

ETSON

The European Technical Safety
Organisations Network

Opening

Side Event – IAEA General Conference

Jean-Christophe NIEL, ETSON President

Germany - GRS
Founding member
since 2006

Finland - VTT
Member since 2008

Lithuania - LEI
Member since 2009

Ukraine - SSTC NRS
Associated member
since 2010

Japan - NRA
Secretariat
Associated member
since 2014

Belgium - Bel V
Founding member
since 2006

United Kingdom - ESRC
RSD Member
since 2015

France - IRSN
Founding member
since 2006

Switzerland - PSI
Member since 2012

Czech Republic - SURO
Member since 2008

Italy - ENEA
Member since 2016

Slovenia - JSI
Member since 2013

Slovakia - VUJE
Member since 2010

Romania - RATEN ICN
Member since 2017

Hungary - HUN-REN
Member since 2015

Technical Harmonization Technical Board for Reactor Safety

Side Event – IAEA General Conference

Didier DEGUELDRE, TBRS member

Technical Board on Reactor Safety

- Support harmonization of safety assessment principles and methodologies in Europe
- Promote a pertinent and robust safety assessment based on:
 - Up-to-date scientific & technological knowledge and latest state-of-the-art methods
 - Technical skills of TSO experts, enhanced by collective expertise
- Identify/discuss generic safety issues





ETSON Expert Groups (1/2)

1. OEF Including Incident and Precursor Analysis
2. *Mechanical Systems*
3. External Hazards (Man-Made, Natural)
4. *Severe Accidents*
5. Environmental Safety Related Qualification of Components
6. *Safety Fluid Systems – Passive Systems*
7. Human and Organizational Factors
8. *Probabilistic Safety Assessment (PSA)*



ETSON Expert Groups (2/2)

- 9. Decommissioning
- 10. Thermal Hydraulic Analyses
- 11. *Safety Concepts, Defense-in-Depth*
- 12. *Fuel Behaviour* (operational & accident conditions)
- 13. Emergency Preparedness and Response
- 14. Waste Management
- 15. Data Science / A.I.

TBRS outcomes

- (Technical) Safety Assessment Guides
- Technical Workshops
 - Aircraft crash, Load Follow-up, fusion...
- Technical Reports
 - Comparison of Rules-Making and Practices
- Position papers



Technical Safety Assessment Guides

A general Safety Assessment Guide supplemented by thematic technical guides

- ❑ Deterministic severe accident analyses
- ❑ Event review & precursor analyses
- ❑ HOF in nuclear facilities design & modification processes
- ❑ Transients & DBA analyses
- ❑ Safety Fluid Systems
- ❑ Environmental Qualification

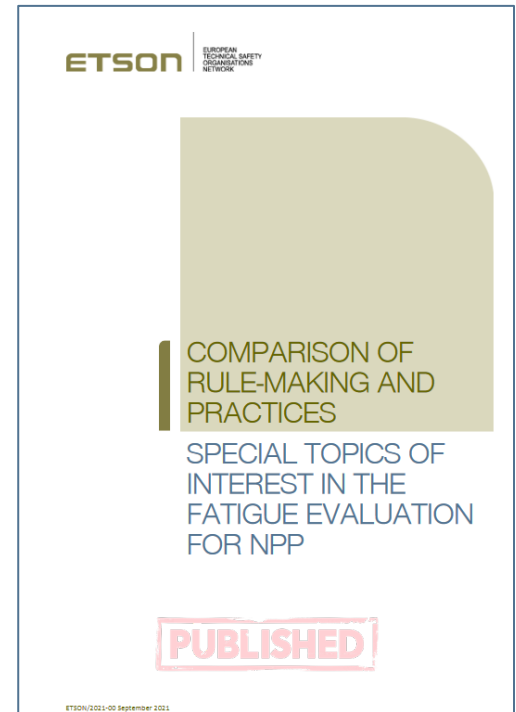
All available on the ETSON website, <https://www.etson.eu/publications>



Latest Publications / Developments (1/6)

A Technical Report on **Fatigue** developed by **EG2**

- ❑ Topics not considered in original design of most NPP in operation
- ❑ Extension of fatigue curves to very high cycles
- ❑ Environmentally assisted fatigue
- ❑ Analysis of mixing zones
- ❑ Analysis of stratification
- ❑ Approach to fatigue for LTO



Comparison of operating experience & practices, assessment of uncertainties with development of **recommendations** for **good practices**

Latest Publications / Developments (2/6)

A TSAG on **Hydrogen** & other combustible gases developed by **EG4**

- Survey on ETSO members' practices/approaches
- Identification of similarities & differences
- Anticipation ongoing R&D programs
- Addressed topics
 - ✓ Regulations and H₂ mitigation strategies (In/Ex Vessel)
 - ✓ Mitigation measures qualification & maintenance
 - ✓ Mitigation strategies assessment
 - ✓ Gas monitoring use
 - ✓ SAMGs



Latest Publications / Developments (3/6)

A Technical Report on implementation of **Passive Systems** developed by **EG6**

- ❑ Survey on ETSON members' practices & approaches related to passive systems
- ❑ Identification of similarities & differences
Highlighting best approaches
- ❑ Update of TSAG Safety Fluid Systems
to include passive systems expected in 2025
- ❑ Addressed topics
 - ✓ Design & Safety Rules
 - ✓ Deterministic & Probabilistic Approach
 - ✓ Code Qualification
 - ✓ Operating Requirements



