



Stress tests experience, and Topical Peer Reviews under the Nuclear Safety Directive

2nd Topical Peer Review – 1st Stakeholder Engagement event, 22 June 2021

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Milestones since the Fukushima accident



- March 2011 • Council mandate to carry out **stress tests** and review legal and regulatory framework for nuclear safety
- 2011-2012 • **EU-wide stress tests/peer review of nuclear power plants** (external hazards, loss of safety systems, severe accident management)
- 2013 • European Commission proposal to **revise the Nuclear Safety Directive**
- 2013, 2015 • Stress tests **implementation workshops**; follow-up is on-going
- 2014 • **Adoption of amended Nuclear Safety Directive**, introduction of **topical peer reviews (TPR)**
- 2017-2018 • **First topical peer review** under the NSD on ‘ageing management’ of reactors
- 2020-2022 • Follow-up of TPR1 national action plans, **preparations for TPR2** in 2023-2024

Post-Fukushima stress tests



- Targeted reassessment of safety margins and robustness of NPPs
 - Extreme natural hazards (earthquake, flooding, extreme weather,..)
 - Loss of safety systems
 - Severe accident management
- Licensee assessments, national reports
- Peer reviews by national regulators/experts: thematic reviews/country reviews, site visits
- Focusing on cooperation, information exchange, safety improvements
- Transparent - 17 country specific reports/findings + overall summary report
- Example outcomes: Reinforced protection against natural hazards, measures to protect containment integrity, supplementary mobile equipment, reinforced emergency response capabilities, rapid intervention teams, ...
- Updated guidance on assessment of extreme natural hazards

Western European
WENRA
Nuclear Regulators' Association

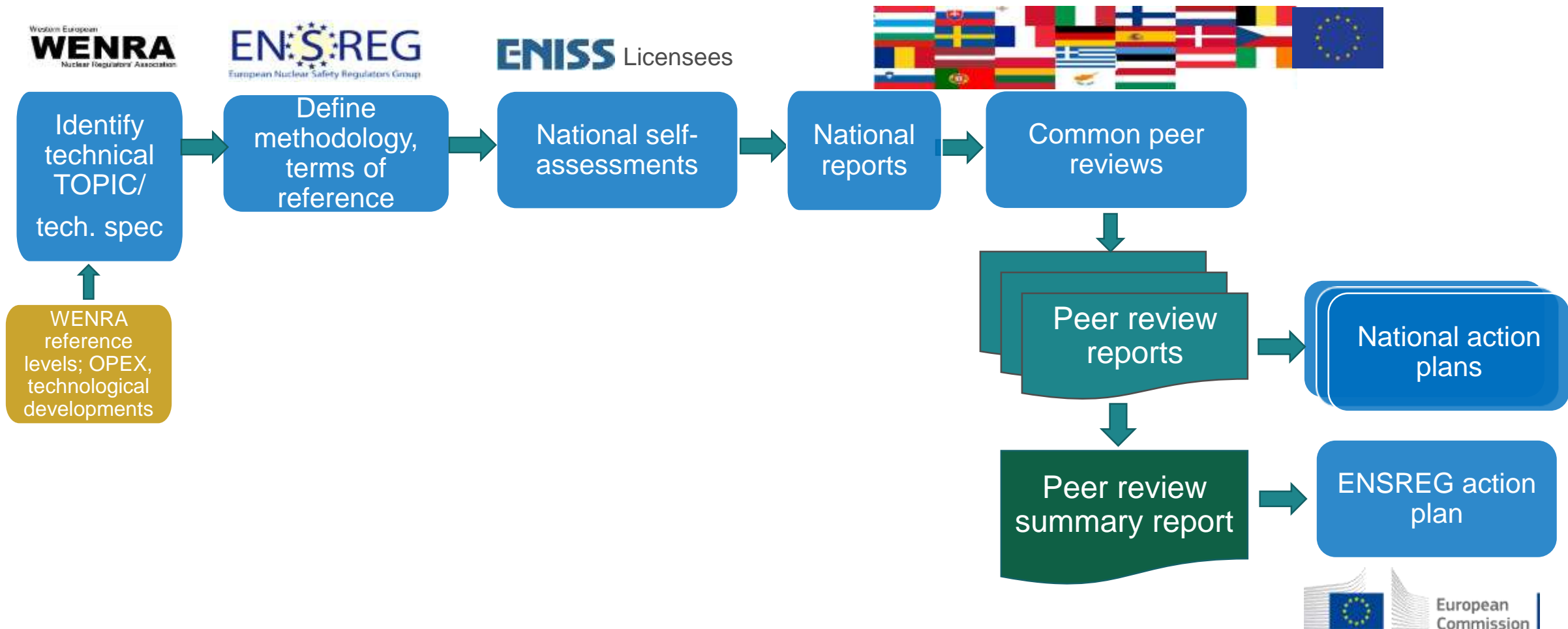
EN:REG
European Nuclear Safety Regulators Group

