

# Nuclear Harmonization and Standardization Initiative (NHSI)

Technical Meeting on Compatibility between Coolants and Materials  
for Fusion Facilities and Advanced Fission Reactors

Brett Rini

Regulatory Activities Section

Division of Nuclear Installation Safety, IAEA

31<sup>st</sup> October 2023



# Background

NHSI was initiated in 2022 with the **goal** of enabling the **effective global deployment of safe and secure advanced nuclear reactors** .

## Key enablers:

- I. Developing **common industrial approaches** by technology holders and users' requirements and criteria by operators, consistent with fair global competition, intellectual property rights protection, and not hampering innovation and continuous improvement.
- II. Developing **harmonized regulatory approaches** between national regulatory bodies, including a common set of internationally recognized reference framework and processes for **leveraging and collaborating during licensing and pre-licensing reviews**, while maintaining national responsibilities for safety and security.



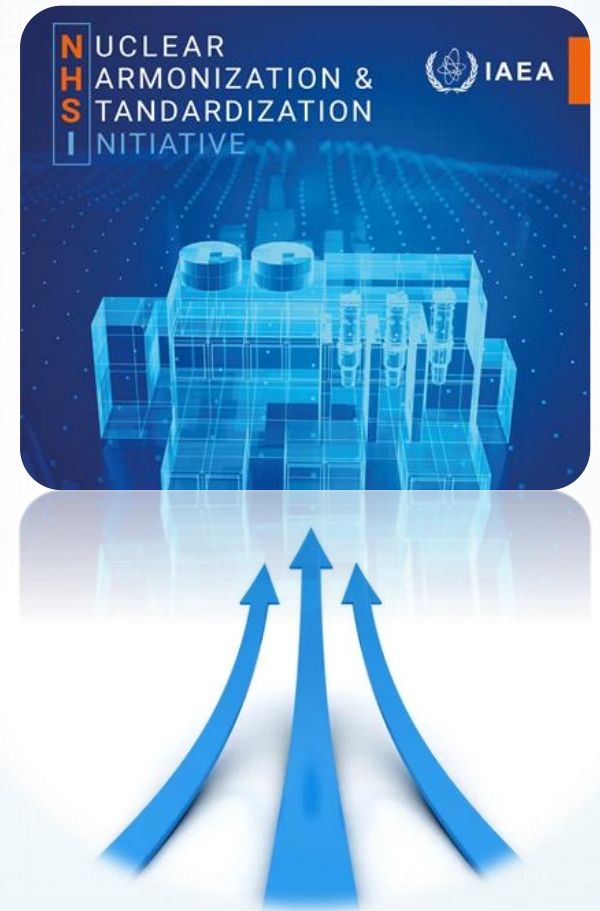
# Tracks

## ➤ Regulatory Track

To set a roadmap for increasing regulatory collaboration towards global harmonisation in the pre-licensing process, and international certification of selected SMR designs – with an agreed expectation of the high levels of safety and security for such advanced designs.

## ➤ Industrial Track

To set a roadmap for technology holders and operators to develop more standardized industrial approaches for design, manufacturing, construction, commissioning, and operation of SMRs, as well as generic users' requirements and criteria.



