Stakeholder needs and Institutional Strength in Depth for SMRs

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Contents

- Background
- Stakeholders and institutions defined
- Institutional Strength in Depth concept
- ELSMOR small study on stakeholder needs in Finland
- Key takeaways

Stakeholders defined

- A broad definition of a **stakeholder** is **any group or individual who feels affected by an activity, whether physically or emotionally** (IAEA, 2021)
- In project management*, stakeholders* are entities who have an interest in a successful implementation of a project, or may have a positive or negative influence in the completion of an endeavour.
- The stakeholders may vary in the degree of interest and influence they exert on the activities and outcomes.
- In SMR context, stakeholders are also all institutions that can influence the safety outcome of SMRs.

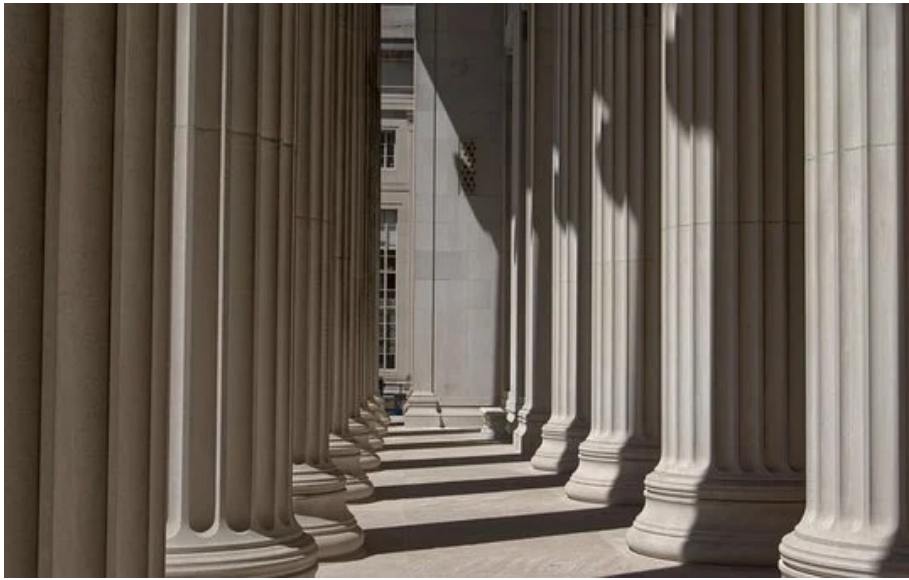
Examples of stakeholders in the nuclear industry

- Legislators
- Media
- Government agencies and decision makers
- Owner/operator
- Regulatory body
- Suppliers
- Workers
- Communities near actual or potential sites
- Neighbouring countries
- Non-governmental organizations
- The public
- . . .

Source: IAEA, 2021

Institutions defined

- Institutions are “humanly devised **constraints that structure political, economic and social interactions**” to create order and reduce uncertainty (North, 1990); **stable social structures** (Scott, 1995)
  - The constraints can be **formal** (rules, laws, regulations and other enforcement mechanisms) and **informal** (norms of behavior, unwritten codes of conduct, sanctions, incentives).



