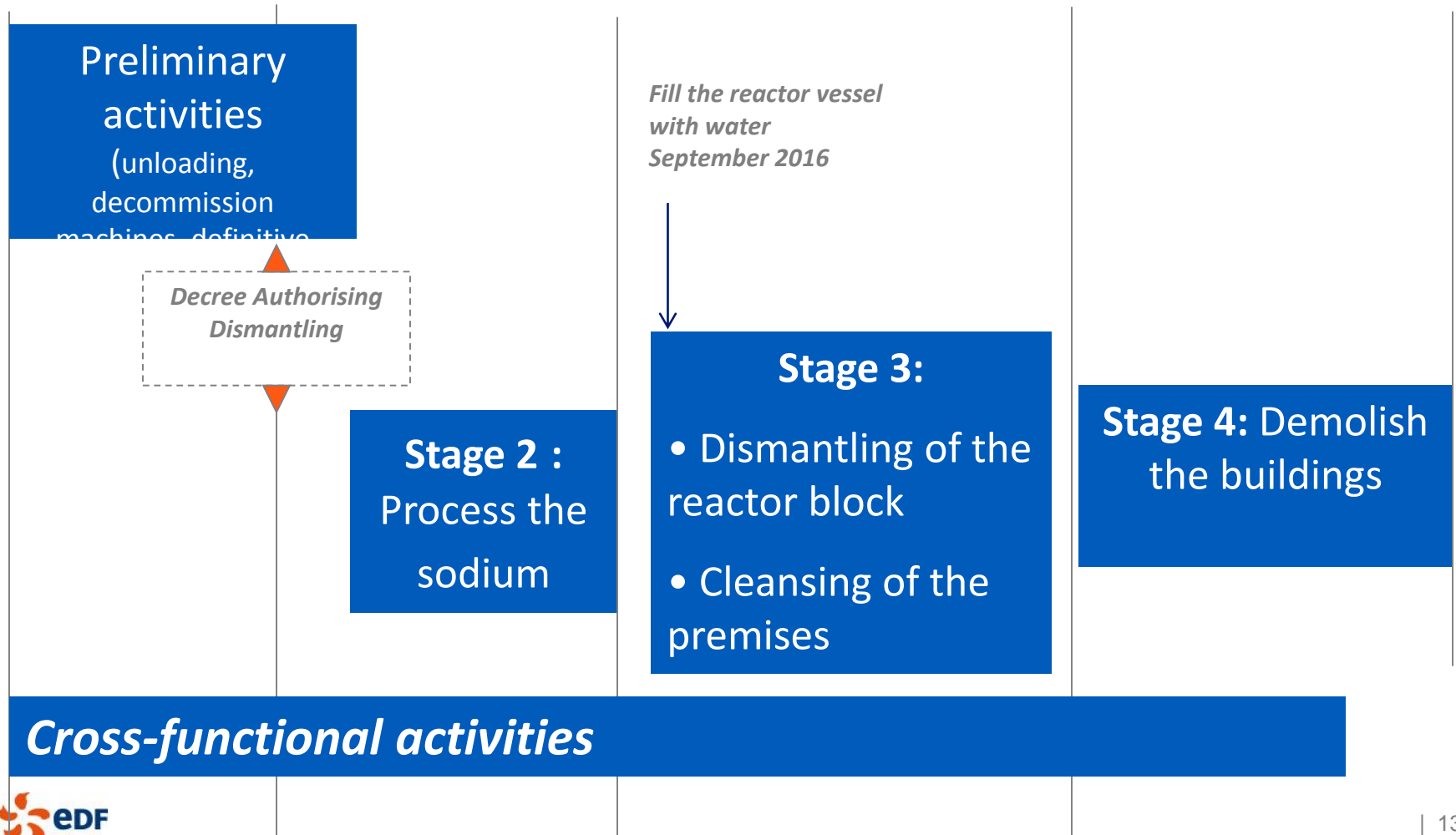
2015

No more radioactivity

2024

Final state

In about 2028



ICEDA

- ❑ Strategic project for EDF's decommissioning programme
- ❑ Project enabling EDF to take responsibility as a waste producer:
 - Pending the availability of geological storage pursuant to the provisions of **Law No. 2006-739 of 28 June 2006** a programme for the sustainable management of radioactive materials and waste



- ❑ Commissioning authority for the construction of ICEDA provided by EDF/CIDEN
- ❑ Site at a standstill since January 2012
- ❑ Still about 2 years' work (electromechanical assembly) before testing and commissioning

ACCEPTABILITY OF NUCLEAR POWER

❑ **Society's expectations** with regard to nuclear safety, environmental protection, transparency and consensus on industrial projects and energy costs (Baupin commission, French General Directorate for Energy and Climate (*Direction Générale de l'Énergie et du Climat (DGEC)*)* Audit, Court of Auditors, etc.)

❑ **Changes in the regulatory pyramid** towards increased transparency and involvement during the inquiry process (local information committee (*Commission locale d'information (CLI)*) (public consultation, etc.) leaving the field open to second opinions and/or the opinions of all stakeholders



- Financial and legal risks
- Increased complexity of the media and communication field



- **DINamic 2020** : methods for supervising projects, efficiency approaches, technical soundness

DGEC* AUDIT

Context:

- . Regulatory framework: monitoring mission entrusted to the DGEC (Article 13 of the decree of 23 February 2007)
- . Report of the Court of Auditors January 2012
- . Regulatory framework: monitoring mission entrusted to the DGEC

Organisation and conduct: . Duration: 10 months, as of 30 June 2014, on average, about 3.5 auditors / month

Scope and aims: Accuracy and completeness of the provisions for the dismantling of PWR installations