

# THE GAP OF NUCLEAR INFRASTRUCTURE READINESS

Jakarta, 24 February 2020

Sriyana,  
Center for Nuclear Energy System Assessment  
Badan Tenaga Nuklir Nasional



- Self Assessment of Nuclear Infrastructure readiness: finished October 2009.
- IAEA INIR (Integrated Nuclear Infrastructure Review) Mission: 23 – 27 November 2009
- Result of the INIR Mission submitted to Indonesia Government: May 11, 2010.
- There are 14 recommendations and 17 suggestion.

# (1) NATIONAL POSITION



Suggestion/Recommendation	Follow up	Institutions Involved
<p>In order to implement the provisions of Act 17/2007, <del>President Decree 5/2006</del>, GR 79/2014, President Decree 22/2016:</p> <ul style="list-style-type: none"> <li>▪ <b>Recommendation no. 1:</b> Clarify the planning and decisions needed for a nuclear power program and identify owner/operator.</li> <li>▪ <b>Recommendation no. 2:</b> Create an inter-agency team to oversee and steer infrastructure development work</li> <li>▪ <b>Recommendation no. 3:</b> Develop a detailed action plan for infrastructure development for phase 2 (until invitation to bid is sent out) as part of longer term planning</li> <li>▪ <b>Recommendation no. 4:</b> Define the responsibilities of organizations to be involved in phase 2, by clarifying “who is responsible for what part of the nuclear energy program”.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Clarify the planning and determine owner/operator</li> <li>✓ Establish a national team</li> <li>✓ Prepare a detailed action plan</li> <li>✓ Define the responsibilities</li> </ul>	<p>Interagency team (BATAN, BAPETEN, ESDM, Kemenlu, PLN, Menristek, BAPEDAL, Kemenperin, DEN, Perguruan Tinggi)</p>

# (1) NATIONAL POSITION – follow up



Follow up	Institutions Involved
<ul style="list-style-type: none"><li>✓ <b>Clarify the planning and determine owner/operator</b><ul style="list-style-type: none"><li>▪ <i>GR 79/2014 : National Energy Policy</i></li><li>▪ <i>President Decree 22/2016: National Energy General Planning</i><ul style="list-style-type: none"><li>• <i>Multicriteria assessment</i></li><li>• <i>Roadmap Establishment</i></li></ul></li></ul></li><li>✓ <b>Establish a national team</b><ul style="list-style-type: none"><li>▪ <i>Working Group under MPTN: huge stakeholder involvement for supporting the National Team under President Decree for NEPIO establishment.</i></li></ul></li><li>✓ <b>Prepare a detailed action plan</b><ul style="list-style-type: none"><li>▪ <i>Several issue among 19 infrastructure issues has already been take several action plan</i></li></ul></li><li>✓ <b>Define the responsibilities</b><ul style="list-style-type: none"><li>▪ <i>Clear responsibility with Act 10/1997 that will be amendment and also clearly stated on the BAPETEN Chairman Reg. 2/2014</i></li></ul></li></ul>	<p><b>Interagency team (BATAN, BAPETEN, ESDM, Kemenlu, PLN, Menristek, BAPEDAL, Kemenperin, DEN, Perguruan Tinggi)</b></p>

# (2) NUCLEAR SAFETY



Suggestion/Recommendation	Follow up	Institutions Involved
<p><b>Suggestion no 1: BAPETEN should:</b></p> <ul style="list-style-type: none"><li>▪ <b>proceed with its existing plans to review and where appropriate revise its management system,</b></li><li>▪ <b>give thought on where technical support would be available should a NPP program be implemented,</b></li><li>▪ <b>explore the need for training for leadership and management of safety,</b></li><li>▪ <b>look into the question of how to review contractors /suppliers management systems, and</b></li><li>▪ <b>explore where IAEA could provide support in the area of training.</b></li></ul>	<ul style="list-style-type: none"><li>✓ Review and revise, if necessary, its management system</li><li>✓ Find out where technical support would be obtained</li><li>✓ Identify the need for training for leadership and management of safety</li><li>✓ Review contractors/ suppliers management system</li><li>✓ Identify where IAEA could give assistance</li></ul>	<p><b>BAPETEN</b></p>

