Cost/Benefit of RE Projects in the Region and Community-based Power in Japan

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Registered non-residential PV projects and their location

Registered installed capacity at the end of 2014 FY

Source: RE Power Generation and Regional Economy (Aug 2015 IEEJ)
In typical non-residential PV projects, panel and power conditioners are procured from other region or abroad.

If these projects are financed by investors outside of the region, power sales profit does not come to the region.

The region will receive such cost as construction, land lease, O&M, which is 1/3 of the total project cost.
Disparity between Municipalities with/without Non-Residential PV

◆ Municipality A and B with 40,000 population (Japan average). Municipality A introduce PV project of 45 MW while investors/factories of related equipment do not exist in A.
◆ Municipality A will have new revenue, but it will be exceeded by additional payment.
◆ Municipality B will simply face additional payment ➞ “Beggar my neighbors policy”

Source: RE Power Generation and Regional Economy (Aug 2015 IEEJ)
Macro-Level Money Flow related to Non-Residential PV (1)

- On macro basis, if all the registered non-residential PV projects of 79 GW start operation, their total value (purchased amount) amounts to 64 trillion JPY.
- Apart from 10 trillion JPY for panel import, 54 trillion JPY will flow in Japan.
- Regions with related factories (PV panel etc) receive 20 trillion JPY.
- 1/3 of PV related money goes to the regions where PV projects are located (region, metropolitan areas)

Source: RE Power Generation and Regional Economy (Aug 2015 IEEJ)
Where are related factories and investors?

- **Location of PV Cell Factories**
  - Regions (10)
  - 9 Other Metropolitan Areas (12)
  - Kanto Metropolitan Area (0)
    - Only 22 out of 1,700 municipalities

- **Investors of Major Mega-Solar Projects**
  - Ukushima Mega-Solar Park (430 MW): Kyocera, Kyudenko, Orix, Mizuho
  - Setouchi Mega-Solar (231 MW): Japan IBM, NTT West Japan, Toyo Engineering etc.
  - Eurus Rokkasho Solar Park (148 MW): Eurus Energy Holdings
  - Wataricho Mega-solar (100 MW): NTT Group
  - Minamisoma Megasolar (100MW): Toshiba, Taisei, Sojitz
  - Oita Solar Power (82 MW): Marubeni
  - Tahara Solar (81 MW): Mitsubishi Co. CEATEC, Mitsubishi UFJ Lease

Community-based mega-solar projects are extremely rare.
Out of 64 trillion FIT payment, metropolitan regions have to pay 39 trillion JPY, which is much higher than their revenue of 7 trillion JPY.

FIT payment by non-metropolitan regions is no less than 19 trillion JPY. Depending on the location of related factories and investors, regions will have to pay more than receive.

Source: RE Power Generation and Regional Economy (Aug 2015 IEEJ)
It is not always the case that RE projects contribute to regional promotion.

Even regions with RE projects could pay more due to increased FIT cost than they receive unless investors and related factories are located within the same regions.

Regions without RE projects could simply face additional cost burden.

Promoting community-based RE projects driven by local municipalities, citizens and enterprises is one way to disseminate the benefit to regional economy.
Emergence of Region-based Electricity Retailers

- As of June 2015, there are 216 electricity retailers.
- There are 4 types of retailers according to the number of sales regions:
  1) nation-wide (more than 4 regions), 2) metropolitan areas (2-3 regions), 3) area specific (single region), 4) community-based (single Prefecture)
- 68 retailers are conducting community-based operation and contributing to diverse demand of regional consumers.

<table>
<thead>
<tr>
<th>Nation-wide</th>
<th>Metropolitan</th>
<th>Area-specific</th>
<th>Community-based</th>
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</thead>
<tbody>
<tr>
<td>45</td>
<td>49</td>
<td>54</td>
<td>68</td>
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<tr>
<td>Ereex</td>
<td>Cenergy</td>
<td>Coop Kobe</td>
<td>Kitakyusyu power</td>
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<td>Itochu Enex</td>
<td>Mitsui Co</td>
<td>MC Retail Energy</td>
<td>Yamagata Power</td>
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<td>Idemitsu Green Power</td>
<td>Itochu Co</td>
<td>Osaka Izumi Coop</td>
<td>Supply</td>
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<td>E-Power</td>
<td>Bayside Energy</td>
<td>Assist One Energy</td>
<td>Izumisano-PPS</td>
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<tr>
<td>Ennet</td>
<td>Diamond Power</td>
<td>Fuso Energy</td>
<td>JCOM</td>
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<tr>
<td>Marubeni Power Retail</td>
<td>JX Energy</td>
<td>Wakayama Power</td>
<td>Nakanojo Power</td>
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<td>Tonen General</td>
<td>Showa-Shell</td>
<td>Harima Power</td>
<td>Tsugaru Apple Power</td>
</tr>
<tr>
<td>SB Power</td>
<td>E Network Systems</td>
<td>Nagasaki Community Power</td>
<td>Chukai Solar Systems</td>
</tr>
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Source: ANRE Electricity Survey (June 2016)
Examples of Community-based Electricity Supply Business

