Nuward's Joint Early Review

A Pragmatic Approach to Multi-Country Pre-Licensing

EFELA Nuclear Congress

Comparison of European and non-EU Regulatory Experiences in the Field of Nuclear Energy Law

Milan – 3 & 4 September 2026

Carole RIVOIRE

NUWARD solution: a GEN 3+ PWR SMR fully relying on **proven technologies**, an **established industrial sector**, and a **sustainable fuel cycle**

Proven technologies

Architecture and systems based on proven technologies used on the existing EDF fleet and EPR2 reactor technology.

A **primary circuit** to deliver a thermal power of 1150 MWth, that can be manufactured with existing industrial facilities.

Established industrial sector

NUWARD SMR relies on the **EDF Group's** technical and industrial expertise and **Framatome's and Arabelle Solution's** industrial infrastructure,

and integrates **partners** to enhance its construction and modularity skills, such as **Tractebel** and **Ansaldo Nucleare.**

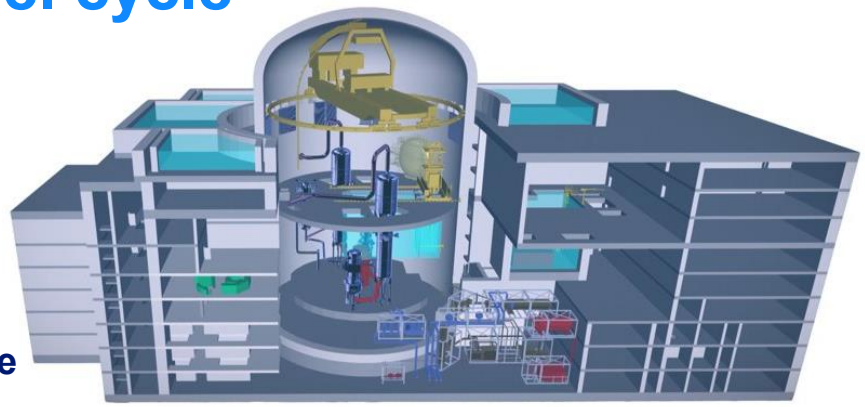
NUWARD's value proposition

Proven technology and enhanced delivery based on **simplification, modularization and prefabrication,** to offer sure, fast and predictable projects to our customers.

Safety targets aligned with the highest international safety standards (IAEA, WENRA, EUR)

A **sustainable fuel cycle** (UO2, URE, MOX) reducing the natural uranium consumption and spent fuel volumes

Up to 400 MWe, and in cogeneration mode up to **290 MWth + 320 MWe**



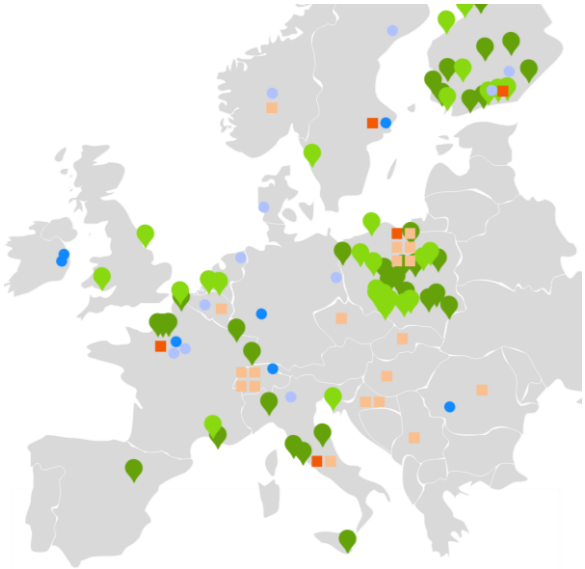
NUWARD is pursuing a growth strategy with a European market focus

NUWARD is dedicated to becoming a **leading force in the European Small Modular Reactor market.**

