“Geothermal Development Program and Status in Indonesia”

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& Indonesia Renewable Energy Society (METI - IRES)

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Outline

• Indonesia Energy condition
• Geothermal Energy Status
• National Energy Policy
• National Energy Mix Target
• Development Plan
• Geothermal & RE Road Map and Strategy
Indonesia Energy Condition
Current energy conditions

- Energy supply in Indonesia is still dominated by fossil fuel
- Not all of Indonesians have enjoyed electricity; electrification ratio is only about 84%
- Due to energy crisis, Indonesia government has to prioritize fossil based energy compared to renewable, since fossil based energy takes shorter time for deployment
- Implications: energy sector will become the major source of emission after 2020
ELECTRICITY CONDITION

Total Installed Capacity:

53.585 MW

(PLN: 37.280 MW, IPP: 10.995 MW, PPU: 2.634 MW, IO Non BBM: 2.677 MW)

Power Consumption

199 TWh

Power Production*

228 TWh

Electrification Ratio

84.35%

Power Condition (March 2015)

Total System Indonesia = 24 System

(5 Normal; 14 Emergency; and 5 Deficit)

Note: Normal = Reserve > 20%; Emergency = Reserve < 1 the Biggest Unit; Deficit = Black out partially

*) Hanya PLN dan IPP
Geothermal Energy Status
1. Geothermal Power Plant

Installed Capacity

1.493.5 MW

New 4 Geothermal PP COD around 215 MW (Ulubelu 55 MW, Sarulla 110 MW, Lahendong 20 MW, Karaha Bodas 30 MW)

Resources 12,386 MW Reserves 16,524 MW
Total Potential 28,910 MW

2. State Revenue (non-tax)

Rp. 518 billion
(82.2% from Rp. 630 billion, target in 2016)

3. Resources: 12,386 MW and Reserves: 16,524 MW
Total Potential: 28,910 MW
<table>
<thead>
<tr>
<th>No.</th>
<th>WKP, Location</th>
<th>Power Plant</th>
<th>Developer/Operator</th>
<th>Turbine Unit</th>
<th>Capacity Total (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sibayak – Sinabung, SUMUT</td>
<td>1 Sibayak</td>
<td>PT. Pertamina Geothermal Energy</td>
<td>1 x 10 MW; 2 MW monoblok)</td>
<td>12,0</td>
</tr>
<tr>
<td>2</td>
<td>Cibeureum – Parabakti, JABAR</td>
<td>2 Salak</td>
<td>Chevron Geothermal Salak, Ltd</td>
<td>3 x 60 MW; 3 x 65,6 MW</td>
<td>377,0</td>
</tr>
<tr>
<td>3</td>
<td>Pangalengan, JABAR</td>
<td>3 Wayang Windu</td>
<td>Star Energy Geothermal Wayang Windu</td>
<td>1 x 110 MW; 1 x 117 MW</td>
<td>227,0</td>
</tr>
<tr>
<td>4</td>
<td>Patuha</td>
<td>4 Patuha</td>
<td>PT Geo Dipa Energi</td>
<td>1 x 55 MW</td>
<td>55,0</td>
</tr>
<tr>
<td>5</td>
<td>Kamojang – Darajat, JABAR</td>
<td>5 Kamojang</td>
<td>PT. Pertamina Geothermal Energy</td>
<td>1 x 30 MW; 2 x 55 MW; 1 x 60 MW; 1 x 35 MW</td>
<td>235,0</td>
</tr>
<tr>
<td>6</td>
<td>Darajat</td>
<td>6 Darajat</td>
<td>Chevron Geothermal Indonesia, Ltd</td>
<td>1 x 55 MW; 1 x 94 MW; 1 x 121 MW</td>
<td>270,0</td>
</tr>
<tr>
<td>7</td>
<td>Dataran Tinggi Dieng, JATENG</td>
<td>7 Dieng</td>
<td>PT. Geo Dipa Energi</td>
<td>1 x 60 MW</td>
<td>60,0</td>
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<tr>
<td>8</td>
<td>Lahendong – Tompaso, SULUT</td>
<td>8 Lahendong</td>
<td>PT. Pertamina Geothermal Energy</td>
<td>4 x 20 MW</td>
<td>80,0</td>
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<tr>
<td>9</td>
<td>Waypanas, LAMPUNG</td>
<td>9 Ulubelu</td>
<td>PT. Pertamina Geothermal Energy</td>
<td>3 x 55 MW</td>
<td>165,0</td>
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<tr>
<td>10</td>
<td>Ulumbu, NTT</td>
<td>10 Ulumbu</td>
<td>PT. PLN (Persero)</td>
<td>4 x 2,5 MW</td>
<td>10,0</td>
</tr>
<tr>
<td>11</td>
<td>Mataloko, NTT</td>
<td>11 Mataloko</td>
<td>PT. PLN (Persero)</td>
<td>1 x 2,5 MW</td>
<td>2,5</td>
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</table>

**TOTAL**                                                                 |                                  |                                   |                                                  | 1,493,5             |
1. Geothermal Investment

0.56 billion USD
(58.3% of target 0.96 billion USD)

2. Renewable Investment

0.018 billion USD
(18% of target 0.1 billion USD)

3. Bioenergy Investment

0.298 billion USD
(94.7% of target 0.31 billion USD)
National Energy Policy
National Energy Policy Principles

1. **Maximize** renewable energy utilization;
2. **Optimize** gas and new energy utilization;
3. **Minimize** oil utilization.
4. Utilization of coal as **the main** national energy supply;
5. Utilization of Nuclear Power Plant as **the last option**.

