Evaluation on Status of Indonesia Nuclear Infrastructure Development

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Abstract

The demand for electricity increases every year. To meet this demand for electricity, it is becoming more and more difficult to rely on existing resources which are limited. It is therefore very important that steps should be taken to seek other sources of energy supply as alternatives. Based on the premise that a Nuclear Power Plant (NPP) is technically safe, reliable, clean and environmentally-friendly, relatively economical, and supported by our modest achievements in preparations in respect of human resources and infrastructure, including the results of the feasibility studies for NPP development and the comprehensive assessment of different energy sources for electricity generation in Indonesia, the option of nuclear power could well be the right solution. The aim of the evaluation approach is to : evaluate all relevant infrastructure issues in a consistent manner; bring the results together in order to identify a comprehensive action plan for moving into a subsequent phase of the establishment of a nuclear power infrastructure; provide a consistent international approach and enhance national competence through participation in a detailed and comprehensive evaluation. The 19 (ninetenth) of nuclear infrastructure are national position, nuclear safety, management, funding & financing, legislative framework, safeguards, regulatory framework, radiation protection, electrical grid, human resources, stakeholder involment, site & supporting facilities, environmental protection, emergency planning, security, nuclear fuel cycle, radioactive waste, industrial involment and procurement [1].

Introduction

•The national electricity demand is estimated to increase significantly in the near future as Indonesia is planning to boost its industrial sector

•Along with other energy sources, nuclear energy is considered one of the most potential options to meet the continuously increasing electricity demand

•In relation to IAEA Doc No. NG-G-3.1 year 2007, Indonesia has included nuclear power option within its energy policy as indicated by Presidential Decree No. 5 year 2006.

•Indonesia is ready to make commitment to a nuclear power programme by the issue of Act No. 17 year 2007, which states that the first nuclear power plant should be started in the year of 2015-2019 with high consideration of safety factor.

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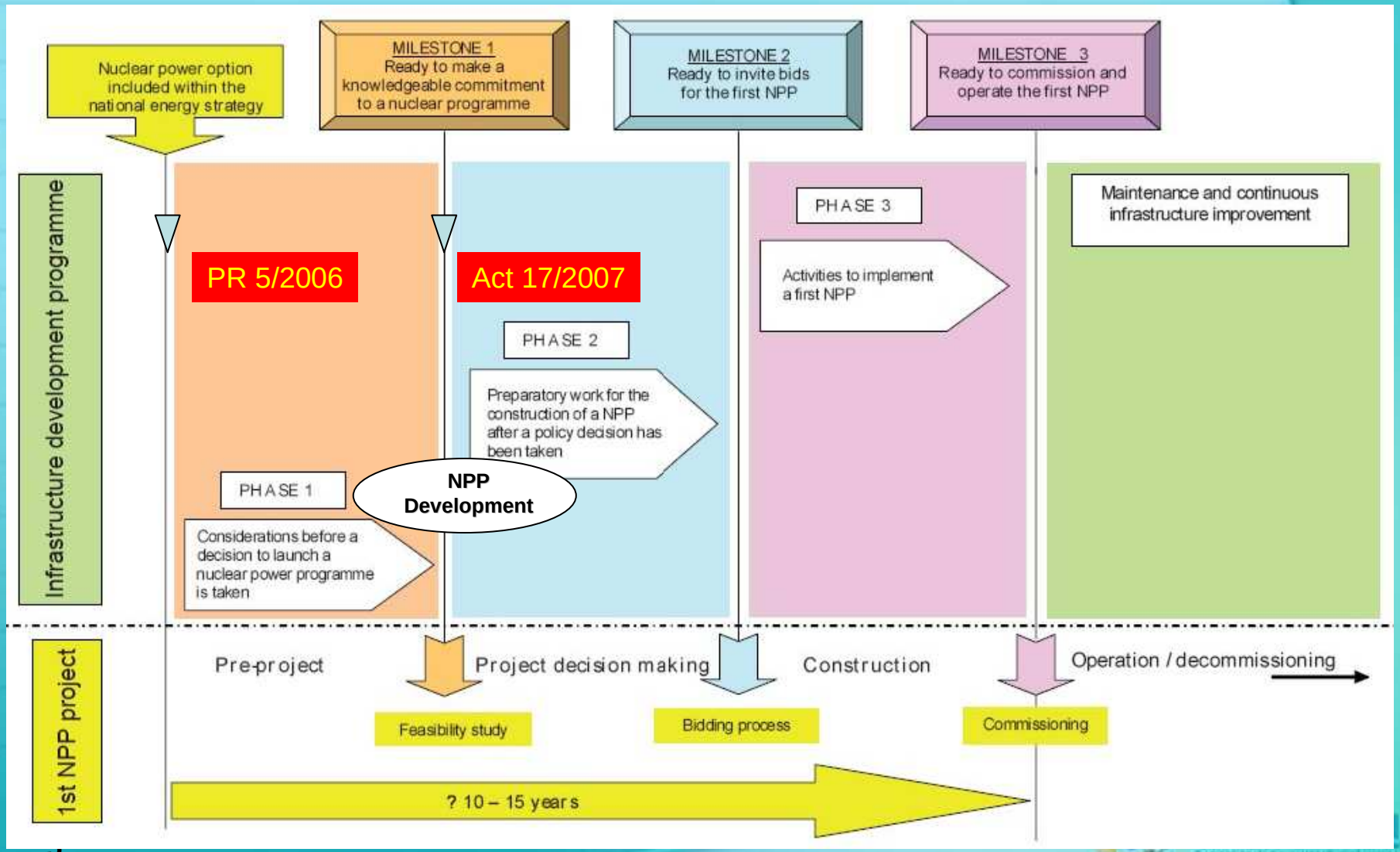
Introduction