Industry Clusters

Utilities

Data Centers



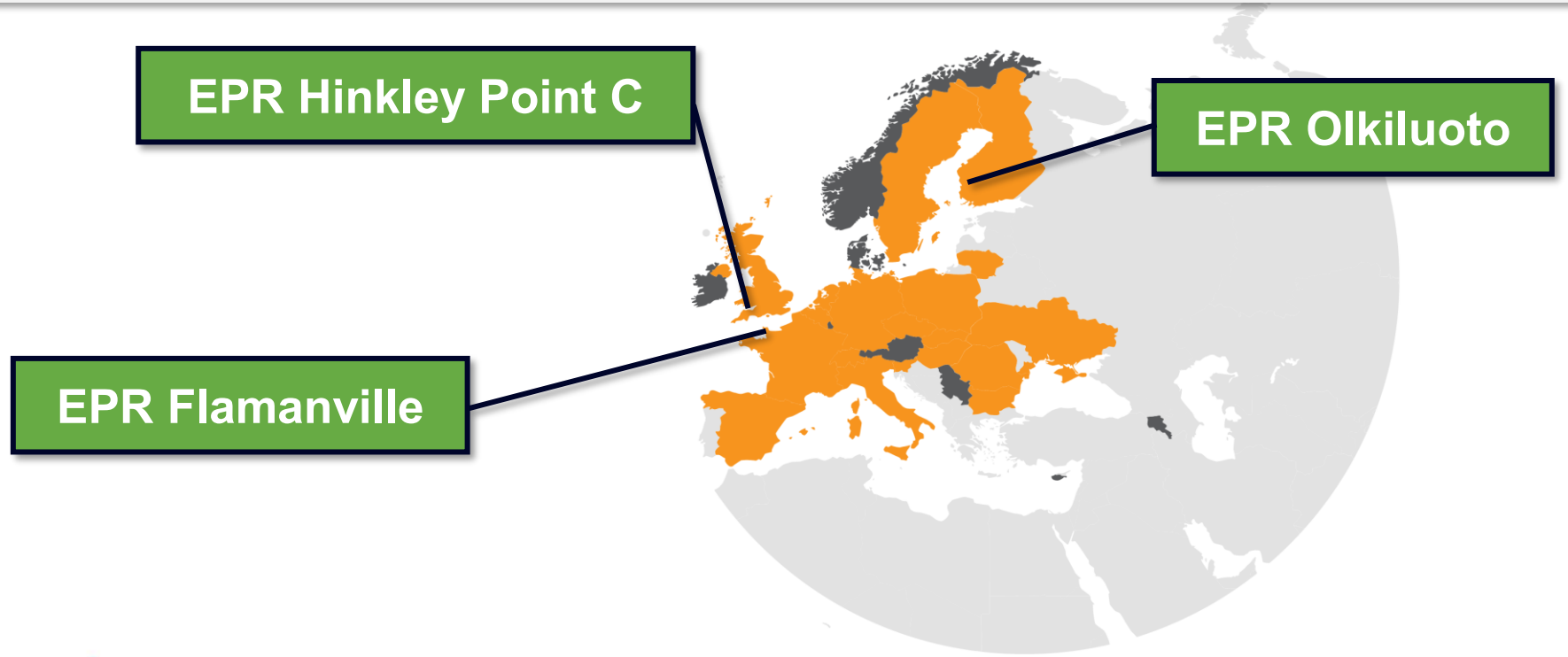
In line with European Commission's SMR strategy to include end uses beyond electricity production

Learn from past experience…

→ Licensing the EPR design in France, in Finland and in the UK has led to important design changes.

→ Even when the high-level IAEA (International Atomic Energy Agency) and WENRA (Western European Nuclear Regulators Association) nuclear safety frameworks provide a common basis in these countries…

1 design + 3 different contexts = 3 different products with the same level of safety



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Why a *Joint Early Review* for loop-type LWR SMR using proven technologies?

STANDARDIZATION

INDUSTRY NEED = Standardized designs for international deployment without major changes

TODAY'S REALITY

Country-specific regulatory frameworks and practices present important differences **also for proven technologies**

PRAGMATIC APPROACH

ADDRESS IMPORTANT DESIGN ASPECTS THROUGH EARLY ENGAGEMENT WITH REGULATORS

- Identify important differences (requirements, expectations) which could impact design standardization
- Decide on how to address these differences in the design (for example maximizing the standardized core of the design or leveraging flexibility through optional features)

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The Joint Early Review, an **innovative initiative** to anticipate the regulator's expectations in the European countries