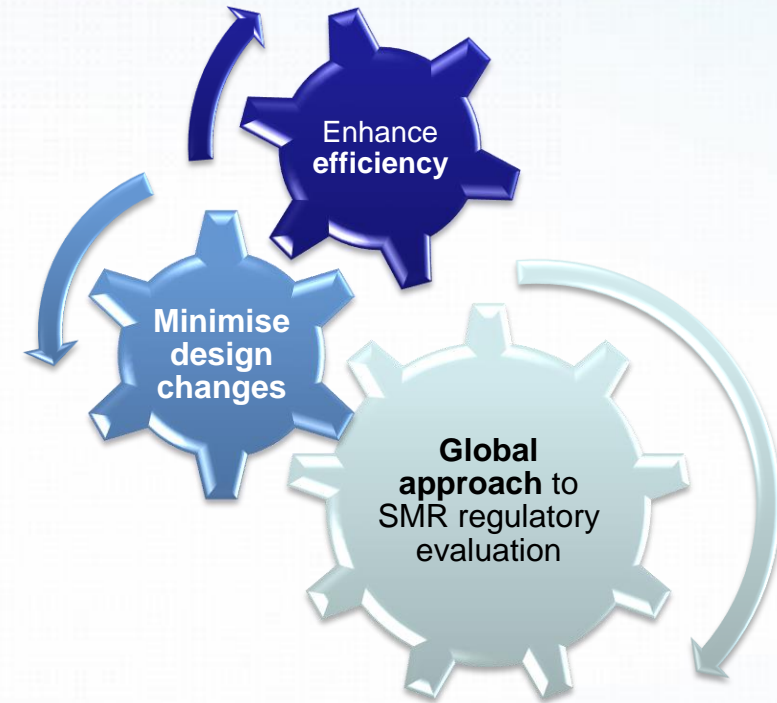


# NHSI Regulatory Track



## The long-term Vision

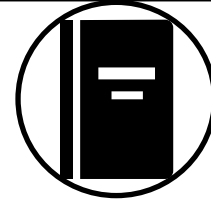
- Developing **harmonized regulatory approaches** between national regulatory bodies that would enable the effective global deployment of safe and secure advanced nuclear reactors
- A **global pre-licensing review framework** that includes safety, security and safeguards by design
  - ✓ A **single review** by a national regulator / team of national regulators
  - ✓ A **harmonized review outcome** while preserving MS sovereignty



# NHSI Regulatory Track Participation



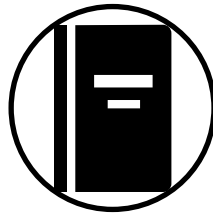
## NHSI WG1



Framework for **information sharing**

- Agreements to share controlled information and repository collating publicly available information

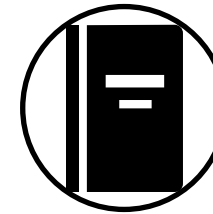
## NHSI WG2



**Towards harmonization:** multinational pre-licensing review process

- A single team and a single review outcome
- Early identification of design “showstoppers”
- **Commitment to avoid duplication**

## NHSI WG3



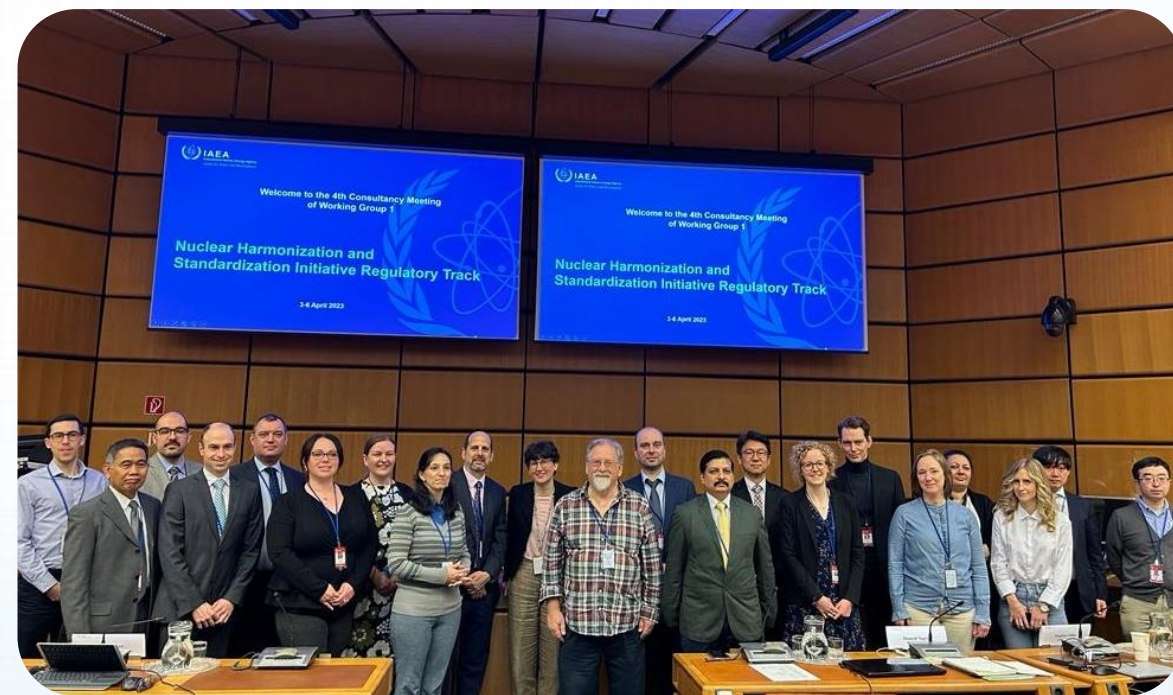
Two processes increasing cooperation – building on **current initiatives**

