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SMRs and Licensing

A Presentation to the Brussels Nuclear Law Association (in cooperation with the International Nuclear Law Association)

Brussels, Fondation Universitaire

22 September 2023

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To cover today

- The significance of the Licensing challenge
- The need for a different approach for SMRs?
- An explanation of the Licensing challenge for SMRs
- Standardisation/Harmonisation or `something else`?
- What is the `something else`?
- Experience in other jurisdictions
- Overall prospects for SMRs

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The significance of the Licensing challenge

- is likely to have an impact on project timeline and cost
- and therefore viability of global development and deployment within the timescales required
- However for those jurisdictions that move faster the rewards are evident:
 - satisfying own energy demands and energy security
 - domestic jobs (manufacturing facilities and supply chain generally)
 - establishing a reputation as a reference point for the development/deployment of new nuclear technologies




A different approach required for SMRs?

- IAEA reference to specific high-level stages of activities (defined in IAEA SSG-12, Licensing Process for Nuclear Installations)
 - Lifecycle Stages: Siting and site evaluation – Design – Construction – Commissioning – Operation – Decommissioning - Release from regulatory control
 - Potential stages in lifecycle of SMRs:
 - Siting and site evaluation • Design • Construction • **Manufacturing** • Offsite commissioning • **Transportation** (both to and from facility) • Onsite commissioning • Operation • Onsite decommissioning • Offsite decommissioning • Release from regulatory control
 - Changes due fundamentally to new element of modularity (but also potentially around new construction and commissioning methods, new fuels and fuel storage options, programmes for long-term operation and maintenance etc)
 - Potential impact on Regulatory Interventions or “Hold Points”
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The Licensing challenge

- Licensing systems around the world are based on conventional large reactors (generally speaking: LWR, PWR or ABWR or HTGR) and this means that the innovative attributes of the wide range of SMR designs are most likely to challenge the existing framework
- The existing traditional nuclear licensing processes are lengthy in duration, high in cost and adopt conservative and stringent regulatory requirements
- But also specific Ownership/Licensee Models which may be presented differently for SMRs:
 - Adequate demonstration of appropriate capability and resources
 - Potential of several designs and several operators of different reactor cores on a single site;
 - Consideration of a single licence for several cores/modules/units
 - Shared safety systems/shared personnel
- Consideration of novel designs and new fuel types and coolants: generally means a lack of operating experience
- A challenge for Regulators (lack of knowledge and capacity)
- How to assess against traditional licensing approaches? (i.e. challenge to Defence in Depth/Graded Approach etc)

Standardisation or Harmonisation or another potential solution to the challenge?

- What do we mean by Standardisation or Harmonisation?
 - See: IAEA NHSI initiative
 - Is this really achievable within the time-scales required?
 - Is there another approach?
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An alternative approach

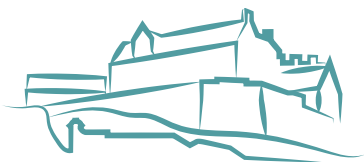
- Multilateral or Bilateral initiatives
 - Examples: MoU`s between Regulators: i.e. CNSC/NRC and ONR/CNSC etc
 - See: European SMR pre-Partnership Reports Workstream 2 – Licencing
 - Joint Interim Reports of CNSC/NRC (examples of topics)
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Experiences in other jurisdictions

- **USA:** Research sites/Licensing of Technology (i.e. recent standard design approval of NuScale's VOYGR)
- **Canada:** SMR Action Plan/roadmap, SMR support programme, pre-licensing vendor design reviews completed for a number of different technology designs
- **Finland:** A current review of Regulations, consideration of specific topics:
 - Size of Emergency Planning Zone;
 - Application of Defence in Depth;
 - New business models and organisational arrangements in constructing, operating and decommissioning;
 - Serial production of reactor modules and other components;
 - New applications: process heat for industry, district heating, hydrogen production..;
 - Marine-based reactors;
 - Remote operation;
 - Arrangements for spent fuel management.
- **Poland:** Recent proposal for new regulations to simplify the licensing of nuclear reactors, including SMRs
- **Sweden:** Reviewing its regulatory framework so that it is fit for purpose for both existing and new nuclear power, such as SMRs
- **Estonia:** Introduction of a new nuclear legal framework to incorporate SMRs

In conclusion

- Licensing challenges
 - A new approach
 - Experience from other jurisdictions
 - An opportunity
 - Any questions?
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Thank you.



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