Latest Publications / Developments (4/6)

A Technical Report on **PSA lessons learned on, from and for PSA** developed by **EG8**

- Several recommendations from lessons learned from PSA reviews, e.g.
 - ✓ Importance of independent reviews
 - ✓ Access by reviewers to whole utility PSA model is desirable
 - Conformity check with national and international standards or guidance
 - ✓ Peer review against national/international standards is to be complemented by technical review with plant specific knowledge
 - ✓ Benefit of close interaction with knowledgeable non-PSA experts
 - ✓ Important aspect: verification of adequacy of PSA elements
 - ✓ Focus on detailed review of risk significant elements is good practice
- In addition, various observations and detailed recommendations from PSA case studies



Latest Publications / Developments (5/6)

A Technical Report on **Challenges and opportunities for licensing process and safety assessment of LW-SMRs** developed by **EG11** with contributions of other EGs

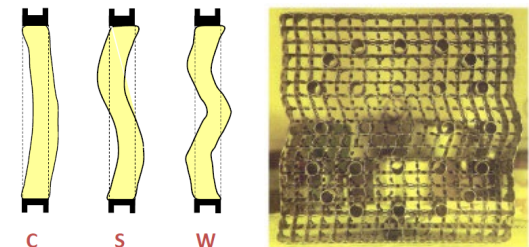
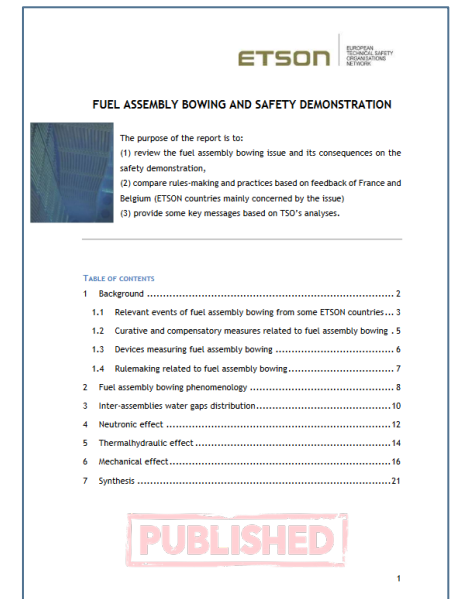
- ❑ share ETSON members' safety concerns/issues related to SMRs and draft common safety positions or highlight the need for deep assessment.
- ❑ opportunity to identify and develop new knowledge within TSOs needed to assess future SMR safety file
- ❑ Identification of needs to develop or review existing (T)SAGs considering LW-SMRs



Latest Publications / Developments (6/6)

A Technical Report on **Fuel Assembly Bowing** developed by **EG12** to

- ❑ Review the fuel assembly bowing and its consequences on the safety demonstration
- ❑ Compare rules-making and practices based on feedback of each country
- ❑ Identify possible safety impacts
 - ✓ Increased RCCA drop time or incomplete rod insertion
 - ✓ Neutronic/Thermohydraulic effects (DNBR?)
 - ✓ Mechanical effects / grid behaviour