1. Leveraging existing regulatory reviews
2. Collaboration between national reviews (independent national reviews in parallel but with information exchange)

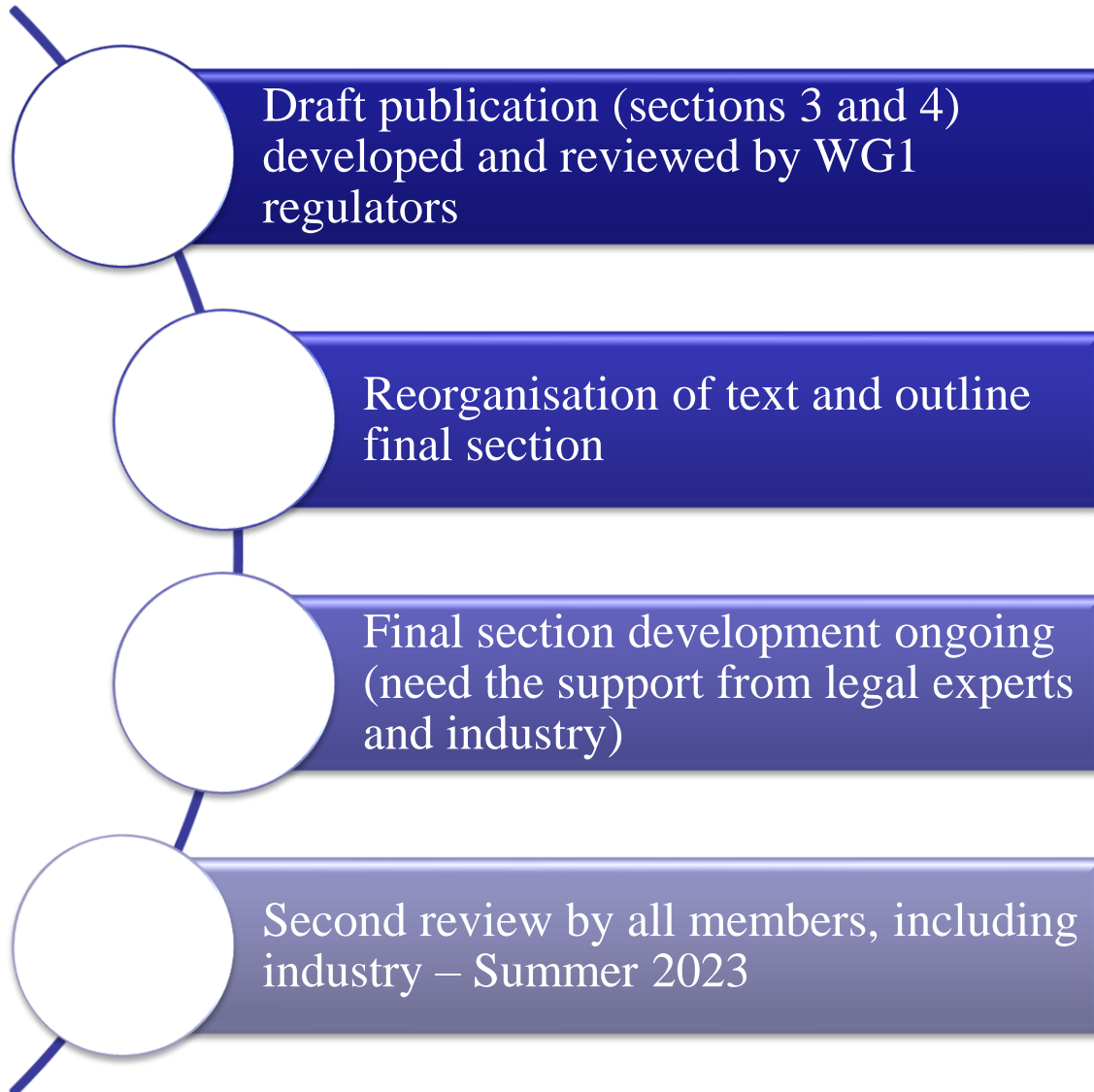
**PLATFORM FOR IMPLEMENTATION**

implementation, lessons learned and process improvement

International Framework for pre-licensing/licensing information sharing to facilitate collaborative reviews and multinational reviews