(2) of article 11 Government Regulation Number 79 Year 2014 concerning National Energy Policy (KEN)
National Energy Mix Target
TARGET OF NATIONAL ENERGY MIX

NEW AND RENEWABLE ENERGY
OIL
GAS
COAL

CURRENT CONDITION

2015
166 MTOE

26%
46%
23%
5%

TARGET RNEN 2025

2025
412 MTOE

22% 30% 25% 23%

TARGET RNEN 2050

2050
1,030 MTOE

20% 25% 31% 24%
Target of RE in 2025

Note:
NRE = New & Renewable Energy
Energy elasticity < 1
Optimize use of RE
Electricity:
• 60% Fossil (68.2 GW), 40% RE (46.8 GW)
• Total Demand: 115 GW by 2025

Need a leapfrog to meet NRE contribution in energy mix from 5% in 2016 to 23% in 2025: possible?
Development Plan
Geothermal Development Status

67 WKP (6.198.5 MW)

**Eksploitation:**
- 9 WKP (1.403.5 MW)

**Exploitation:**
- 30 WKP (3.205 MW)
  - Expected produce: 3.370 MW
  - **Under process License:**
    - 2 WKP (165 MW)
  - **Bidding Process:**
    - 26 WKP (1.425 MW)

**Under Going:**
- 17 WKP (1.930 MW)

**Stagnant:**
- 13 WKP (1.275 MW)

Ministry Regulation 17/2014 to Accelerate 13 Stagnant WKP
Development plans

Low estimate:
- Number of developments is similar to MEMR plan, but
- Size of some individual projects is smaller and some are delayed
Development plans, cont.
Geothermal & RE Road Map and Strategies
GEOTHERMAL BUSINESS ACTIVITIES AND PROCESS

Potensi Panas Bumi
Geothermal Potential

Survey
Pendahuluan
Preliminary
Survey

Eksplorasi
Exploration

Studi Kelayakan
Feasibility Study

Eksploitasi
Exploitation

Pemanfaatan
Utilization

Pemerintah/
Pemerintah Daerah/
Badan Usaha
Government/
Local Government/
Business Entity

Badan Usaha
Business Entity

Badan Usaha
Business Entity

Badan Usaha
Business Entity

Potensi
Panas Bumi
Geothermal
Potential

Pemerintah/
Pemerintah Daerah/
Badan Usaha
Government/
Local Government/
Business Entity

Pemerintah/
Pemerintah Daerah/
Badan Usaha
Government/
Local Government/
Business Entity

Badan Usaha
Business Entity

Badan Usaha
Business Entity

Badan Usaha
Business Entity

Pasar 17 ayat (4)

Pasal 17
ayat (4)

WILAYAH KERJA PANAS BUMI

3G
Geofisik
Geokimia
Geologis

Sumur uji
Injection well
Sumur eksplorasi
exploration well

30 Years
Maximum 30 years

Pemerintah/
Badan Usaha
Government/
Business Entity

Pemerintah/
Badan Usaha
Government/
Business Entity

Badan Usaha
Business Entity

Badan Usaha
Business Entity

Badan Usaha
Business Entity

Pemerintah/
Badan Usaha
Government/
Business Entity

Sumur pengembangan & injeksi
Dev't & Injection well
Pemb. fasilitas lap & penunjangnya
Steamfield & supporting facilities
Operasi produksi
Production operation

Ijin Panas Bumi
Geothermal License

Paling lama 5 tahun + 1 tahun + 1 tahun
Maximum 5 years + 1 year + 1 year

GEOTHERMAL BUSINESS ACTIVITIES
AND PROCESS
RE Roadmap and Strategies 2015-2025

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</thead>
<tbody>
<tr>
<td>Oil</td>
<td>37%</td>
<td>35%</td>
<td>34%</td>
<td>32%</td>
<td>31%</td>
<td>29%</td>
<td>25%</td>
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<tr>
<td>Gas</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
<td>21%</td>
<td>22%</td>
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<tr>
<td>Coal</td>
<td>33%</td>
<td>33%</td>
<td>34%</td>
<td>35%</td>
<td>36%</td>
<td>36%</td>
<td>30%</td>
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<tr>
<td>RE</td>
<td>10%</td>
<td>10%</td>
<td>11%</td>
<td>12%</td>
<td>13%</td>
<td>14%</td>
<td>23%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
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<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**STRATEGY**

1. Good governance, clean and accountable;
2. Completing regulations;
3. Business licensed simplification;
4. Creating Incentives;
5. Preserving renewable energy subsidy;
6. Coordinating with ministries/regional government and association;
7. Energy saving campaign;
8. Updating renewable energy data;
9. Enhancing the networking;

**+ 36,3 GW electricity from RI**

**Within 10 years**

**3,6 GW per annum**

**± Rp. 1.600 trillion needed**
GOI is actively promote and set up the RE strategy development. Some effort has been done such as:

- improving policy and regulation,
- creating the market,
- subsidy,
- feed in tariff,
- incentives and facilities,
- funding and financial supports, and
- developing cooperation with other countries and international institutions.
REGULATION TO SUPPORT GEOTHERMAL DEVELOPMENT

1. Ammendment of the Geothermal Law No.27/2003 to Law No.21/2014;
2. Revise Government Regulation No. 59/2007 and GR No. 70/2010 on Geothermal Business;
3. GR No. 79 Year 2014 on NEP;
4. President Regulation No. 4 / 2010 to Mandated Public Utilities - PT. PLN to Accelerate use RE;
5. Ministry of Energy Regulation
   ✓ No 11/2008 on Procedure of Geothermal Working Area;
   ✓ No 02/2009 on the Procedure of Preliminary Survey by Private Company;
   ✓ No 11/2009 on Geothermal Business Process and Bidding;
   ✓ No 17/2014 on Geothermal Pricing;
   ✓ No 40/2014 on the List of the Geothermal Project to be
Thank You for Your Attentions