

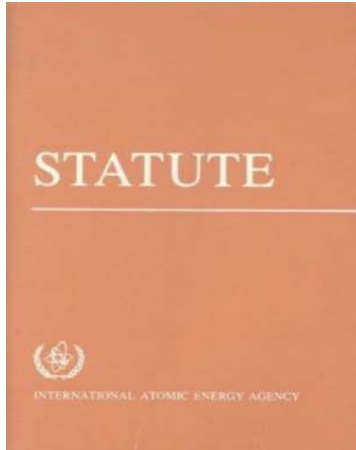
Explanatory Meeting on the Methodology for Technical and Scientific Support Organizations Self Capability Assessment

IAEA Safety Standards and TSOF Activities

Lingquan Guo, SH-NMPS, NSOC, IAEA

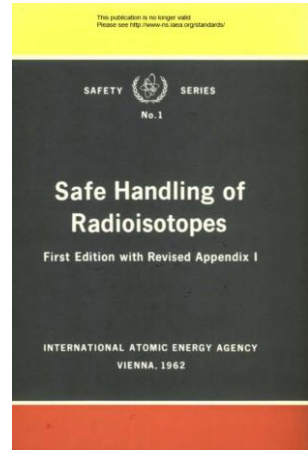
February 19, 2024

Origin



Under Article III.A.6, the IAEA is authorized:
“To establish or adopt ... standards of safety for protection of health and minimization of danger to life and property... and to provide for the application of these standards...”

The IAEA published its first safety standard,
“Safety Series No. 1, Safe Handling of Radioisotopes”,
in **1958**, just one year after the Agency was established

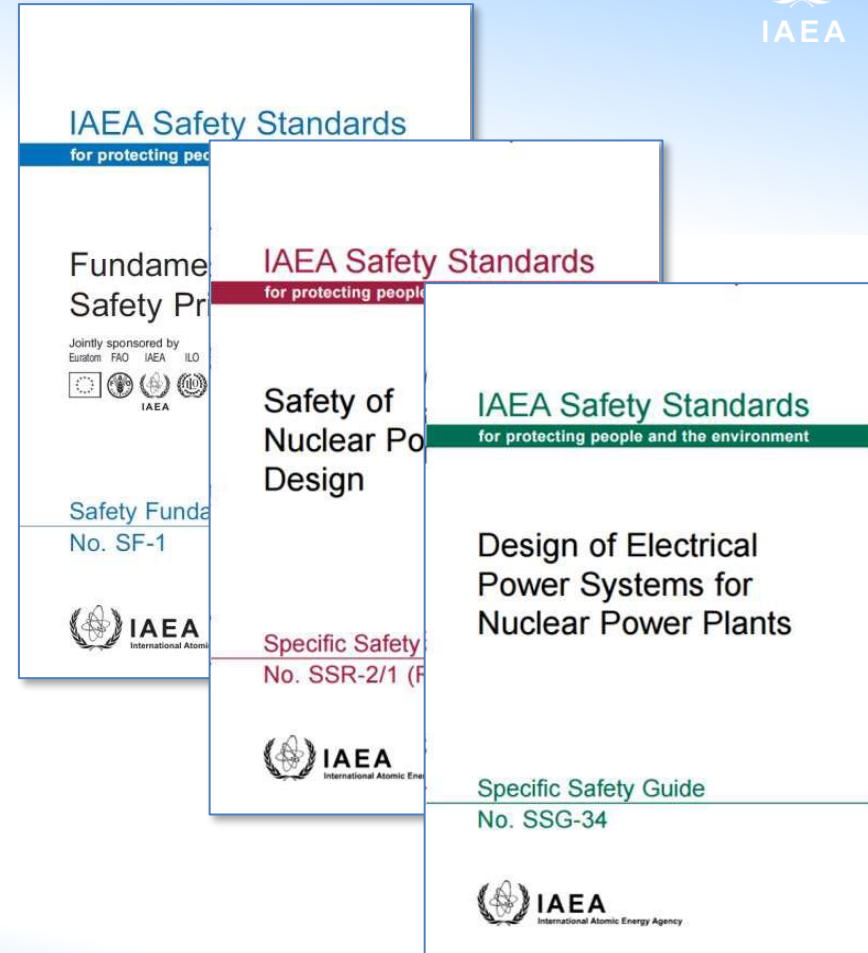


Purpose

An integrated, comprehensive and consistent set of up-to-date, user friendly and fit-for-purpose safety standards of high quality

They provide for a high level of protection for people and the environment from harmful effects of ionizing radiation

They present international consensus on a level of safety



Scope

IAEA safety standards are primarily addressed to national regulatory authorities and cover all regulatory and operational aspects of nuclear and radiation safety.

