The interest in SMR in Indonesia and its URD

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1. Nuclear Energy is the last option (National Energy Policy – 2014)

2. In General Plan for National Energy (2017), the Government focuses on:
   - Electrification ratio,
   - “Affordable” electricity prices,
   - Target for new and renewable energy: 23% (2025)

COP21: The Indonesian government commit to voluntarily reduce GHG emissions 29% by its own efforts or achieve 41% with international assistance in 2030.
Mix Energy Policy (Gov Reg 70/2014)
Target for Electrification Ratio

**NASIONAL**

98.30%

**Informasi:**
- > 70
- 50 - 70
- < 50

**RE 98.30%**
- PLN 95.87%
- Non PLN 2.06%
- LTSHE 0.37%

Gambar 20. Peta Rasio Elektrifikasi Nasional tahun 2018
1. Only the Java island, which has had a good power grid infrastructure with a large enough capacity.

2. The development of the first nuclear power plant in a large capacity ($\geq$1000 MWe) have a high financial risk.

3. NPP is the last option (Gov. Reg. 79/14).

4. Public acceptance is a key factor for NPP Development.

5. NIMBY, 5 years political cycle (NIMET, BANANA)
## Estimated Assessment Time to get operation permit

<table>
<thead>
<tr>
<th>No.</th>
<th>License Step</th>
<th>Documents Completeness</th>
<th>Technical Assessment by BAPETEN</th>
<th>Technical Revision by applicant</th>
<th>Validity period (Maximum/ Extension before expired)</th>
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<td>Max.</td>
<td>Min.</td>
<td>Max. repeat</td>
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<td>≤3 y</td>
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<td>Operation Permit</td>
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</table>

**Total estimation time from early documents evaluation until commissioning (source: GR No. 2 / 2014.)**

≤19 y

*Note: for modular nuclear reactors that have obtained a design certificate from the supplier country Supervisory Agency, the applicant may submit a Combined Operation Permit (Construction Permit, Commissioning Permit and Operation Permit at once) Application after obtaining a Site Permit, max 2 years after Site Permit. Article 21 GR No. 43 / 2006 for further information.*
Common NPP Technology Goals of Indonesia

- Appropriate size for the (West Kalimantan) grid
- Proven Technology and Regulatory Certainty
- Plant Standardization
- Constructability → Shorter construction time
- Operability and Maintainability
- High capacity factor
- Supply chain (fuel, system, component, equipment)
- Severe accident robustness
- Cost competitiveness: Affordable upfront capital cost and competitive generation cost per kW-hour.
Local governments that have been interested in SMR
SMR activities in Indonesia

- LWR based SMR (in progress for URD)
- HTGR
  - RDE (10 MWth HTGR, progress on DED)
  - joint lab of HTGR with INET – Tsinghua University (goal: conceptual design of 150 MWth HTGR)
1. The Government plans to build 2 industrial estates in West Kalimantan: (Alumina & aluminum industries, and latex & CPO industries).

2. The current total capacity of power plant at that Province is 737 MW, and is still imports from Malaysia 363 Mwe.

3. For alumina industry: electric power required 3 x 35 Mwe (6-7cent$/kWh)

4. For aluminum industry: 1800 Mwe (~3.5cent$/kWh)
LICENSING REQUIREMENTS

• The plant should be licensed by the national regulatory authority before being established and applied in Indonesia.

• The SMRs should be licensed in the country of origin or in case in the absent of such a license, the SMR vendor may submit licensing to nuclear energy regulatory body (BAPETEN).
ECONOMIC REQUIREMENTS

• The economic target can be simply stated as: the levelized cost of electricity from nuclear plants should be competitive or below the electricity generation cost in the national system (7 cents USD/kWh).

• While for the deployment at remote areas or at the less developed regions the economic criteria for the SMR alternatives are expected to be:
  • the largest social gain, and;
  • smaller than the cost to upgrade the infrastructure and transportation means in order to remove the “remoteness” qualification.
Specific requirement

• Manpower development
  • Specific training course and on the job training

• Infrastructure and national participation
  • Maximum local content (national industrial involvement)

• Technology transfer

• Licensing support

• Technical support

• Long term partnership (R&D cooperation)

• Funding scheme (minimize national burden)
1. Public perceptions and Economic factors (cost of NPP) are key issues in Indonesia

2. Indonesia looks for reference model for SMR

3. Proven Technology, design standardization, simplification, and manufacturability of the systems are the main factors to reduce the cost

4. Localizations, industrial participation, and joint R&D are the ways to develop the capacity building of industry and man power.
Thank You