Jakabaring Green Sports City

2MW Solar Plant In Palembang, South Sumatra

Supported by Financing Programme for JCM Model Projects

Sharp Corporation
July 12th, 2017
Sharp in Indonesia – Local Production/Local Services

We developed our business in close with the market since 1970

Company name: **PT. Sharp Electronics Indonesia (SEID)**
Foundation and starting sales business in 1 April 2005
*Company name changed since 1 May 2015.

Sharp - Solar / Energy Management

*PV Module Core Technology + Energy Management System*

**Crystalline Silicon Technology:** 58 years of Experience

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>Start R&amp;D of Crystalline PV cells</td>
</tr>
<tr>
<td>1963</td>
<td>Start mass production of Crystalline PV cells</td>
</tr>
<tr>
<td>1967</td>
<td>Start R&amp;D of Space-use PV cells</td>
</tr>
<tr>
<td>1970</td>
<td>Start mass production of Space-use PV cells</td>
</tr>
<tr>
<td>1981</td>
<td>Start operation in Katsuragi factory</td>
</tr>
<tr>
<td>2008</td>
<td>Start operation in Sakai factory</td>
</tr>
<tr>
<td>2010</td>
<td>Equipped with more than 160 satellites*</td>
</tr>
<tr>
<td>~2017</td>
<td>IEEE milestone recognition</td>
</tr>
</tbody>
</table>

* As of April 2010

More than 2,800 installations in Japan*
Background of the Project

South Sumatra Government will host a part of Asian Games in 2018 at Jakabaring Sports City, Palembang

- Initiation by South Sumatra Government [Green Sports City]
- PDPDE, selected by South Sumatra Government
- Sharp, Technology Provider
- Joint Development by PDPDE and Sharp
- JCM Subsidy for the Project
- PPA with PLN
Outline of 2MW Solar Plant

South Sumatra Government will host Asian Games in 2018 at Jakabaring Sports City

1. Plant Capacity: 2MWac
2. Expected Power Generation: 1,897MWh/year
3. Expected CO2 Reduction: 1,303 ton (0.687 ton/MWh)
Structure of the Project

Ministry of the Environment of Japan

PLN

South Sumatra Government

Persahaan Daerah Pertambangan Dan Energi PDPDE

Contractor

International Consortium

Host country project partner

Representative entity

Sharp Corporation

Land, Permission

Maximum 50% of subsidy

CO2 credit for 17 years

Equipment supply

- Land
- Permit/license
- Investment
- Construction
- O&M

- PV module
- Mounting structure

Inverter/Combiner box/monitoring system

- JCM MRV

Sharp Solar Solution Asia (Thailand)
System size: 1,653.12kWdc/2,000kWac
Module type: Poly-crystalline 315W
Number of PV modules: 5,248 pcs
Direction: North
Inclination: 10 degree
Current progress, the challenges, and the contribution to sustainable development of the Project

1) GEC announced a selection of the project in 2016
2) PDPDE secured Power Purchase Agreement (PPA) in 2017
3) Land Preparation work started in last May
4) Start Installation in September
5) Commercial Operation in January, 2018

Becomes Jakabaring Sports City as
Green Sports City which contribute to CO2 emission reduction for more than 17 years
Technologies

- 72 cells large PV module with proven technologies
- Large scale centralized inverter

Together with

- Optimized local technologies, like foundation of pile
MRV Progress of the JCM Project Cycle

For the FY 2017, we will process for the PDD documentation, Local Stakeholder Consultation, and project registration

- Making PDD
- Holding Local Stakeholder Consultation
- Signing to MoC
- Public comment, registration application
- Making SDIP

- Making monitoring report
- Making credit issuance application form
- Making SDIP
- Application to CO2 credit issuance
- Administration to open JCM credit account
### Calculation of emission reduction

<table>
<thead>
<tr>
<th>No.</th>
<th>Eligible criteria for the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion 1</td>
<td>The project newly installs solar PV system(s)</td>
</tr>
<tr>
<td>Criterion 2</td>
<td>The PV modules are certified for design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).</td>
</tr>
<tr>
<td>Criterion 3</td>
<td>The equipment to monitor output power of the solar PV system(s) and irradiance is installed at the project site.</td>
</tr>
</tbody>
</table>

**Calculation of emission reduction**

\[
RE_p = \sum_i (EG_{i,p} \times EF_{RE,i}) = \text{Power generation amount} \times \text{grid emission factor}
\]

\[
ER_p = RE_p - PE_p = RE_p
\]

- \(ER_p\): Emission reductions during the period \(p\) \([tCO_2/p]\)
- \(RE_p\): Reference emissions during the period \(p\) \([tCO_2/p]\)
- \(PE_p\): Project emissions during the period \(p\) \([tCO_2/p]\)

**Applied grid emission factor**: 0.483 t CO2/MWh (Sumatra grid)
MRV Monitoring point

Monitoring point

- PV array
- Combiner Box
- Inverter
- Switch gear
- Step-up transformer
- Inverter house
- To the grid

- Data signal
- Watt meter in switch gear
- Remote monitoring of the data
- Internet

- Monitoring item
  - Current, Power,
  - Sun irradiation, temperature

- Monitoring item
  - Sun irradiation, temperature

- PV module back sheet temperature measure

- Sun irradiation measure

- Sensors

- Data signal

- Data logger at site

- Monitoring system

- Data signal

- Data signal

- Data signal
Thank you