

Timely new nuclear deployment needs licensing and regulatory streamlining



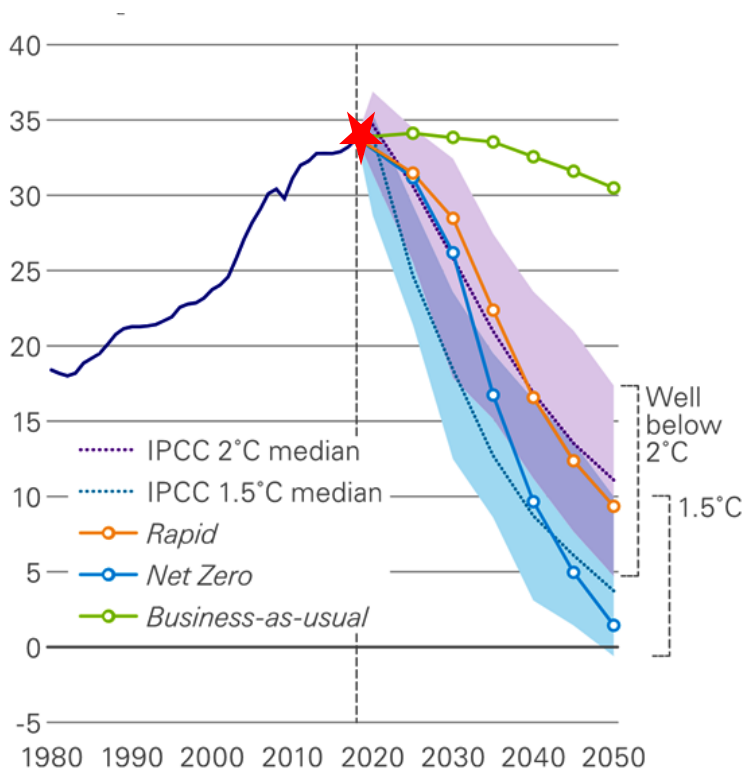
Allan Carson

CORDEL Programme Lead

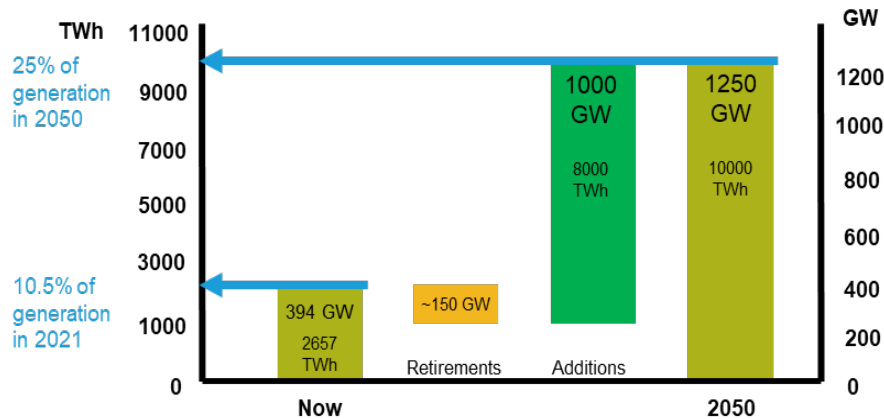
Tuesday, May 10th, 2022

IAEA's Technical Meeting on Codes and Standards,
of Components for Small Modular Reactors