They cover all facilities and activities that can give rise to radiation exposure (only peaceful facilities and activities are covered)

Safety standards are:

- Nonbinding on IAEA Member States but may be adopted by them
- Binding for the IAEA's own activities
- Binding on States in relation to operations assisted by the IAEA or States wishing to enter into project agreements with IAEA



Hierarchy



Fundamental safety objective and **ten** principles for protecting people and environment

Functional requirements that have to be met to ensure protection of people and environment (“shall”)

Recommendations, guidance on how to comply with the safety requirements (“should”)

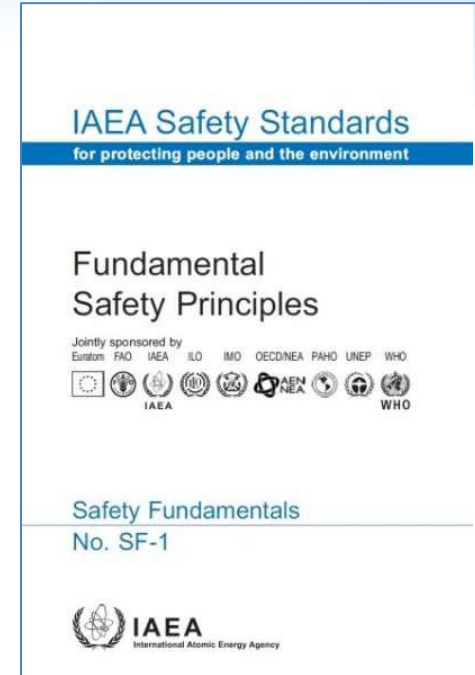
Fundamental Safety Principles



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

10 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 risk



Safety Requirements

General Safety Requirements

GSR Part 1: Governmental, Legal and Regulatory Framework for Safety

GSR Part 2: Leadership and Management for Safety

GSR Part 4: Safety Assessment for Facilities and Activities

GSR Part 3: Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

GSR Part 5: Predisposal Management of Radioactive Waste

GSR Part 6: Decommissioning of Facilities

GSR Part 7: Preparedness and Response for a Nuclear or Radiological Emergency

Specific Safety Requirements

SSR-1: Site Evaluation for Nuclear Installations Safety of Nuclear Power Plants

SSR-2/1: Design

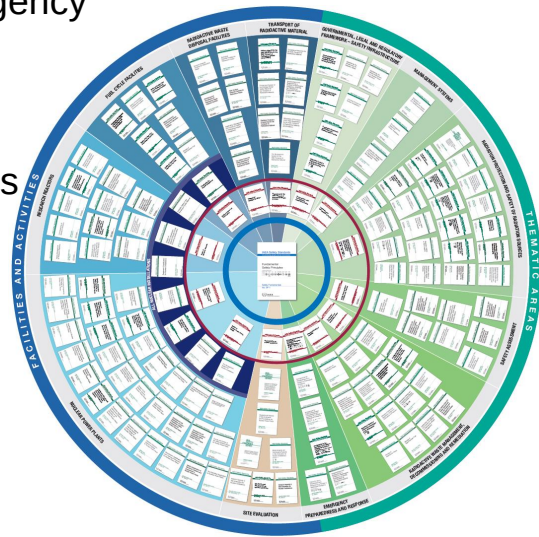
SSR-2/2: Commissioning and Operation

SSR-3: Safety of Research Reactors

SSR-4: Safety of Nuclear Fuel Cycle Facilities

SSR-5: Disposal of Radioactive Waste

SSR-6: Regulations for the Safe Transport of Radioactive Waste



GSR Part 1: Governmental, Legal and Regulatory Framework for Safety

Requirement 3: Establishment of a regulatory body

The government, through the legal system, shall establish and maintain a regulatory body, and shall confer on it the legal authority and provide it with the competence and the resources necessary to fulfil its statutory obligation for the regulatory control of facilities and activities.