# (2) NUCLEAR SAFETY – follow up



## Follow up

## Institutions Involved

### ✓ Review and revise, if necessary, its management system

- *BATAN & BAPETEN has already adopted and implemented Integration Management System (GSR part 3) → (1) BATAN Management System – SIMBA, and follow & meet the BCR 4/2010 about Management System for Nuclear Installation (2) BAPETEN has review to improve BCR 4/2010*

**BAPETEN,  
BATAN**

### ✓ Find out where technical support would be obtained

- *BATAN is an TSO for commercial NPP, University (ITB, UGM, UI), and other related institution.*

### ✓ Identify the need for training for leadership and management of safety

- *BATAN, BAPETEN, ESDM, Kemenristek has an Training and education center that could provide leadership and management of safety. The expert could come from other institution and also from abroad.*

### ✓ Review contractors/ suppliers management system

- *Not yet implemented, but already have several experiences for consultancy*

### ✓ Identify where IAEA could give assistance

- *TBD (discuss wit relevan and competence institution)*

# (3) MANAGEMENT



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Recommendation no. 5: Identify owner/operator of NPP(s) and determine its responsibilities in the development of the nuclear power infrastructure.</b></li><li>▪ <b>Suggestion no. 2: Continuously update national energy strategy using the latest information.</b></li></ul>	<ul style="list-style-type: none"><li>✓ Identify the owner/operator and define the responsibilities</li><li>✓ Update the national energy strategy</li></ul>	<p>interagency team</p>

# (3) MANAGEMENT – follow up



## Follow up

## Institutions Involved

- ✓ **Identify the owner/operator and define the responsibilities**
  - *Not defined yet*
  
- ✓ **Update the national energy strategy**
  - ***GR 79/2014: National Energy Policy***
  - ***President Decree 22/2016: National Energy General Planning***
    - *Multicriteria analysis for NPP*
    - *Roadmap for Commercial NPP*

interagency team



# (4) FUNDING AND FINANCING



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Recommendation no. 6:</b> Identify the appropriate funding scheme for the selected owner/operator.</li><li>▪ <b>Suggestion no. 3:</b> Fully secure resources (staffing and funding) to the national inter-agency team mentioned in recommendation no. 2.</li><li>▪ <b>Suggestion no. 4:</b> Develop a funding method for long-term waste and decommissioning liabilities.</li></ul>	<ul style="list-style-type: none"><li>✓ Identify funding scheme</li><li>✓ Conduct staffing and funding</li><li>✓ Define funding method</li></ul>	interagency team

# (4) FUNDING AND FINANCING - follow up



## Follow up

## Institutions Involved

### ✓ Identify funding scheme

- *Done with in the FS (as part of scope of study)*
  - ✓ 2013, 2020

### ✓ Conduct staffing and funding

- *It will perform together with NEPIO establishment*

### ✓ Define funding method

- *Done with in the FS (as part of scope of study)*
  - ✓ 2013, 2020

interagency team (BATAN)

# (5) LEGISLATIVE FRAMEWORK



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Recommendation no. 7:</b> Review the nuclear and relevant non-nuclear legislation that will impact the nuclear power project</li><li>▪ <b>Recommendation no. 8:</b> Indonesia should finalize the ratification process for the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management. Indonesia should further clarify the situation concerning:<ul style="list-style-type: none"><li>○ The Vienna 1997 Convention on Civil Liability for Nuclear Damage</li><li>○ The Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention.</li></ul></li></ul>	<ul style="list-style-type: none"><li>✓ Review legislation on nuclear and non-nuclear</li><li>✓ Conduct finalization of the ratification process.</li></ul>	<p>BATAN, BAPETEN</p> <p>BATAN, BAPETEN, DEPLU</p>

# (5) LEGISLATIVE FRAMEWORK - follow up



## Follow up

## Institutions Involved

### ✓ Review legislation on nuclear and non-nuclear

- *Regulation for NPP construction already prepare:*
  - *From site license up to operation lisenca*

BATAN, BAPETEN

### ✓ Conduct finalization of the ratification process.

- *Already ratified.*

BATAN, BAPETEN,  
DEPLU

# (6) SAFEGUARD



Suggestion/Recommendation	Follow up	Institutions Involved
■ -	✓ -	<b>BATAN, BAPETEN</b>