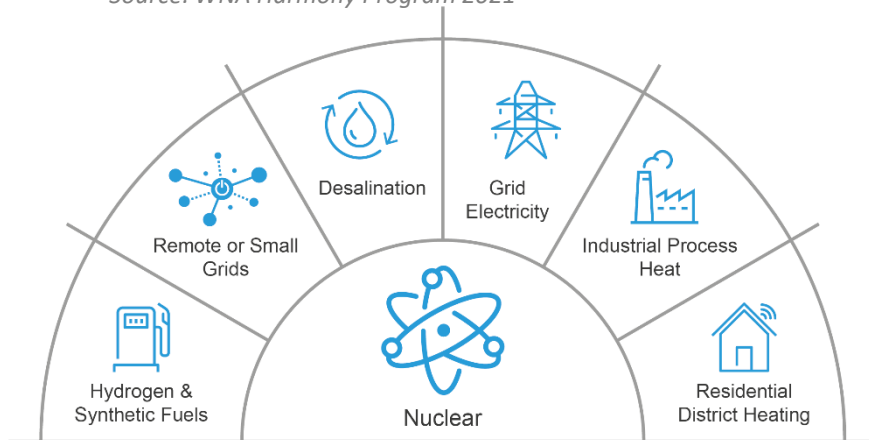
Nuclear energy is essential to address the urgency and enormity of the climate change challenge



Source: BP Energy Outlook 2020/IPCC



Source: WNA Harmony Program 2021



Existing Challenge

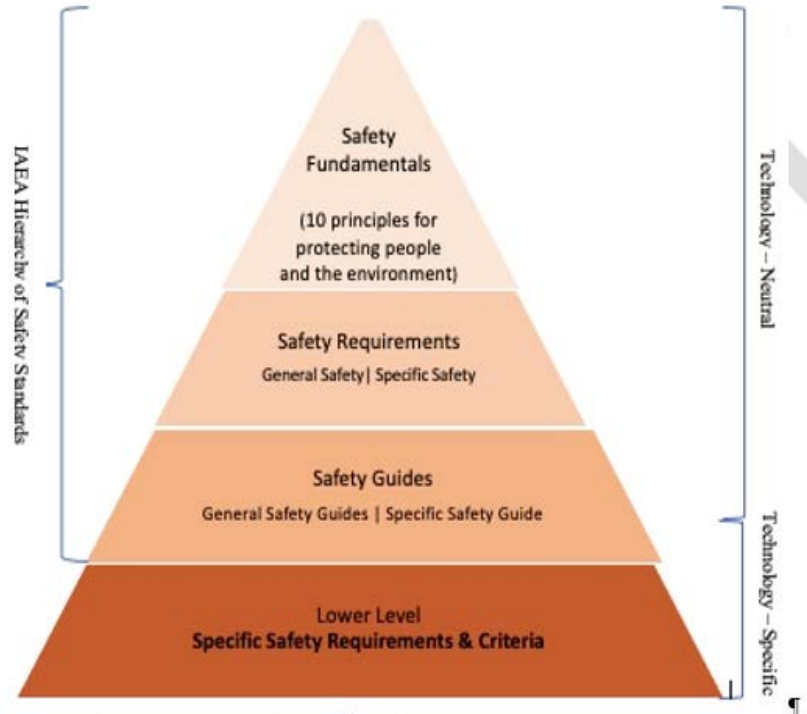
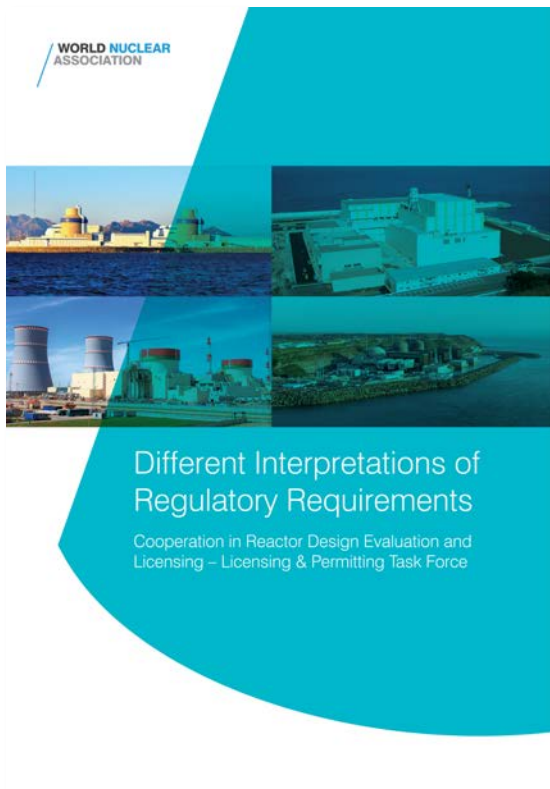


Figure 2: IAEA safety requirement hierarchy

- IAEA requirements developed by consensus utilizing historical national standards
- IAEA member states claim that their regulatory frameworks conform with IAEA standards
- Differences continue to persist.

