



# Addressing future nuclear safety challenges in the EU

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# Euratom Treaty signed in Rome in 1957



## EU level competences

- **Nuclear safety**
- Waste management
- Radiation protection
- Nuclear safeguards
- Emergency preparedness and response
- Fuel supply policy
- International relations
- Insurance and third party liability

# Learning the lessons from Fukushima

## EU-stress tests



### EUROPEAN COUNCIL 2011:

- Targeted reevaluation of the safety of NPPs
- EU-wide peer review,
- Lessons from Fukushima
  
- Review of the existing legal and regulatory framework

### 132 POWER REACTORS IN 14 EU MS, + CH, UA

Reassessment of the safety margins related to extreme natural events challenging the plants safety functions



### FINDINGS:

- NPPs safe to operate, but improvements identified
- Measures to improve safety margins in case of loss of power
- Procedures for severe accident management
- Different approaches to assessing external hazards (Flooding, seismic risks)



### IMPROVEMENTS:

- Mobile back-up power supplies
- Additional flooding defenses
- Measures to protect containment integrity
- European guidance on assessment of natural hazards (earthquake, flooding and extreme weather conditions)

# Examples of stress tests safety improvements



# Euratom secondary legislation

**Directive 2009/71/Euratom**  
**Nuclear Safety**  
**of nuclear installations**

**Directive 2011/70/Euratom**  
**Spent Fuel and Waste Management**

**Directive 2013/59/Euratom**  
**Basic Safety Standards**

**Directive 2014/87/Euratom**  
**amending Directive 2009/71/Euratom**

1957

2009

2011

2013

2014

2023



European  
Commission

# Amended Nuclear Safety Directive (2014)

- Applies to **civilian nuclear installations**
- Defines '**nuclear safety**' as the achievement of proper operating conditions, prevention of accidents and mitigation of accident consequences, resulting in protection of workers and the general public from ionizing radiation
- Requires Member States (MS) to establish, maintain and continuously improve a national legislative, regulatory and organisational **nuclear safety framework and a competent authority**
- Contains **high-level provisions**, non-prescriptive approach
- Introduces **graded approach**: proportionate transposition depending on MS' nuclear profile and type of nuclear installations

# NSD transposition and implementation

Adoption by the Council	8 July 2014
1 <sup>st</sup> Implementation report	<i>22 July 2014</i>
1 <sup>st</sup> EC report to the Council and the European Parliament	July 2015
2 <sup>nd</sup> Implementation report	<i>22 July 2020</i>
<b>2<sup>nd</sup> EC report to the Council and the European Parliament</b>	<i>21 April-2022</i>
<b>Workshop on implementation of the report's findings</b>	<i>8-9 November 2022</i>
Completeness checks	Completed 7 infringement cases launched / all closed
Conformity checks	Completed No infringement cases

# Key areas for improvement

## Priority topics for EU-level action

November 2022 Workshop discussions

**SAFETY  
CULTURE**

**STRONG &  
INDEPENDENT  
CRAs**

**TRANSPARENCY**

**NUCLEAR  
SAFETY  
OBJECTIVE**

**LICENCE  
HOLDER**

**TOPICAL PEER  
REVIEWS**



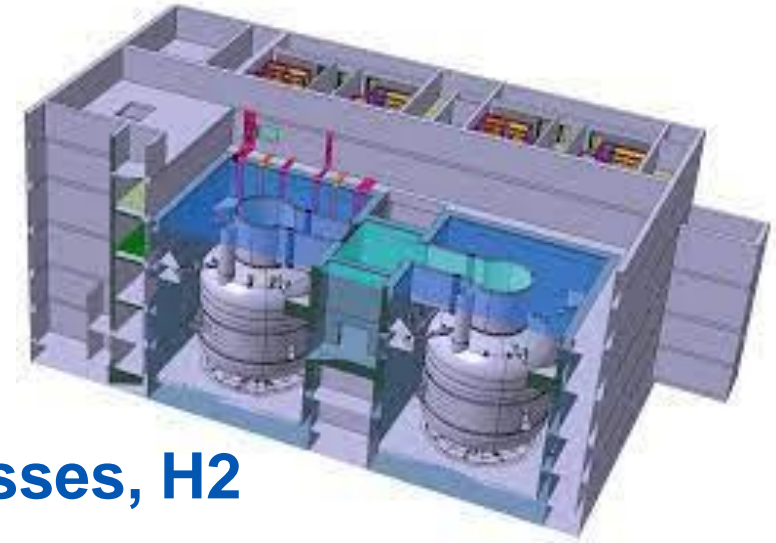
# Topical Peer Reviews (TPRs)

**Process:**



- Peer reviews are a requirement from the **Nuclear Safety Directive**
- Performed **every six years**, on a specific topic related to nuclear safety, followed by a peer review by other Member States, with the European Commission as an observer.
- TPR-1: 'ageing management' of nuclear reactors, 2017 and 2018
- **TPR-2: fire protection at nuclear installations, 2022 - 2025**

# Small modular reactor designs



- Power reactors designs ~ **300MWe or less**
- Can use heat for **district heating or industrial processes, H2** production or their combination;
- **Modular construction**, factory fabrication, aimed at economies of series production and short construction times
- **Enhanced safety features**, designed to meet latest safety objectives and latest standards
- Opportunities for **harmonisation of licensing** and applicable standards
- **Lower generation of some types of radioactive waste**

# Security of supply

Diversification of supply for **VVER-type reactors** (5 EU Member States)



Security of supply in the **nuclear front-end market**



# Euratom Research and Training Programme

Supports research in key areas of research and innovation, which include fusion energy and fission

## Objective

- Research and training activities to reduce risks in nuclear safety and security, development of safe nuclear technologies and optimal radiation protection.

## Key novelties

- Increased focus on non-power applications of radiation (medical, industrial, space)
- Opening mobility opportunities for nuclear researchers through inclusion in Marie Skłodowska-Curie Actions

## Budget for the period 2021 – 2027

- 1.981 billion EUR

Thank you for your attention