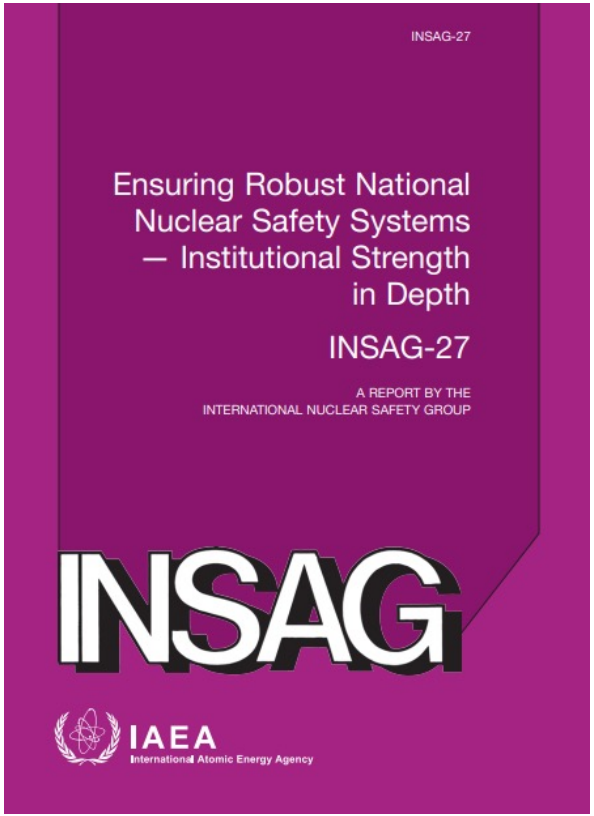
Institutional factors

- Institutions are associated with **seeking legitimacy** to ensure continuity and success (Scott, 2001; Greenwood et al. 2012).
  - Legitimacy - “the degree of cultural support” (Meyer & Scott, 1983) by which companies can gain and enhance support and recognition from their powerful institutional stakeholders (Fan & Wang, 2010).
- Taken-for-granted beliefs and practices gradually become rooted, institutionalized (= hard to change) in organizations and whole industries.
- Although operational conditions are changing, the deeply rooted assumptions are not so quick to change, and this may be risky.

Institutional Strength in Depth

Institutional Strength in Depth (ISiD)

- Institutional Strength in Depth (ISiD) construct was introduced following the Fukushima Daiichi accident
- IAEA's (2017) INSAG-27 outlines the Strength in Depth (SiD) concept to institutional systems
  - Multiple layers and components;
  - Independence of layers;
  - Layers built to include diversity, redundancy and separation of function.