Actors and stakeholders



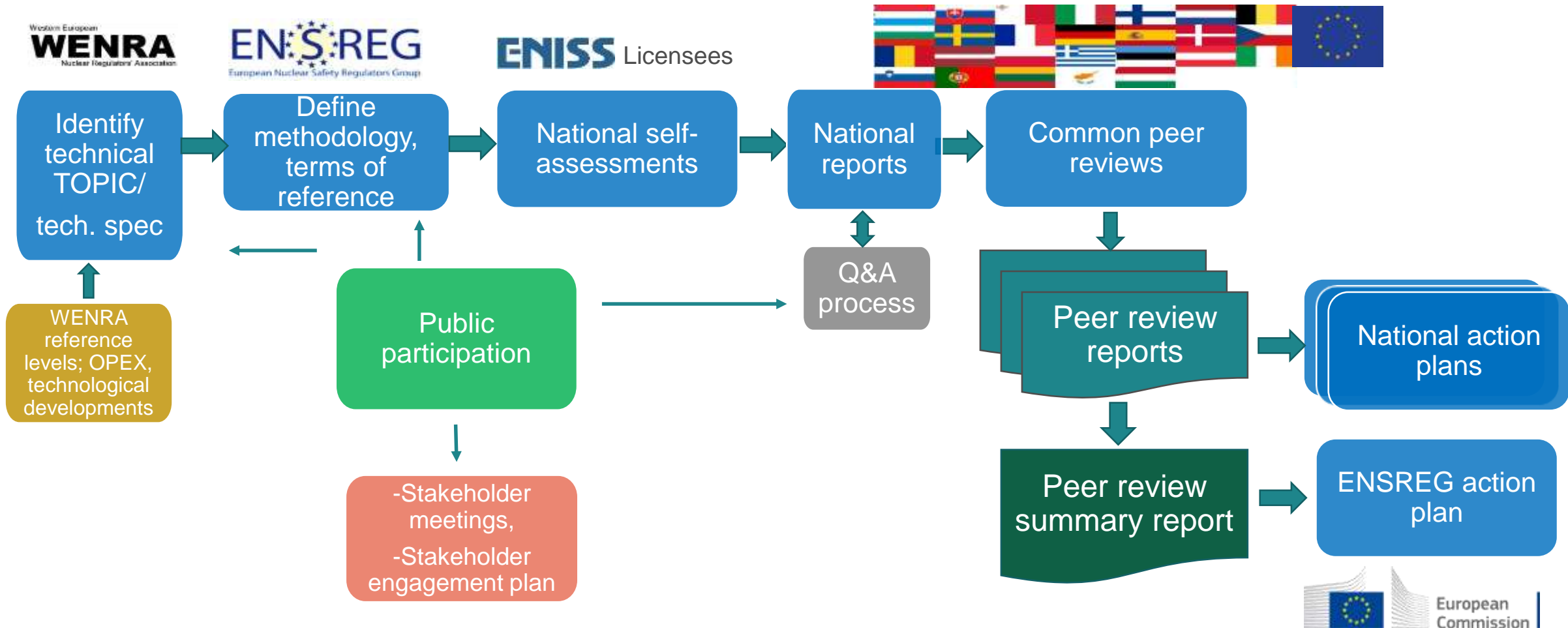
Principles of topical peer review under the NSD

European Commission (observer)



Topical peer reviews – public participation

European Commission



TPR1: Examples of safety improvements



- More comprehensive **ageing management** programme for research reactors
- **In-service inspections** of civil structures based on **latest international standards**
- Additional monitoring, testing, and **inspection for concealed pipework**
- Assurance of **cable performance under extreme ambient conditions**
- Definition of specific **ageing management performance indicators**
- Applying ageing management practices to **new constructions**

