

“No Need to Reinvent the Wheel”

Activities to Support Regulatory Infrastructure Development and SMR Safety in IAEA Member States

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International Atomic Energy Agency (IAEA)



IAEA at a high level

- Established in **1957**; **178** Member States
- **2560 staff** from **> 100 countries**
- **3 scientific laboratories** and research centres

IAEA's role in strengthening nuclear safety

- Provide for **implementation of legal instruments**
- Develop internationally recognized **safety standards**
- Provide **quality support and assistance** to Member States developing **safety infrastructure**
- Offer **Capacity building** (training courses, workshops, fellowships, and scientific visits)
- Facilitate **exchange of regulatory and operating experience**
- **Coordinate and collaborate effectively** with other organizations
- Facilitate **stakeholder engagement, communication and public understanding**

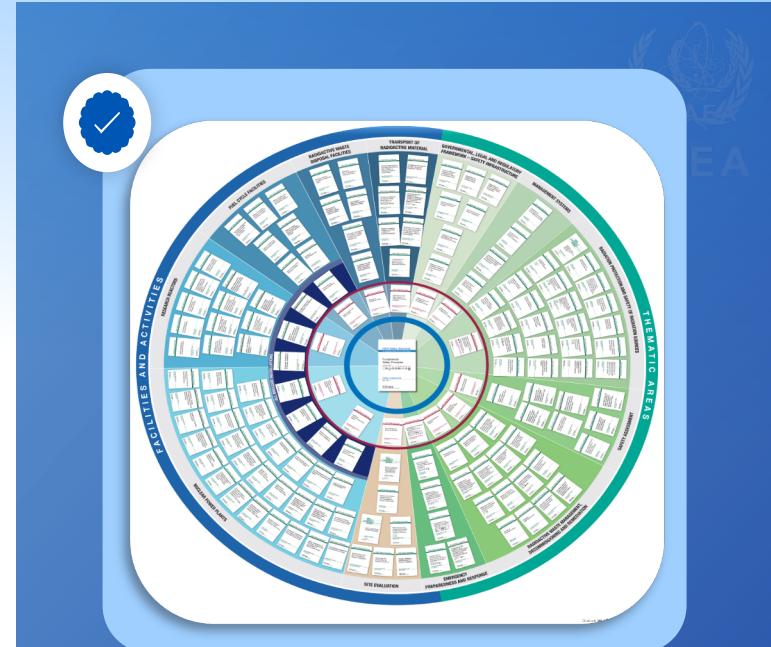
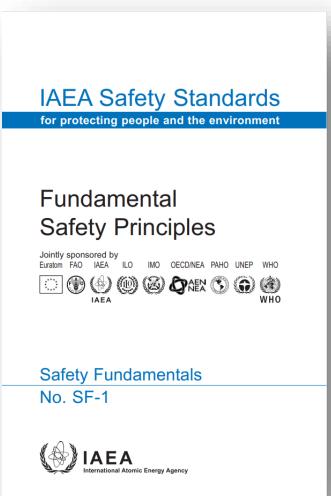


Effective Regulatory Framework for Ensuring Nuclear Safety

“The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation”

IAEA Fundamental Safety Principles:

1. Responsibility for safety
2. Role of government
3. Leadership and management for safety
4. Justification of facilities and activities
5. Optimization of protection
6. Limitation of risks to individuals
7. Protection of present and future generations
8. Prevention of accidents
9. Emergency preparedness and response
10. Protective actions to reduce existing or unregulated radiation risks





	Generic	Specific/Topical	
General Peer-Review Services	Integrated Regulatory Review Service (IRRS) Review of the national regulatory infrastructure for safety	Emergency Preparedness Review (EPREV) To appraise preparedness for nuclear and/or radiological emergencies in Member States	
	Operational Safety Review Service (OSART) Review of operational safety of a nuclear power plant	Independent Safety Culture Assessment (ISCA) Review of safety culture capabilities (corporate and plant levels)	
		Peer Review of the Effectiveness of the Operational Safety Performance (PROSPER) Review of arrangements for managing operating experience	
		Safety Aspects of Long Term Operation (SALTO) Review of ageing management and long term operation	
	Integrated Safety Assessment of Research Reactor (INSARR) Review of operational safety of a research reactor	Independent Safety Culture Assessment (ISCA) Review of safety culture capabilities (plant levels)	
Technical Peer-Review Services	Safety Evaluation of Fuel Cycle Facilities During Operation (SEDO) Review of operational safety of a fuel cycle facility		
	Technical Safety Review (TSR) Review of design safety and safety assessment of nuclear power plants	<ul style="list-style-type: none"> • Design Safety • Generic Reactor Safety • Safety Requirements 	<ul style="list-style-type: none"> • Probabilistic Safety Assessment • Accident Management • Periodic Safety Reviews
	Site and External Events Design (SEED) Review of site and nuclear power plant design safety against external events	<ul style="list-style-type: none"> • Site and Design Regulations • Site Selection Process • Site Evaluation Review 	<ul style="list-style-type: none"> • Environmental Impact Assessment • External Hazards • Site Monitoring

