Indonesian Proposal on Mutually-Beneficial Collaboration for SMR Regulatory Infrastructures Improvement

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Introduction
Motivation

Why do SMR become attractive for Indonesia?
National Regulatory Systems

- 1945 Constitution
- Acts
- Government Regulations
- President Regulations
- BAPETEN Chairman Regulations
- Standards and BAPETEN Chairman Guidelines

No. 10 / 1997
Regulatory Infrastructure
Regulatory Infrastructure for NPP

Act. No.10 / 1997

Nuclear Energy

GR No.2 / 2014

Licensing of Nuclear Installations and Materials

BAPETEN’s Chairman Regulations

- Site, Design, Construction, Commissioning
- Security (Transport)
- Safeguards (Physical Protection)
- Emergency Preparedness & Response
- etc.

Based on Large LWR technology
SMR Regulatory Challenges
Small Modular Reactor

- Evolutionary proven technology
- Modularity
- Long life core
- Floating / Underwater (Seafloor)
- Innovative Applications
Small Modular Reactor

✔ **Evolutionary proven technology**

Some SMRs are evolutionary design of proven LWR, like an Integral-PWR which means the reactor vessel contains all pumps, steam generators, pressurizer and control rod drive mechanisms. This evolutionary design should be regulated by innovative regulation due to its new reactor internal design.

✔ **Modularity**

The modularity aims for factory fabrication, rail/road transportable, and multi-module deployment. Therefore, we have to assure that our country provide (prepare) physical and security infrastructures for transport of its equipments.
Small Modular Reactor

✓ **Long life core**

Long life core of SMR compared to existing reactor technology requires improvement on operability and maintainability of the reactors. Regulator should provides an effective regulation (safety requirements) to this design feature.

✓ **Floating / Underwater (Seafloor)**

The regulation (requirements) for technical aspects in Indonesia are based on the Land-Based Large LWR. For the floating or underwater reactor types, it should be made proper regulation for the designs.
Some innovative non-electric application of SMR, such as sea water desalination and hydrogen production (HTGR), should also be regulated well.
We’ve not fixed in regulatory system to be implemented: ‘Prescriptive’ or ‘Performance’ based regulation system.

To be ‘Prescriptive’ based: we’ve ‘Time Constraint’, and to be ‘Performance’ based: we’ve ‘HR Constraint’ (number and capability)
The GR No.2/2014 and its supporting technical regulation (BCRs) are substantially constructed based on the land-based conventional Large-LWR.

We have to provide guidances (Prescriptive) at least for ‘Graded Approach’ review and assessment, we have to provide adequate minimum level of skills for HR.
There are limited sources of best practices on SMR regulatory activities in international level due to the fact that SMR is majority still in the design and construction activities.

We have difficulties on how to propose bilateral and international collaboration scheme to effectively accelerate ‘knowledge transfer’ of SMR from nuclear (technology holder) countries.
Collaborations Proposal
Focus

➢ Regulatory Knowledge Transfer
   To achieve an adequate level of regulatory knowledge to be properly applied on SMR design

➢ TSO Personnels Capacity
   To provide an adequate level of technical skills related to SMR’s safety features to support licensing activities (Review and Assessment) in Regulatory Body
Contents

Regulatory Knowledge Transfer

√ Binding Requirements for Licenses
√ Rule Making Process
√ Standard Review Plans
√ Review Standards
√ Regulatory Guides
Contents

TSO Personnels Capacity

- Safety Analysis
- Technical Assessment
- Computer Codes
- Designing Involvement Experience
How to be mutually-beneficial?

- Regulatory Competency Improvement
- Technical Competency Improvement
- Possibility of Technology Supply
- Possibility of Expert Involvement