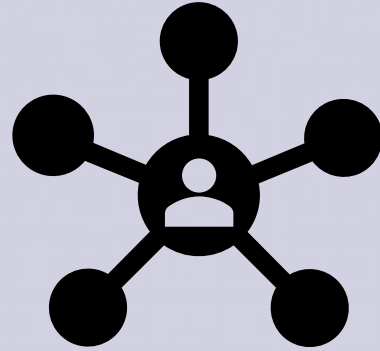


## Document Structure

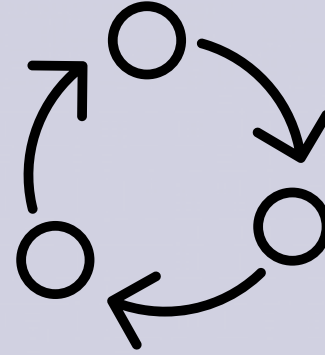
1. Introduction
2. General Approach
3. Identification of Information Needs to Facilitate Regulatory Cooperation
4. Identification of Potential Impediments with Sharing Information
5. Identification of Potential Solutions
  - Agreements needed for key impediments identified
  - Approach to implement the agreements
  - Stakeholder engagement plan
  - Agreements used in previous successful international collaborations (e.g., MDEP; NRC/CNSC; ASN/STUK/SUJB)



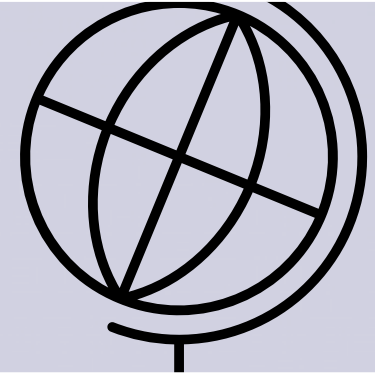
Wider participation of legal experts and government policy makers