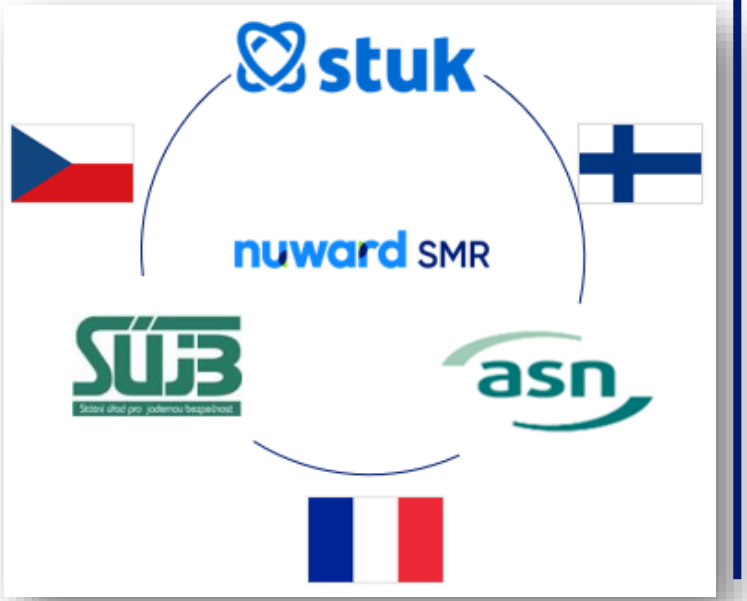
Main objectives

- **Foster exchanges** with and between several **European regulators** on the NUWARD SMR design and its safety approach
- **Identify key enablers** and conditions to meet licensing expectations in participating countries
- Enable all participants **to increase their respective knowledge** of each other's **regulatory practices**

Phase 1 06/2022 – 06/2023
3 regulators – 6 topics

Phase 2 12/2023 – 04/2025
6 regulators – 4 topics

Phase 3 01/2026 – 12/2026
8 regulators – 3 topics



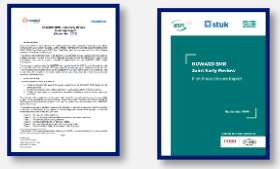
Joint Early Review = A topical review

Focus → Design aspects for which licensing process could have significant impact on cost and timeline

JER Phase 1

- Topic 1: General safety objectives
- Topic 2: List of design basis conditions and design extension conditions
- Topic 3: Use of passive cooling systems
- Topic 4: Development plan for computer codes
- Topic 5: Integration of two reactor units in a single facility
- Topic 6: Probabilistic Safety Assessment (PSA) approach

Summary Reports JER Phase 1
published in September **2023**



JER Phase 2

- Topic 7: Design extension conditions management strategies
- Topic 8: Containment and radiological consequences assessment
- Topic 9: Criticality risk management
- Topic 10: Electrical and I&C systems architecture

Summary Reports JER Phase 2
published in December **2025**

JER Phase 3

- Topic 11: Break exclusion approach as compared to leak before break approach
- Topic 12: Safety Classification and link to codes and standards
- Topic 13: LOOP (Loss Of Offsite Power) approach and associated demonstration

Summary Reports JER Phase 3
to be published early **2027**

Outcomes and benefits of Joint Early Review (Designer's perspective)

- ✓ Helps **build and promote a coherent, widely acceptable safety case** based on a strong generic design core. Early engagement **enhances generic design** maturity and **multi-country regulatory compliance**, both essential to the viability of the SMR model.
- ✓ Fosters **transparency and early understanding** of design process, design choices and safety demonstration approach, essential to building trust with regulators.
- ✓ Supports and showcases the **benefits of international cooperation between regulators and with designers** (e.g. JER, NHSI, MDEP, regulators' forum on SMRs).
- ✓ Bottom-up initiative that **provides regulators with concrete cases and examples** that can be used in regulators' forums to illustrate what drives the need for harmonization and cooperation.
- ✓ Provides **early feedback before any formal licensing** or pre-licensing heavy processes.
- ✓ Can pave the way towards **a more efficient and streamlined licensing process down the line**, in 2 ways:
  - Move towards **more harmonized regulations**. → **LONG-TERM HARMONIZATION OBJECTIVE**
  - Push towards **mutual recognition of licensing decisions**. → **SHORT-TERM INDUSTRY NEED**

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What could accelerate SMR deployment?

Beyond technology, deployment requires regulatory and industrial readiness to move from "*reviewing the same design multiple times*" to "*building on each other's assessments*".

- ✓ **Establish robust multi-country pre-licensing frameworks** :
  Enable vendors to engage regulators early, before a specific project, site or customer is identified.
  Assess generic and standardized design features at an early stage.

- ✓ **Expand regulatory cooperation :**
  Strengthen international reliance.
  Promote joint or coordinated assessments between regulators, built on a common technical basis.

- ✓ **Enable industrial anticipation :**
  Facilitate manufacturing of Long Lead Items and modular fabrication before final deployment decisions.
  Increase reliance on shared inspection and oversight practices.

- ✓ **Prepare projects before specific projects exist:**
  Identify and qualify potential nuclear sites in advance.
  Streamline permitting pathways and coordinate licensing authorities.

Thank you !

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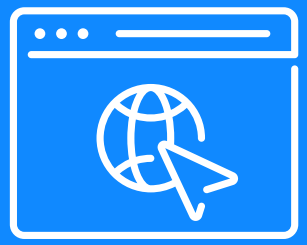
About us :



Our website

Our LinkedIn page

Our SMR solution

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