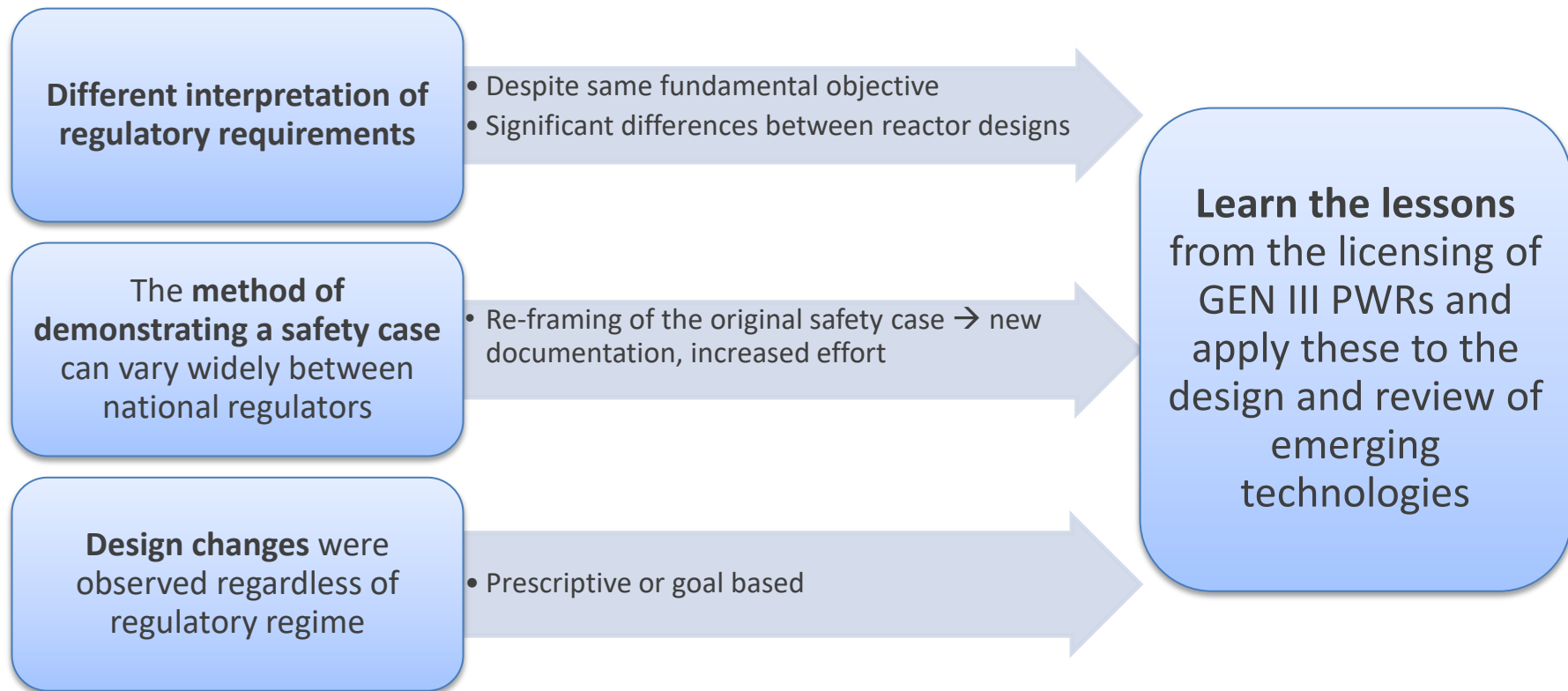
Nuclear Regulation Needs Harmonization



- Differences in how fundamental requirements are interpreted and applied continue to persist
- Different versions of the same reactor design being deployed in different countries
- **Added Uncertainty and Risk to the deployment of new nuclear reactors**