Implementation by many stakeholders from governments and industry

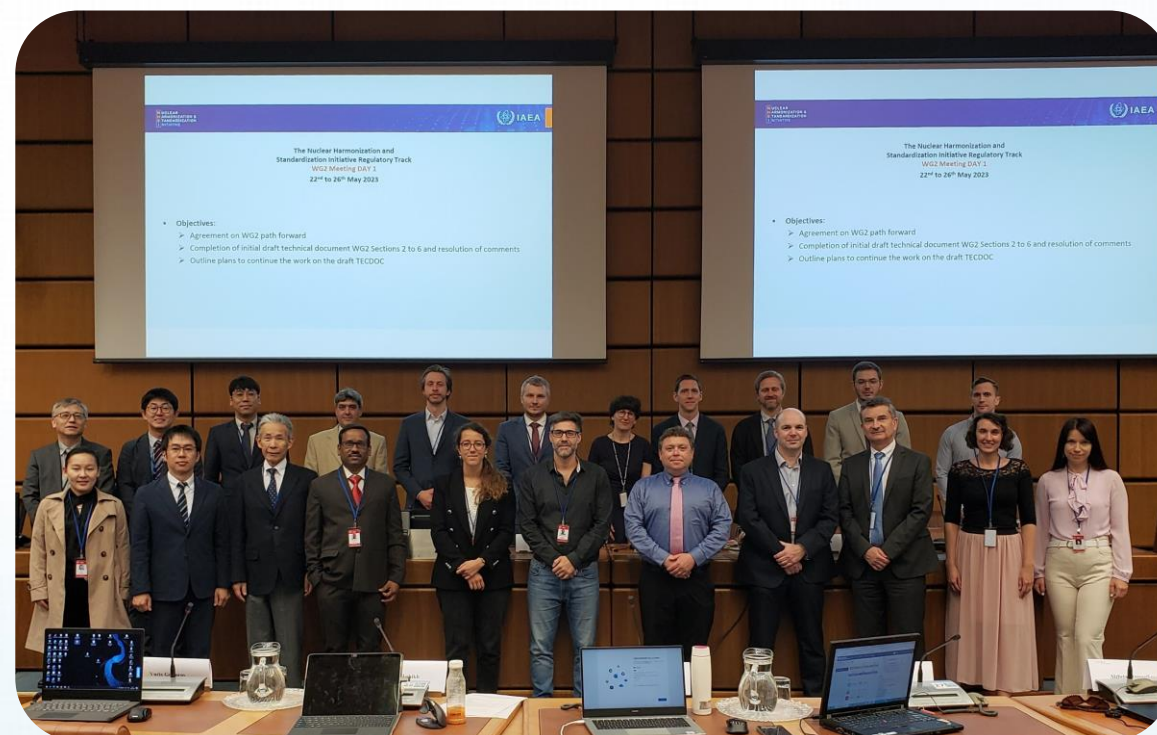


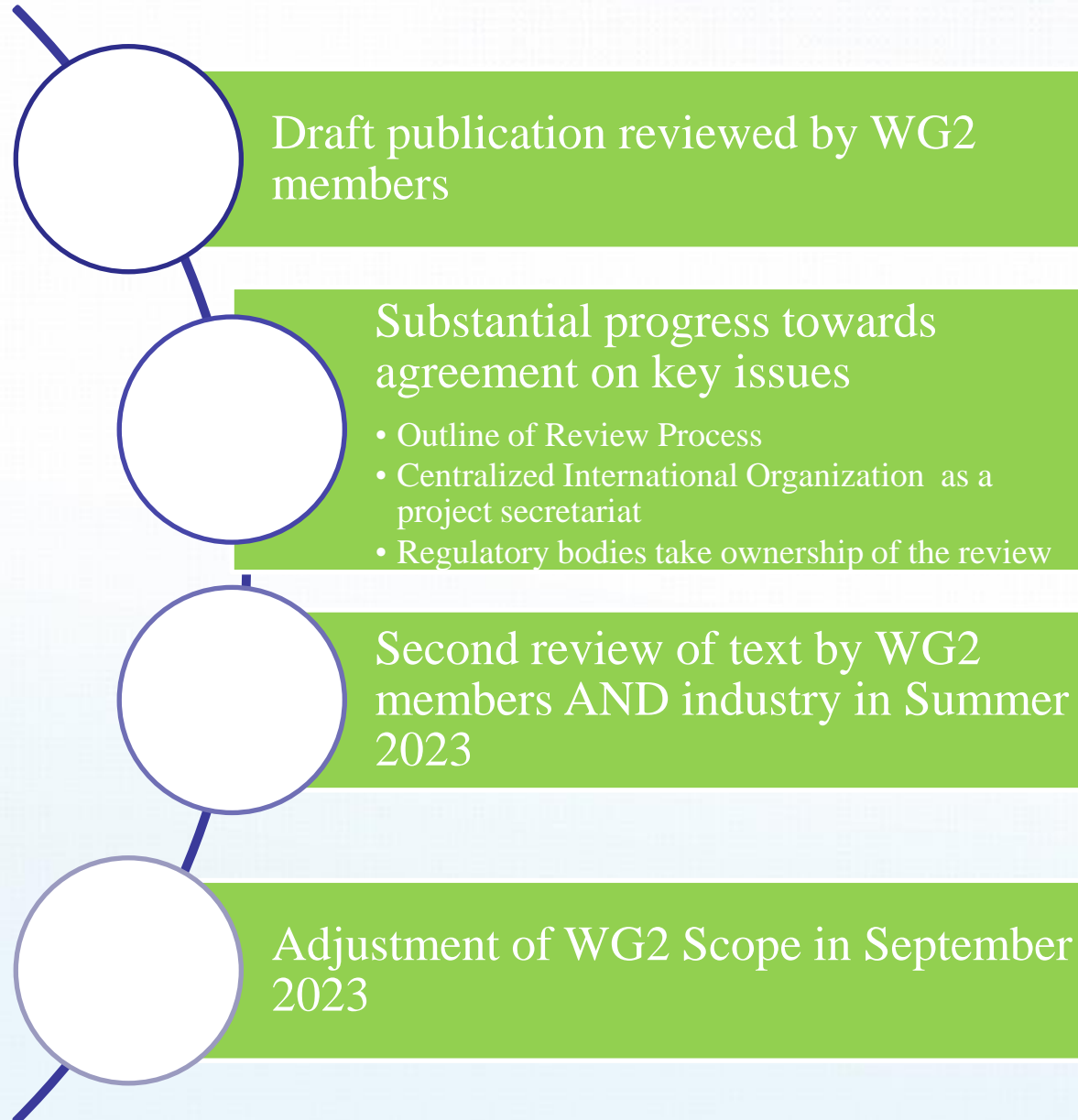
The solutions will shape WG2 and WG3 processes