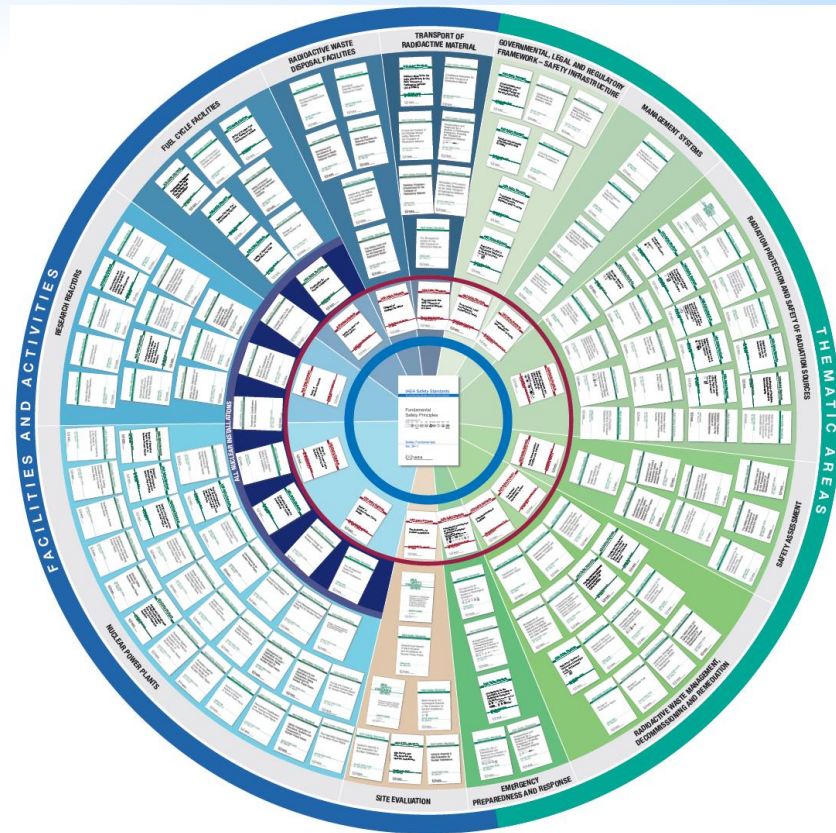
Requirement 4: Independence of the regulatory body

The government shall ensure that the regulatory body is effectively independent in its safety related decision making and that it has functional separation from entities having responsibilities or interests that could unduly influence its decision making.

2.7. An independent regulatory body will not be entirely separate from other governmental bodies. The government has the ultimate responsibility for involving those with legitimate and recognized interests in its decision making. However, the government shall ensure that the regulatory body is able to make decisions under its statutory obligation for the regulatory control of facilities and activities, and that it is able to perform its functions without undue pressure or constraint.

Current Status of the Safety Standards (As of Feb. 2024)

- 135 are established.
133 are published.
- 32 drafts are in the development process (revise and new).
- The expected total number is 146.
- Fundamentals and Requirements issued in all official languages.



Who is involved in the development of IAEA safety standards?



- The IAEA Secretariat
- Member States
- The Commission on Safety Standards
- The Safety Standards Committees and the Nuclear Security Guidance Committee
- The IAEA's Board of Governors
- The United Nations, its specialized agencies (such as the FAO, ICAO, ILO, IMO, WHO) and other intergovernmental organizations
- International experts
- Users

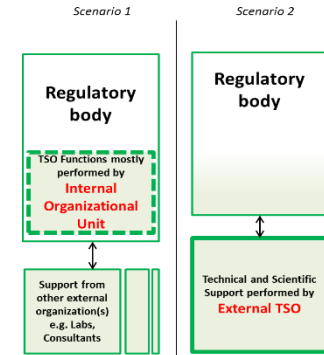
TSO (Technical and Scientific Support Organization)

What is a TSO?

