Commercial PPAs changing the PV landscape: Focusing on Asian PV market

Izumi KAIZUKA,
Director, RTS Corporation/ Deputy OA, IEA PVPS Task 1
kaizuka@rts-pv.com, https://www.rts-pv.com/en/
Contents

• About RTS Corporation
• Asian PV market and LCOE status
• Corporate PPA and challenges
• Summary
RTS Corporation – founded in 1983, 37-year experience


Comprehensive Consulting company on Photovoltaics (PV)

Business: Helping establish PV business strategy, “Go to Japanese market”

Clients: Government agencies, utilities, manufacturers (entire value chain of PV) project developers, financial institutes, industry associations, etc.

in JP, US, DE, IT, FR, AT, NR, CHE, AUS, CHN, IND, KOR, Taiwan, Thailand, Norway, etc.
Asia Pacific region leads the global market
5 Asian countries ranked in top 10 ranking of 2019 installed capacity

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Annual Installed Capacity</th>
<th>Cumulative Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>30.1 GW</td>
<td>China 204.7 GW</td>
</tr>
<tr>
<td>2</td>
<td>European Union</td>
<td>16.0 GW</td>
<td>European Union 131.7 GW</td>
</tr>
<tr>
<td>2</td>
<td>United States</td>
<td>13.3 GW</td>
<td>United States 75.9 GW</td>
</tr>
<tr>
<td>3</td>
<td>India</td>
<td>9.9 GW</td>
<td>Japan 63 GW</td>
</tr>
<tr>
<td>4</td>
<td>Japan</td>
<td>7.0 GW</td>
<td>Germany (EU) 49.2 GW</td>
</tr>
<tr>
<td>5</td>
<td>Vietnam</td>
<td>4.8 GW</td>
<td>India 42.8 GW</td>
</tr>
<tr>
<td>6</td>
<td>Spain (EU)</td>
<td>4.4 GW</td>
<td>Italy (EU) 20.8 GW</td>
</tr>
<tr>
<td>7</td>
<td>Germany (EU)</td>
<td>3.9 GW</td>
<td>Australia 14.6 GW</td>
</tr>
<tr>
<td>8</td>
<td>Australia</td>
<td>3.7 GW</td>
<td>UK (EU in 2019) 13.3 GW</td>
</tr>
<tr>
<td>9</td>
<td>Ukraine</td>
<td>3.5 GW</td>
<td>Korea 11.2 GW</td>
</tr>
<tr>
<td>10</td>
<td>Korea</td>
<td>3.1 GW</td>
<td>France (EU) 9.9 GW</td>
</tr>
</tbody>
</table>
Trends of installation capacity of Asian Countries: ~60 GW installed in 2019

Source: IEA PVPS and RTS Corporation
Contribution of PV in the electricity mix of selected Asian countries (2019)

Source: BP Statistics 2020, compiled by RTS Corporation
PV Market drivers in Asian countries

- Market oriented scheme from incentives
  - FIT program → more market-oriented mechanism with competitive LCOE
    - Utility scale:
      - Auction: China, India, Malaysia, Japan
      - Feed-in Premium Program (planned in Japan)
    - Distributed generation: Net-metering

- National Commitment on Paris agreement
  - Need to replace coal
  - National target for renewable energy or PV capacity

- RPS: obligation to use renewable energy
  - India(SRPO), South Korea (REC), Japan (44% of non-fossil electricity by 2030),
  - China (RPS 2021 after)

- Emerging drivers: demand for renewable energy by users
  - Self consumption
  - Corporate PPAs
Demand for renewable energy from companies

- Responsible for decarbonatization
- Responding investors demand
- Rising the value of the business
- Economical advantage
Procurement options of renewable energy

Procurement Options

RECs

Onsite (Rooftop PV)
- CAPEX model (Direct ownership)
- LEASE ($/month) or CPPA ($/kWh)

Offsite (Wind or PV)
- CAPEX model (Direct ownership)
- CPPA ($/kWh)
LCOE of commercial PV in selected Asian countries, 2010-2019

Source: IRENA, "Renewable Power Generation Costs in 2019"
Benchmark PV LCOE and Electricity price of selected countries in Asia

Note: not average
Corporate PPA in APAC, PPA volumes does not match with the PV installed capacity

Figure 1: Global corporate PPA volumes

Source: BloombergNEF. Note: Data are through 2019, reported in MW DC capacity. Onsite PPAs are not included. Australia sleeved PPAs are not included. APAC number is an estimate. Pre-market reform Mexico PPAs are not included. These figures are subject to change and may be updated as more information is made available.
Issues: Regulatory framework

• Self-consumption: Available in most countries
• Onsite Lease model: common in most countries
• CPPA: emerging but still limited, off-site PPA sometime difficult due to regulation or higher transmission fee

• Example of regulatory framework in ASEAN countries

<table>
<thead>
<tr>
<th>Country</th>
<th>OPEX model (selfconsumption)</th>
<th>Leasing model</th>
<th>CPPA model</th>
<th>Net metering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔ (&lt;=100kW)</td>
</tr>
<tr>
<td>Thailand</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>(Residential only)</td>
</tr>
<tr>
<td>Malaysia</td>
<td>✔</td>
<td>✔</td>
<td>Not permitted</td>
<td>✔ (upto 1MW or 75% supply of demand)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>✔</td>
<td>✔</td>
<td>✔ (✔) Only Outside of PLN service</td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>✔</td>
<td>Under discussion</td>
<td>Under discussion</td>
<td>✔ (at the same rate with FIT)</td>
</tr>
<tr>
<td>Cambodia</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔?</td>
</tr>
<tr>
<td>Singapore</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Issues Challenges: Finance

Source: International Renewable Energy Agency
https://theaseanpost.com/article/aseans-renewable-energy-challenges
Conclusion

• CPPA is emerging business models in Asian countries
• Benefit for both PV power suppliers and electricity
• Current major options
  – Leasing and onsite PPA as well as Self-consumption
• Issues remains
  – Regulatory barriers due to electricity market structure
  – Finance
  – Economic recovery after/with COVID-19 era
Acknowledgement for the support of PVPS activities

Contact: Izumi KAIZUKA, RTS Corporation, kaizuka@rts-pv.com
RECs are available in most Asian countries