Source: https://www-pub.iaea.org/MTCD/Publications/PDF/P1779_web.pdf

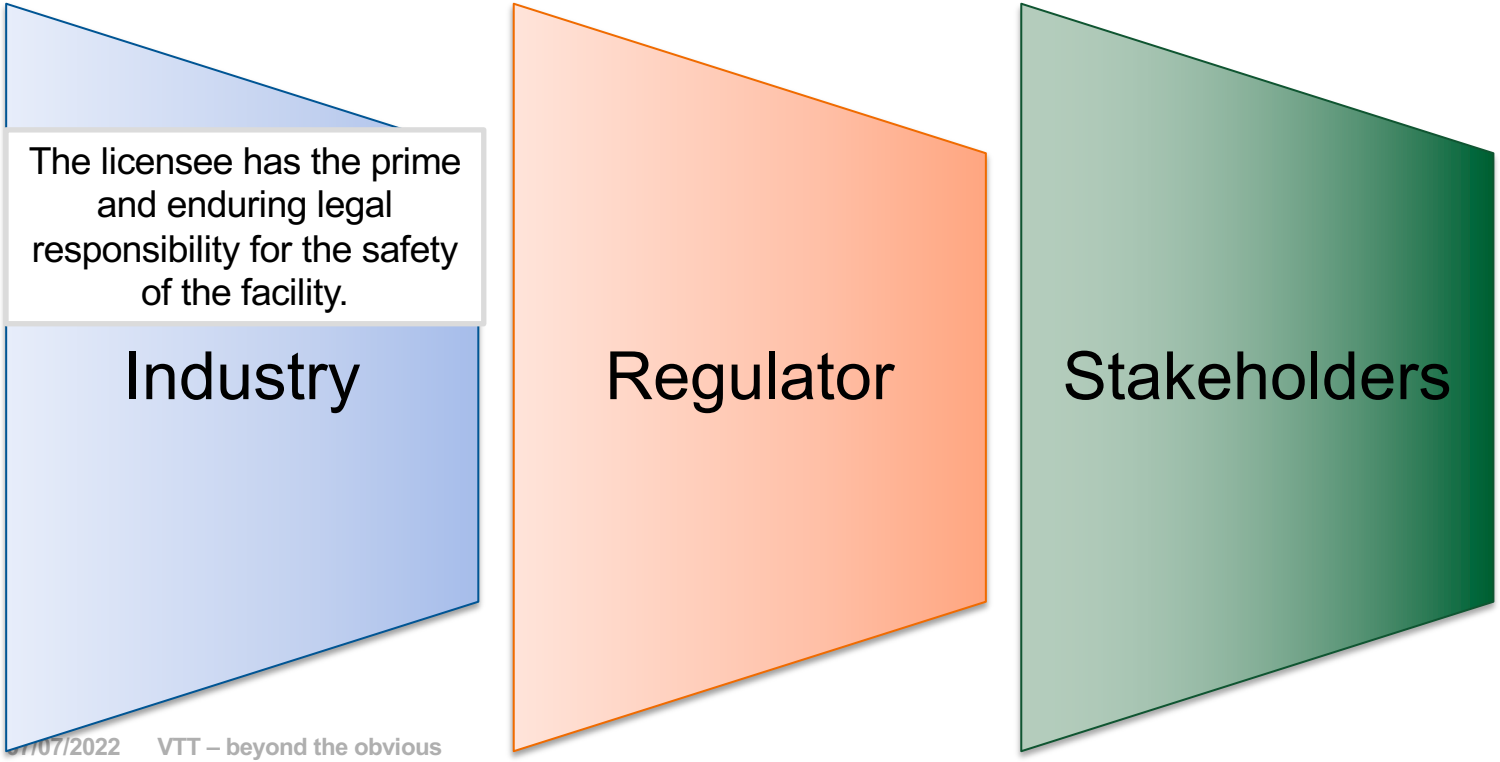
Robustness and resilience

- After the Fukushima Daiichi Accident it was recognized that a **robust nuclear safety system** has to be developed along with **resilience capabilities** to ensure safety standards and guidance document for excellence should be applied in all circumstances, nuclear facilities and adequate in all conditions.
- A holistic understanding of safety: **The importance of institutional systems and governance over technology, process and human & organizational factors** was recognized as another aspect to maintain and improve safety, in addition to technical strength.

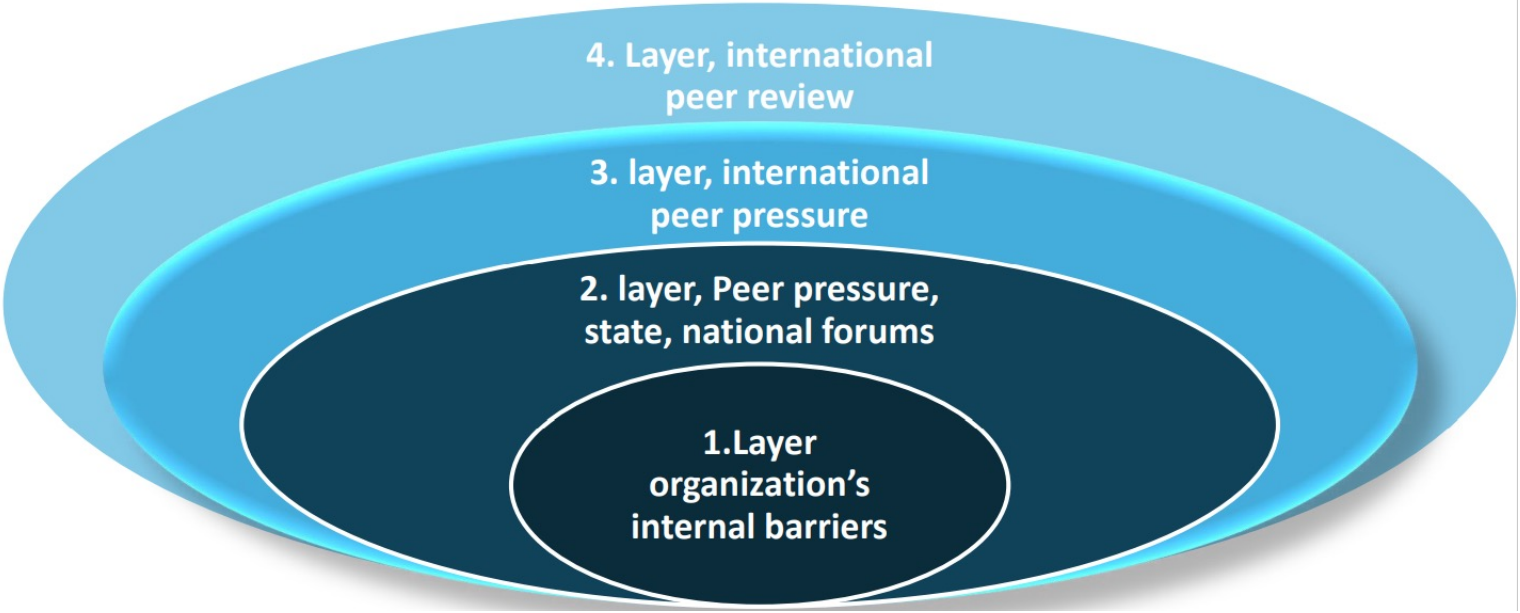
ISiD: Based on the defence-in-depth philosophy

