Strategy and Roadmap for PV Systems in Japan

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Takao Ikeda
The Institute of Energy Economics, Japan (IEEJ)
Road Map for PV

**Conversion Efficiency**
- 2014: 8-18%
- 2020: 20%
- 2030: 40%

**Cost**
- 2014: JPY14/kWh
- 2050: JPY7/kWh

**Multi purpose**
- New utilization technology in unutilized area
- Technology demonstration for high value added module system

*Source*: "R&D road map for energy Related Technologies", METI, Dec 2014
Scenario for Introduction of Photovoltaic Generation (as of 2008)

- For residential use: About 5.3 million houses
  - 28 million kW (7 million kl)
- Non-houses: About 20%

- Houses: about 70%
- Non-houses: about 30%

- 14 million kW (3.5 million kl)

- Start of subsidy for residential photovoltaic generation
- Start of buyback system

- About 20 times higher than in 2005
- Technological Development of the system is necessary

- For residential use: About 320,000 houses
  - 1.4 million kW (350,000 kl)

- Houses: about 70%
- Non-houses: about 30%

- About 10 times higher than in 2005

- 53GW
  - In 2030
  - About 40 times higher than in 2005
Trend of Primary Energy Supply in Japan

- **RPS (Renewable Portfolio Standard)**
  - wind, solar, small hydropower, biomass power generation, binary geothermal
  - 8-year target set by every 4 years
  - Finish in July 2012 as FIT started

- **2003**

- **2009 Nov**
  - **Buyback surplus PV electricity from residence**
    - Developed from Utilities’ voluntary Net -metering system

- **2011 Aug**
  - **Passage of FIT Law**

- **2012 Jul**
  - **Commencement of FIT**
    - Started from July 1

- **2015 Jun**
  - **Expiration of premium period of FIT**
    - Premium period will expire on June 30. FIT system itself will continue.

- When FIT passed the Diet in August 2011, the law was designed to make the first 3 years as the premium period for investors.
- PV FIT was JPY32/kWh in FY2014. In FY2015, PV FIT is JPY29/kWh from April to June 2015 and will be JPY27/kWh from July 2015 to March 2016.
Trend for PV FIT approval of Application and installation
PV Installation/Connection Limit

- Approved Amount (Oct, 2014)
- Applied for Connection (Nov, 2014)
- Connected to the Grid (Oct, 2014)

Total amount available to be connected to the Grid (verified by METI advisory committee in Dec 2013)
Revised Disconnection Rule for new application

Current Rule
- The rule of disconnection is applied only over 500kW PV plant
- Utilities can disconnect the PV power plants from the grid up to 30 days without compensation to the plants.

New rule for New Application
- This rule of disconnection can be applied even under 500kW plant.
- The residential houses under 10kW should be applied after non-residential plants over 10kW.
- Utilities can disconnect PV plant up to 360 hours and wind power plant up to 720 hours without compensation to the power plants.
- Geothermal and Small Hydro power plants have no limitation to connect to the grid.
Grid Framework in Japan and Renewable Energy Potential

- Good wind resource
- Not enough Transmission line

Strengthening the Grid and Energy Storage will be needed
Road Map for High Performance Storage Battery

◆Total 27 Billion JPY is allocated for R&D of Utility scale battery system in FY 2014

- Improving the sophistication of Lithium ion batteries, Redox Flow battery, NAS battery and other existing batteries
- Cost Reduction
- Commercially realization of innovative battery, energy storage system other than batteries

R&D for innovative battery, energy storage system other than batteries

(Source) “R&D road map for energy Related Technologies”, METI, Dec 2014
Multi-purpose Grid Storage Project

Hokkaido Electric Power Co., Inc.

<table>
<thead>
<tr>
<th>Subsidized Company</th>
<th>Battery type</th>
<th>System Capacity</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>Hokkaido Electric Power Co., Inc.</td>
<td>Redox Flow battery</td>
<td>60 MWh</td>
<td>Substation in Hokkaido</td>
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<tr>
<td>Sumitomo Electric Industries Ltd</td>
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</tbody>
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(Source) NEDO.
Large-scale Battery Energy Storage System

Tohoku Electric Power Co., Inc.

Subsidized Company | Battery type | System Capacity | Location
---|---|---|---
Tohoku Electric Power Co., Inc. | Lithium ion Battery | 20 MWh | Substation in Tohoku

(Source) NEDO.
Large-scale and cutting-edge pilot projects have been launched in 4 areas. The outcomes to be accumulated through the projects will be utilized to create smart communities and smart cities in Asia and other countries.
Thank you for your attention!