IAEA Global Nuclear Safety and Security Network (GNSSN)



- Development of the GNSSN was carried out jointly **by the IAEA and the G8 Nuclear Safety and Security group in 2007**.
- It acts as a **worldwide gateway** to assist countries in **building capacity** in a safe and secure way via **international, regional and national networks and portals**.
- **It connects IAEA member states to strengthen Nuclear Safety and Security**

GNSSN in Numbers

- ✓ **20 Networks**
- ✓ **17 Thematic Area**
- ✓ **130 Member States**
- ✓ **Over 70 000 documents ~ million pages viewed per year**
- ✓ **Since 2011, over 450 regional and national activities**
- ✓ **Since 2011, ~4500 experts involved in the GNSSN activities**



Regulatory Cooperation Forum (RCF)



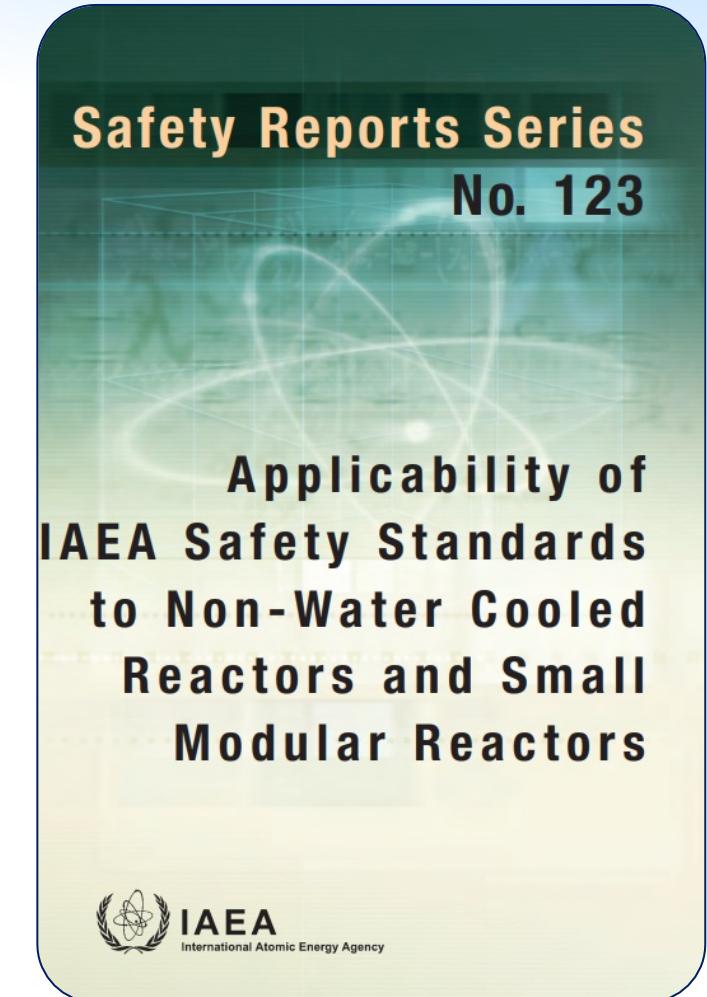
- RCF is a **member-driven** forum of nuclear safety regulators.
- The RCF **promotes the sharing** of regulatory knowledge and experience through **international cooperation** with the goal of achieving a high standard of nuclear safety, consistent with the IAEA safety standards
- The RCF aims to improve **coordination of providers' support** and to optimize resources among RCF members and avoid unnecessary support duplication.
- The RCF contributed to the **implementation of bilateral assistance** such as:
 - The Advanced Licensing Exercise Project (ALEP) from the U.S. NRC to the Polish PAA; and
 - The European Instrument for International Nuclear Safety Cooperation (INSC) from EC to several African regulators.
- Mr Ramzi Jammal (Canada) serves as RCF Chair and Mr Faizan Mansoor (Pakistan) as RCF Vice Chair; IAEA serves as Secretariat. Currently 26 members and 4 observers.