- The principle of **defence in depth** - a central safety principle for design in the nuclear industry.
  - Components and systems should be designed in a way that if one of them breaks down, another and different defence layer remains and activates to protect the environment and population from radiation.
- Institutional Strength-in-Depth was recognized as **one of the areas that can be most influential toward improvements for the nuclear industry** and to sustain operational excellence.

Three main independent institutional sub-systems to prevent nuclear accidents

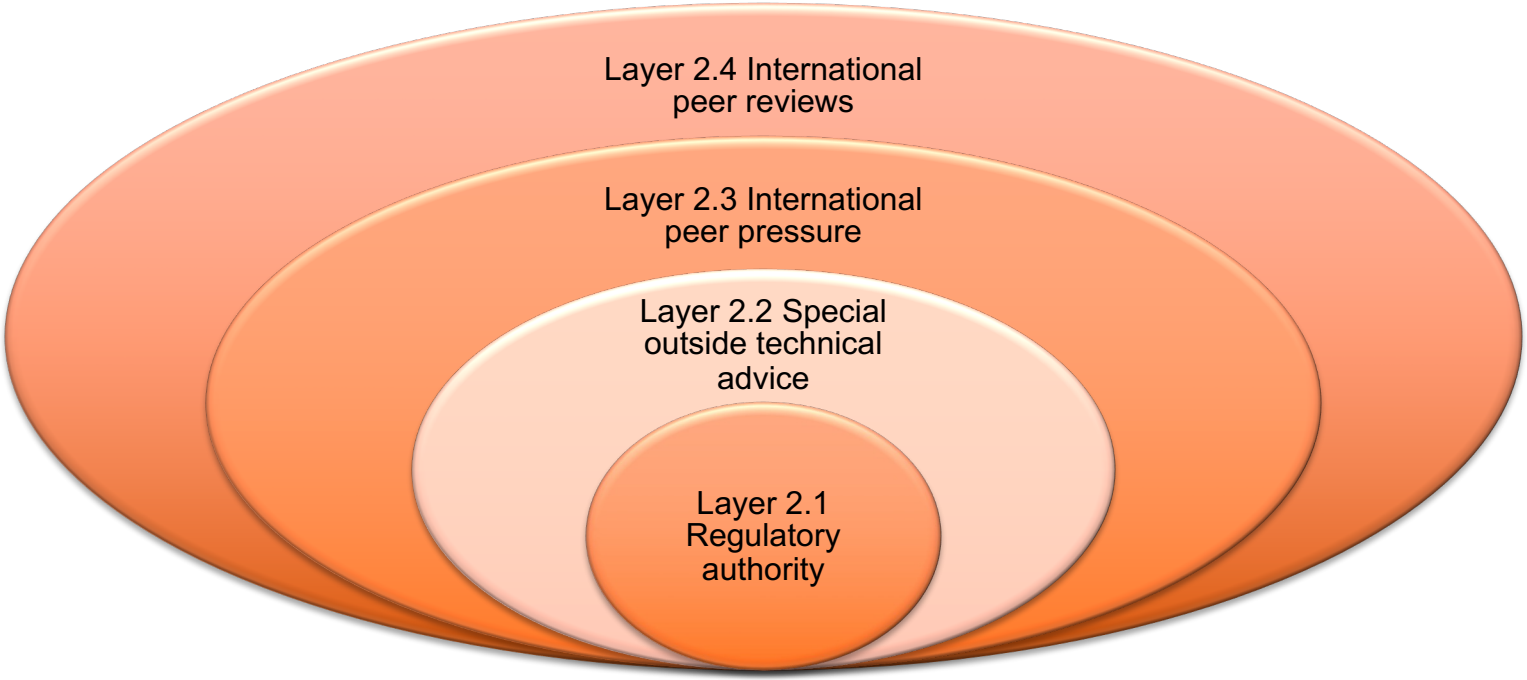


Layer 1: Components of a strong nuclear industry sub-system



