Installation of Solar PV Systems

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1. Company Profile (1/2)

Construction consulting company founded in 1951

Various Services

- International
- Land Conservation
- Transportation Infrastructure
- Urban Development and Environment
- Business Development
- Environmental Solutions
- Project Management

Qualified Engineers

- PhDs 40
- Professional Engineers 1,122
- Other Certified Engineers 1,259

Branches

- Land Conservation
- Transport Infrastructure
- Electricity, Machinery Facility
- Social Management
- IT System
- Planning
- Environment, Energy
- Geotechnical Engineering
- International

- Business Development
- Research and Development

Experts in Climate Change

Institute for Global Environment Research

1. Climate Change Policy
   Assessment and analysis of climate change polices and international negotiations

2. Climate Change Adaptation
   Development of strategies to cope with global warming

3. Climate Change Mitigation
   Feasibility study and implementation of greenhouse gas emission reduction projects
2. Track Record of Pacific Consultants (1/2)

Recent Projects

◆ Implementation of JCM Model Projects: 9 projects to date
◆ Project finding and feasibility study for JCM in Bangladesh, Cambodia, Indonesia, Laos, Maldives, Palau, Thailand, Vietnam, Chile, Costa Rica, Mexico, Peru, Ethiopia, Kenya
◆ Development of methodology and PDD for JCM projects:
  ◆ Rooftop and ground mount solar power, Small hydropower and Biomass cogeneration
◆ Technical and commercial due diligence assistance for JCM grant program (separate from Model Projects Program)

2. Track Record of Pacific Consultants (2/2)

Status of JCM Model Projects

◆ Total GHG emission reduction 65,700 tCO₂/year

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>Status (a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Palau</td>
<td>Rooftop solar: 371kW</td>
<td></td>
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<tr>
<td>2 Maldives</td>
<td>Rooftop solar: 185kW</td>
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<tr>
<td>3 Palau</td>
<td>Rooftop solar: 155kW</td>
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<tr>
<td>4 Palau</td>
<td>Rooftop solar: 446kW</td>
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<tr>
<td>5 Thailand</td>
<td>Rooftop solar: 995 kW</td>
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<tr>
<td>6 Ethiopia</td>
<td>Biomass cogeneration: 13.2MW</td>
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<tr>
<td>7 Bangladesh</td>
<td>Ground mount solar: 50 MW</td>
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<tr>
<td>8 Kenya</td>
<td>Mini-hydro: 6 MW</td>
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<tr>
<td>9 Kenya</td>
<td>Ground mount solar: 991kW</td>
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</tbody>
</table>

(a) Project commencement  (b) Procurement and installation  (c) Project operation
(d) Validation/JCM registration  (e) Verification/Credit issuance
3. Project Examples (1/7)

Palau

Warehouse / Commercial Building
(371kW)

3. Project Examples (2/7)

Maldives

School Classrooms
(185kW)
3. Project Examples (3/7)

Palau

Schools Gymnasiums (155kW)

3. Project Examples (4/7)

Palau

Warehouse / Shop / Shop (446kW)
3. Project Examples (5/7)

Thailand
Office Building and Factory
(995kW)

3. Project Examples (6/7)
Bangladesh
IPP (50 MW)

Source: lonely planet
3. Project Examples (7/7)

Salt Factory (991kW)

4. Case Studies (1/5): Palau

Net-Metering in Palau

- Solar PV system
- Solar PV module
- Inverter
- Electricity meter
- Grid

Power flow:
- From the solar PV system
- From the utility grid

Meter for measuring solar production
- Used to calculate emission reductions
- Used for billing

Net-metering Meter
- kWh

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4. Case Studies (2/5): Palau

Net-Metering in Action

- Excess power is reversed into grid and credited to consumer (C)
- Consumer can off-set grid power consumption (D) with reversed power (C)
- Consumer only pay (D)-(C) to power company

Solar PV (263kW)

Warehouse
42,700 kWh/month
100%

(A) Power from solar 74 %
(B) Solar power consumed instantly 40%
(C) Reverse power to grid 34 %
(D) Power taken from grid 60 %

*Net-metering

Figures are % of total demand


Benefit of installing solar PV system under net-metering

- Power cost savings: Power production x Electricity rate = 486 (USD/kW/year)
- Investment: EPC cost – 50% JCM finance = 1,500 (USD/kW)
- Return on Investment: 3.1 years

IPP (Independent Power Producer)

Bangladesh Power Development Board (BPDB) <-> PPA <-> IPP (Special Purpose Company)

Power Purchase Agreement
0.17 USD/kWh - 20 years

Solar PV module (55.16 MW)

Benefits

- Use of high-efficiency solar PV modules with superior performance even at high temperatures
- Attention and momentum to conclude the PPA negotiations

Challenges

- Timeline:
  JCM Model Project financing term vs PPA negotiation

Source: Manufacturer's brochure
5. Conclusions

Appealing features of supports for JCM
◆ Financing Program shortens ROI and encourages investment in low-carbon technologies
◆ It boosts host country’s policies on renewable energy
◆ Means provided by Japanese government promotes turning model projects into real JCM projects
  i.e. assistance on development of methodology and PDD

Recommendations to expand JCM
◆ Institutional development and promoting understanding on renewable energy by host country
  e.g. net-metering, FIT, preferential taxation
◆ Making requirements of JCM Financing Program friendlier
  e.g. fiscal year budget policy, liability period, responsibility of Japanese party etc.

Thank you so much for allowing us to make a presentation.