Residential PV Market in Japan

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Contents

• PV market in Japan
• Drivers for residential PV market
  – The FIT Program
  – Electricity rate
• Status of self consumption
• Outlook
• Summary
Japan: second largest PV market in 2013

Source: IEA PVPS Task1: Trends Report 2014
Installed capacity in Japan

2013 Market
- Installed Capacity: 6GW(AC), 6.9GW(DC)
- Shipping Volume: 7.7G
- Cumulative Capacity: ~13.6GW
- Cumulative Capacity of Residential PV: ~6GW
Shift of the market segment

![Graph showing the shift of market segments from 2010 to 2013. The graph indicates a decrease in Residential share from 80% in 2010 to 75% in 2013, an increase in Commercial share from 10% in 2010 to 25% in 2013, and a slight decrease in Utility share from 10% in 2010 to 20% in 2013. The Off-grid share remains constant at 10%.]
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## New FIT for FY 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>FY 2013 FITs</th>
<th>FY 2014 FITs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 kW (residential, excess power)</td>
<td>38 Yen/kWh, 0.27 €/kWh</td>
<td>37 Yen/kWh, 0.26 €/kWh</td>
</tr>
<tr>
<td></td>
<td>10 years</td>
<td>10 years</td>
</tr>
<tr>
<td>Double Generation</td>
<td></td>
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<tr>
<td>&lt; 10 kW with batteries/fuel cells/ gas generator (residential, excess Power)</td>
<td>31 Yen/kWh, 0.22 €/kWh</td>
<td>30 Yen/kWh, 0.21 €/kWh</td>
</tr>
<tr>
<td></td>
<td>10 years</td>
<td>10 years</td>
</tr>
<tr>
<td>≥ 10kW (non-residential)</td>
<td>36 Yen/kWh, 0.26 €/kWh</td>
<td>32 Yen/kWh, 0.23 €/kWh</td>
</tr>
<tr>
<td>Gross-FIT</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>20 years</td>
<td>20 years</td>
</tr>
</tbody>
</table>

- National subsidy for residential PV system: Terminated in March 2014
Basis of new FIT: Cost of Residential PV system (Unit: Yen/W)

Source: METI, compiled by RTS Corporation
Electricity Production by energy sources

FY 2010: 1000 TWh → FY 2012: 941 TWh → FY 2013: 889 TWh

(Unit: 100 GWh)

Source: FEPC, METI
Another driver: increase of electricity bill for household:
Example of TEPCO (Unit: JPY/Month)

Average family consumption: 290kWh/Month,
7,978 Yen/month (~57 Euro)

Source: TEPCO
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As of the end of Fiscal year 2013 (March 2014):
1,508,439 houses totaling 6.6GW of residential PV houses
(~2.7% of houses have PV)
Estimated annual generation power:
> 0.6% of National electricity consumption in 2013

Source: JPEA/J=PEC, compiled by RTS Corporation
Average residential PV capacity

Average capacity increased FIT plus reduction of install cost

Source: JPEA/J=PEC, compiled by RTS Corporation
Analysis of surplus PV power to the grid

Source: RTS, based on a survey for METI
Average sold power from double-generation houses

**PV only**
- Self-consumption: 40%
- To Grid: 60%

**Double Generation**
- Self-consumption: 40%
- To Grid from PV: 75%
  (PV: 25 + FCs/batteries: 15)

Source: RTS, based on a survey for METI
Current status:
- Most residential PV systems suppliers provides PV + storage batteries
- Still limited users due to high Investment cost
  Example of additional cost:
  - \(~1.8\) MJPY for Li-ion battery system (7.2kWh) with 0.6 MJPY subsidy
    (Subsidy FY12 1/3 of the cost \(\rightarrow\) FY 14: 1/3 to 2/3)
  - Total cost
    \[4kW \text{ PV} (1.6 \text{ MJPY}) + \text{ LiB} (1.2 \text{ MJPY}) = \sim 2.8 \text{ MJPY} (\$ 28,000)\]

Post-FIT: PV + storage batteries = standard residential PV system
- Driver: high electricity price
- Suppliers: more focus of value-added residential PV (PV/HEMS/Storages….)
- Cost reduction of Li-batteries expected
Residential PV system & Heat Pump: popular combination

Example of economical simulation by Panasonic

- Monthly electricity charge: 12,000 JPY + Gas: 8,000 JPY
- All-electrification with IH+ Heat pump: -22%
- All-electrification with IT+ Heat pump+ PV(4kW): -93%
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Outlook for residential PV market

More consumed PV power vs. export

• Drastic reduction for FIT is planned in FY 2015 (From March 2015)

• Increase of electricity charge (increasing import of natural gas, increase of surcharge for the FIT)

• Constriction of grid may increase the use of PV with storage batteries
FIT project status as of April 2014

Approved capacity: 68GW
Commissioned capacity: 9.7 GW

Not all the projects will be completed, especially large scale projects. But residential PV market will continue to be steady:
- Approval does not guarantee grid connection
- Restriction of the grid and other obstacles will result in cancellation of the projects (by METI or by project developers)
Summary

- Residential market = self consumption market in Japan is driven by FIT plus high electricity rate
- Current FIT level does not promote self consumption
- FIT reduction from FY 2015 and increase of electricity charge may accelerate more self consumed PV power
- Storage batteries will change consuming model after Post-FIT era and contribute to grid constriction
Thank you for your attention!

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