



**Monitoring report form for CDM project activity  
(Version 06.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**MONITORING REPORT**

|   |   |                                     |
|---|---|-------------------------------------|
| <b>Title of the project activity</b>  | Gimcheon PV Power Plant Site 1 CDM Project                                  |                                     |
| <b>UNFCCC reference number of the project activity</b>  | 2683  |                                     |
| <b>Version number of the PDD applicable to this monitoring report</b>   | 5.0   |                                     |
| <b>Version number of this monitoring report</b>   | 1.0   |                                     |
| <b>Completion date of this monitoring report</b>  | 24/01/2018  |                                     |
| <b>Monitoring period number</b>   | Second monitoring period  |                                     |
| <b>Duration of this monitoring period</b>   | 11 May 2011 ~ 31 Dec 2011   |                                     |
| <b>Monitoring report number for this monitoring report</b>  | 1   |                                     |
| <b>Project participants</b>   | Gimcheon Enervix Co., Ltd.  |                                     |
| <b>Host Party</b>   | Republic of Korea   |                                     |
| <b>Sectoral scopes</b>  | Sectoral Scope 1 : Energy industries<br>(renewable/non-renewable sources)   |                                     |
| <b>Applied methodologies and standardized baselines</b>   | Version 13 of AMS-I.D.<br>"Grid connected renewable electricity generation" |                                     |
| <b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b> | Amount achieved before 1 January 2013                                       | Amount achieved from 1 January 2013 |
|   | 4,478   | N/A                                 |
| <b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>    | 5,294   |                                     |

## SECTION A. Description of project activity

### A.1. General description of project activity

► Purpose of the project activity and the measures taken to reduce greenhouse gas emissions

Purpose of the project activity is electricity generation and greenhouse gas emission reduction which can be achieved by generating electricity from solar energy. Furthermore photovoltaic power plant does not cause any natural resource depletion.

► Brief description of the installed technology and equipment

The project activity is electricity generation by converting sunlight into electricity. Total capacity of the project is 9.1MW and project is comprised of 2 types of solar systems. One type is stationary (3.1MW) and the other type is system with trackers (6MW). Location of project activity

The components of the plant are supplied by the companies have advanced technology.

- Module : SunPower, S-Energy, Suntech
- Tracker : Poscon, SunPower
- Inverter : Siemense

<Technology description-Module>

| Supplier                   | SunPower      |               | S-Energy   | Suntech    |
|----------------------------|---------------|---------------|------------|------------|
| Capacity                   | 290Wp         | 300Wp         | 200Wp      | 200Wp      |
| Construction Capacity(kWp) | 2,449.92      | 3,550.8       | 2,502.4    | 696.8      |
| Efficiency (%)             | 17.8          | 18.7          | 13.98      | 13.71      |
| PV Cell Type               | Mono          | Mono          | Poly       | Mono       |
| Control type               | With Trackers | With Trackers | Stationary | Stationary |
| Module error               | ±5%           | ±5%           | ±3%        | ±3%        |

### A.2. Location of project activity

San 85, Okgye-ri, Eomo-myeon, Gimcheon, Gyeongsangbuk-do, Korea (latitude of 36.14°N and longitude of 128.05°E)

### A.3. Parties and project participants

| Parties involved  | Project participants                           | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|-------------------|--|--|
| Republic of Korea | Gimcheon Enervix Co., Ltd.<br>(private entity) | No   |

### A.4. Reference to applied methodologies and standardized baselines

Version 13 of AMS-I.D. "Grid connected renewable electricity generation"

### A.5. Crediting period type and duration

Fixed crediting period : 17/09/2009 ~ 16/09/2019

**SECTION B. Implementation of project activity****B.1. Description of implemented project activity**

Project participant made a construction contract on 17/07/2008 and completed construction on 30/01/2009. The plant has been operating well since 29/09/2008. Any event or situation did not occur during the monitoring period, which may impact the applicability of the methodology.

**B.2. Post-registration changes****B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines**

Not applicable

**B.2.2. Corrections**

Not applicable

**B.2.3. Changes to the start date of the crediting period**

Not applicable

**B.2.4. Inclusion of monitoring plan**

Not applicable

**B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools**

To monitor E<sub>Gy</sub>, measurement of electricity supplied to the Grid and electricity supplied from the Grid need to monitor. Therefore, additional meter to measure electricity from the Grid is required to be installed and it measures general electricity consumption for industrial use and general use within the project boundary which is not directly related to power generation by this project activity.

| Date  | Event  | Details  |
|---|--|--|
| June 2011<br>(During the First monitoring verification) | Validation of the revised monitoring plan<br>(validator : KFQ) | Meter to measure electricity from the Grid is added as requested by Korea Electric Power Corporation (KEPCO) |