*“A Technical and Scientific Support Organization (TSO) is an **organization** or **organizational unit** designated, or otherwise **recognized by a regulatory body and/or a government**, to **provide expertise and services to support nuclear and radiation safety and all related scientific and technical issues**, to the regulatory body.”*

IAEA GSR Part 1 requirement 11:

*“The government shall make provision for **building and maintaining the competence** of all parties having responsibilities in relation to the safety of facilities and activities.”*



TSO Forum (TSOF)



Established in 2010 by IAEA

Platform to encourage open dialogue among TSOs worldwide

Works to

- Strengthen the role of technical and scientific capabilities in MS
- Support technical and scientific capabilities in countries expanding or embarking on nuclear programme
- Promote coordination and collaboration among the TSOF members to foster scientific and technical capacity building
- Share safety and security research, development and experiences including lessons learned
- Share feedback on the use of the IAEA safety standards and other publications

TSOF Steering Committee Membership

New Term 2023-2025

- Belgium
- Canada
- China
- Czech Republic
- Finland
- France
- Germany
- Italy
- Japan
- Republic of Korea
- Norway
- Lithuania

- Pakistan
- Poland
- Russian Federation
- Slovakia
- South Africa
- Türkiye
- Ukraine
- United Kingdom
- United States of America
- The European Commission

TSOF

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Technical and
Scientific Support
Organization Forum

27 Members
21 Countries

IAEA 67th General Conference, 10th GNSSN Plenary Meeting



Over 90 participants, and 15 Member States attended the annual gathering that focused on international cooperation and dialogue among global, regional and national technical networks in nuclear safety and security.



GNSSN
Global Nuclear
Safety and Security
Network

Director General Mr Rafael Mariano Grossi

welcomed all participation and delivered opening remarks highlighting that **GNSSN Largest network in Nuclear Safety and Security**, is key in building global safety infrastructure and fostering a new generation of experts.



Rafael Mariano Grossi
@rafaelmgrossi

Following

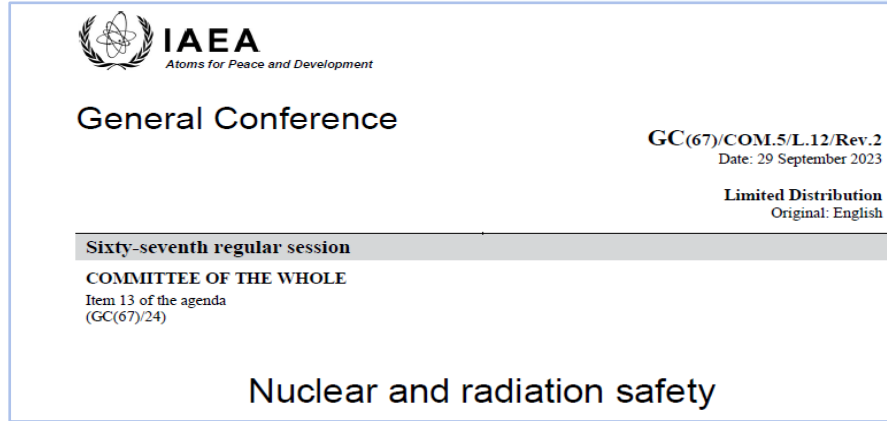
#GNSSN, largest network in nuclear safety & security, is key in building global safety infrastructure & fostering a new generation of experts. Pleased to deliver remarks at #IAEAGC event. Congrats on continuously expanding through regional networks to enhance  safety & security



The **TSOF Chair and Vice Chair** discussed how to further strengthen regulatory infrastructure as well as the role of the **Technical and Scientific Support Organization Forum (TSOF)**, in developing and strengthening technical and scientific capabilities supporting regulatory functions and emerging technologies as well as **TOSCA** as an innovative web-based tool for the self-assessment.



IAEA GC67 Resolutions in the context of TSOF



31 *Encourages Member States to consider establishing organizations to provide technical and scientific support to regulatory functions, as appropriate, and requests the Secretariat to promote cooperation between Member States, including through the Technical and Scientific Support Organization (TSO) Forum and regional TSO networks, and to assist, upon request, in this regard, including in applying the TSO Self Capability Assessment (TOSCA) methodology;*

32 *Urges Member States to establish or maintain systematic and robust regulatory decision-making processes that take into account scientific knowledge and expertise, including, where appropriate, from TSOs and other relevant institutions.*

Regulatory Cooperation Forum (RCF) Plenary Meeting, September 2023

TSOF presentation



The presentation from the TSOF contributed to the discussion on how to best coordinate RCF activities with other networks for nuclear safety for enhanced effectiveness.

Discussions were held on the sidelines of this meeting to further consider cooperation between TSOF and RCF in the near future.