<table>
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<tr>
<th>Retailers</th>
<th>Funding from Municipalities</th>
<th>Services</th>
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| Miyama Smart Energy | Yes                        | • With a view to coping with declining population, a part of revenue from power sales is to be used for life support for elder people and households with children  
• Purchase power from PV in the city (1 JPY higher than large retailers) for promoting local production/local consumption  
• 50 JPY discount for package payment with water bill of Miyama City  
• Volunteers of life support service will receive 300 points (=300 JPY) per month                                                                 |
| Yonago Local Energy | Yes                        | • Established by joint funding of Yonago City and 5 local enterprises. All local funding.  
• Procuring power from municipal waste power generation and PV. 80% local produced.  
• Supply power to public facilities as well as households through local CATV.                                                                 |
| Wakayama Power      | No                         | • Purchase power from PV in the Prefecture (FIT price + 1 JPY)  
• Part of saved electricity cost is reimbursed through voucher/coupon issued by local municipalities/enterprises                                                                 |
| Nara Power          | No                         | • A part of profit is deposited in a fund for promoting education, welfare and sport in Nara                                                                                                               |

Source: ANRE/METI
Electricity Retailers Supported by Municipalities

Electricity Retailers funded by Municipalities

- Yanagata-PPS
- Tottorishimin Power
- Nakanojo Power
- Local Energy
- Chukai Solar Systems
- Nambu Dandan Energy
- Okuizumi Power
- Kitakyusyu Power
- Miyama Smart Energy
- Ichiki Kushikino Power
- Hioki Local Energy
- Higashimatsushima Organization for Progress and Economy, Education, Energy
- Tokyo Environmental Public Service Corporation
- Narita Katori Energy
- Chiba Mutsuzawa Energy
- Hamamatsu New Electricity
- Konan Ultra Power

Source: ANRE 11 Oct 2016
Higashimatsushima Organization for Progress and Economy, Education, Energy

- Regional Low Carbon Power Plants (Waste)
- Existing Grid
- Regional Low Carbon Power Plants (mega solar)
- 4 Hospitals
- Public Facilities
- 70 Houses
- 15 Collective Houses with PV 49.9 kW
- Meeting Place with PV 9.1 kW
- Biodiesel Emergency Generator (500 kVA)
- Large Battery (480 kWh)
- Disaster Prevention Pond Middle Solar (PV 400 kW)
- Sales of generated power
- Power supply

CEMS
Community Energy Management System
Yonago Local Energy

Power Mix
Apr 2016-Aug 2016

- FIT Power (waste: Yonago Clean Centre)
- Waste (Yonago Clean Centre)
- Waste
- FIT Power (PV: Softbank Tottori Yonago Solar Park)
- FIT Power (PV: Chukai TV)
- FIT Power (Geothermal: Kyowa Consultant Yurihama)
- JPEX
### Opportunities

- **Consensus building could be easier since the project is developed on bottom-up basis within the community**
- **Mayors could have broader perspective and combine regional RE development with other functions (e.g., heat use, social welfare, tourism) for enhancing multi-faceted benefits for local communities.**
- **Compared with projects based on external large capital, community-based power could stand longer pay-back period.**

### Challenges

- **Small-scale**
- **High dependence on FIT ➔ Ongoing downward revision of FIT price could discourage formation of community-based projects**
- **Lack of expertise and human resources**
Government’s Role for Facilitating Community-based Power

- Policies for regional RE development (METI, MOE, MAFF, MLIT, MIC)
  - Public awareness
  - Capacity building
  - RE potential survey
  - M/P, F/S
  - Matching
  - Fund for promoting regional low carbon investment
  - Subsidy for introducing/replacing RE facilities (e.g., equipment, construction, design)
  - Distributed energy system model & demonstration project
  - Support to agriculture/forestry/fishery cooperatives considering community-based RE projects (M/P, F/S, consensus building, setting up business, formulating financial plan)
It is not always the case that regional RE projects contribute to the regional economy.

Even regions with RE projects could pay more due to increased FIT cost than they receive unless investors and related factories are located within the same regions. Regions without RE projects could simply face additional cost burden.

When RE projects are promoted by regional investors, the region could expect more profit.

Community-based RE projects driven by local municipalities, citizens and enterprises is one way to disseminate the benefit to regional economy.

Such projects could be combined with other functions for promoting multi-faceted benefits (e.g., heat, healthcare, tourism)

Government could help such community-based initiative by various policy menu.

Most successful cases are often those without depending on government assistance.
Thank you very much