*For harmonized and enhanced nuclear safety
assessment practices in Europe...*



Thank you for your attention

www.etson.eu

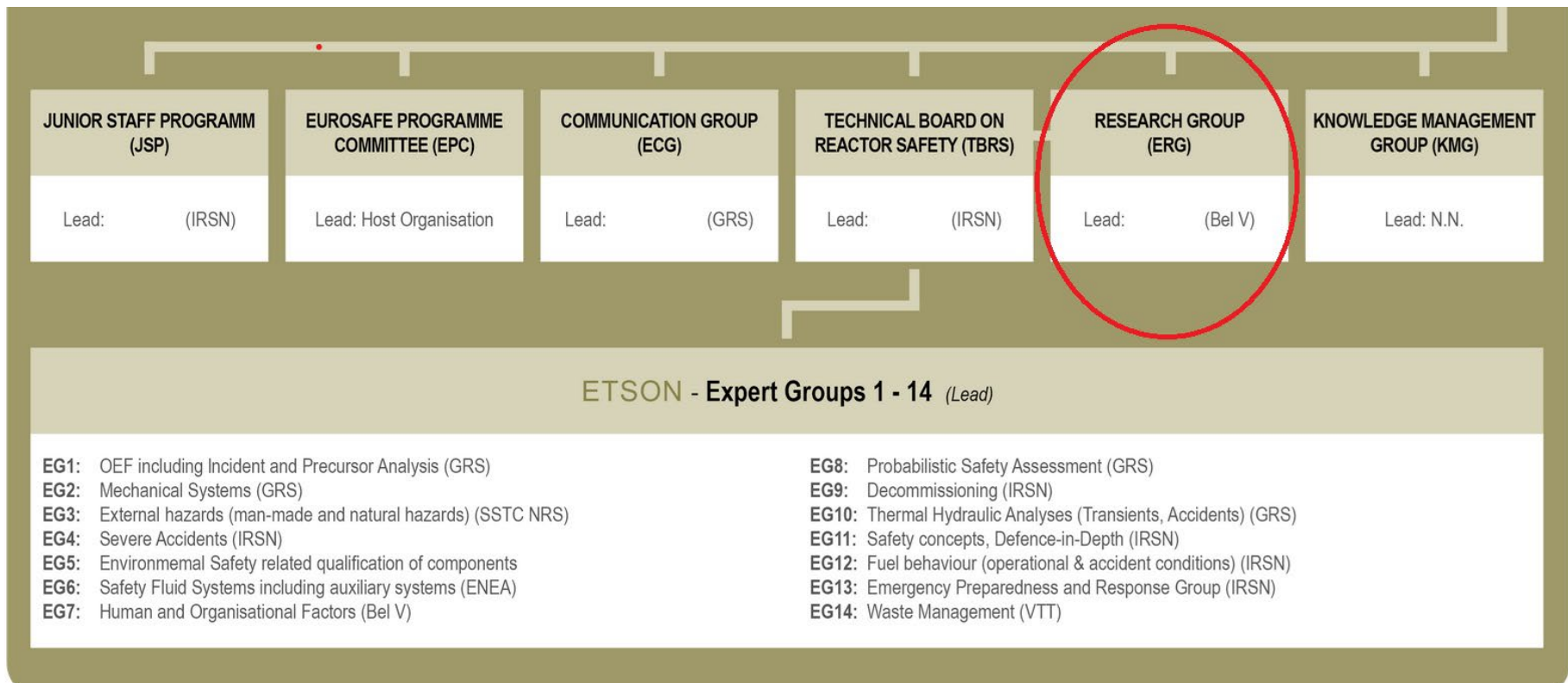
www.etson.eu/eurosafe

Overview of R&D activities of the ETSON Research Group (ERG)

Side Event – IAEA General Conference

*Anis BOUSBIA SALAH, ERG chair
&
Federico ROCCHI, ERG member*

ETSON Groups



ETSON Research Group (ERG)

Identify and prioritize safety research needs of Gen.II-III+ Nuclear Power Plants (NPP),
 Disseminate knowledge among ETSON members,
 Share information on R&D projects/activities in which ETSON members are involved or can be involved,
 Launch initiatives for new R&D research programs.



ERG activities

INTERNAL
Research Projects

EXTERNAL
Research Projects

POSITION
PAPERS on
research needs

Overview of ERG activities

EXTERNAL Research Projects

In-kind contributions (e.g., as expert member of Advisory Boards such as those of EC Horizon Europe projects, as well as sponsoring of events such as conferences or workshops)

Overview of ERG activities

INTERNAL Research Projects

ERG MITHYGENE: Hydrogen deflagration Benchmark (Budget 40 k€) lead by (IRSN) (Status **Completed**).

ERG SAMHYCO: Benchmark on hydrogen flame propagation in stratified atmosphere (Budget 60 k€) lead by (IRSN) (Status **Completed**).

ERG BARCO: Benchmarking on Assessment of Radiological Consequences: (Budget 21 k€) lead by (SSTC NRS) (Status **Completed**).

ERG-AMHYCO: Benchmark on Hydrogen-carbon monoxide flame propagation under conditions representative of severe accident late phase (Budget 30 k€) lead by (IRSN) (Status **Ongoing**).

BARCO project

Objectives & Tasks



ETSON Research Group
R&D Activity Proposal
BARCO

ETSON RESEARCH GROUP R&D ACTIVITY PROPOSAL

Benchmarking on Assessment of Radiological Consequences (BARCO)

Contents

1	Introduction.....	1
2	Technical proposal.....	2
2.1	Objective(s) of the activity	2
2.2	Description of the proposed activity	3
2.3	Description of the calculation tools	4
2.4	Time schedule of the activity	4
2.5	Expected results and deliverables	5
2.6	Participants.....	6
2.7	End users.....	7
3	Resources	7
4	Connection with other projects	7
5	Conclusions	7

Prepared on DATE by AUTHOR(S) (ORGANIZATION)
Reviewed by: REVIEWER(S)
Distribution list: NAME(S)

- To carry out comparative analysis of the performance of EP&R calculation codes used by ETSON Members for a general accident scenario, and
- To evaluate existing gaps in the modeling, the use of meteorological data and other databases by ETSON Members, and skills of the participants with regard to the interpretation of results.

BARCO project

List of participants/Computational Tool(s)

- **Ukraine:** SSTC NRS – Project Leader/*RODOS*
- **Italy:** ENEA – Project Leader/ *RODOS & FLEXPART*
- **Lithuania:** LEI/*RODOS*;
- **Finland:** VTT/ *VALMA & ARANO*;
- **Germany:** GRS.

Benchmark specifications

- Total released activity of 29 radionuclides.
- Release duration: 24 hrs;
- Assess the off-site radiological consequences on the territory of Ukraine and adjacent countries

Main Outcomes (DOI: [10.2139/ssrn.4741318](https://doi.org/10.2139/ssrn.4741318)):

Non-negligible differences between the predictions suggest to carry out additional investigations for a better harmonization of approaches & methodologies between TSOs in Europe.