TSOF Initiatives

- What are the TSOs?
IAEA-TECDOC-1835
- What are the key challenges for the TSOs?
- The way forward to support Member States on the TSO capacity development and sustainability (*How?*)

TECDOC-1835

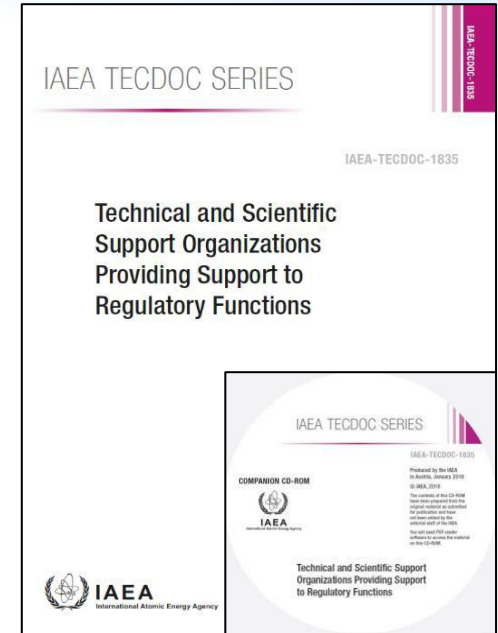
Case studies library

TSO Self-assessment
(TOSCA Methodology)

National workshop

TSO Conferences

Core Groups

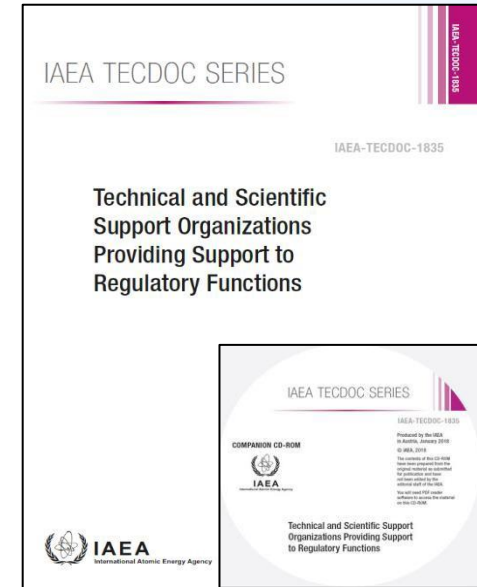


IAEA-TECDOC-1835 *Technical and Scientific Support Organizations Providing Support to Regulatory Functions*



IAEA

- Describes the general characteristics, organizational aspects and types of services provided by TSOs to support regulatory functions,
- Provides description, common core values and characteristics, of TSOs in countries where the regulatory infrastructure is well established, and it focuses largely on nuclear safety issues
- Provides examples (CD-Rom)



You will find a list of TSO case studies of member states illustrating key TSO development and operational problematics.

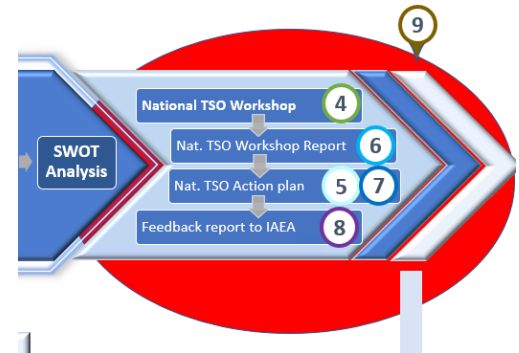
VTT Finland_TSO
Case
study_Research
Programmes

TSO Self-Capability Assessment (TOSCA)

- **Objective to assess the technical and scientific capabilities of a TSO**
 - What are the technical and scientific capabilities of the TSO?
 - How are they developed, managed and sustained?
 - How are they applied in regulatory functions?
 - To be used as self-assessment tool, in workshops among MS, or in connection with peer reviews
 - For embarking countries or countries with already established capabilities
- **Key considerations in the development of the questionnaire**
 - Based on the IAEA-TECDOC-1835
 - Emphasis on evaluation of how the TSO is performing its duties

TOSCA Workshop in 2023

- ✓ **National Assessment Workshop in Norway**
(Phase A, General Level)
 - ✓ **International Workshop on TSO in Norway**
(e.g. TOSCA for International TSOs)
 - ✓ **Regional Workshop on TSO in Tadjikistan**
(e.g. TOSCA for Regional TSOs)
- Methodology for discussion and interaction with all the national / regional / international stakeholders to better understand the meaning and importance of TSOs in the self-assessment process