Preparing for the Future...

- **Changing environments** are impacting the role of regulators worldwide.
- Given the growing interest in **advanced new reactor technologies**, there are **regulatory challenges** associated with such new and innovative technologies such as **small modular reactors, advanced reactors, floating NPPs, fusion technology and the use of AI**.
- In 2022, the IAEA launched the **Nuclear Harmonization and Standardization Initiative (NHSI)** to facilitate the deployment of safe and secure advanced nuclear reactors.
- Expanding the use of nuclear power as a clean energy source to **fight climate change** will **require a renewed focus on how a warming climate impacts the safety** of nuclear power plants.
- In 2023, the IAEA organized the **International Conference on Effective Nuclear and Radiation Regulatory Systems**: Preparing for the Future in a Rapidly Changing Environment



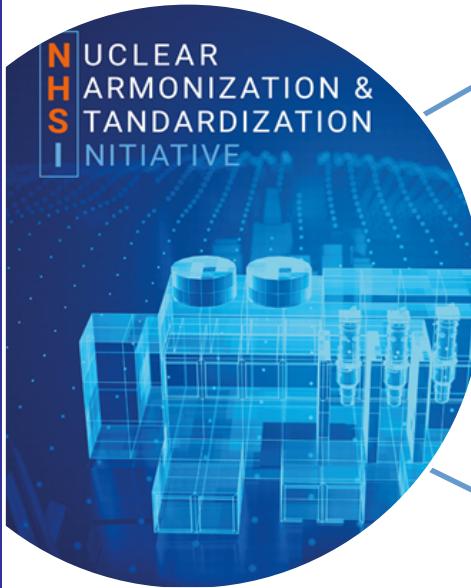
IAEA Activities on SMR Safety and Regulation



Nuclear Harmonization and Standardization Initiative (NHSI)



Effective Global Deployment of **Safe and Secure** Advanced Nuclear Reactors



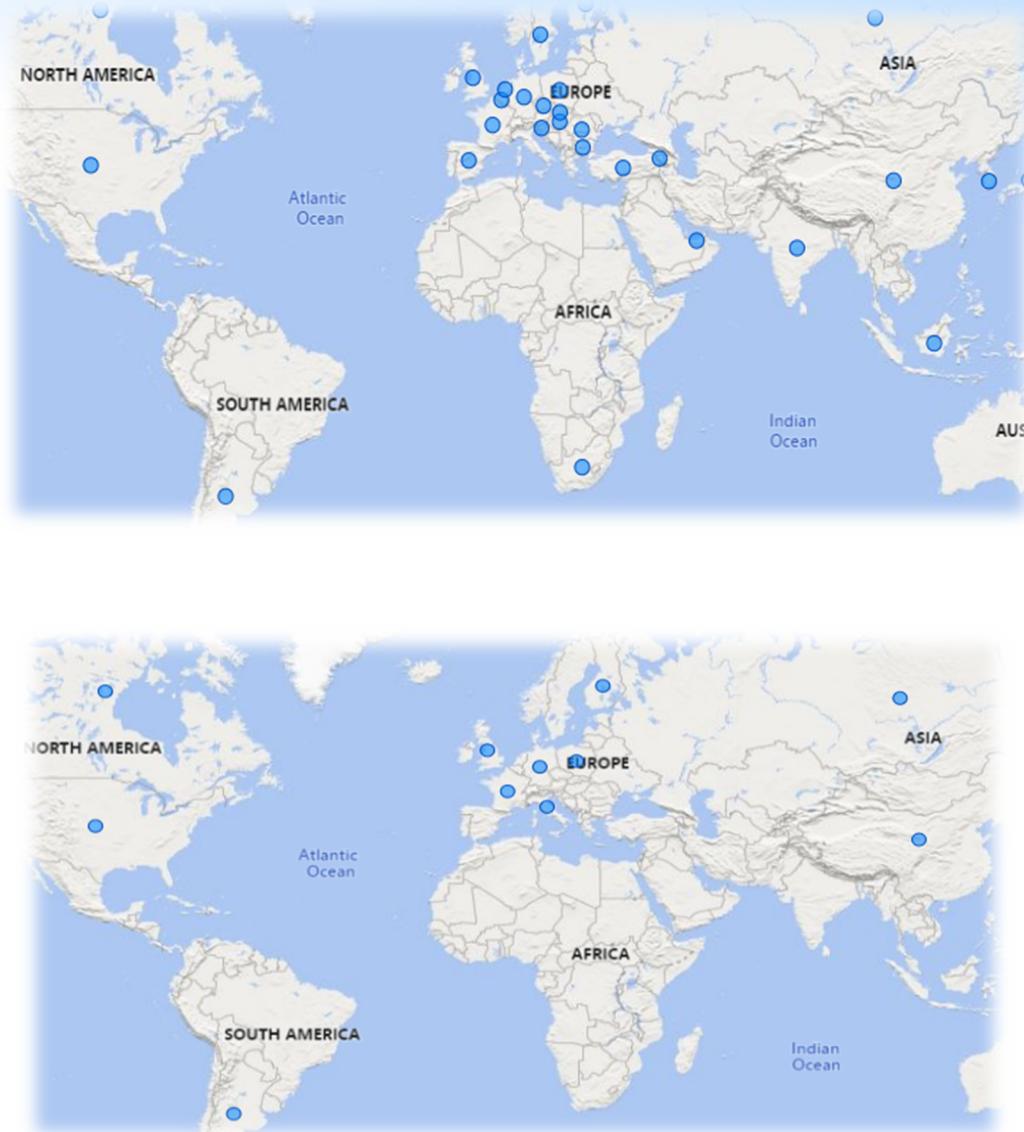
Harmonization and Standardization of **Industrial Approaches**