# (7) REGULATORY FRAMEWORK



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Suggestion no. 5:</b> With respect to further assistance an IAEA IRRS mission could be considered at an appropriate time.</li></ul>	✓ Consider the IRRS mission → <b>DONE</b>	<b>BATAN, BAPETEN</b>

# (8) RADIATION PROTECTION



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b><i>Suggestion no. 6</i></b> : Set up an advisory committee to the chair of BAPETEN to discuss specific regulation drafts.</li></ul>	✓ Establish the committee <b>BAPETEN regular program</b>	<b>BAPETEN, BATAN</b>

# (9) ELECTRICAL GRID



Suggestion/Recommendation	Follow up	Institutions Involved
▪ -	✓ -	PT. PLN



# (10) HUMAN RESOURCES DEVELOPMENT



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Suggestion no. 7</b> : Involve owner/operator candidate organizations as soon as possible in planning for human resource development</li><li>▪ <b>Suggestion no. 8</b> :Develop a human resource development plan for implementing phase 2 that includes a determination if national human resources are sufficient to implement phase 2</li></ul>	<ul style="list-style-type: none"><li>✓ Invite owner/operator to develop HRD planning</li><li>✓ Develop HRD plan</li></ul>	<b>Interagency team</b>

# (10) HUMAN RESOURCES DEVELOPMENT -follow up



Follow up	Institutions Involved
<ul style="list-style-type: none"><li>✓ Invite owner/operator to develop HRD planning<ul style="list-style-type: none"><li>▪ <b>National Team under Ministry of Energy (2010)</b></li></ul></li> <li>✓ Develop HRD plan<ul style="list-style-type: none"><li>▪ <b>National Team under Ministry of Energy (2010), Roadmap HRD for RDE, for SMR (2015 – 2017)</b></li></ul></li></ul>	Interagency team

# (11) STAKEHOLDER INVOLVEMENT



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Recommendation no. 9:</b> Develop and implement comprehensive programs for stakeholder involvement and public communication.</li><li>▪ <b>Recommendation no. 10:</b> Involve professional communicators in the development and implementation of plans.</li><li>▪ <b>Recommendation no. 11:</b> Implement national opinion surveys to determine the degree of public knowledge and attitudes towards nuclear power and evaluate effectiveness of communication efforts.</li><li>▪ <b>Recommendation no. 12:</b> Evaluate if public participation should be included in the decision making process, such as reactor licensing by BAPETEN.</li></ul>	<ul style="list-style-type: none"><li>✓ Develop programs involving stakeholders for public communication</li><li>✓ Contact professionals</li><li>✓ Carry out public survey</li><li>✓ Consider the possibility of public participation in making decision</li></ul>	<b>BATAN, ESDM, KEMENRISTEK</b>

# (11) STAKEHOLDER INVOLVEMENT -follow up



Follow up	Institutions Involved
<ul style="list-style-type: none"><li>✓ Develop programs involving stakeholders for public communication</li><li>✓ Contact professionals</li><li>✓ Carry out public survey</li><li>✓ Consider the possibility of public participation in making decision</li></ul> <p><i>Several activities for public information and education (stakeholder mapping, stakeholder engagement, professional involvement, public survey several times, etc.)</i></p>	BATAN, ESDM, KEMENRISTEK

# (12) SITE AND SUPPORTING FACILITIES



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Recommendation no. 13:</b> Update the Site Data Report when owner/operator is identified.</li><li>▪ <b>Recommendation no. 14:</b> Prepare a Site Evaluation Report for the preferred site. Continue investigations of alternative sites..</li></ul>	<ul style="list-style-type: none"><li>✓ Update the data</li><li>✓ Prepare the report and find other alternative sites</li></ul>	<b>BATAN &amp; Interagency</b>

# (12) SITE AND SUPPORTING FACILITIES



Follow up	Institutions Involved
<ul style="list-style-type: none"><li>✓ <b>Update the data</b><ul style="list-style-type: none"><li>▪ <i>Done (RDE site, Bangka site, Muria site)</i></li></ul></li> <li>✓ <b>Prepare the report and find other alternative sites:</b><ul style="list-style-type: none"><li>▪ <i>Experience in apply for site licence for RDE and got the site license January 2017, and another site study (bangka, kalbar, NTB)</i></li></ul></li></ul>	<p><b>BATAN &amp; Interagency</b></p>