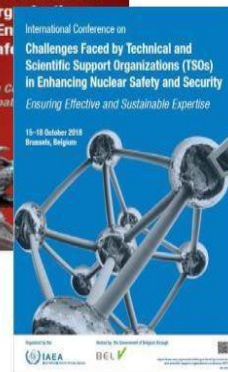
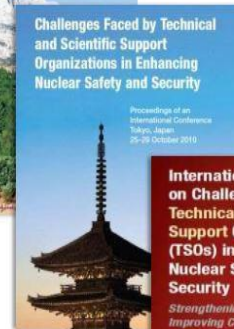
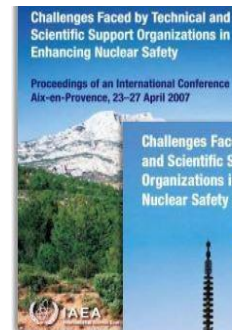
TSO Conference

General conclusions of past TSO conferences:

- *Need to share experiences and practices in nuclear safety assessment*
- *Expertise is science-based*
- *Need to define roles and characteristics of TSOs supporting regulatory functions*
- *Need to support Member States in their strategies to develop their TSO capacities*

Specific conclusions of IAEA TSO Conferences:

- 2007 : 1st TSO Conference in Aix-en-Provence, France
 - Develop a common understanding of the TSOs challenges
- 2010 : 2nd TSO Conference in Tokyo, Japan
 - Regulatory functions need to be science based.
 - **Need of a platform for networking** => **Creation of TSO Forum**
- 2014 : 3rd TSO Conference in Beijing, China
 - **Technical and Scientific function is a critical component of the regulatory system**
=> **Development of a TECDOC**
 - Member States should have the possibility to evaluate the capabilities of their national technical scientific support function. The TSO Forum (TSOF) could **contribute to the building of TSO capabilities of newcomer countries.** => **TSO initiative**
- 2018 : 4th TSO Conference in Brussels, Belgium:
 - **Encourage further progress of TSO initiative** => **TSO Self Assessment Tool + National Workshop**
 - **Promote TSO potential contribution to the independence and sustainable effectiveness of the national regulatory system.**



TSO Conference 2024

- 5th TSO Conference to be held at 2-6 December 2024 in Vienna, Austria



Scientific Programme

Session 1: Current Technical and Scientific Challenges
1.1: Long Term Operation, Periodic Safety Review (PSR) and Licensing Beyond Design Life
1.2: Transition to Decommissioning, challenges with Legacy, Unconventional Waste Management and Remediation
1.3: Radiation Protection and Monitoring (including Calibration and Record keeping)
Session 2: Emerging Technical and Scientific Challenges
2.1: New and emerging technologies (e. g. SMR, Fusion, Gamma knife)
2.2: Innovative tools and techniques (e. g. Artificial Intelligence, harmonized analytical tools)
2.3: Dealing with disruptive events (e. g. <i>pandemic, external hazards, national emergencies, climate change</i>)
Session 3: Interaction of TSOs with stakeholders
3.1: regulators and public authorities
3.2: public/civil society
3.3: academia, research institutions and industry
Session 4: Scientific and Technical Capacity Building
4.1: Knowledge management and fostering involvement of young generation
4.2: Equity, diversity, and inclusion
4.3: Education and Training
4.4: Research and development (needs, priorities, and infrastructure)
4.5: TSO self-capability assessment adopted in different countries (e. g. South Africa, Norway)
Session 5: Role of TSOs in an international context and for Embarking Countries
5.1: International cooperation (e. g. TSOF) and use of International Experience Feedback
5.2: bi and multi-lateral cooperation (Cross-border and regional approaches for e. g. EPR, transportation, sources)
5.3: Supporting embarking countries and building national TSO capacities (e. g. competencies, technical independence, conflict of interest)
Session 6: Holistic approach to risk and hazard management
6.1: Safety and Security Interface
6.2: Promoting and fostering Safety and Security Culture
6.3: Initiatives on leadership and management
6.4: Graded approach and integrated safety assessment

Core Groups in TSOF

- TOSCA Core Group
 - Enlargement and improvement of the TOSCA methodology (how?)
 - Promotion of TOSCA methodology
- R&D Core Group
 - Identification of R&D topics, specially with focus on developing an R&D program for embarking countries
- Ad-hoc Core Group
 - Contribution of TSOF to NHSI NEXSHARE (workshop in 2024)
 - Revision of TECDOC 1835

Thank you!