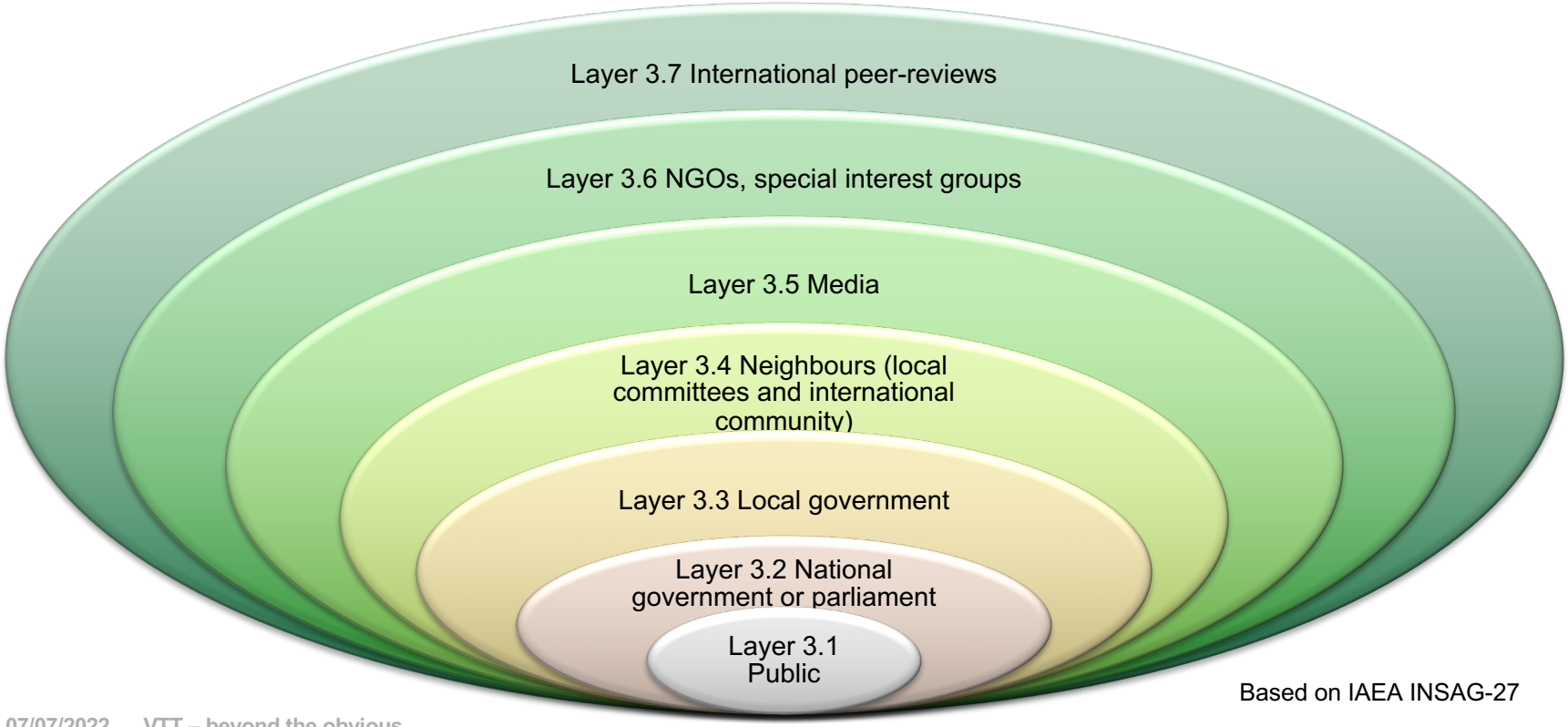
Based on INSAG-27; Figure source: Ylönen, 2019
http://kyt2022.vtt.fi/omt_seminar/4_Overall%20Safety%20and%20ISiD_Ylonen.pdf

Layer 2: Components of a strong nuclear regulatory sub-system



Based on IAEA INSAG-27

Layer 3: Components of a strong nuclear stakeholder sub-system



Based on IAEA INSAG-27

Institutional Strength in Depth

- ‘Strong’ in this context refers to the strength to
  - encourage and welcome challenge,
  - challenge others,
  - question and consider others’ options and advices,
  - listen and learn,
  - respect other perhaps opposing views,
  - possess the competence and capacity to fulfil functions and duties.