# (13) ENVIRONMENT PROTECTION



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b><i>Suggestion no. 9</i></b> : Clarify the relationship between the environment ministry and other organizations that are involved in the nuclear power program.</li></ul>	✓ Describe the relationship between BAPEDAL/KLH and BAPETEN/BATAN	BAPEDAL, KLHK, BAPETEN, BATAN

# (13) ENVIRONMENT PROTECTION -follow up



Follow up	Institutions Involved
<p>✓ <b>Describe the relationship between BAPEDAL/KLH and BAPETEN/BATAN</b></p> <ul style="list-style-type: none"><li>▪ <i>Already implemented whenever RDE step to get the environmental permit. Ministry of Environment will process the Application for EL if site license already got.</i></li></ul>	<p>BAPEDAL, KLHK, BAPETEN, BATAN</p>



# (14) EMERGENCY PLANNING



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b><i>Suggestion no. 10: The Governmental and local authorities should be involved in the preparation of the Emergency Preparedness Review process.</i></b></li></ul>	<ul style="list-style-type: none"><li>✓ Establish plan to involve Government and local authorities in the preparation of the Emergency Preparedness Review process</li></ul>	Interagency team & Pemda

# (14) EMERGENCY PLANNING – follow up



Follow up	Institutions Involved
<p>✓ <b>Establish plan to involve Government and local authorities in the preparation of the Emergency Preparedness Review process</b></p> <ul style="list-style-type: none"><li>▪ <i>Implemented : BNPB, BPBD, POLRI, Kawasan Nuklir, Pemda → PPIKSN, Bapeten</i></li></ul>	Interagency team & Pemda

# (15) SECURITY & PHYSICAL PROTECTION



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Suggestion no. 11: Planning for nuclear security implementation should be continued, and where applicable, involve relevant stakeholder organizations. The recommendations provided from INSServ and Sustainability missions should be followed up, in particular:</b><ul style="list-style-type: none"><li>▪ <b>Development of security oversight and inspection capability in the regulatory body.</b></li><li>▪ <b>Development of a national nuclear security training capability for workers, management and security personnel at sites with nuclear and radioactive material.</b></li><li>▪ <b>Development of site-level DBT and documentation demonstrating that the site security systems are sufficient, as well as a review process for both.</b></li><li>▪ <b>The Government of Indonesia should define organizations to participate in the review and update the national and site DBTs.</b></li></ul></li></ul>	<p>✓ Establish plan to involve relevant stakeholders organization in the preparation of nuclear security implementation</p>	<p>Interagency team &amp; Pemda</p>

# (15) SECURITY & PHYSICAL PROTECTION



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Suggestion no. 12:</b> A program of strong security culture and regulation that addresses security requirements to radioactive sources and waste should be reviewed, guided by the IAEA Nuclear Security Series documents “Nuclear Security Culture” and “Security of Radioactive Sources”. As many key people might leave shortly a staffing plan should be developed to ensure knowledge retention and seamless transitions in job positions.</li><li>▪ <b>Suggestion no. 13:</b> It is advisable that a National Committee to oversee nuclear security coordination across all government bodies is established and National training capability is developed.</li></ul>	<ul style="list-style-type: none"><li>✓ Review program of security culture and regulation</li><li>✓ Oversee nuclear security coordination</li></ul>	Interagency team & Pemda

# (15) SECURITY & PHYSICAL PROTECTION - follow up



## Follow up

- ✓ **Establish plan to involve relevant stakeholders organization in the preparation of nuclear security implementation**
- ✓ **Review program of security culture and regulation**
- ✓ **Oversee nuclear security coordination**
  - *Indonesia Center of Excellent for Nuclear Security and Emergency Preparedness (I-CoNSEP) → BAPETEN*
  - *Center for Security Culture and Assessment (CSCA) → BATAN*

## Institutions Involved

Interagency team & Pemda

# (16) NUCLEAR FUEL CYCLE



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b><i>Suggestion no. 14</i></b> : Work should start early on the activities of phase 2, in particular a strategy and planning document should be developed for all aspects of the fuel cycle and ensure the appropriate inclusion in bidding documents.</li></ul>	<ul style="list-style-type: none"><li>✓ Prepare strategy and planning document for fuel cycle aspects</li></ul>	<b>BATAN, BAPETEN</b>