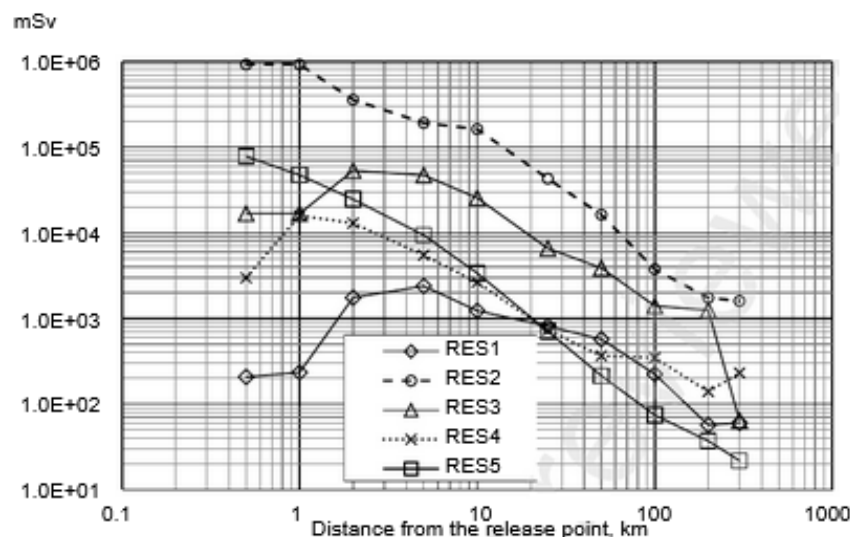


Figure (thyroid equivalent dose in the first 7 days)

ERG-AMHYCO project

Benchmark objectives



ETSON RESEARCH GROUP

R&D ACTIVITY PROPOSAL

BENCHMARK EXERCISE ON HYDROGEN-CARBON MONOXIDE
FLAME PROPAGATION UNDER CONDITIONS REPRESENTATIVE
OF SEVERE ACCIDENT LATE PHASES

Contents

1	Introduction.....	3
2	Technical proposal.....	4
2.1	Objective(s) of the activity	4
2.2	Description of the proposed activity.....	4
2.3	Description of the experimental facility	4
	Description of the modules	5
2.4	Obstacles	8
2.5	Vacuum System	9
2.6	Gas Manifold.....	9
2.7	Description of the calculation tools.....	10
2.8	Time schedule of the activity.....	11
2.9	Expected results and deliverables	11
2.10	Participants.....	11
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3	Resources	11
4	Connection with other projects.....	12
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Prepared on October 10th, 2023 by A. BENTAIB (IRSN)

Reviewed by: G. JIMENEZ

Distribution list: ETSON RESEARCH GROUP, AMHYCO members

1 | 12

Last saved: BA 28/09/2023

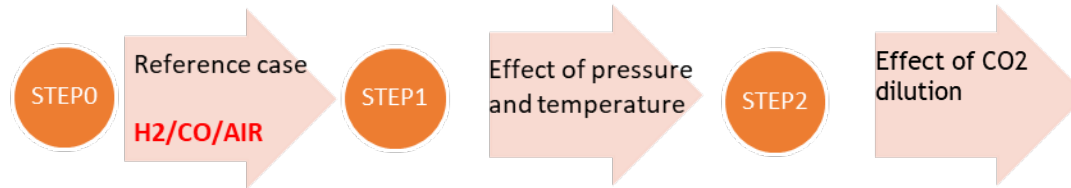
Objectives

- Rank the existing models
- Identify knowledge gaps
- Improve numerical predictions

ERG-AMHYCO project

Benchmark Specifications

Experimental campaign:



Blind phase: Deliver the simulation results before the release of the experimental results.

Post-blind phase: Deliver the revised simulations results after disclosure of the experimental data.



ERG-AMHYCO project

Expected participation

Partner	Country	Code	Code Type
NRA	Japan	OPENFOAM 3.0	CFD
GRS	Germany	CFX 17.0	CFD
IJS	Slovenia	Fluent 13.0	CFD
PSI	Switzerland	Fluent 16.2	CFD
VTT	Finland	Fluent 15.0	CFD
SSTC NRS	Ukraine	CFX 18.0	CFD
IRSN	France	Fluent 16.3	CFD
IRSN	France	P ² REMICS V1.0	CFD
LEI	Lithuania	ASTEC V2.1.1.1	LP
SSTC NRS	Ukraine	MELCOR 2.1/Rev.6342	LP
IRSN	France	ASTEC V2.1.1.0	LP

ERG-AMHYCO project

Resources & Deliverables

- Organizing meetings and workshops: 10 k€
- Performing experiments and preparing the test report: 10 k€
- Travelling cost for the ETSON partners: 10 k€.

Deliverables

- 1: *Benchmark specification including fundamental data*
- 2: *Quick look report of the experimental results*
- 3: *Benchmark results analysis*
- 4: *Publication to international conference*
- 5: *Publication to international journal*

- **1st Position Paper on Research needs in nuclear safety, released in 2011 (see [ETSON webpage](#)),**
- **2nd ETSON views on R&D priorities for implementation of the 2014 Euratom Directive on safety of nuclear installations, released in 2016 (see [Kerntechnik Vol. 81 issue 5](#)),**
- **3rd Summary of ETSON strategic orientations on research activities, released in 2017 (see [EUROSAFE 2017 paper](#)),**
- **4th Overview of ETSON Modelling and Experimental capabilities for R&D on Nuclear Safety, released in 2018 (see [IAEA proceedings TSO conf. 15-18 October 2018](#)).**

ETSON Position Papers on research needs

Ongoing Activity: Review of the current ETSON Position Paper on research needs

- ✓ Mapping of experimental infrastructures and modelling teams in ETSON members,
- ✓ Outcomes from recent/ongoing EU/OECD R&D projects, NUGENIA, etc.
- ✓ Address further R&D challenges (Passive Safety Systems, advanced computational tools) through future internal projects.