Available at <https://world-nuclear.org/our-association/publications/>

DIRR Conclusions



DIRR Recommendations



Differences in regulatory approaches

Assess impact on reactor designs
Understand level of regulatory readiness
Investigate broader design solutions



Develop common terminology

Expand on existing work
Develop guidance on how it should be applied



Key safety requirements

Expand upon the areas identified in this report
Develop guidance on how these should be implemented within reactor designs



A new framework

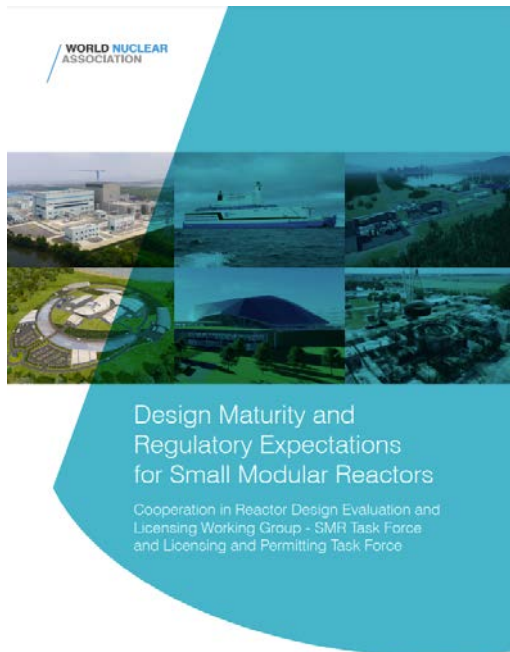
Share outputs, joint regulatory reviews & recognition assessments
Identify other areas for collaboration

Timely and cost-effective new nuclear deployment needs licensing and regulatory streamlining

- Enablers of SMR deployment:
 - ✓ Emergence of a global market
 - ✓ Standardized, proven reactor designs
 - ✓ Consolidation of global supply chains
 - ✓ Streamlined licensing processes between countries
- The world has changed, we must change with it...