# (16) NUCLEAR FUEL CYCLE – follow up



## Follow up

- ✓ **Prepare strategy and planning document for fuel cycle aspects**
  - *Study for nuclear fuel fabrication (economic feasibility)*

## Institutions Involved

**BATAN, BAPETEN**

# (17) RADIOACTIVE WASTE



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b><i>Suggestion no. 15</i></b> : It would be useful to develop early a formal strategy and planning document for all aspects of waste management, including an appropriate funding (for decommissioning and spent fuel and waste management) to ensure the fund buildup during NPP operation. It would further be useful to involve the prospective owner/operator of the NPP in this work.</li></ul>	<ul style="list-style-type: none"><li>✓ Prepare strategy and planning document for waste management aspects</li></ul>	<b>BATAN, BAPETEN</b>



# (17) RADIOACTIVE WASTE - follow up



Follow up	Institutions Involved
<p>✓ <b>Prepare strategy and planning document for waste management aspects</b></p> <ul style="list-style-type: none"><li>▪ <i>GR 61/2013: Radwaste Management</i></li><li>▪ <i>..... Will be completed by PTLR</i></li></ul>	<p><b>BATAN, BAPETEN</b></p>

# (18) INDUSTRIAL INVOLVEMENT



Suggestion/Recommendation	Follow up	Institutions Involved
<ul style="list-style-type: none"><li>▪ <b>Suggestion no. 16 : Set up a target for local content for NPP construction utilizing the result of the survey of domestic industrial capability.</b></li><li>▪ <b>Suggestion no. 17 : Develop relevant phase 2 action plans.</b></li></ul>	<ul style="list-style-type: none"><li>✓ Define local content target</li><li>✓ Prepare action plans for Phase 2</li></ul>	<p><b>BATAN, Kemenperin</b></p> <p><b>Interagency</b></p>

# (18) INDUSTRIAL INVOLVEMENT – follow up



Follow up	Institutions Involved
<ul style="list-style-type: none"><li>✓ <b>Define local content target</b><ul style="list-style-type: none"><li>▪ <i>Target estimation for local content (several national industry participation studies)</i></li><li>▪ <i>Target of local content for coal, RE, etc, already established with Ministry of Industry regulation, but nuclear has not been established yet.</i></li></ul></li> <li>✓ <b>Prepare action plans for Phase 2</b><ul style="list-style-type: none"><li>▪ <i>GR 14/2015: Master Plan for National Industry Development 2015 – 2035, provide more attention for nuclear power development: will develop nuclear as industry of energy generation</i></li></ul></li></ul>	<p><b>BATAN, Kemenperin</b></p> <p><b>Interagency</b></p>

# NATIONAL INDUSTRY PARTICIPATION

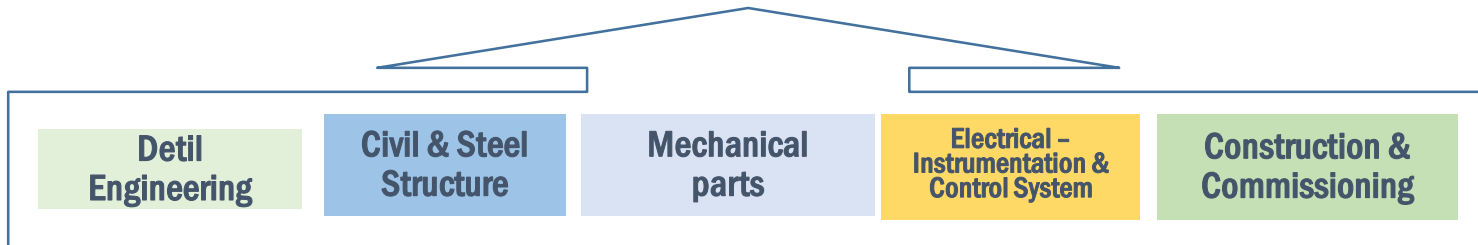
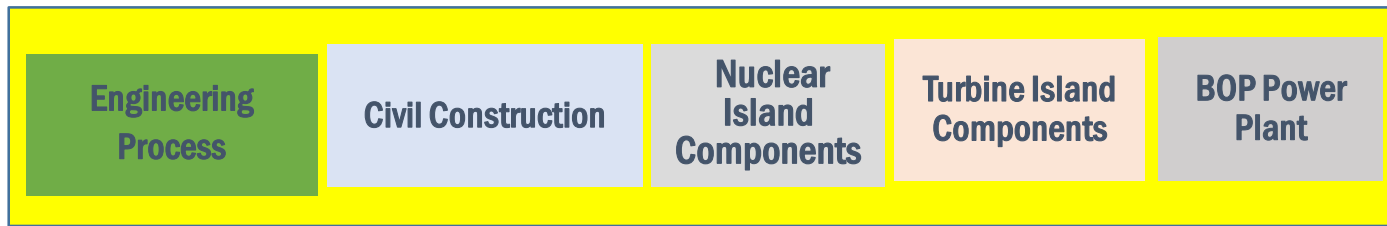