- *Since 2000, the ETSON/ERG's experts collaboration allowed:*
 - To perform R&D activities in support of regulatory R&D needs (as well as publish Position Papers,...),
 - To launch and implement research programs (BARCO, AMHYCO,...) promoting experimental & analytical activities,
 - To develop and maintain expertise within the ETSON members.

- *Future activities of the ERG:*
 - Redaction and publication of the new ETSON Position Paper,
 - Address further R&D challenges (Passive Safety Systems, Advanced Designs & computational tools)



Thank you for your attention

ETSON And the Young Generation

Junior Staff Program Initiatives

Side Event – IAEA General Conference

Léopold KHALFI, JSP Chair



The ETSON Junior Staff Programme (EJSP) brings together young experts from all ETSON members to :

- share knowledge, experience and practices,
- **build a network** between young experts from different countries,
- develop their ability to **work in an international context (practical case studies)**
- encourage intercultural interaction,
- Improve **long-term partnership** between member TSOs.

Summer Workshop (1/2)

- One week workshop open to all young expert of ETSON members.
- Presentation of their work, case studies, discussion on safety practices.
- Technical visits to NPP and research center.



Summer Workshop (2/2)

- ❑ 2024 Aging Management for Human Resources and Equipment (**JSI, Ljubljana, Slovenia**)
- ❑ 2023 Small Modular Reactor Technology (**RSD, Manchester, UK**)
- ❑ 2022 Radioactive material dissemination – sea and atmosphere Radioactive waste (**IRSN, Cherbourg, France**)



ETSON Awards

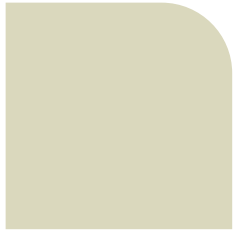
Goal:

To reward annually two papers written by a group of young engineers among the TSOs.

Price:

€ 3,000 for the first, € 2,000 for the second
and presentation of the paper during the
TSO Conference (December 3, Vienna)





Thank you for your attention

TSO Self-Capacity Assessment Methodology

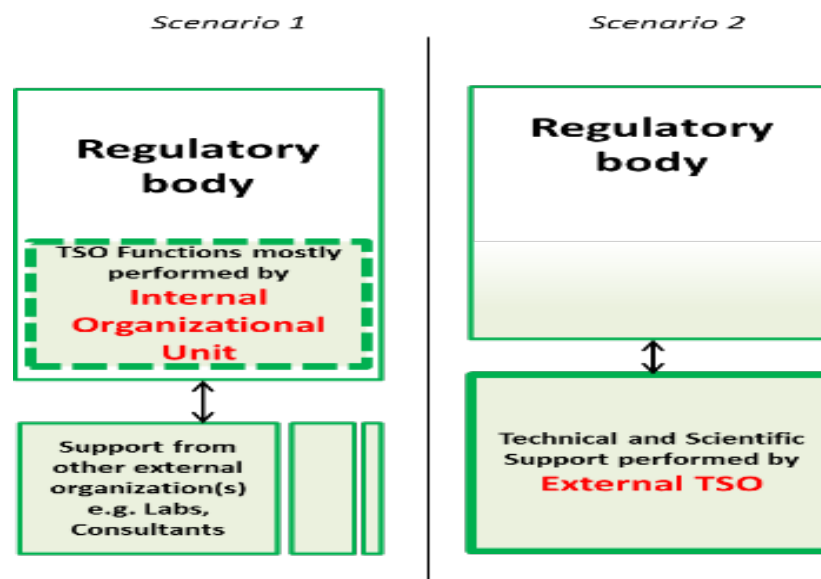
Side Event – IAEA General Conference

*Michel VAN HAESENDONCK – Vice President (ETSON) & Chair (TSO Forum)
&
Carla EIBL-SCHWAEGER – Secretary (ETSON) & Co-Chair (TSO Forum)*

Context

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 self-assessment

- Objective to assess the Scientific & Technical capabilities of a TSO :
 - What are the Scientific & Technical 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, on regional level, or in connection with peer reviews
 - For embarking or “non-nuclear” countries or and countries with already established capabilities and bodies in the field of nuclear safety and radiation protection
- Key considerations in the development of the questionnaire
 - TECDOC-1835 based on the IAEA Safety Standards and Reports
 - Emphasis on evaluation of how the TSO is performing its duties in its national regulatory context



Expected outcome – TSO self-assessment

1. Scope Setting

- Selection of relevant topics within the **Technical & Managerial 8 pillar menu**
- Setting of expectations levels in regard to the **TSO Development Steps**
- Setting **National Priority** Co-efficients for the chosen topics