•In order to find out the readiness of Indonesia in the deployment of the first NPP, the status of its nuclear infrastructure development should be identified.

•Identification of Indonesia infrastructure is carried out by referring to IAEA Nuclear Energy Series No. NG-T-3.2 on the Evaluation of the Status of National Nuclear Infrastructure Development.

•The objective of this infrastructure evaluation is to identify the status of Indonesia nuclear infrastructure development in order to support the construction of the first NPP.

INFRASTRUCTURE DEVELOPMENT PROGRAMME & NPP PROJECT



Source: IAEA NG-G-3.1, 2007

Milestones in the matrix form

Milestones

Milestone 1: Understanding the commitment (pre-project)
Milestone 2: Ready to request bid for the first NPP
Milestone 3: Ready to commission and operate the first NPP

Scope of evaluation

National Position
Regulatory Framework
Financing
Safeguards
Emergency Planning
Nuclear Waste
Nuclear Safety
Stakeholder Involvement
Management
Procurement
Legal Framework
Radiation Protection
Human Resource Development
Security and Physical Protection
Nuclear Fuel Cycle
Environmental Protection
Sites & Supporting Facilities
Electrical Grid
Industrial Involvement

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Methodology

For this infrastructure evaluation, the methodology are following :

1. Evaluation preparation
2. Acquisition of data and information by questionnaire
3. interview and site visit
4. Observation of evidence
5. Analysis of data & information obtained
6. Verification of evidence
7. Identifying areas requiring further attention
8. Preparing draft report

Evidence

- Reports
- Meeting notes
- Correspondence
- Talks and presentations
- Conferences attended with meeting reports
- CVs, organization and job descriptions

Evaluation

1. National position: Nationally, Indonesia is committed to introducing safe, secure, and peaceful implementation of nuclear power as clearly indicated in the related act and Government regulation. National team on NPP development plan for the deployment and development of the first Indonesia's NPP is being prepared.
2. Nuclear safety: BATAN has developed Guidance for the Development and Application of Sustainable Nuclear Energy System, which describes the safety basic principles. Document of Works, Safety, and Safety Culture has been prepared by BATAN to develop an appropriate safety culture in the nuclear agency. All of the results gained by BATAN will be transferred to the future operator of NPP.
3. Management: BATAN in cooperation with other related institutions has initiated the preparation of documents describing national criteria and general specification for an NPP to be deployed in Indonesia.
4. Funding and financing: Indonesia is still considering the study of funding scheme for its NPP deployment. The funding for the construction of NPP may be a combination of long term loans and equity.