BY	YEAR	NPP TYPE	LEVEL OF NATIONAL PARTICIPATION (%)				
			Unit 1&2	Unit 3&4	Unit 5&6	Unit 7&8	Unit 9&10
NewJec	1994	PWR	25	30	35	60	Optimum
MHI-WH	1996	AP600	31	60		-	-
GE	1996	ABWR	26,1	31,4	37,5	60	Optimum
KEPCO	1997	KSNP1000	25	40		60	-
UGM	2004	OPR1000	25	-	-	-	-
KHNP	2006	OPR1000	20	50		70	
BATAN	2010	1000 MWe	30	40		80	
FS Bangka	2013	PWR 1000	30	30			

## Road map of construction:

NPP (unit#)	#1,#2	#3,#4	#5,#6	#7,#8	#9,#10
Year of construction	2027	2034	2037	2040	2043
Contract type	Turn-key	Turn-key	Split package	Split package	Split package
Local content	30	35	40	60	80

# NUCLEAR POWER PLANT PROJECT National Supporting Industries



Engineering Company

Civil Construction Company

BUMN/Private Company

Electrical Company

EPC Company



*barata indonesia*



beyond construction



beyond construction



# Industry National Pressure Vessel / Reactor Fabrication



*barata indonesia*

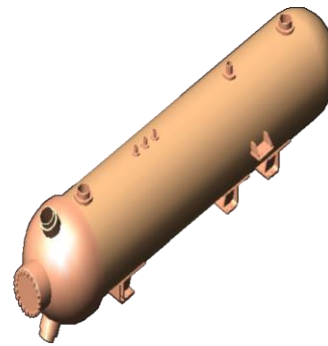
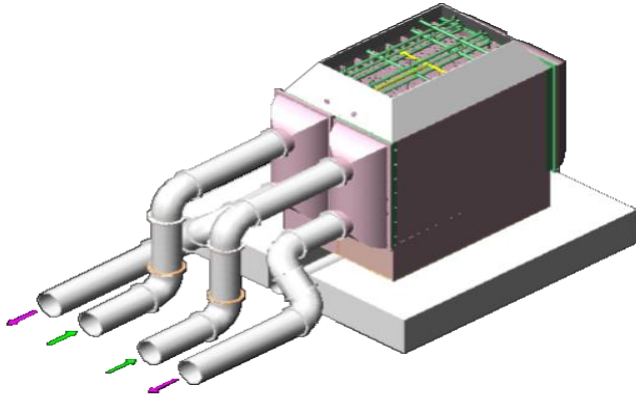


**PAI** INDONESIA



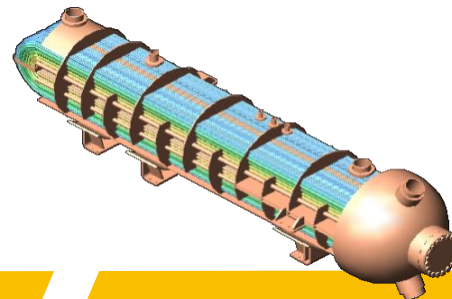
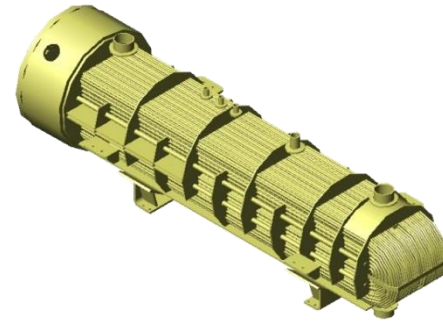
PT. CILEGON FABRICATORS  
FABRICATORS OF INDUSTRIAL

