ELECTRICITY OF INDONESIA

“Leveraging Carbon Pricing to Accelerate Power Sector Decarbonisation in Asia Pacific”
Asia-Pacific Climate Week 2021 side-event

Gigih Udi Atmo
Deputy Director of Electricity Business Supervision

Directorate General of Electricity
Jakarta, July 8th 2021
<table>
<thead>
<tr>
<th>Outline</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>3</td>
</tr>
<tr>
<td>Indonesia’s electricity: context and policy</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>9</td>
</tr>
<tr>
<td>Indonesia’s electricity market</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>14</td>
</tr>
<tr>
<td>Voluntary carbon trading in electricity sector</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>19</td>
</tr>
<tr>
<td>Closing statement</td>
<td></td>
</tr>
</tbody>
</table>
INDONESIA’S ELECTRICITY: CONTEXT AND POLICY
STATUS OF NATIONAL ELECTRICITY (MAY 2021)

INSTALLED CAPACITY OF NATIONAL POWER GENERATION

BASED ON THE OWNER

- IPP: Independent Power Producer
- PPU (Private Power Utility) is a holder of a business area other than PLN
- IO non BBM is the holder of an Operation License with a generator that uses fuel other than BBM

BASED ON THE TYPE

- GTPP/CCPP/G: Gas Turbine Power Plant/Combine Cycle Power Plant/Gas
- CFPP: Coal Fired Power Plant
- DEPP: Diesel Engine Power Plant
- HEPP/MHPP/MiHPP: Hydro Electric Power Plant/Mini Hydro Power Plant
- GeoPP: Geothermal Power Plant
- NRE: Non-Renewable Energy

TRANSMISSION AND DISTRIBUTION

- Transmission: 61,591 kmc
- Substation: 150,618 MVA
- Distribution: 1,011,949 kmc
- Distribution Substation: 62,227,370 MVA

NATIONAL ELECTRICITY CONSUMPTION

- Non PLN: 13%
- PLN: 87%

ENERGY MIX OF PLN’S POWER GENERATION

- Coal: 63.52%
- Gas: 18.7%
- Other RE: 0.33%
- Geothermal: 5.63%
- Oil + Biofuel: 4.23%
- Other: 7.59%

Notes:
- GTPP: Gas Turbine Power Plant
- CCPP: Combine Cycle Power Plant
- CFPP: Coal Fired Power Plant
- DEPP: Diesel Engine Power Plant
- HEPP: Hydro Electric Power Plant
- MHPP: Mini Hydro Power Plant
- MiHPP: Micro Hydro Power Plant
- GeoPP: Geothermal Power Plant

4
Energy Security

Gov. Regulation No. 79/2014 on National Energy Policy

Energy Security is the condition which availability of energy and public access to energy at an affordable price in the long run are guaranteed, with due regard to environmental protection.

**AFFORDABILITY**
affordability of energy investment costs, from exploration, production, and distribution costs, to consumer affordability of energy prices

**ACCEPTABILITY**
use of energy which are environmentally friendly (land, sea, and air), including public acceptance (on nuclear power etc.)

**AVAILABILITY**
availability of energy and energy sources, both from domestic and abroad

**ACCESSIBILITY**
ability to access energy sources, grid infrastructure, including geographic and geopolitical challenges
**Global Commitment**

Paris Agreement Target:
Keeping global temperature rise not exceeding 2°C, and striving to be 1.5°C

**National Commitment:**
Mandate of Law No. 16/2016 on Ratification of the Paris Agreement
Reduce GHG emissions according to NDC by 2030:
- 29% from BaU (own ability)
- 41% from BaU (International assistance)

**Energy Sector Commitment:**
Reduce GHG emissions by 314 – 398 Million Tons of CO2 by 2030
Target 23% NRE from Primary Energy Mix & 17% Energy Efficiency from BaU Final Energy

Mitigation actions will be carried out through:
1. Diverting the fuel subsidy budget to productive activities (infrastructure);
2. 23% renewable energy of the total national primary energy mix by 2025;
3. Waste to Energy (WtE).
NATIONAL ENERGY GENERAL PLANNING TARGET IN 2025 & 2050

**2025 Target**

1. Total Generation Capacity: 115 GW (NRE 45 GW)
2. Energy Consumption: 1.4 TOE/capita
3. Electricity Consumption: 2,500 kWh/capita

**2050 Target**

1. Total Generation Capacity: 430 GW (NRE 168 GW)
2. Energy Consumption: 3.2 TOE/capita
3. Electricity Consumption: 7,000 kWh/capita

**Priority Principles of National Energy Development**

- **Maximize RE utilization**
- **Minimize oil utilization**
- **Optimize gas and new energy usage**
- **Utilization of coal as part of the baseload power plants**
- **Utilization of Nuclear Power Plants as the last option**
2 INDONESIA’S ELECTRICITY MARKET
ELECTRICITY INTERCONNECTION DEVELOPMENT PLAN

Interconnection Acceleration on 11 sections of Transmission Line

1. 500 kV Interconnection of Batam-Singapore (Sumatera-Singapore)
2. 500 kV Interconnection of Sumatera-Malaysia (2030)
3. 150 kV Interconnection of Sumatera-Bangka (2022)
4. 150 kV Interconnection of Bangka-Belitung
5. 150 kV Interconnection of Belitung-Kalimantan (Sumatera-Kalimantan)
6. 150 kV Interconnection of Sumatera-Bintan (2027)
7. 500 kV Interconnection of Jawa-Sumatera
8. 150 kV Interconnection of Bali-Lombok (2028)
9. 150 kV Interconnection of Kalimantan (2023)
10. 150 kV Interconnection of Sulawesi (Tambu-Bangkir)
11. 150 kV Interconnection of Bau Bau-Sulbagsel