5. Legislative framework: Indonesia has issued and enacted a number of national legal frameworks as adherence to relevant international legal instruments. .
6. Safeguards: Indonesia ratified nuclear non-proliferation treaty in 1978 as indicated by the issuance of Act No. 8 Year 1978 on Ratification of Convention on Prevention of Distributing Nuclear Weapon.
7. Regulatory framework: BAPETEN's roles in oversight and regulation are essential and significant.The basic policies of nuclear energy supervision in Indonesia consist of six main components: licensing, regulation, inspection, assessment, engineering, and nuclear emergency preparedness.
8. Radiation protection: The requirements of the IAEA Safety Standards for the radiation protection have been adopted into government regulation and BAPETEN Chairman Regulation.
9. Grid: Presently, an integrated system of electrical grid exists in Java-Bali-Madura and Sumatera. The Java-Bali-Madura system is interconnected with 500 kV and 150 kV lines, while Sumatra is interconnected with 275 kV and 150 kV lines

10. Human resources development: Blue print of Human Resources Development (HRD) program and concept of Nuclear Training Center (NTC) facilities are being conducted by interdepartmental organization.
11. Stakeholder involvement: Open and timely interaction and communication regarding nuclear power program, including some training programs and interactions among stakeholder, meeting with local government, school-teachers, and groups of public who support nuclear power program, have been provided.
12. Site and supporting facilities: Report of the site and environmental study by NEWJEC recommends three preferred candidate sites on the North Coast of Java Sea of Muria Peninsula, Central Java: (1) Ujung Lemahabang (ULA); (2) Ujung Grenggengan; and (3) Ujung Watu. In order to have many sites in anticipation of energy demand growth, it is then necessary to find other potential sites.
13. Environmental protection: Guidance to prepare an environmental impact assessment is issued by Ministry of Environment (KLH), while BAPETEN issues guidance on procedures for environmental impact analyses for construction and operation of nuclear reactor.

14. Emergency planning: BAPETEN as a national competent authority concerning nuclear emergency has organized an inter-departmental meeting on national nuclear emergency preparedness plan in formulating the above roles and responsibilities. BATAN has prepared General Guidance for Nuclear Emergency Preparedness for Serpong Nuclear Area.

15. Security and physical protection: The national detection strategic committee related to nuclear security will be established with members including BATAN, BAPETEN, Police, Military, Custom, etc. The join training exercise is periodically carried out by BATAN and supported by off-site response forces.

16. Nuclear fuel cycle: The result of feasibility study for the first NPP in Indonesia shows that Indonesia prefers open cycle with extended interim storage of spent fuel. If economically feasible, nuclear fuel element fabrication is planned to be conducted in Indonesia and the national uranium resources will be used as substitutions. Meanwhile, enrichment services will be obtained from international market.

17. Radioactive waste :The radioactive waste management is conducted to prevent radiation hazard to workers, the public, and the environment. Since the beginning of the nuclear activities in Indonesia, BATAN has implemented the Radioactive Waste Management Program.

18. Industrial involvement: Several surveys of industries potential to participate in the NPP construction have been done. These surveys analyze each industrial company to meet nuclear program requirements and identify local supplier companies able to supply equipment and services for NPP construction.

19. Procurement: The draft of Bid Invitation of Specification (BIS) was prepared based on Presidential Decree No. 80/2003. The study on participation of national industries in nuclear energy program has been conducted and the results will be used for the BIS development.