Harmonization of **Regulatory Approaches**

- **WG1:** Framework for information sharing
- **WG2:** Towards harmonization - multinational pre-licensing joint review process
- **WG3:** Two processes increasing cooperation: leveraging existing regulatory reviews; collaboration between national reviews

IAEA as facilitator
within and between the tracks

- **TG1:** Harmonization of high-level user requirements
- **TG2:** Common Approaches to codes and standards
- **TG3:** Experimental testing and validation for design and safety analysis computer codes
- **TG4:** Accelerating the implementation of nuclear infrastructure for SMRs



NHSI Regulatory Track Timeline

ASPIRATION (Long Term)

- Global framework for review: one review framework (requirements and approaches), one team and/or one review outcome, regulatory bodies take full benefit from past regulatory reviews and collaborations

Short to medium term

- National reviews in parallel with international cooperation

NHSI Phase I

- Tools and processes

- Limited scope reviews
- Better understanding of regulatory practices

Proposed NHSI Phase II

- Implementation of NHSI phase 1 and pilot projects
- Capture experience
- Enhanced support to embarking countries

Medium to long term

- Reviews and resource sharing
- Designers can easily account for remaining areas of difference

Increased Efficiency and Cooperation Phase

- Common framework based on joint reviews (towards a global framework for review)
- Targeted work to resolve areas of difference
- Full benefit from past reviews and collaborations



International Cooperation to Address Challenges

Assistance to Ukraine:

- Since **24 February 2022**, the Agency has been providing support to Ukraine with regards to the nuclear safety and security of its facilities and activities.
- These are **unprecedented conditions** for IAEA field missions to provide assistance to a Member State amid an armed conflict.
- The IAEA deployed a **continued presence for safety and security** and conducted a series of **fact-finding missions** in 2022 and 2023, with the objective of preventing a nuclear accident.
- 30 MSs and the EU are contributing to support IAEA programme in Ukraine.
- Strong coordination at international level is needed with the objective of achieving efficiency without duplication.

First-of-a-kind Facilities:

- International cooperation can also help to address challenges presented by **first-of-a-kind facilities**, which have no operational experience. Example: **Onkalo deep geological repository**.
- Operational safety is the scope of a forthcoming international peer review requested by Finland of the deep geological repository in Onkalo.
- IAEA, through international projects such as **GEOSAF (launched in 2008)** on the safety of geological disposal facilities, has successfully brought together countries with experience of developing geological disposal facilities.

In conclusion...

- The IAEA will **continue supporting regulators** to build their **national technical capacity and to share knowledge and experience** given the rapidly changing environment and the emergence of new needs.
- The IAEA remains **fully committed** to **enabling the safe and secure deployment of advanced nuclear reactors such as SMRs.**
- It is essential to mobilise the **knowledge gained and experience shared** by the IAEA MSs and to **build on the existing wealth of knowledge.**
- The IAEA will continue being **proactive and flexible and will provide tailored services**, as appropriate.
- **Indeed, there's no need to reinvent the wheel but there is a clear need to think outside the box to find innovative ways of performing our jobs in order to be more effective and efficient in addressing new challenges.**



Thank you for your
attention!