Note:
Letters in blue denote Interconnection related to Supergrid Nusantara Study

Existing 500 kV
Existing 275 kV
Existing 150 kV
Planned 500 kV
Planned 275 kV
Planned 150 kV
VOLUNTARY CARBON TRADING IN ELECTRICITY SECTOR
VOLUNTARY EMISSION TRADING SYSTEM (ETS) IN POWER SECTOR

According to article 52 of Government Regulation No. 46/2017 on Economic Instrument of Environment, emission trading must be implemented maximum in November 2024. For preparing the mandatory ETS in 2024, starting this year Directorate General of Electricity conducting ETS trial (voluntary scheme).

ETS trial (voluntary scheme) is conducted through Subroto Awards in Efficiency Energy, using the following scheme:

Objectives of ETS trial:
- Reducing GHG emissions to achieve NDC target
- Implementing of cap emission for coal-fired power plants
- Strengthening Measurement, Reporting and Verification in Inventory GHG emission
- Raising awareness in implementation of carbon pricing, especially in cap and trade, and offset

GHG emission cap in Coal Fired Power Plant (CFPP)

<table>
<thead>
<tr>
<th>Power Plant</th>
<th>Installed Capacity (MW)</th>
<th>Cap (tonnes CO₂/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFPP</td>
<td>Larger than 400 MW</td>
<td>0,918</td>
</tr>
<tr>
<td>CFPP</td>
<td>Between 100 and 400 MW</td>
<td>1,013</td>
</tr>
<tr>
<td>Mine Mouth CFPP</td>
<td>Between 100 and 400 MW</td>
<td>1,094</td>
</tr>
</tbody>
</table>

- CFPP capacities distribution according to the MEMR Regulation No 9/2020 on the Efficiency of the Electricity Supply of PT PLN (Persero).
- The cap value based on the 2019 weighted average GHG emission intensity in each CFPP groups and considering the emission quota status.
INCENTIVE FOR ELECTRICITY GENERATION FROM RENEWABLE ENERGY
MEMR Regulation No. 50 of 2017 jo No. 53 of 2018 jo No 04 of 2020 on Utilization of Renewable Energy for Power Generation

Types of Renewable Energy
Solar PV, Wind, Hydro, Biomass, Biogas, Biofuel, Municipal Waste, Geothermal, and Tidal/ocean

Implementation of Power Purchase

In accordance to the provisions of the legislation

Procurement mechanism: Direct selection and Direct appointment

Direct selection: Hydro, Solar PV, Wind, Biomass, Biofuel Tidal/Ocean, and Biogas Power Plant, Geothermal, and Municipal Waste

Direct appointment: Emergency condition, excess power, expansion, or only one developer

Power Purchase Price

<table>
<thead>
<tr>
<th>Power Generation Type</th>
<th>Solar PV, Wind, Biomass, Biogas, Biofuel, Ocean/Tidal</th>
<th>Municipal Waste, Geothermal, Hydro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>All capacity</td>
<td>All capacity</td>
</tr>
<tr>
<td>Ceiling price in case of: local BPP ≤ national BPP</td>
<td>Based on agreement</td>
<td>Based on agreement (including in Sumatera, Jawa, Bali)</td>
</tr>
<tr>
<td>Ceiling price in case of: local BPP &gt; national BPP</td>
<td>Max 85% of local BPP</td>
<td>Max 100 % of local BPP</td>
</tr>
</tbody>
</table>
POWER WHEELING OPPORTUNITIES IN INDONESIA

Opportunities:
• RE potential located outside the business area
• RE demand potential from business area customers, including RE100 companies
• Potential of RE excess power from captive power outside the business area

Challenges:
• The government has 23% renewable energy utilization target of the national energy mix by 2025
• Limited land area for business area holders to develop RE power plants

Power Wheeling Schemes
• PT B as the captive power located in PLN business area distributes electricity to the PT B’s factory located in PLN business area by utilizing the PLN network
• PT B as the captive power located in PLN business area distributes electricity to the PT B’s factory located in PT X business area by utilizing the PLN and PT X networks
• PLN’s RE power plant supplies RE demand from PT A (customer of PT X’s business area) by utilizing the PLN network
• PT X’s power plant located in PLN business area distributes electricity to PT X’s business area by utilizing the PLN network
CLOSING STATEMENT

The Government, through the Ministry of Energy and Mineral Resources, is committed to providing electricity in sufficient quantities, good quality, and at reasonable / affordable prices in order to improve the welfare and prosperity of the people in a just and equitable manner.

In an effort to reduce carbon emissions in the electricity sector, the Indonesian government has established targets for CO2 emissions reduction, renewable energy development, and introducing voluntary carbon markets.

Regulations for supporting renewable energy have been introduced to increase the economics of renewable energy power plants and for enabling power delivery across transmission network.
Thank You

www.gatrik.esdm.go.id

Follow us on social media accounts:

Facebook: @infogatrik
Instagram: @infogatrik
Twitter: @infogatrik
YouTube: Info gatrik

Jl. H.R. Rasuna Said Blok X2 Kav.07-08 Kuningan, Jakarta Selatan, DKI Jakarta. 12950