No.	Content	Further Attention
1	National position	National Team on NPP Development Planning not yet established
2	Nuclear safety	Need to build an appropriate safety culture in Regulatory Body (RB), Technical Support Organization (TSO) and Operator (OP).
3	Management	Lack of management system for project Implementation
4	Funding and financing	Need to develop an evaluation of financing and economic viability (Gov and OP).
5	Legislative framework	Need to complete national legislation before issue the bid.
6	Safeguards	Implementation for NPP
7	Regulatory framework	Need assistance to perform necessary actions as those described in IAEA Safety Standard publication
8	Radiation protection	Need assistance to perform appropriate hazards analysis based on IAEA safety Standard
9	Grid	Still need to complete a study on electric expansion planning with nuclear option

No.	Content	Further Attention
10	Human resources development	Design of appropriate NTC facilities and programme.
11	Stakeholder Involvement	To develop appropriate information and education programme and tools as well as training course for nuclear communicator.
12	Site and supporting facilities	Development of an appropriate SER to support site permit process.
13	Environmental protection	Development of an appropriate Environmental Impact Assessment to support licensing process.
14	Emergency planning	Development of an appropriate Environmental Impact Assessment to support licensing process.
15	Security and physical protection	Development of Security and physical protection for NPP

No.	Content	Further Attention
16	Nuclear fuel cycle	Development of long term of spent fuel
17	Radioactive waste	Development of long term of spent fuel
18	Industrial involvement	Development of standards and qualification and review the feasibility of national industry involvement.
19	Procurement	Development of procurement process

Result

Indonesia has completed issues of phase 1 of electrical grid with no action needed. Issues of National position, Nuclear safety, Management, Funding and Financing, legislative frame work, Radiation protection, Human resources, Stakeholder involvement, Site and supporting facilities, Environmental protection, Emergency planning, Security, Nuclear fuel cycle, Radioactive waste and Industrial Involvement are need minor action. Significant action must be taken on Procurement.

Result

No.	INFRASTRUCTURE ISSUES	PHASE 1, STATUS
1.	National position	Minor Actions Needed
2.	Nuclear safety	Minor Actions Needed
3.	Management	Minor Actions Needed
4.	Funding and Financing	Minor Actions Needed
5.	Legislative Framework	Minor Actions Needed
6.	Safeguards	Minor Actions Needed
7.	Regulatory Framework	Minor Actions Needed
8.	Radiation protection	Minor Actions Needed
9.	Electrical Grid	No Actions Needed
10.	Human resources	Minor Actions Needed
11.	Stakeholder involvement	Minor Actions Needed
12.	Site and supporting facilities	Minor Actions Needed
13.	Environmental protection	Minor Actions Needed
14.	Emergency planning	Minor Actions Needed
15.	Security	Minor Actions Needed
16.	Nuclear fuel cycle	Minor Actions Needed
17.	Radioactive waste	Minor Actions Needed
18.	Industrial Involvement	Minor Actions Needed
19.	Procurement	Significant Actions Needed

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Conclusion

- Indonesia Government has made a strong commitment on development of nuclear power with the important goal for building the first nuclear power plant in Indonesia and putting it into safe and effective operation in the year 2015-2019.
- There are 10 years left for preparation of all national infrastructure elements required for nuclear power plant being constructed and commissioned timely, safely, securely and efficiently. It requests big efforts and strong commitment from relevant national organizations and a close international cooperation with the IAEA and other countries.

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References

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Basic Infrastructure for a Nuclear Power Project, IAEATECDOC-1513, IAEA, Vienna (2006).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Milestones in the Development of a National Infrastructure for Nuclear Power, IAEA Nuclear Energy Series No. NG-G-3.1, IAEA, Vienna (2007).

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Evaluation of the Status of National Nuclear Infrastructure Development, IAEA Nuclear Energy Series No. NG-T-3.2, Vienna (2008).

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THANKS FOR YOUR ATTENTION