Inclusion of embarking countries

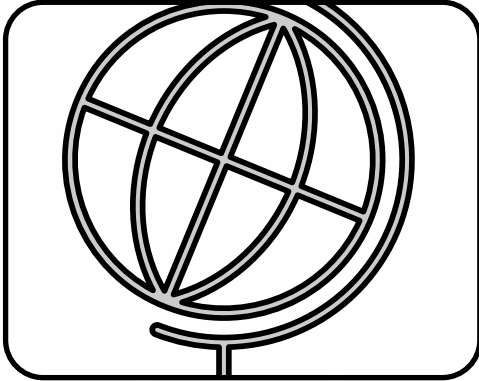
## Developing a process and reference framework for multinational pre-licensing regulatory reviews



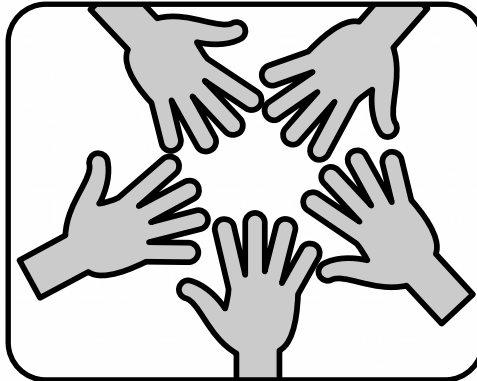


## Document Structure

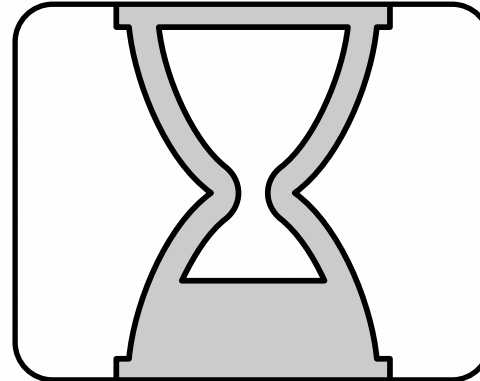
1. Introduction
2. Purpose, Scope of the Review and Approach
3. Review Process
4. Content of Vendor Application / Submission to be Reviewed
5. Methodology for Selection of Review Focus Areas and Reference Framework
6. Example of Review Focus Areas for Reference Framework
7. Regulatory Review Documentation
8. Road Map Towards Harmonisation
9. Appendix A: Examples of Reference Framework Based on IAEA Safety Standards



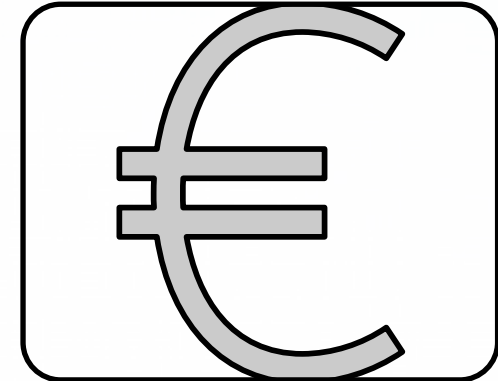
How to ensure that there is limited duplication with eventual national review?



How should the review team be composed?  
Should all participating regulators be involved in all topics?



How long should such a review last? Is a process that takes several years viable?