2. Self-evaluation

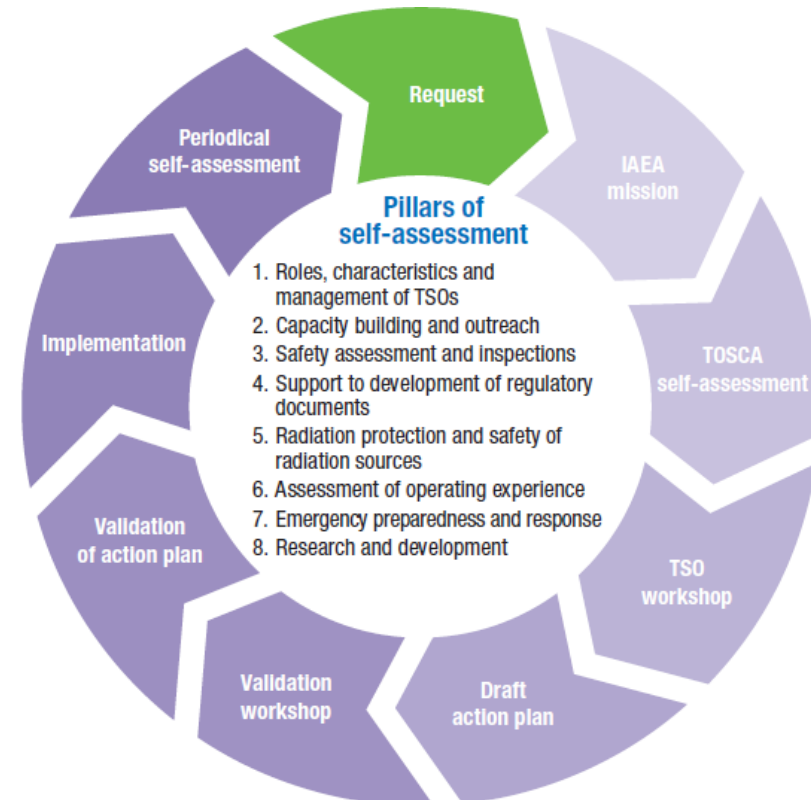
- Assessing topics within relevant pillar with the help of the **TOSCA questionnaire and relevant IAEA documents** (TECDOC 1835, CASE STUDIES, SSG-16, ...)
- Automatic generation of results via analysis tool (**spider web-chart**)
- Results are displayed in different ways and also compared via **benchmarking**.

3. Self-assessment report and National Action Plan:

- Preparing the self-assessment report, identifying key strengths and areas for improvement, opportunities and threats (SWOT analysis)
- Providing support, as needed, through **National Workshops** with IAEA experts.
- Preparing a **National Action Plan** to further implement the sustainable National TSO development strategy as a strong message to the governmental responsibilities

Implementation – TOSCA CYCLE

1. Member State request to the IAEA for a TOSCA self-assessment
2. Pre-assessment exploratory IAEA mission and preparation of self-assessment
3. Self-assessment phase, with the support of the TOSCA Tool
4. National TSO Workshop, organized jointly by the Member State and the IAEA, with contribution of IAEA TSOE Experts
5. Drafting of the National TSO Workshop Report and elaboration (or update) of a draft National Technical Support Development Action Plan
6. Validation of Workshop Report by competent national authorities and by IAEA
7. Finalization, and validation of National Action Plan by competent national authorities after consultation of IAEA TSOE Experts
8. Implementation of the Action Plan, and information feed-back to IAEA TSOE on implementation results
9. Periodical Self-Assessment – even partly – when appropriate or necessary



Implementation – TOSCA Pillars (web-database)

TOSCA

IAEA Methodology for Technical and Scientific Organisations and Organisational Units (TSOs) Self Capability Assessment

Page Help carlaclaudia.es@gmail.com



8 PILLARS

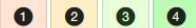
The questionnaire under the process and performance-oriented aspects are grouped into 8 chapters, represented as PILLAR.

Role, Characteristics and Management

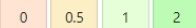
Pillar 1

The characteristics and management of technical and scientific support are the conditions for its effectiveness and efficiency for the regulatory functions.

Development Step:



National Priority:



Capacity Building and Outreach

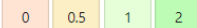
Pillar 2

The development and maintaining of technical knowledge, expertise and capability is a key supporting process for an effective TSO.

Development Step:



National Priority:



Support to Safety Assessment and Inspection

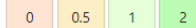
Pillar 3

Safety assessment review and inspection are performed to support the regulatory body in determining whether facilities and activities comply with regulatory obligations and conditions.

Development Step:



National Priority:

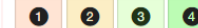


Support to the Development of Regulatory Documents

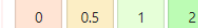
Pillar 4

The TSO supports the regulatory body by contributing to the process of updating and development of documents for guidance, rules, and regulations.

Development Step:



National Priority:



Radiation protection and Safety of Radioactive sources

Pillar 5

The TSO contribution to radiation protection and safety as well as to environmental monitoring, assessment and surveillance is key issue for protecting people and the environment.

Assessment of Operating Experience

Pillar 6

The TSO supports the regulatory body to investigate and disseminate information on operating experience to use this in their management, safety assessment and engineering practices.

Emergency Preparedness and Response

Pillar 7

The TSO supports the regulatory body together with the response organizations and the operating organisations in emergency preparedness and response.

Research and Development

Pillar 8

Research and development support of the TSO is to independently assess and review the adequacy of the technical basis for safety regulation.