# Industry National Condenser, Heat Exchanger Fabrication



*barata indonesia*

**PAI** INDONESIA



# National Industries of Bearing Housing Steam Turbine - Generator



*barata indonesia*





# National Industries of Steam Turbine Components



PT Siemens  
Indonesia  
Cilegon Factory



*barata indonesia*

# National Industries of Manufacturing Machining Facilities

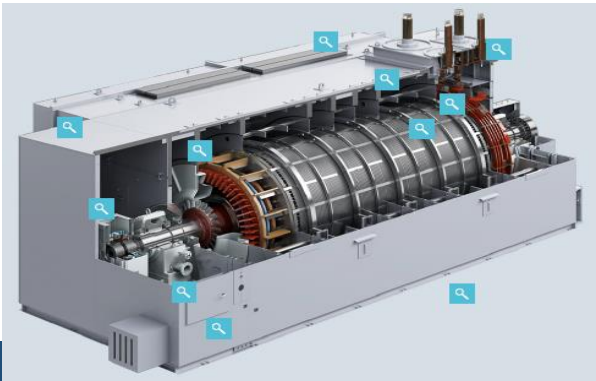
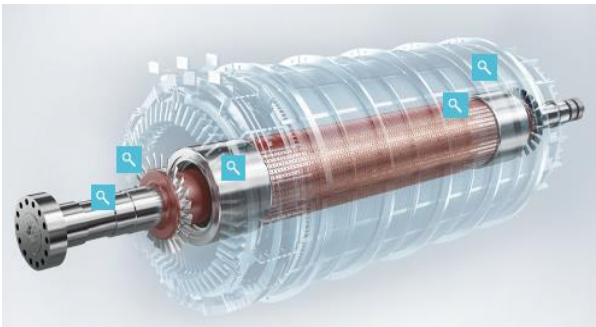


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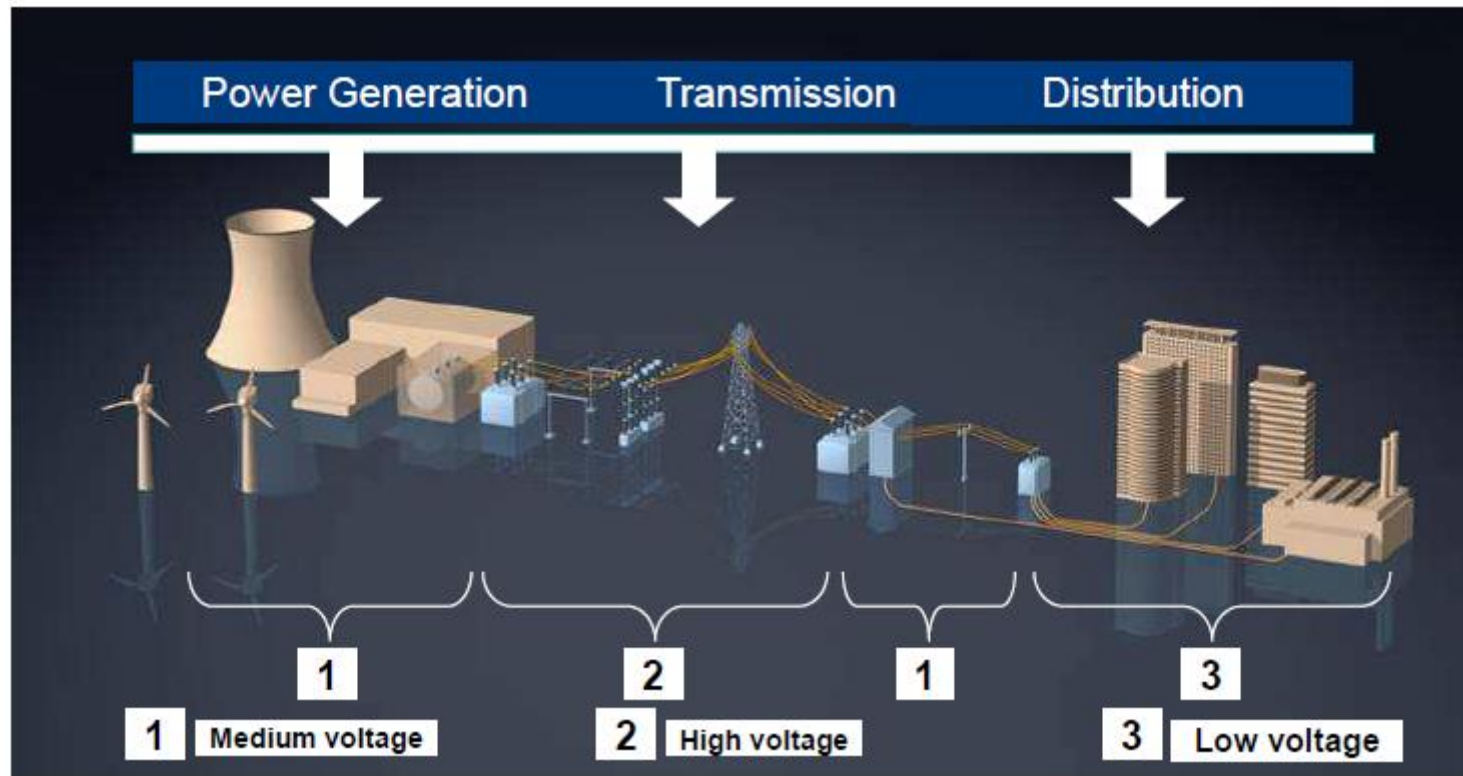
**PAI** INDONESIA