Source: IAEA (2017), INSAG-27

A preliminary study on stakeholder needs and Institutional Strength in Depth for SMRs in Finland

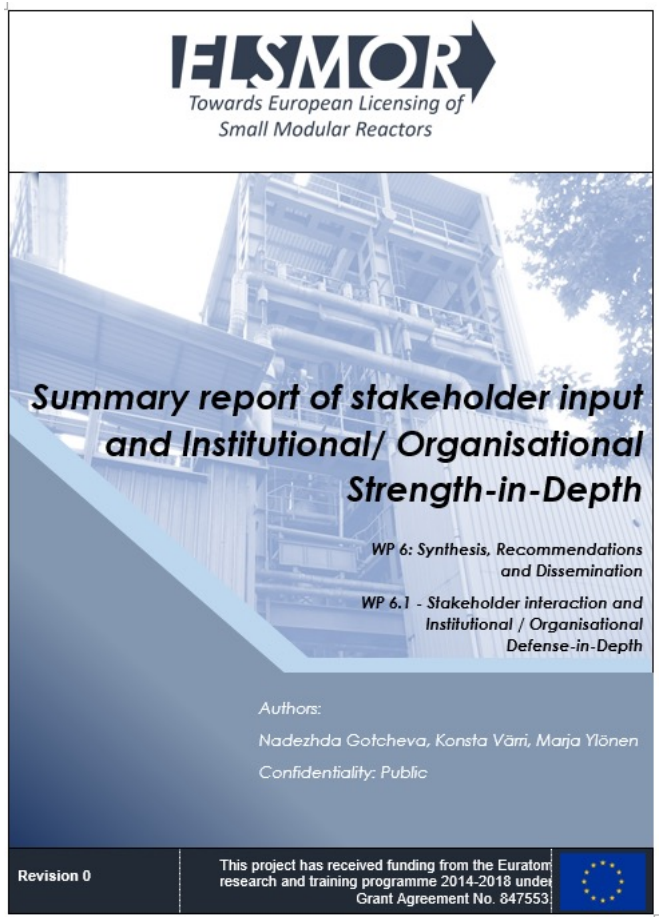
Objective

- The objective of this preliminary small case study was to collect insights about needs and expectations of selected key stakeholders in Finland regarding SMRs
- The study was conducted as a part of EU project ELSMOR “Towards European Licencing of Small Modular Reactors”

ELSMOR project has received funding from the Euratom research and training programme 2014-2018 under Grant Agreement No. 847553

