Geothermal Development in the Philippines: The Country Update

Ariel D. Fronda, Mario C. Marasigan and Vanessa S. Lazaro
Geothermal Energy Management Division
Renewable Energy Management Bureau
Department of Energy, Energy Center, Rizal Drive, Bonifacio Global City, Taguig City
Philippines
Presentation Outline

I. Philippine Geothermal Energy Situation
II. Republic Act (RA) 9513 – The RE Law
III. Government Initiated Project: “Detailed Assessment of Selected Low Enthalpy Geothermal Resources in the Philippines
IV. Investment Opportunities
V. The Way Forward
## Philippine Power Sector Situationer

<table>
<thead>
<tr>
<th>FUEL TYPE</th>
<th>LUZON</th>
<th>VISAYAS</th>
<th>MINDANAO</th>
<th>PHILIPPINES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW</td>
<td>% Share</td>
<td>MW</td>
<td>% Share</td>
</tr>
<tr>
<td>Coal</td>
<td>4,671</td>
<td>35.36</td>
<td>806</td>
<td>32.25</td>
</tr>
<tr>
<td>Oil Based</td>
<td>2,033</td>
<td>15.39</td>
<td>670</td>
<td>26.81</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>2,861</td>
<td>21.66</td>
<td>1</td>
<td>0.04</td>
</tr>
<tr>
<td>Geothermal</td>
<td>843</td>
<td>6.38</td>
<td>945</td>
<td>37.82</td>
</tr>
<tr>
<td>Hydro</td>
<td>2,471</td>
<td>18.70</td>
<td>11</td>
<td>0.44</td>
</tr>
<tr>
<td>Wind</td>
<td>283</td>
<td>2.14</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Biomass</td>
<td>50</td>
<td>0.38</td>
<td>44</td>
<td>1.76</td>
</tr>
<tr>
<td>Solar</td>
<td>0.00</td>
<td></td>
<td>22</td>
<td>0.88</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>13,212</strong></td>
<td></td>
<td><strong>2,499</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Interconnection Line Capacity**
- Leyte-Luzon (440 MW)
- Leyte-Cebu (400 MW)
- Leyte-Bohol (100 MW)
- Cebu-Negros (200 MW)
- Negros-Panay (100 MW)
Philippine Power Sector Situationer

2013 INSTALLED CAPACITY

- Coal: 32.14%
- Natural Gas: 16.52%
- Oil Based: 19.36%
- Hydro: 20.32%
- Geothermal: 10.78%
- Wind: 0.19%
- Solar: 0.01%
- Biomass: 0.68%

Total: 17,325 MW

2013 POWER MIX

- Coal: 43%
- Natural Gas: 25%
- Geothermal: 13%
- Hydro: 13%
- Other: 6%

Total: 75,265,842 MW
Geothermal Power Plants

1,896 MW Total Installed Capacity
(as of December 2014)
World's 2nd Largest Producer of Geothermal Energy

Source: Earth Policy Institute (http://www.earth-policy.org/)
Republic Act No. 9513: The Renewable Energy Law

• RE Act signed on 16 December 2008 and took effect on 30 January 2009
• Nationwide consultation on the drafting of the RE Act IRR
• IRR signed ahead of schedule on 25 May 2009
• IRR implementation effective 12 June 2009
• Coverage: BIOMASS, GEOTHERMAL SOLAR, HYDRO, OCEAN, WIND
AN ACT PROMOTING THE DEVELOPMENT, UTILIZATION AND COMMERCIALIZATION OF RENEWABLE ENERGY RESOURCES AND FOR OTHER PURPOSES (Approved on December 16, 2008)

Section 2. Declaration of Policies

1. Accelerate the exploration and development of renewable energy resources
   • achieve energy self-reliance,
   • reduce the country’s dependence on fossil fuels
   • minimize the country’s exposure to price fluctuations
Republic Act No. 9513: The Renewable Energy Law

Section 2. Declaration of Policies, cont.

2. Increase the utilization of renewable energy by providing fiscal and non-fiscal incentives;

3. Encourage the sustainable development and utilization of renewable energy to effectively prevent or reduce harmful emissions;

4. Establish the necessary infrastructure and mechanisms to carry out the mandates specified in the Act and other laws.
Incentives under Republic Act No. 9513

- 7 years Income Tax Holiday (ITH)
- 10 year Duty-free Importation of RE Machinery, Equipment and Materials
- 1.5% Special Realty Tax Rates on Equipment and Machinery
- 7 year Net Operating Loss Carry-Over
- 10 % Corporate Tax Rate after ITH
- Accelerated Depreciation
- Zero Percent Value-Added Tax Rate
- Cash Incentive of Renewable Energy Developers for Missionary Electrification
- Tax Exemption of Carbon Credits
- 100% Tax Credit on Domestic Capital Equipment and Services
- Exemption from the Universal Charge
- Payment of Transmission Charge
- Hybrid and Cogeneration Systems
Newly Commissioned Geothermal Power Plant