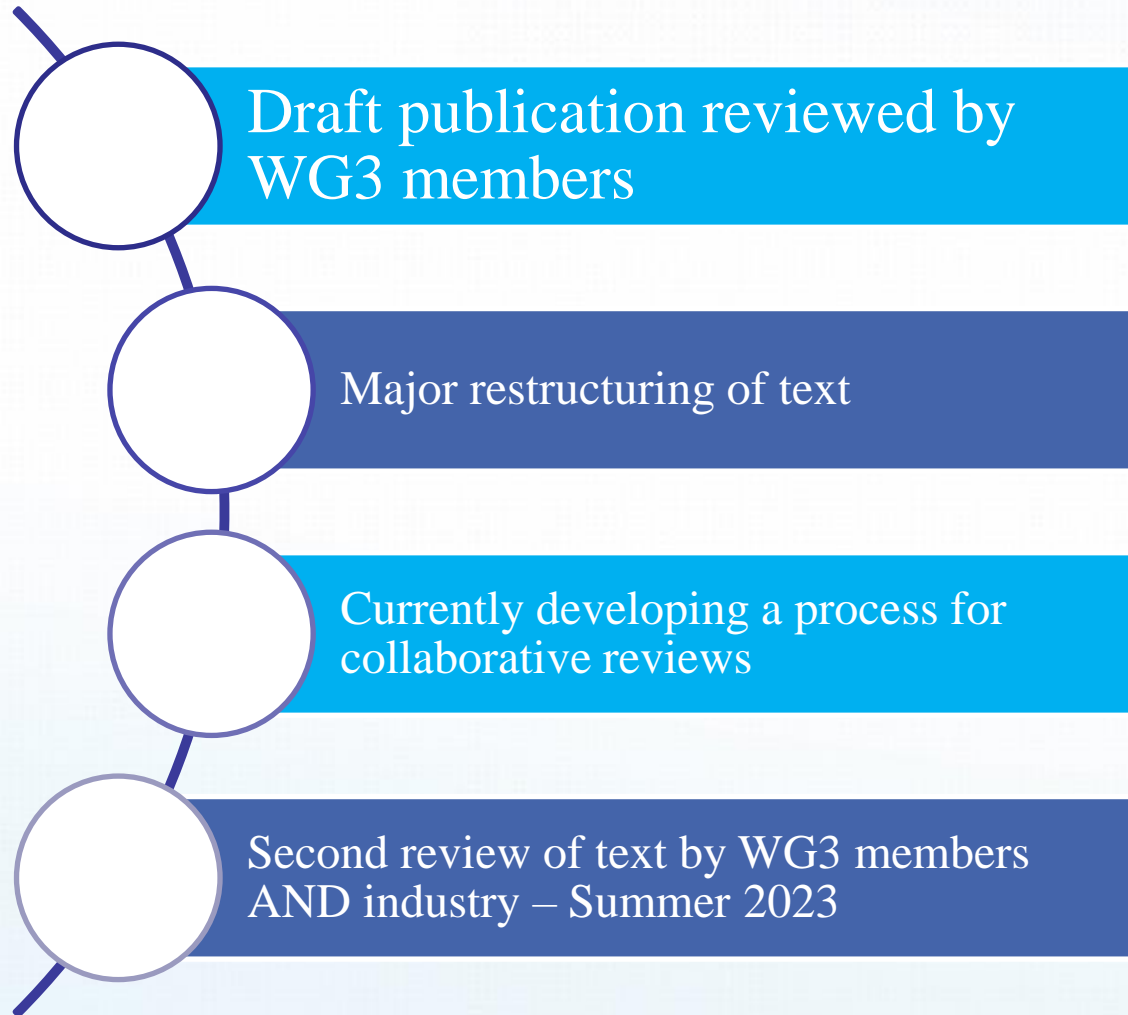
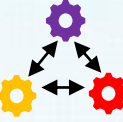


How will the multinational effort be funded?  
Do governments need to be involved?



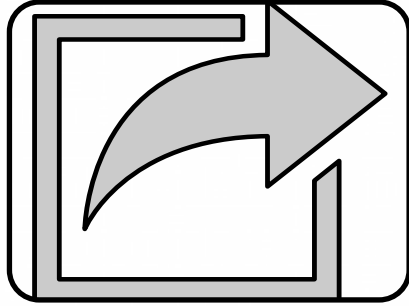
Developing a process to leverage the reviews of other regulators and for regulators to work together during ongoing regulatory reviews





