PLN’s Initiatives and Achievements towards Cleaner and more efficient Power Generation

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Agenda of Presentation

• General policy
  – Meeting the growing demand
  – Role of non-renewable and renewable
  – Feed-in tariff for renewable

• Update on Geothermal

• Update on hydropower

• Update on solar, wind, biomass, etc
General policy (1): demand

- Meeting the growing demand

Average annual growth 8,5%
General policy (2): non-renew and renew

• Share of renewable increase from 11% (2011) to 20% (2020)
Emission will increase from 123 million tons in 2010 to 256 million tons in 2019, and approx 80% of those will come from coal combustion.

*Grid emission factor* improves from 0.725 kgCO₂/kWh in 2010 to 0.675 kgCO₂/kWh in 2019, the improvement is achieved by utilisation of natural gas, geothermal, hydropower and adoption of supercritical /ultra-supercritical technology.
General policy (4): renewable

- Hydropower and geothermal dominate renewable development
- Feed-in tariff for other renewable (small hydropower, biomass, wind-power, solar PV)
  - The present feed-in tariff for small hydropower and biomass reflects various development in electrification rate. Less developed regions receive higher rate.
  - Rp 656/kWh for mini/micro hydropower (<10MW) in Jawa-Bali, incentive factors of 1.1 – 1.5 for outside Jawa-Bali.
  - Rp 975/kWh for biomass with incentive factors of 1.1 – 1.3 for outside Jawa-Bali
  - Rp 850/kWh and Rp 1050/kWh for electricity from municipal solid waste.
  - Government prepare feed-in tariff for solar PV and wind power to attract private investment.
  - Feed-in tariff should encourage development of domestic manufacturing facilities.
Update on Geothermal

New Geothermal Capacity: 6.5 GW

- 2012: 100 MW
- 2013: 150 MW
- 2014: 250 MW
- 2015: 1,050 MW
- 2016: 400 MW
- 2017: 1,000 MW
- 2018: 1,250 MW
- 2019: 1,600 MW
- 2020: 400 MW
Update on Hydropower

New Hydropower (5.4 GW; 304 sites)

<table>
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<tr>
<th>Year</th>
<th>Capacity</th>
<th>No. of Site</th>
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<tbody>
<tr>
<td>2012</td>
<td>306</td>
<td>47</td>
</tr>
<tr>
<td>2013</td>
<td>244</td>
<td>57</td>
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<tr>
<td>2014</td>
<td>700</td>
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<td>2016</td>
<td>1810</td>
<td>24</td>
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<tr>
<td>2017</td>
<td>852</td>
<td>11</td>
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Update on Solar, biomass, wind

• Solar
  – Off grid solar power: 1.9 MWp; 9 sites in operation. 3.6 MWp; 21 sites under construction. All in remote sites, competitive to diesel plants. The “100 island solar PV Project” (20 MWp) by the end of 2012. The “1000 island solar PV Project” (225 MWp) starts in 2013.
  – On grid solar power: reducing diesel generation. 305 MWp has been identified and opened for private participation.
  – Solar home system: provide LED lighting (and TVs) to groups of houses that difficult to access or far away from the grid, treated as PLN’s customers.

• Biomass
  – Excess power: 39 MW; 7 sites
  – IPP: 15 MW; 3 sites

• Windpower
  – IPP: 2 project (10 MW & 50 MW)