Conclusions – stress test and topical peer review achievements

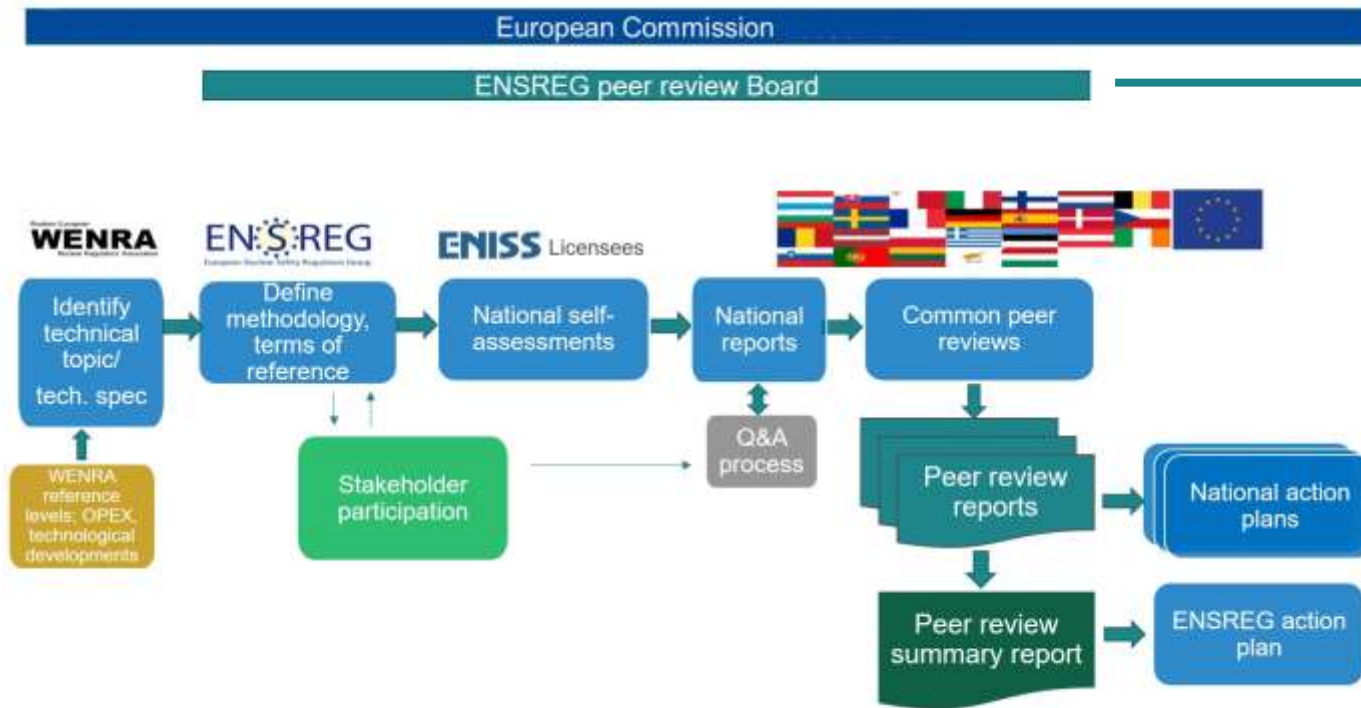
- Tangible safety improvements, improved preparedness, shared good practices
- Enhanced regulatory and technical cooperation amongst countries
- Updated European regulatory guidance, e.g. on natural hazard assessments – promotes harmonisation of approaches
- Stakeholder involvement and focus on transparency - all reports published - has improved public engagement and participation
- Strengthened EU cooperation with international organisations, IAEA, NEA – based on common aims
- Participation of EU-neighbouring countries, promotion of stress tests in other countries has contributed to regional and global nuclear safety

Thank you for your attention!