**Program Development**  
**Capacity up to 25 MW : 2019**  
**Capacity up to 100 MW : 2021**



## Locally produced switchgears

Medium Voltage Switchgear



Low Voltage Switchgear



Automation and Control System



**SIEMENS**  
*Ingenuity for life*

**ABB**

**Schneider**  
Electric

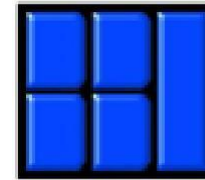
**TAMCO**



# BUMN

*Hadir untuk negeri*

## Ready to Support Nuclear Power Plant



## INVOLVEMENT NATIONAL EPC COMPANY IN EPC STAGE

No	Scope	Basic Design	Detail Design	Procurement	Construction	Commissioning
1	NSSS	-	-	-	●	-
2	Turbine Island	●	●	●	●	●
3	Balance of Plant	●	●	●	●	●
4	Substation & Transmission Line	●	●	●	●	●
5	Civil Work	●	●	●	●	●

● Major Involvement  
● Minor Involvement

- In NSSS & Turbine Island scope, National EPC companies have minor involvement but shall be involved in collaboration with Foreign EPC company for transfer knowledge process.
- For the pilot project NPP with capacity < 300 MW, Turbine Island scope will be major involvement by National EPC company excl. commissioning work

## DETAIL SPLIT OF WORK IN EPC STAGE

No	Scope	Basic Design	Detail Design	Procurement	Construction	Commissioning
1	NSSS					
	• Nuclear Reactor & Steam generator	TP	TP	TP	EPC I	TP
	• Auxiliary	TP	TP	EPC I	EPC I	TP
	• Civil work	TP	TP	EPC I&N	EPC I&N	-
2	Turbine Island	EPC I&N	EPC I&N	EPC I&N	EPC N	EPC I&N
3	Balance of Plant	EPC N	EPC N	EPC N	EPC N	EPC N
4	Substation & Transmission Line	EPC N	EPC N	EPC N	EPC N	EPC N
5	Civil Work	EPC N	EPC N	EPC N	EPC N	-

**Note :**

TP : Technology Provider

EPC I : EPC International Company

EPC N : EPC National Company

# (19) PROCUREMENT



Suggestion/Recommendation	Follow up	Institutions Involved
▪ -	✓ -	<b>Owner, BATAN, BAPETEN and other stakeholders</b>

**THANK FOR  
YOUR KIND ATTENTION**