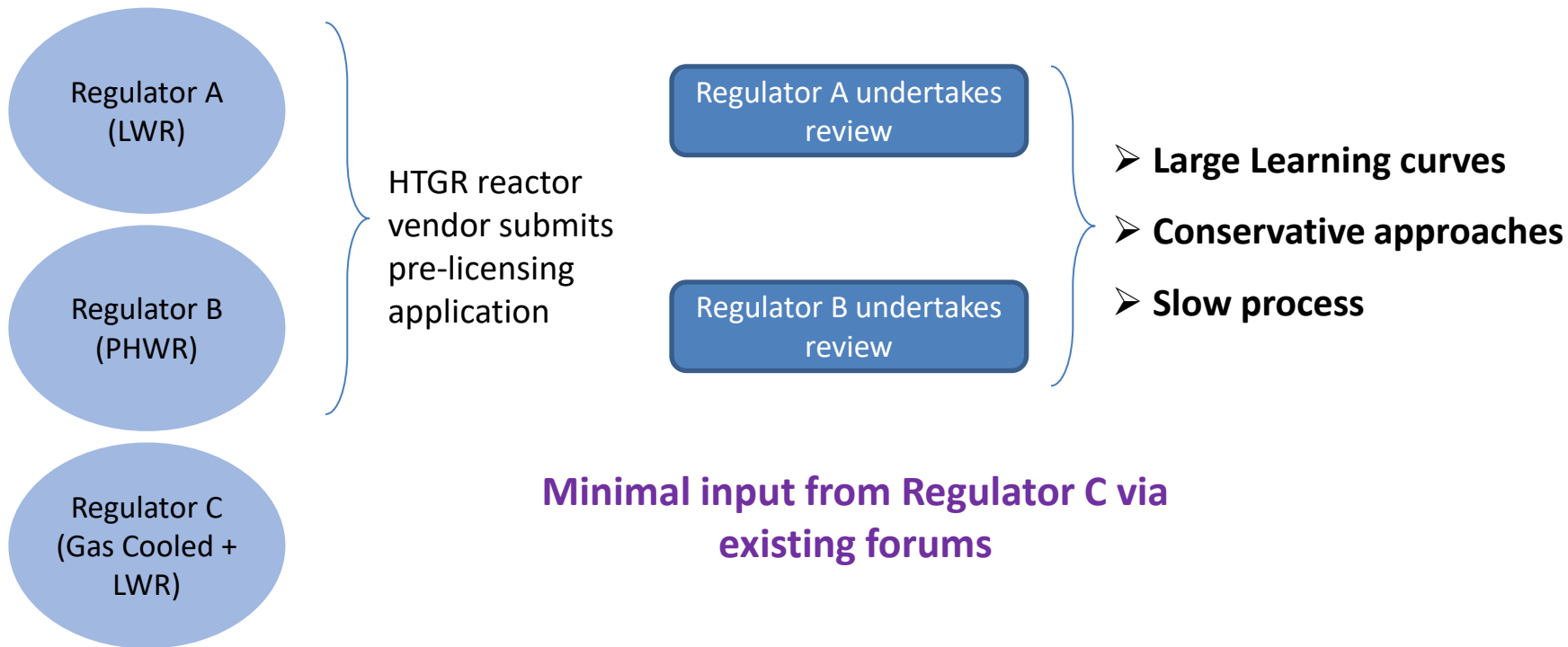


SMR challenges

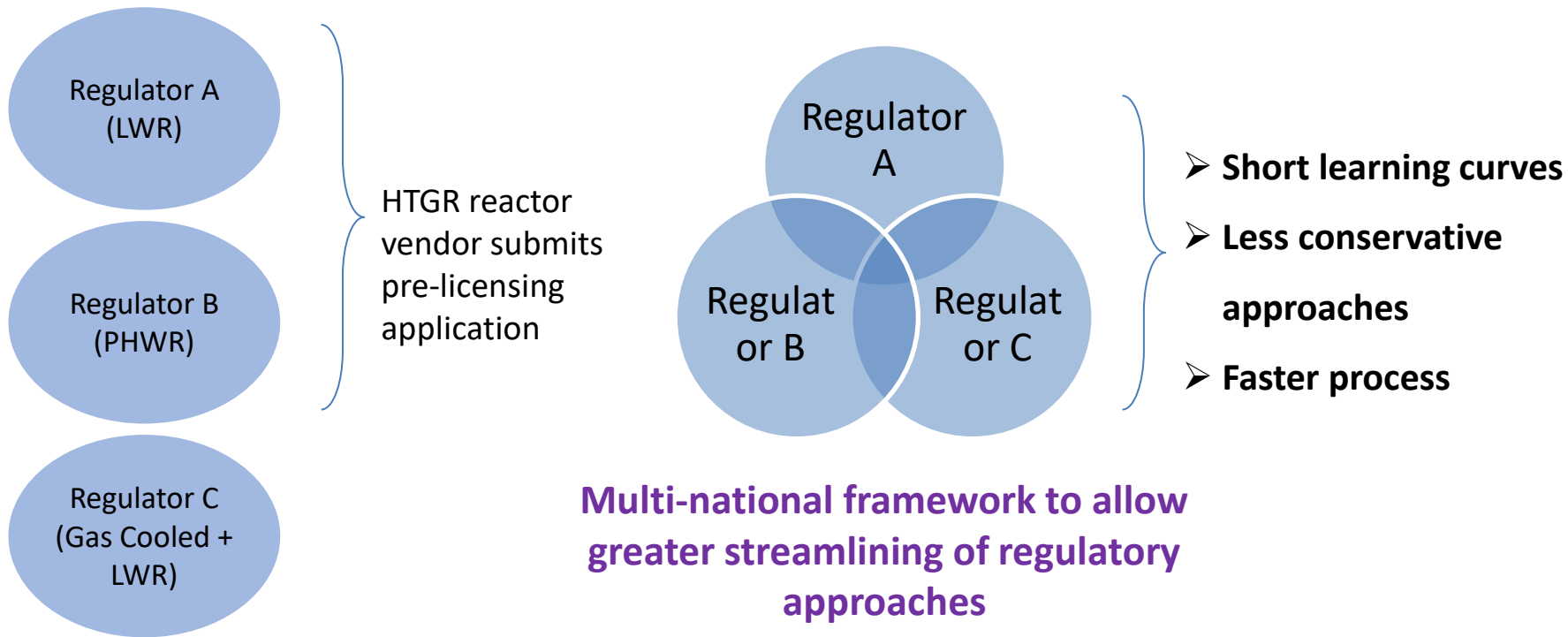


- Significant interest in SMR deployment
- Large numbers of SMR designs
 - Differing design maturity
 - FOAK challenges
- Limited regulatory experience
 - Revising frameworks – increased flexibility
 - FOAK challenges
- Significant differences in pre-application processes
