

International fleet approach: Advantages & Challenges

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Team NB Purpose Statement

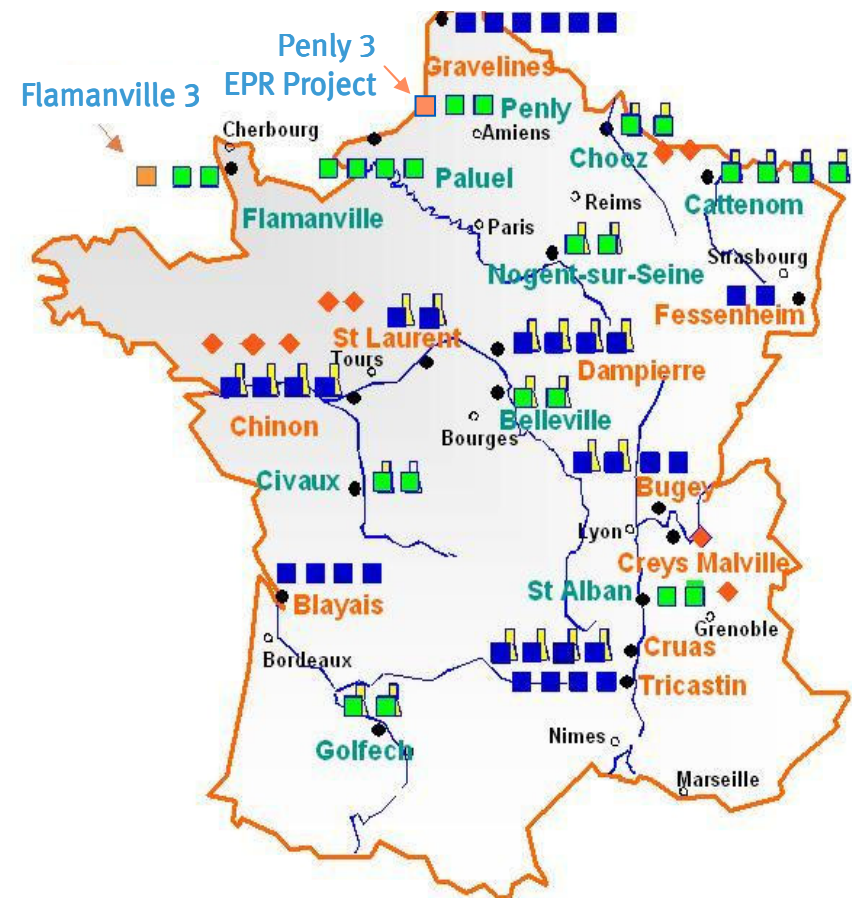
Leading the way in building a fleet of safe, reliable nuclear power stations without costing the earth.

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EDF experience of construction and nuclear generation

- EDF experienced in the construction and the operation of 58 reactors spread across 19 sites (+ 1 under construction)
- Same technology: Pressurized Water Reactor (PWR) with 3 series
 - 900 MW: 34 units,
 - 1300 MW: 20 units
 - 1500 MW: 4 units
- The EPR is also a PWR, benefitting from feedback experience from more than 1200 reactor years



Our choice – the EPR

- Areva design
- Strong EDF involvement since the beginning of the design



Artists impression of Flamanville 3, Normandy

EDF Group EPR projects

USA
4 EPR with Constellation
Energy Group

UK
4 EPR- 1st due to
be commissioned
in 2018

France
• 1 EPR under
construction
• 1 EPR at consents
phase

*Italy
Nuclear renewal
announced by the
Government
First agreement
with Enel*

China
2 EPR with CGNPC
1st due to be
commissioned in
2014

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A new approach: an EDF EPR Worldwide fleet

- 3 Units (FA3 – TS1 – TS2) under construction
- 9 additional planned (4 UK – 4 US – 1FR)
- More at early stage (Italy)
- These units already represents a great opportunity to take benefits of the fleet approach

EDF Group EPR Family Objective

To maximise the benefits of a serie effect:

Designs as **similar** as possible with the same safety level

EDF is committed to a fleet approach

- **The French experience (58 reactors in operation based on only 3 series) has demonstrated the pertinence of the approach**
- **Allow a safer operation sharing easily the lessons learned across the fleet**
- **Reduce the development cost of a new construction program by mutualisation of design studies**
- **Allow an easier back-office support team, well aware of the design**

New Challenges

- Regulatory context is national
- Some design codes may be different (RCC-M vs ASME)
- Our reference plant (FA3) has been built using European standards and some members of the family are outside Europe
- “Local” particularities may impact strongly the design (e.g. 50Hz vs 60Hz)

How to progress?

Introduction of the EPR family concept

Areas of cooperation includes:

- Safety and licensing issues
- Construction feedback (already good examples between Flamanville3 and Taishan)
- Later: operation experience feedback
- Joint procurement
- IT

EDF Group EPR Family Organisation

- Several EDF Engineers dispatched in each EPR project abroad
- A back office in EDF Engineering division in France serving the projects
- Regular contacts and meetings between projects to exchange information on technical issues

EDF Group EPR Family

Safety issues exchanges

- Licensing processes
- Identification and understanding of design differences
- I&C
- PSA
- Accident releases
- Transient analysis
- ...

International Safety Harmonisation ?

- Today some significant differences between national safety regulations
- Each EPR project will comply with its country safety regulations
- Regulators participate to the EPR family meetings so we can share our concerns

- Regulators and Licensees need to be clear on design differences and their reasons

From international to local challenges

- Not only the international fleet represents a challenge, some challenges begin very locally:
- Most of the new projects are based on existing sites
- We need to conciliate continuity of a safe operation of existing plant with the constraints of a construction site.

Just if you want a picture of FA3 illustrating the proximity of construction / operation



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Thank You



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