TOSCA – Assessment Results

☐ 1
 ☐ 2
 ☐ 3
☐ 4
 ☐ 5
 ☐ 6
☐ 7
 ☐ 8

Analysis Type

☐ Broad analysis
☐ In-depth-analysis

Orientation

☐ Performance
☐ Process

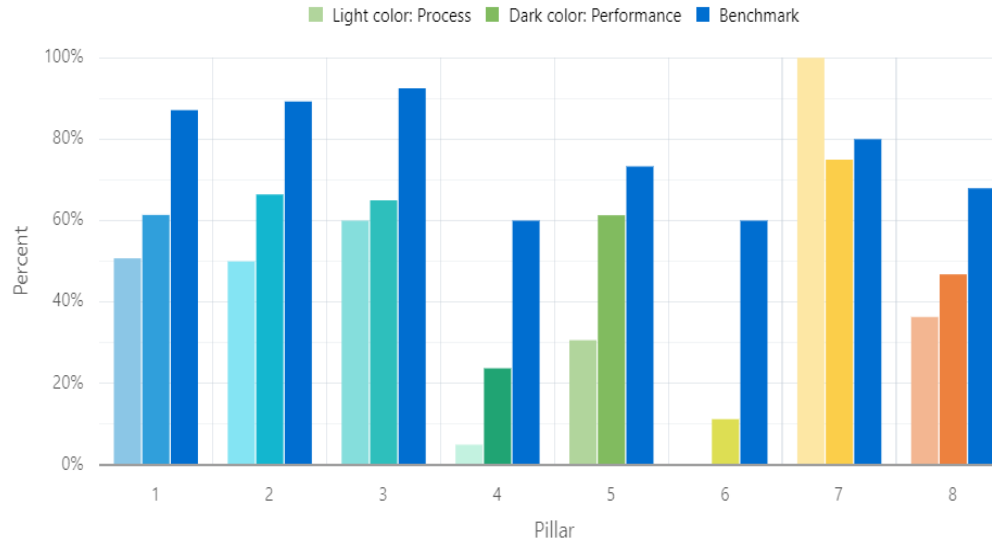
Development Step

☐ 1
 ☐ 2
 ☐ 3
 ☐ 4

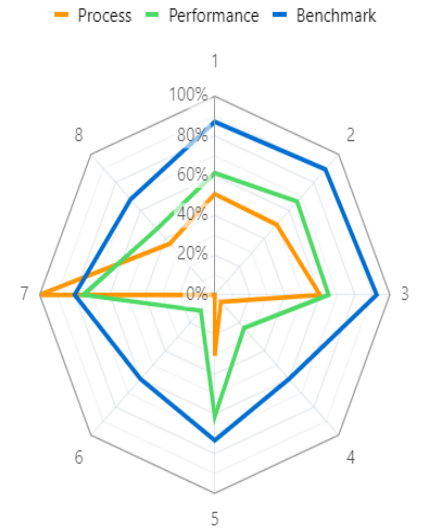
National Priority

☐ .5
 ☐ 1
 ☐ 2

Evaluation of My Organization - Bar Chart



Evaluation of My Organization - Radar Chart

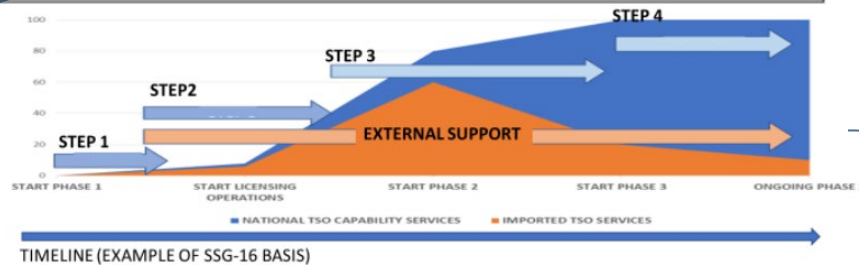


Pillar	Name	Analysis Type	Orientation	Development Step	National Priority	Rating	Benchmark
1	Role, Characteristics and Management	Broad analysis	Process	① ② ③ ④	L M H	★★★★☆	★★★★★
1	Role, Characteristics and Management	Broad analysis	Performance	① ② ③ ④	L M H	★★★★☆	★★★★★

TOSCA Methodology

WHEN?

TIMELINE TSO STRATEGY APPROACH



WHO?



Case Study Library

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

WHY?

Establishment of
NNR TSO Case
Study_June 2020

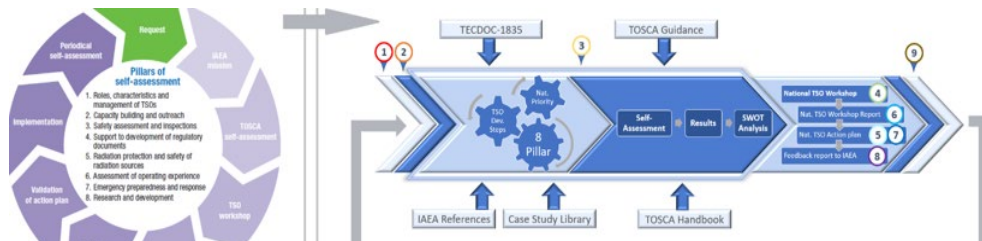
IRSN France TSO
Case study on
Research_Jan 2023

TSO Case Study
(final)_PNRA-
Pakistan

VTT Finland_TSO
Case
study_Research
Programmes

WHAT?

HOW?





