20th INPRO Dialogue Forum
On Challenges and Issues in Capacity Building
For Ensuring Nuclear Energy Sustainable Development

Session II: Capacity Building for Newcomers
Chair: Topan Setiadipura

Oak Ridge National Laboratory, Tennessse, USA
27-31 March 2023, Room Tennessee A, Building 5200
Objectives:
1. Discuss each of the major elements of capacity building necessary for a safe, secure, reliable and sustainable nuclear energy program;
2. Discuss the national, regional and global level challenges, opportunities and issues in capacity building programs that impact the sustainability of nuclear energy development;
3. Present and discuss the competencies necessary throughout the lifecycle of nuclear energy systems from policy, through construction, operation and decommissioning;
4. Identify the mechanisms that can be utilized to achieve the necessary capacity building e.g., university education programs, training programs from specialists, staff exchanges, international collaborations, etc.;
5. Exchange information, experiences and best practices from related programs and share lessons learned from different approaches;
How can INPRO support Member States to proceed along the development phases by strengthening their capacity building?

Understanding the situations

Understanding the opportunities and treats

Common Understanding and Joint-Action under the INPRO
How can INPRO support Member States to proceed along the development phases by strengthen their capacity building?

Phases of Nuclear Energy Initiative Development:

**Pre-FS dan FS:**
- Contracting Licensing*: Site Lic.
- Design Approval
- Construction Lic.
- Commissioning Lic.
- Operational Lic.

* based on Indonesian Regulation.
Nuclear Reactor/Energy Projects, although at the end it is not yet finally delivered, from the perspective of Capacity Building, is important to keep the momentum and to push the Continual Development of human and institutional competencies.
An internal team was established to develop a BED of RDE.
- Comprise of 31 technical staffs. [Reactor Physics, Process, Mechanical & piping, I&C, Electric, Civil]
- Results of this activities will enhance trust from national stake-holders and invite them to contribute in the RDE Program
- Also act as an effective Capacity Building, attracting Universities and Industries.

Govt. Commitment in EPC-Phase financing.
- Updated FS
- Component Level cost Estimation
- Involvement of more nat. stake holder
- BIS Preparation
- Tech. Attachment of Bidding Doc.

Note:
Institutional Transition is one of the biggest challenge in Capacity Building.
2. Target Application

The initial target of PeLULt/RDE was as an experimental power reactor for research, which basically focuses to
demonstrate the operational and safety performance of a pebble bed high temperature gas-cooled reactor
(PB-HTGR). It will demonstrate the capability of the reactor to survive even in the most severe accident
scenarios such as depressurized loss of forced cooling (DLOFC), in addition also to perform a cogeneration
experiment utilizing its high steam temperature output.

In collaboration with national industries such as PT. Pembangunan Perumahan (PT. PP) and PT. Rekadaya
Elektrika Consult (Reconsult), a direct utilization of PeLULt as electric source for many islands in Indonesia,
replacing an expensive diesel fuel, was foreseen. A joint cooperation with national industries to study and
develop the techno-economic and detail design of the reactor was already started in 2018-2019, which was
halted. The new focus is to utilize PeLULt as a green hydrogen production in collaboration with PT.
PERTAMINA.
West Kalimantan Initiative / Project
Techno-Economic Assessment of SMR in West Kalimantan (Grant from US-TDA)

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Can INPRO provide project to maintain and develop MS capacity member?

Can the project be performed in cross-institutional in MS or even at regional context?

In general, YES IT CAN!
Nuclear Energy System Assessment (NESA)

- **NESA of Large Reactor (2011-2014)**
  - Full-scope, Report published by BATAN in 2015

- **NESA of SMR (2020-2022)**
  - Economics and Infrastructure (2020)
  - Submitted to and reviewed by INPRO in 2020
  - Consultancy with INPRO and PESS (April 2021)
  - Waste Management & Proliferation Resistance (2021)
  - Further revised. Draft to be submitted for review (Dec 2022)
  - Environment and Safety (2022)

- **NESA of Fuel Cycle (2021-2025)**
  - Limited scope for Mining and Milling, Conversion, Fuel Fabrication, Waste Management
  - Defining NES and Scope (2021)
  - Fuel Fabrication: Collecting data, preliminary study / comparative assessment, drafting (2021-2023)

- **NESA on HTR Fuel Fabrication**
  - Preliminary study of HTR fuel program (2020-2021)
  - Presentation at HTR2021 and publication in NED journal (Nov 2022)

A paper on Indonesia’s NESA experience entitled “Addressing Sustainability of Planned Nuclear Energy System in Indonesia Using INPRO Methodology” has been submitted to a journal, awaiting for feedback.
How can INPRO (methodology) support Member States to proceed along the development phases by strengthening their capacity building?

Understanding the situations, problem, challenges

Understanding the opportunities and treats

Common Understanding and Joint-Action under the INPRO
Thank You
Let’s have a fruitfull session!