Back-ups

Topical Peer Review Board and EC role



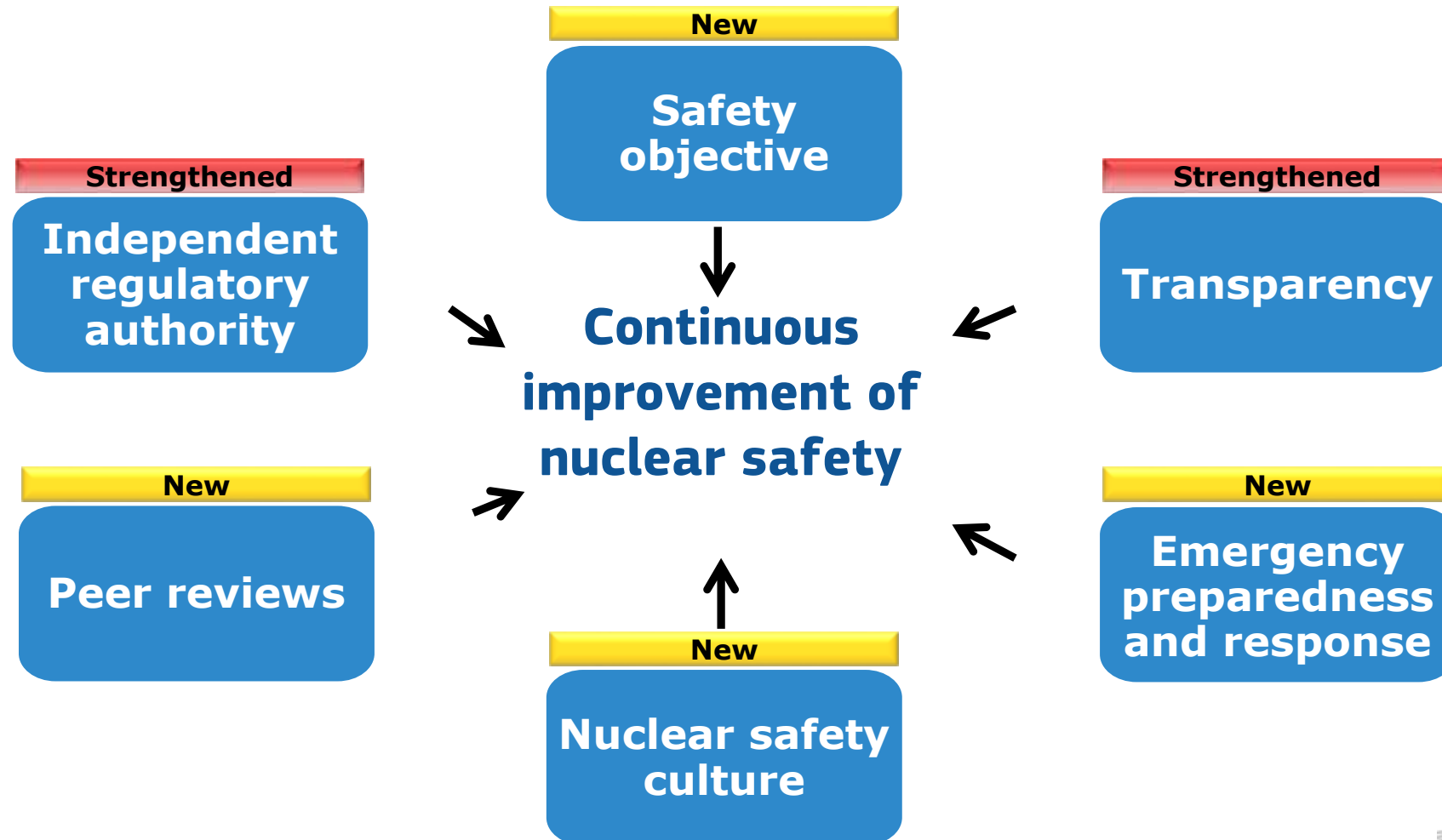
European Commission

- Observer role
- Secretariat (DG ENER)
- Technical input (JRC)

ENSREG TPR Board (Chair, Vice-Chair, EC)

- To oversee the process and provide the main orientations

Amended 2014 Nuclear Safety Directive (NSD)



Stress tests: Outcomes

- **Consideration of complex accident scenarios**, loss of infrastructure, events of long duration; unavailability of several safety systems, multiple units affected, including spent fuel pools
- **Reinforced protection** against natural hazards, e.g. flooding, seismic
- Implementation of measures to protect **containment integrity** (prevention of hydrogen explosions, containment overpressure)
- Use of **bunkered and mobile equipment**, reinforced emergency response capabilities, **rapid intervention teams**
- **Updated guidance** on assessment of extreme natural hazards