National Workshops /Promotion on the TOSCA Methodology

- **South Africa** (whole regulatory system)
 - 2018: First Workshop based on a Excel tool for the SWOT analysis
- **Norway** (Regulator / internal TSO, Center of Excellence)
 - 2023: First workshop based on the TOSCA database, Phase A
 - 2024/2025: Continuation of the TOSCA Self-Assessment, Phase B (in depth)
- **Ghana** (Regulator / TSOs, University, R&D&I)
 - Q1/2024: Preliminary Mission
 - Q4/2024: National Workshop of the TOSCA Self-Assessment
- **Armenia** (Regulator / internal TSO, external TSO)
 - Q1/2024: Preliminary Mission
 - Q4/2024: National Workshop of the TOSCA Self-Assessment
- **Promotation of the TOSCA Methodology**
 - 2021: IAEA General Conference etc.
 - Q1/2024: IAEA Workshop for TSO in Ryiadh (on operator side with the intention to enhance)
 - Q1/2024: Explanatory Mission in Vienna for TSO interested / applied for the TOSCA Methodology



International / Regional Workshops, Multipliers for the TOSCA Methodology

- **International Workshop, Vienna, 2019**
 - Explanation of the TSO Forum work and the TOSCA methodology based on TECDOC-1835
- **International Workshop, Norway 2023**
 - First workshop to understand the TSO role in a regulatory system and to use the TOSCA methodology based on the TOSCA database
 - In cooperation with EuCAS, members from external and internal TSOs from the Northern European region et al.
- **Regional Workshop, Dushanbe 2023**
 - Second workshop to understand the TSO role in a regulatory system and to use the TOSCA methodology based on the TOSCA database
 - In cooperation with EuCAS, members from external and internal TSOs in Central Asia and Ex-Yugoslavia
- **TSO Conference, Vienna, December 2024**
 - TOSCA side event and presentations for TSOs and their regulatory bodies



Outcome and Further Developments

General Findings

- Involvement of all national stakeholders (RB, TSO internal + external entities, Universities, Labs, Institutes etc.) from the very beginning, especially the RB when a TSO has to be established
- Clear definition of national priorities and development steps according to each regulatory function support
- It is recommended to complete the questionnaire swiftly (2-3 months)
- The SWOT Analysis Report based on the results of the tool leads to the national / strategic action plan

Newly developing countries

- Focus on the broader analysis (Phase A) together with technical topics in parallel or at a later stage (Phase B)
- Exchange with other countries in a similar situation during regional or international workshops is very useful
- Learning from the case studies



Future steps

- Huge interest from IAEA member states for the National Assessment Workshop
 - Norway, Ghana, Armenia (ongoing)
 - Pakistan, Turkiye, Belarus (applying)
 - Bangladesh, Egypt etc.
- Collaboration with other GNSSN, EUCAS (ongoing) and RCF (started)
- Further development and implementation via EC/IAEA (TSOF)/ETSON 5yr – project
- Initiative taken for a new Nuclear Safety Guide/Report
- Strong commitment of ETSON (Database, TOSCA Core Group, Responsible / Performer for the National Workshops)

Outlook (cont.)

International Conference on

Enhancing Nuclear Safety and Security Through Technical and Scientific Support Organizations (TSOs)

Challenges and opportunities in a rapidly changing world

Vienna, Austria
2-6 December 2024



ETSON Side Event

Conclusions

Michel VAN HAESENDONCK – Vice President (ETSON) & Chair (TSO Forum)



Reminder on main objectives of ETSON

TSOs (Technical Safety Organisations) are science-based organisations which support national regulators. We aim to

- Develop common approaches to nuclear safety assessments
 - Share technical and scientific knowledge and experiences
 - Carry out nuclear safety research and
 - Represent the TSOs' interests towards international organisations dealing with nuclear safety issues
 - Strengthen ETSON scientific and technical contribution to the work of international organisations, to enhance nuclear safety worldwide
- **Independence of judgment** to ensure that technical analyses and positions are not unduly influenced by external interests



Challenges & Priorities

Shift in energy/climate policies in the different countries, creating different nuclear national contexts

- new NPPs being commissioned or moving closer to commissioning (e.g. France, Finland, Slovakia), or being in an early construction phase;
- context of LTO (e.g. France, Belgium, UK, Netherlands,...);
- context of nuclear phase out (e.g. Germany, Belgium, Switzerland);
- Plans for SMRs & AMRs

But also

- nuclear installations in conflict zone;



Challenges & Priorities

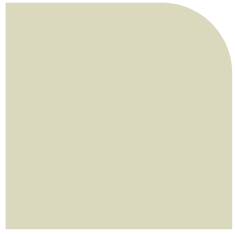
Importance of exchange of nuclear know-how (knowledge, skills, attitudes)

- Inside networks e.g. ETSON (TBRS, ERG, JSP);
- Inside TSO Forum of the IAEA, ETSON contributes actively to assisting IAEA Member States and especially newcomer/embarking countries in the establishment and strengthening of their nuclear and radiation safety infrastructure – TOSCA methodology;
- Rapidly evolving topics : e.g. AI & Big data

Challenges & Priorities

- Importance of international collaboration in R&D on nuclear safety, waste management ... also in view of financing
- More during IAEA's TSO Conference :





Thank you for your attention

All presentations and documents mentioned available :

www.etsn.eu