- Need greater collaboration

Regulatory FOAK challenges



Regulatory collaboration



There have been many efforts to achieve harmonization in nuclear regulation...

International

- Regulatory Forums
- Harmonization Initiatives



Regulatory

- Bi-lateral Cooperation
- Safety Reference levels



Industry

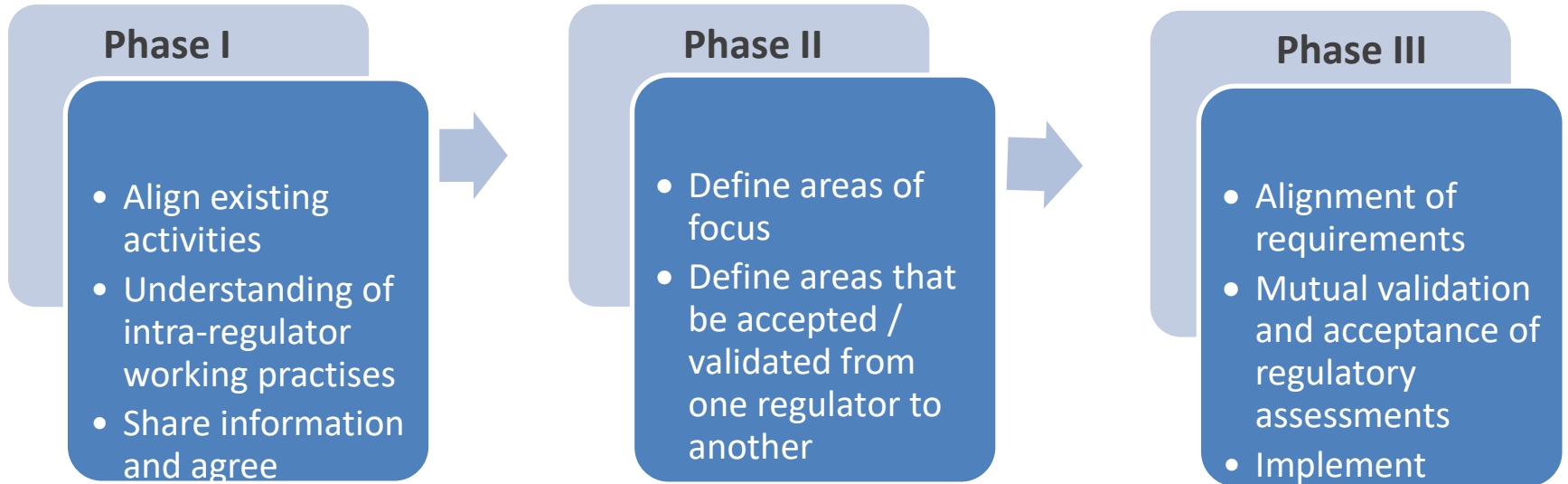
- Harmonization proposals
- Owner requirements