20 MW Maibarara Geothermal Power Project commissioned on February 08, 2014
Unveiling the marker (from left to right) are EDC President & COO Richard Tantoco, EDC Chairman & CEO Federico Lopez, Energy Secretary Jericho Petilla & Mayor Edgar Teves of the Municipality of Valencia, Negros Oriental

Inauguration of the 49 MW Nasulo Geothermal Power Plant on 26 September 2014
• Geothermal
  – A total of nine GRESCs under Open and Competitive Selection Process (OCSP), five GREOCs/GOCs and 22 GRESCs/GSCs under Direct Negotiation for frontier areas and seven conversions of Geothermal Service Contracts under P.D. 1442 into GRESCs under R.A. 9513 were signed.
  – To date, the country has 43 GRESCs/GSCs, seven (7) of which are producing fields with total installed capacity of 1,868 MW, while the remaining are under pre-development/exploration. Among the major islands, Visayas has the highest installed capacity with 915 MW. Luzon has 844 MW and Mindanao has 108 MW of geothermal energy.

Note:
GRESC – Geothermal RE Service Contract/
GSC – Geothermal Service Contract
GREOC – Geothermal RE Operating Contract/
GOC – Geothermal Operating Contract
Government Initiated Project:
Detailed Assessment of Selected Low Enthalpy Geothermal Resources in the Philippines

• **Banton Island, Romblon**
  - Completed the integrated resource assessment, however, no geothermal resource in the area.

• **Balut Island, Davao Occidental**
  - Completed the integrated resource assessment. Studies confirm the existence of a geothermal resource with a possible gas cap in the area. Potential capacity range from 10 to 40 MW

• **Maricaban Island, Batangas**
  - Completed the integrated resource assessment. Recommended for drilling of two (2) gradient wells with an accumulated depth of 1,500m. The purpose of the drilling is not to prove the existence of the geothermal reservoir due to its shallow penetration but to collect core, temperature log and fluid samples
More Investment Opportunities

RP’s estimated geothermal potential: **4,407 MW**

The Department of Energy offers Energy Independence Package i.e. Open and Competitive Selection Process in the Award of Renewable Energy Service Contract

On the screen are the 4 areas contracted in the 2nd Round, totaling 66-134 MW potential capacities
ROADMAP for the EXPLORATION, DEVELOPMENT and UTILIZATION of GEOTHERMAL RESOURCES IN THE PHILIPPINES (2013-2030)

Establishment of RPS and FIT

2013
- Installation of additional 50 MW
  - New Areas: 20 MW
  - Expansion: 30 MW
  - Generation: 350.4 GWh
  - Employment: 85 (full time)
  - Investment: ~PHP11,250 MM

2015
- Installation of additional 1,180 MW
  - New Areas: 1,050 MW
  - Expansion: 130 MW
  - Generation: 8,269.44 GWh
  - Employment: 2,006 (full time)
  - Investment: ~PHP265.500MM

2020
- Installation of additional 155 MW
  - New Areas: 90 MW
  - Expansion: 65 MW
  - Generation: 1,086.24 GWh
  - Employment: 263 (full time)
  - Investment: ~PHP34,873 MM

2025
- Installation of additional 80 MW
  - New Areas: 20 MW
  - Expansion: 60 MW
  - Generation: 526.6 GWh
  - Employment: 136 (full time)
  - Investment: ~PHP 18,000MM

2030
- Installation of additional 80 MW

VISION:
- Increase of 75% in geothermal capacity by 2030

Steps:
1. Installation Capacity 1,848 MW
   - Implementation of Detailed Assessment of Low-Enthalpy Geothermal Resources Project
   - Drafting of policy/guidelines for the direct use of small-scale geothermal energy
   - Feasibility of Small-Scale Geothermal Energy

2. Research/study on steam/electricity pricing of geothermal resource to determine true cost of steam production
   - Research/Study on Enhanced Geothermal System (EGS) and Geothermal Heat Pump
   - Feasibility Study of Enhanced Geothermal System (EGS), Binary Technology, Utilization of Ablato Reservoir and Geothermal Heat Pump
   - Optimization and Improvement of Geothermal Power Plant Efficiency and Energy Conversion
   - Establishment of Geothermal Training Center

3. Encourage Service Contractors to undertake expansion and full utilization or optimization of the geothermal projects

4. Study and promotion of nonpower application/cascaded use of geothermal energy for development
   - IEC campaign to address the following issues: environmental permits and approval of SLUP, FLAG, TCP; protected areas; LGUs and NCIP/IPs social acceptability and harmonization with other government agencies’ policies

5. Continued improvement of database and networking for better data access of both internal and external clients

Continued exploration in identified, under-explored, unexplored resource assessment of geothermal areas (high and low temperature geothermal systems)
The Way Forward

- Formulation of guidelines for the direct use of small-scale geothermal energy
- Continued Resource Inventory and continued improvement of Geothermal RE Database
- Capacity Building / Information, Education and Communication Campaigns
- Establishment of Geothermal Training Center in coordination with RE Stakeholders
- Ongoing study on the exploration, development and market of low enthalpy, acidic reservoir and enhance geothermal system
THANK YOU!

http://www.doe.gov.ph