**B.2.6. Changes to project design**

Not applicable

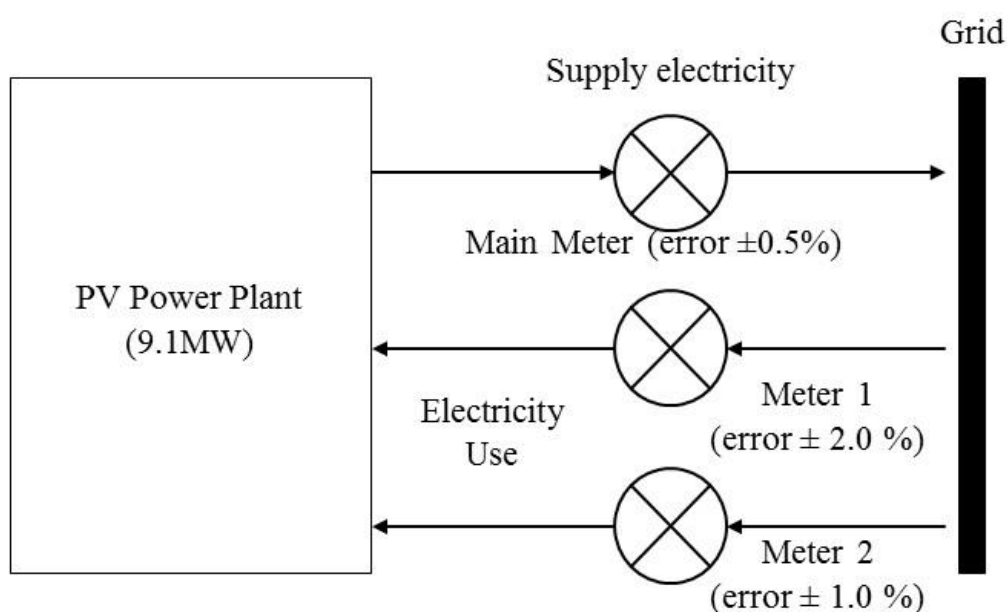
## SECTION C. Description of monitoring system

### ► Data collection procedure

The electricity supplied to the grid by the project have to be monitored through the main meter. The data is measured hourly and automatically transmitted to Korea Power Exchange. The operator can check the data online. The electricity generation is reported to the general manager of the organization who is in charge of operation everyday and reported to stockholders of Gimcheon Enervix once a month.

The amount of electricity used at the project site is monitored through the meter and the operator of the plant can check the data through a monthly receipt.

Net electricity generated by the project activity (EGy) is calculated by subtracting the amount of electricity used from total electricity generation.



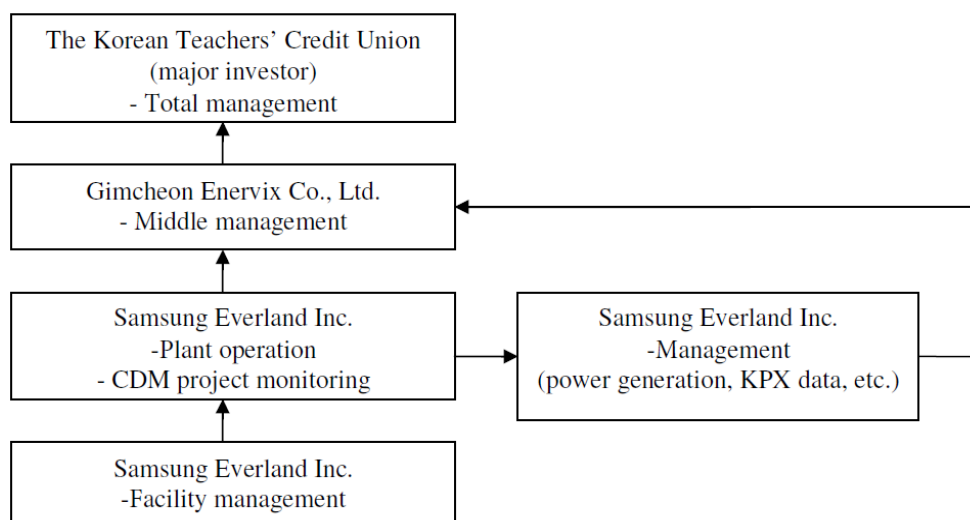
| Meter      | Monitoring data                            | Details                                 |
|------------|--|---|
| Meter 1    | The amount of electricity used at the site | Measures electricity for industrial use |
| Meter 2    |  | Measures electricity for general use    |
| Main meter | The generated electricity                  | Transmitted to Korea Power Exchange     |

The amount use of electricity is measured by meter 1 and meter 2. Meter 1 measures the amount of electricity which is for industrial use such as inverter operation. Meter 2 which is added after CDM registration measures the amount of general electricity use which is supplied to street lights, security system, etc.