Motivation

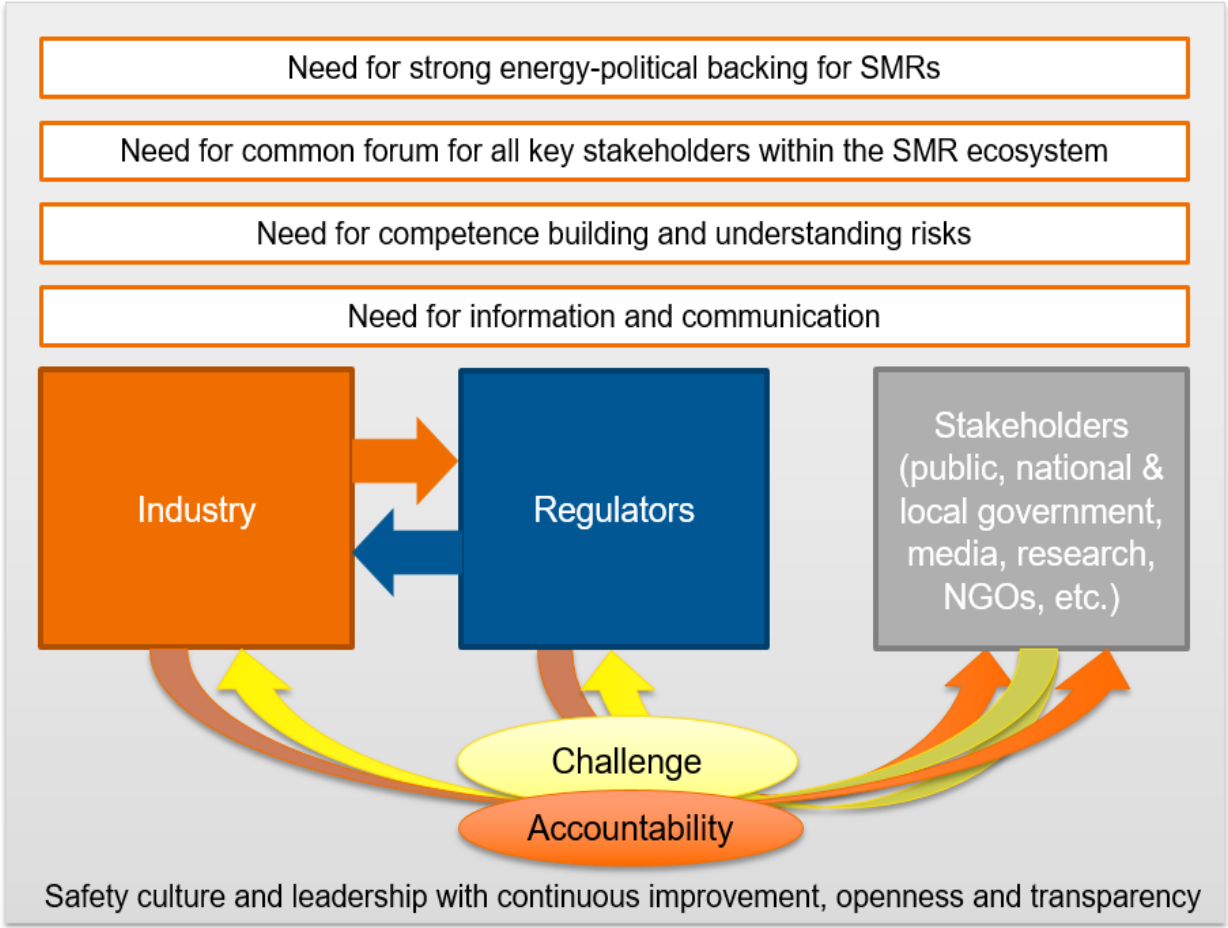
- Institutional Strength in Depth (ISiD) concept provides a framework to analyse the robustness of national nuclear community and other relevant actors interested to be involved in SMRs
- Research gap: In the context of SMRs, to expand ISiD framework beyond country-specific context to include the international nuclear industry community / European actors involved in SMRs, and to analyse internal barriers and enablers relevant to core stakeholders.



Method

- Qualitative method: six semi-structured interviews were conducted with representatives of selected key stakeholders (institutions and organizations):
  - Ministry of Economic Affairs and Employment
  - STUK (regulator)
  - Nuclear power company
  - Energy company
  - Research institute
  - Municipality (siting officials)
- Thematic analysis of data to identify key overarching topics such as emerging needs and expectations

Results


Need for strong energy-political backing for SMRs
Need for common forum for all key stakeholders within the SMR ecosystem
Need for competence building and understanding risks
Need for information and communication
Industry
Regulators
Stakeholders (public, national & local government, media, research, NGOs, etc.)
Challenge
Accountability
Safety culture and leadership with continuous improvement, openness and transparency

Key takeaways

- The study sheds light on current status of SMRs stakeholder landscape in Finland by exploring needs and expectations of some key stakeholders in Finland regarding SMRs.
- This study also gives additional input to understand the initial challenges and opportunities related to regulation, licensing, stakeholder interaction and interfaces etc. from different stakeholders' perspectives.

Institutional Strength in Depth is an important prerequisite for SMRs licencing, deployment and operation in the future. A good safety culture and leadership need to be continuously developed and improved at all layers.

beyond

the obvious

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