Industry Initiatives on New Reactor Designs

EDF perspective

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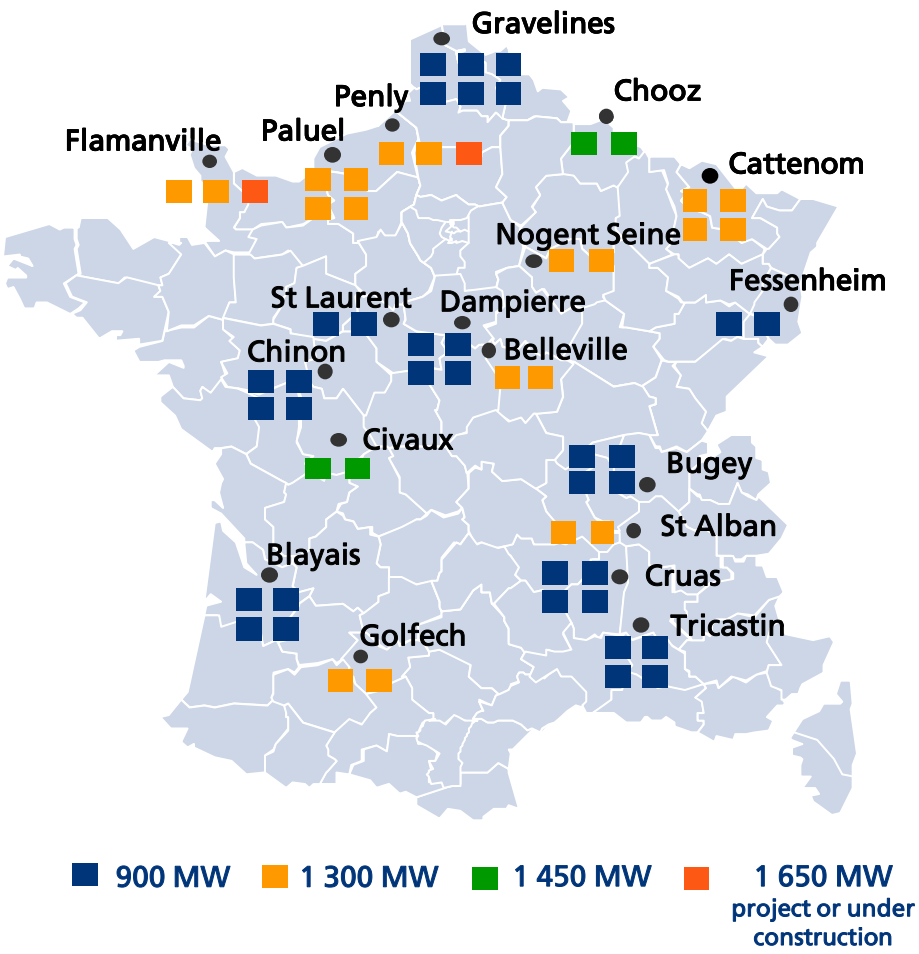
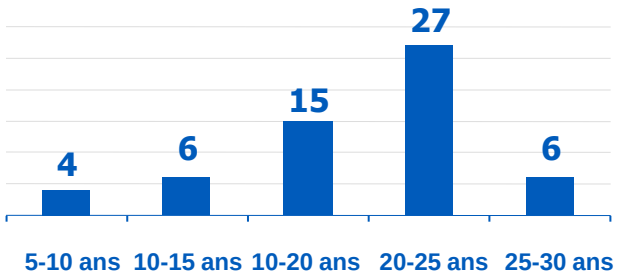
EDF's nuclear facilities in France



- A standardized fleet
  - 58 reactors in operation
  - Distributed over 19 sites
  - Unique technology : PWR ("Pressurized Water Reactor")
  - 3 power capacity levels :
    - 900 MW : 34 units, 31 GW
    - 1 300 MW : 20 units, 26 GW
    - 1450 MW (N4) : 4 units, 6 GW
  - EDF owns both nuclear power plants and sites
  - Average age : 24 years



EDF involved in several EPR projects in the world

United States
- First EPR planned at Calvert Cliffs

France
- 1 EPR unit under construction (Flamanville)
- 1 EPR project (Penly)

Great Britain
- Target: 4 EPR units
  First EPR planned at Hinkley Point

China
- 2 EPR units under construction in Taishan with CGNPC

Standardization and series effect for plant design

- Standardization and series effect do not mean strict duplication but should rely for a reactor design on the following:
  - Adaptability of safety demonstrations and of plant design to specific country and site conditions
  - Same core of main design features (main SSCs of the Nuclear Island)
  - Benefit of the experience feedback and potential synergies between projects
- Evolutions are necessary to avoid for a n^{th} new project using the same technology to be a FOAK
  - Harmonized regulatory framework or mutual recognition mechanisms between regulators
- EDF together with other utilities develops actions to promote harmonization and standardization through specific organizations
  - The European Utility Requirements (EUR)
  - European Nuclear Installations Safety Standards (ENISS)
  - The EPR family

The European Utility Requirements

- EUR : a mature cooperative organization of European utilities
- EUR : a hub to harmonize European utilities views and requirements and to interact with major external stakeholders
  - Regulators : safety (WENRA), HV grid…
  - Vendors
  - International organizations: IAEA, EU, WNA
  - EUR counterparts outside Europe : EPRI, Asian utilities
- The EUR document
  - A generic GEN3 LWR specification
  - A list of preselected designs
  - A living document: Rev D of Volumes 1&2 in mid 2012, Rev E in a longer term

ENISS: European Nuclear Installations Safety Standards Initiative

- FORATOM/ ENISS representing nuclear licensees of the EU
- Interaction with WENRA in a constructive dialogue through the RHWG and the WGWG
  - Reference Levels for operating reactors
  - “Stress tests” specifications in the light of the Fukushima event
  - Safety objectives for new reactors
- Interaction with IAEA through assistance in IAEA drafting groups
- Interaction with the European Commission
  - EU safety directive
  - Long Term operation
  - “Stress tests”

The EPR Family : synergies and series effect between EPR projects

- Within the EDF group and in interaction with AREVA and TVO
  - Sharing safety and licensing issues and lessons learned
  - Sharing construction experience and best practices
  - Sharing procurement and information technology
  - Preparing for commissioning and operation
  - Coordinating our public acceptance initiatives

- In interaction with MDEP through the EPRWG
  - Making available information and data to explain and understand differences existing between different EPR projects
  - Promote harmonized principles, methods and solutions resulting in the same level of safety for all EPR family plants