Measuring instruments are calibrated every 2 years. QA/QC guidance and procedure follow Measures Act and Rules on Electricity Market Management.

### ► Organizational structure for the monitoring

The project participant has all authority and responsibility on the project activity. According to the O&M contract, Samsung Everland operates and monitors the project as proxy instead of the project participant.



► Responsible department and person for the monitoring

Total management : The Korean Teachers' Credit Union  
 Middle management : Gimcheon Enervix Co., Ltd.  
 Plant operation and CDM project monitoring : Samsung Everland Inc.  
 Management (power generation, KPX data etc.) : Samsung Everland Inc.  
 Facility management : Samsung Everland Inc.

► Emergency procedure

When emergency situation occurs, it will be handled according to the operation manual and the situation will be reported to the general manager of Samsung Everland which is in charge of plant operation and CDM project monitoring. In case serious issue occurs it will be reported at the board meeting.

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

| Data/Parameter                                       | EF <sub>2008</sub>   |
|--|--|
| Unit   | tCO <sub>2</sub> /MWh  |
| Description  | Combined margin CO <sub>2</sub> emission factor for grid connected power generation in year y calculated using the "Tool to calculate the emission factor for an electricity system" |
| Source of data                                       | Calculated from Statistics of Electric Power in Korea (2006,2007,2008) / KEPCO   |
| Value(s) applied                                     | 0.6152   |
| Choice of data or measurement methods and procedures | The value was calculated according to "Tool to calculate the emission factor for an electricity system"  |
| Purpose of data/parameter                            | The data is used for baseline emission calculation   |
| Additional comments                                  | The value is ex-ante and used for the crediting period.  |

### D.2. Data and parameters monitored

| Data/Parameter | EG <sub>y</sub>                                   |
|----------------|---|
| Unit           | MWh   |
| Description    | Net electricity generated by the project activity |

| Measured/calculated/default           | Measured and calculated  |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
|---------------------------------------|--|---------------------|--------------------|-----------------------|--------------------|-----------------------|----------|-----|------------|------------|---------|------------|----------|---------------------|--------------------|-----------------------|-------------|-----|------------|------------|---------|------------|----------|---------------------|--------------------|-----------------------|-------------|-----|------------|------------|---------|
| Source of data                        | Actual measurement   |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Value(s) of monitored parameter       | 7,279.050  |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Monitoring equipment                  | <p>Electricity meters' information:</p> <ul style="list-style-type: none"> <li>· Main meter (measures total electricity generation) <table border="1"> <tr> <th>Serial No.</th><th>Accuracy</th><th>Calibration done on</th><th>Calibration due on</th><th>Calibration frequency</th></tr> <tr> <td>95246744</td><td>0.5</td><td>11/05/2011</td><td>10/05/2013</td><td>2 years</td></tr> </table> </li> <li>· Meter 1 (measures electricity for industrial use) <table border="1"> <tr> <th>Serial No.</th><th>Accuracy</th><th>Calibration done on</th><th>Calibration due on</th><th>Calibration frequency</th></tr> <tr> <td>PS030002346</td><td>2.0</td><td>06/10/2011</td><td>05/10/2013</td><td>2 years</td></tr> </table> </li> <li>· Meter 2 (measures electricity for general use) <table border="1"> <tr> <th>Serial No.</th><th>Accuracy</th><th>Calibration done on</th><th>Calibration due on</th><th>Calibration frequency</th></tr> <tr> <td>02350034282</td><td>1.0</td><td>06/04/2011</td><td>05/04/2013</td><td>2 years</td></tr> </table> </li> </ul> | Serial No.          | Accuracy           | Calibration done on   | Calibration due on | Calibration frequency | 95246744 | 0.5 | 11/05/2011 | 10/05/2013 | 2 years | Serial No. | Accuracy | Calibration done on | Calibration due on | Calibration frequency | PS030002346 | 2.0 | 06/10/2011 | 05/10/2013 | 2 years | Serial No. | Accuracy | Calibration done on | Calibration due on | Calibration frequency | 02350034282 | 1.0 | 06/04/2011 | 05/04/2013 | 2 years |
| Serial No.                            | Accuracy   | Calibration done on | Calibration due on | Calibration frequency |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| 95246744                              | 0.5  | 11/05/2011          | 10/05/2013         | 2 years               |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Serial No.                            | Accuracy   | Calibration done on | Calibration due on | Calibration frequency |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| PS030002346                           | 2.0  | 06/10/2011          | 05/10/2013         | 2 years               |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Serial No.                            | Accuracy   | Calibration done on | Calibration due on | Calibration frequency |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| 02350034282                           | 1.0  | 06/04/2011          | 05/04/2013         | 2 years               |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Measuring/reading/recording frequency | The data is measured hourly and recorded monthly   |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Calculation method (if applicable)    | EG <sub>y</sub> is calculated by subtracting the amount of electricity used from total electricity generation  |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| QA/QC procedures                      | QA/QC guidance and procedure follow Measures Act and Rules on Electricity Market Management  |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Purpose of data/parameter             | The data is used for emission reduction calculation  |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |
| Additional comments                   |  |                     |                    |                       |                    |                       |          |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |            |          |                     |                    |                       |             |     |            |            |         |