... but much work is still needed to be successful

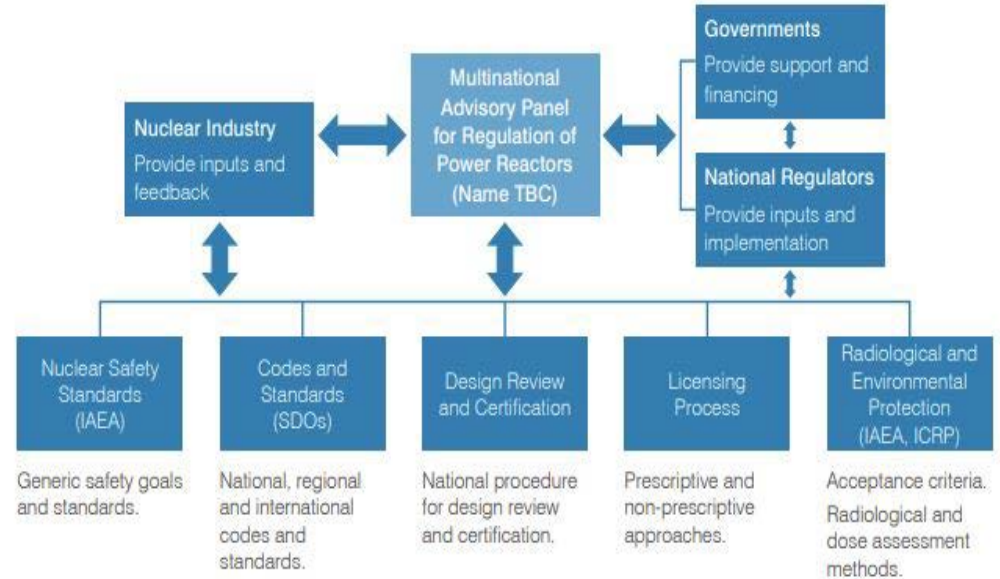
New Framework - Structure

- Start small (3-5 regulators + related industry)
- Initially focus on alignment of existing harmonization activities
- 3 phase approach



Key lessons from transport

- Develop an international model / framework
- Develop quantitative acceptance criteria
- Develop common understandings / terminology
- Mechanism to incorporate outputs into national regulations

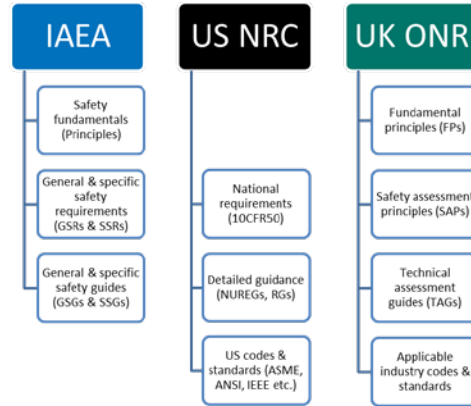


“Harmonization of Reactor Design Evaluation and Licensing: Lessons Learned From Transport”