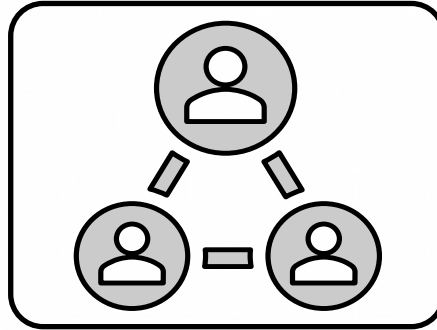
## Document Structure

1. Introduction
2. Scenarios for Leveraging Information and Collaborative Reviews
3. Preconditions for Leveraging Other Regulatory Reviews
4. Approach to Leveraging Information
5. Collaborative Reviews (independent national reviews in parallel but with information exchange)
6. Managing Risks from Leveraging Other Regulators' Reviews and Collaborative Reviews
7. Roles in Leveraging Information and in Collaborative Reviews



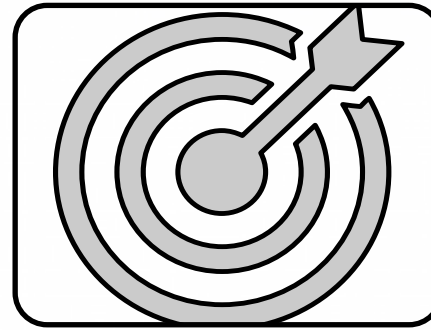
## Leveraging existing reviews

Ensure building capacity needed to ‘own’ the leveraged review and undertake due diligence

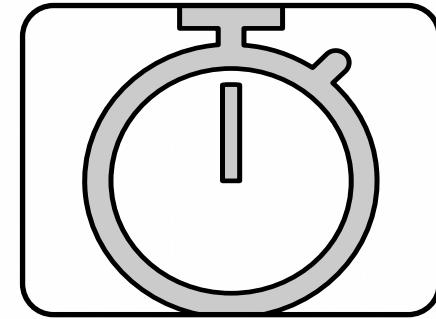
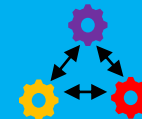


## Collaborative reviews

Ensuring processes are less resource intensive than doing the review ‘from scratch’



How to achieve convergence if national regulatory frameworks are very different?



Including other countries:  
at a later stage sharing learning with embarking countries





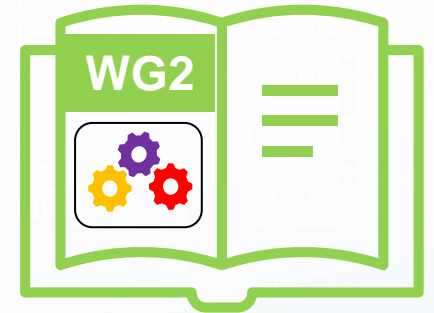
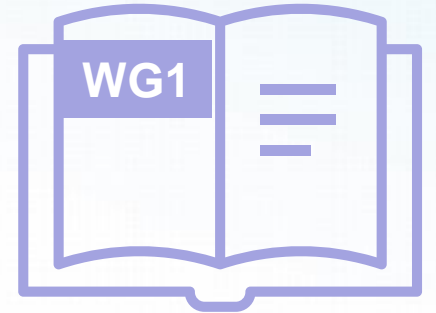
WG1, WG2 and WG3 updated draft reviewed by WG members in the summer 2023

WG1 draft document to be reviewed by more legal experts

WG2/3 were shared with industry representatives for feedback

A total of 3 more meetings in 2023 and 12 more meetings in 2024

Consideration of summary document (providing the full framework) and stakeholder engagement plan



## Building cooperation and trust

**harmonized regulatory approaches**

for effective global deployment of safe and secure advanced nuclear reactors



Information sharing arrangements

Implementing reviews and gathering experience



Disseminating knowledge

Improving processes and expanding scope



**GLOBAL REVIEW FRAMEWORK**

- IAEA provides centralized support and helps with stakeholder engagement for implementation of arrangements

- IAEA provides administrative support for multinational pre-licensing reviews
- IAEA gathers experience from collaborative reviews and leveraging of reviews via implementation platform (e.g. groups of countries interested in same design)

- IAEA repository of national reviews, collaborative reviews and multinational reviews
- Capacity building by facilitating practical experience opportunities, missions

- Reflecting lessons learned
- Expansion to non water cooled reactors
- Expanding the depth of the reviews

- Facilitates harmonization of national requirements
- Facilitates review leveraging
- Facilitates harmonized review outcomes

# Thank you!

