Hydro and geothermal development in Japan

April 9, 2013
Japan has a potential of 34.7GW of hydroelectric power
Conventional hydropower represents generation capacity of approx. 10% (21GW)

Source: Ministry of Economy, Trade and Industry (METI)  Degen Kaihatsu no Gaiyou 2010
Development of Hydropower Generation in Japan

- Larger scale sites (>30MW) have already been developed
- Previous subsidies and RPS schemes were not enough to promote development of smaller sites

**Large scale sites:**
More efficient, but already tapped

**Smaller scale sites:**
Less efficient and more remote in location

FIT and other ways to support Hydropower Projects

- FIT scheme (July 2012) is expected to suit smaller-scale sites
- Other incentives and further deregulation would promote development

**FIT Scheme**
- FIT scheme to support development cost

**Incentives**
- Preferential taxation and loan schemes

**De-regulation**
- Clarification of licensing criteria regarding water rights etc.

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**Purchase rate and duration set for Feed-in-Tariff (FY2012)**

<table>
<thead>
<tr>
<th>Procurement category</th>
<th>1MW or more but less than 30MW</th>
<th>0.2MW or more but less than 1MW</th>
<th>Less than 0.2MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tariff (exclusive tax)</td>
<td>25.3 US cents/kWh</td>
<td>30.5 US cents/kWh</td>
<td>35.8 US cents/kWh</td>
</tr>
<tr>
<td>Duration</td>
<td>20 years</td>
<td>20 years</td>
<td>20 years</td>
</tr>
</tbody>
</table>

Rate: 1$ = 95 JPY

### Feature s of Geothermal Power Generation

- Japan ranks 3\textsuperscript{rd} in the world for potential geothermal resources
- Geothermal power accounts for 0.2% of total capacity and 0.3% of generated electricity in Japan
- No new capacity has been added since 1999

### Geothermal resources by countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Potential Resources</th>
<th>Installed Capacity</th>
<th>Power Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>797</td>
<td></td>
<td>27,791</td>
</tr>
<tr>
<td>US</td>
<td>2,534</td>
<td></td>
<td>23,000</td>
</tr>
<tr>
<td>Japan</td>
<td>535</td>
<td></td>
<td>20,540</td>
</tr>
<tr>
<td>Mexico</td>
<td>953</td>
<td>6,000</td>
<td>2,534</td>
</tr>
<tr>
<td>Philippines</td>
<td>1,931</td>
<td>6,000</td>
<td>1,931</td>
</tr>
<tr>
<td>Iceland</td>
<td>172</td>
<td>5,800</td>
<td>172</td>
</tr>
<tr>
<td>NZ</td>
<td>436</td>
<td>3,650</td>
<td>436</td>
</tr>
<tr>
<td>Italy</td>
<td>791</td>
<td>3,267</td>
<td>791</td>
</tr>
</tbody>
</table>

### Geothermal Power Production in Japan (1975-2009)

Source: *Denki Jigyo Binran 2011*, compiled by Federation of Electric Power Companies of Japan (FEPC)

**Sources:**

Issues & Solutions for Geothermal Projects

- Restriction by National Parks Law and hot spring business have left geothermal resources untapped
- Deregulation and financial support including FIT scheme will promote development in medium to long term
- Due to a long lead-time and high development cost caused by uncertainty in potential resources, risks for operators remain high

### National Parks Law

### Deregulation

### Public Acceptance

### Financial Activities for PR activities

### High development risks

### Subsidies for resource survey

### Economic Efficiency

### Purchase guarantee with FIT

#### Purchase rate and duration set for Feed-in-Tariff (FY2012)

<table>
<thead>
<tr>
<th>Procurement category</th>
<th>15MW or more</th>
<th>Less than 15MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tariff (exclusive tax)</td>
<td>27.4 US cents/kWh</td>
<td>42.1 US cents/kWh</td>
</tr>
<tr>
<td>Duration</td>
<td>15 years</td>
<td>15 years</td>
</tr>
</tbody>
</table>

Rate : 1$ = 95 JPY