Wind Power Business in Japan
- Before and After the FIT -

February 26, 2013

Tetsuro NAGATA
Executive Advisor
Eurus Energy Holdings Corporation

http://eurus-energy.com
Japan’s Wind Power Installations

- FY2011: 2,557 MW, 1,855 turbines, 424 facilities
  - Minimal growth of 3.4% from 2010
- FY2010 -11: Expectation of transition from RPS to FIT held back growth

* Source: NEDO, JWPA

2.47 GW, did not reach the National target, 3 GW, in 2010
Effectiveness of the FIT

- Minimum level for economic viability: 22 yen / kWh over 20 years (valid for already-operating facilities as well), but premium tariff for the first 3 years
- Possibility of negative impact by environmental impact assessment, power curtailment by utilities, and so on
- Tariff for off-shore wind not yet introduced
- To secure and expand the grid connection, more flexible grid rules and policies for the infrastructure improvement are necessary

<table>
<thead>
<tr>
<th>Purchase period (Year)</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>-0.3%</td>
<td>0.7%</td>
<td>1.7%</td>
<td>2.7%</td>
<td>3.7%</td>
<td>4.6%</td>
<td>5.4%</td>
<td>6.3%</td>
<td>7.1%</td>
<td>7.9%</td>
</tr>
<tr>
<td>16</td>
<td>0.5%</td>
<td>1.5%</td>
<td>2.5%</td>
<td>3.4%</td>
<td>4.3%</td>
<td>5.2%</td>
<td>6.1%</td>
<td>6.9%</td>
<td>7.7%</td>
<td>8.5%</td>
</tr>
<tr>
<td>17</td>
<td>1.1%</td>
<td>2.1%</td>
<td>3.1%</td>
<td>4.0%</td>
<td>4.9%</td>
<td>5.7%</td>
<td>6.6%</td>
<td>7.4%</td>
<td>8.2%</td>
<td>8.9%</td>
</tr>
<tr>
<td>18</td>
<td>1.7%</td>
<td>2.7%</td>
<td>3.6%</td>
<td>4.5%</td>
<td>5.4%</td>
<td>6.2%</td>
<td>7.0%</td>
<td>7.8%</td>
<td>8.6%</td>
<td>9.3%</td>
</tr>
<tr>
<td>19</td>
<td>2.2%</td>
<td>3.2%</td>
<td>4.1%</td>
<td>4.9%</td>
<td>5.8%</td>
<td>6.6%</td>
<td>7.4%</td>
<td>8.1%</td>
<td>8.9%</td>
<td>9.6%</td>
</tr>
<tr>
<td>20</td>
<td>2.7%</td>
<td>3.6%</td>
<td>4.5%</td>
<td>5.3%</td>
<td>6.1%</td>
<td>6.9%</td>
<td>7.7%</td>
<td>8.4%</td>
<td>9.2%</td>
<td>9.9%</td>
</tr>
</tbody>
</table>
Wind Energy Potential: On-shore

- Average wind speed > 6.5 m/s at 80m height
- Potential (available wind energy) = 143.8 GW
- Minimum selection (potential and electric power company capacity) = 59.1 GW

\[
\frac{59.1\text{ GW}}{2} \div 30\text{ GW}
\]

*Based on the 2010 Renewable Energy Intake Potential Survey Report (Ministry of the Environment) and JWPA creation.*
Wind Energy Potential : Off-shore

- Average wind speed > 7.5 m/s at 80 m height, distance to shore < 30 km, water depth < 200 m
- Potential (available wind energy) = 378.3 GW
- Minimum selection (potential and electric power company capacity) = 96.0 GW

\[ \frac{96.0 \text{ GW}}{3} \approx 30 \text{ GW} \]

* : 出典 平成22年度再生可能エネルギー導入ポテンシャル調査結果報告書 (環境省) から、JWPA作成
Middle & Long Term Target of Wind Power

Source: JWPA

- **Middle and Long Term Target of JWPA:**
  - **2020:** more than 11GW
  - **2030:** more than 27GW
  - **2050:** more than 50GW, 10% of Domestic demand

National Target makes it easier for investors and manufacturers to plan and invest more
Japanese Grid System: change is needed

- More flexible rule/operation maximizing current TL capacity
- Infrastructure improvement within and across utilities
- Grid-side battery, operation with weather forecast etc.
### Aspiration for De-regulation

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Current issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Impact Assessment Act</td>
<td>Since Oct 2012 this act is applied to wind power development as well, thus demanding 3 or 4 more years and additional cost.</td>
</tr>
<tr>
<td>Agricultural Land Act</td>
<td>Taking land out of active use for agriculture is very difficult, even where wind farm makes some contribution to regional economy.</td>
</tr>
<tr>
<td>Building Codes</td>
<td>Same code as skyscraper is applied to wind mill over 60 meters.</td>
</tr>
<tr>
<td>Forest Act</td>
<td>Release of forest conservation for wind power is very difficult and varies with each local authority.</td>
</tr>
<tr>
<td>Natural Parks Act</td>
<td>Wind mill installation in Natural Park is severely restricted, while landscape code is ambiguous.</td>
</tr>
</tbody>
</table>