### D.3. Implementation of sampling plan

Not applicable

## SECTION E. Calculation of emission reductions or net anthropogenic removals

### E.1. Calculation of baseline emissions or baseline net removals

The total electricity generation 7,443.799 MWh (11/05/2011 ~ 31/12/2011) is measured the main meter which is calibrated on 11/05/2011.

The used electricity for general is 26,149 kWh, for industrial is 138,600 kWh, making a total of 164,749 kWh.

As the baseline emissions were calculated in a conservative manner which was mentioned in paragraph 4 of "Guidelines for assessing compliance with the calibration frequency requirements", although this monitoring period start from 11/05/2011, the use of electricity is to be calculated from 1<sup>st</sup> of May 2011 to 31<sup>th</sup> of Dec 2011.

Therefore, the net generated electricity 7,279.050 MWh/yr is used for conservative baseline emissions calculation.

The baseline emissions during this monitoring period are as follow:

$$\begin{aligned}
 BE_{(11/05/2011 \sim 31/12/2011)} &= EG_{(11/05/2011 \sim 31/12/2011)} \times EF \\
 &= (7,443.799 - 138.600 - 26.149) \text{ MWh} \times 0.6152 \text{ tCO}_2/\text{MWh} \\
 &= 7,279.050 \text{ MWh} \times 0.6152 \text{ tCO}_2/\text{MWh} \\
 &= 4,478.072 \text{ tCO}_2
 \end{aligned}$$

**E.2. Calculation of project emissions or actual net removals**

The project emissions of this project activity are zero because this project activity is photovoltaic power generation which does not cause greenhouse gas emission.

**E.3. Calculation of leakage emissions**

Leakage due to the project is not occurred.

**E.4. Calculation of emission reductions or net anthropogenic removals**

|              | Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e) | Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e) | Leakage GHG emissions (t CO <sub>2</sub> e) | GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e) |                 |              |
|--------------|---|--|---|---|-----------------|--------------|
|              |   |  |   | Before 01/01/2013   | From 01/01/2013 | Total amount |
| <b>Total</b> | 4,478.072   | 0  | 0   | 4,478.072   |                 | 4,478        |

**E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD**

| Amount achieved during this monitoring period (t CO <sub>2</sub> e) | Amount estimated ex ante (t CO <sub>2</sub> e) |
|---|--|
| 4,478   | 5,294  |

**E.6. Remarks on increase in achieved emission reductions**

The actual emission reduction achieved during the current monitoring period is about 15% lower than estimated value in the registered PDD. According to the baseline methodology ex-ante emission reductions were calculated by using expected electricity generation. Expected electricity generation was based on statistic of past weather. However, there were more cloudy or rainy days during the monitoring period. It caused the actual emission reductions lower than estimated value.

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**Document information**

| <i>Version</i>  | <i>Date</i>     | <i>Description</i>   |
|---|-----------------|--|
| 06.0  | 7 June 2017     | Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Make editorial improvements.</li> </ul>  |
| 05.1  | 4 May 2015      | Editorial revision to correct version numbering.   |
| 05.0  | 1 April 2015    | Revisions to: <ul style="list-style-type: none"> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to the Host Party;</li> <li>• Remove reference to programme of activities;</li> <li>• Overall editorial improvement.</li> </ul>  |
| 04.0  | 25 June 2014    | Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul> |
| 03.2  | 5 November 2013 | Editorial revision to correct table in page 1.   |
| 03.1  | 2 January 2013  | Editorial revision to correct table in section E.5.  |
| 03.0  | 3 December 2012 | Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).  |
| 02.0  | 13 March 2012   | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).   |
| 01.0  | 28 May 2010     | EB 54, Annex 34. Initial adoption.   |
| Decision Class: Regulatory<br>Document Type: Form<br>Business Function: Issuance<br>Keywords: monitoring report |                 |  |