CORDEL publication (December 2020) in cooperation with COG

<https://world-nuclear.org/our-association/publications/>

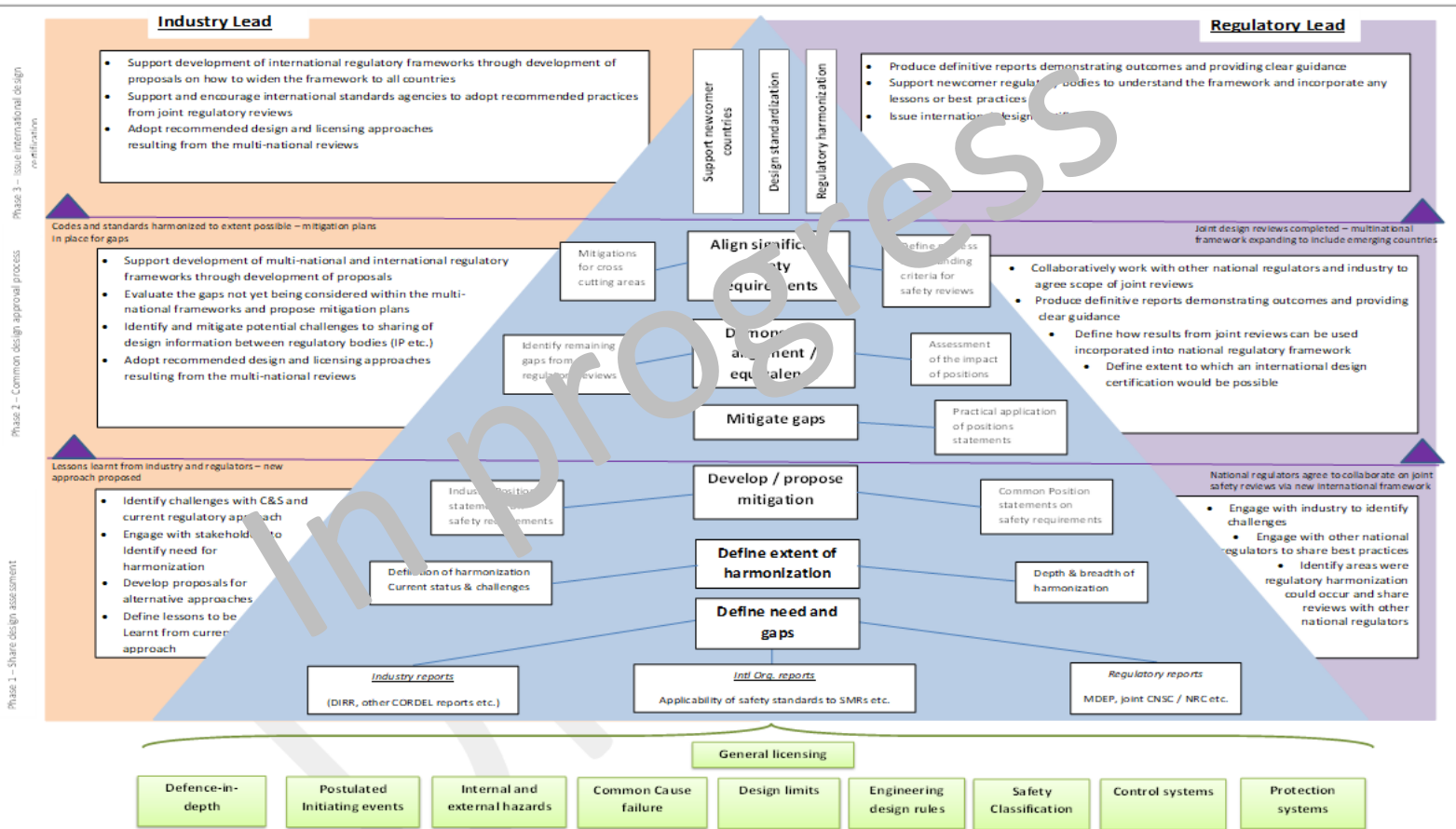
Priority Areas of Focus



- General Licensing
- Defence-in-depth
- Postulated initiating events (including DBA & DEC)
- Internal & external hazards
- Common cause failure
- Design limits
- Engineering design rules
- Safety classification
- Control systems
- Protection systems



A potential international framework to streamline international licensing and regulation



4th CORDEL Regional Workshop



ENISS



framatome

Harmonization to support the operation and new build of NPPs including SMRs

- Lyon, France 18th to 20th May 2022
- Topical subjects:
 - Harmonization of Safety Requirements Implementation/Licensing
 - Standardization in Design, Manufacturing and Construction
- Technical tour of Framatome's Le Creusot and Saint-Marcel facilities

There is an urgent need to move forward together

- Leadership by national governments for the development of suitable legal frameworks, policies and capabilities
- Effective collaboration among international organizations, regulators, and industry to streamline international licensing and regulatory frameworks
- Support for newcomer countries to optimize their approach to regulation and adoption of low-carbon nuclear technology appropriate to their needs
- Make use of lessons learned in harmonization when developing new regulations for advanced technologies



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