

MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: DD/MM/YYYY

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

<p align="center">MONITORING REPORT Version 01 and date 01/06/2011 Title: GOCHANG SOLARPARK 14.98MW PHOTOVOLTAIC POWER PLANT PROJECT UNFCCC Reference Number: 3009 Monitoring period: 01/03/2010 – 31/05/2011</p>
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SECTION A. General description of the project activity

A.1. Brief description of the project activity:
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- Purpose of the project activity and Measures taken to reduce greenhouse gas emissions

The project activity is a unilateral CDM project with 14.98MW of total capacity which generates electricity via the use of solar energy and delivers the generated electricity to the grid.

Since PV power plant technology can generate electricity without emitting any greenhouse gas (GHG), this project activity contributes to the reduction of GHG by alternating at least one of fossil fuel-fired power plants which would have generated electricity with emitting GHG.

-Brief description of the installed technology and equipments

This project is operated and maintained by Gochang solarpark Co., Ltd. The project site is divided into 5 areas and the total capacity of PV power plant is about 15MW.

	Item	Gochang	
I	Module Maximum Output Power	175W	9,996,000W
	Number of module	57,120 piece	
II	Module Maximum Output Power	180W	4,987,800W
	Number of module	27,710 piece	
Total			14,983,800W

- Relevant dates for the project activity

Item	Gochang
Completion of construction	27/11/2009
Commissioning date	29/05/2009 (Area#1)
Starting date of operation	05/2009 (Area#4)
	07/2009 (Area#5)
	08/2009 (Area#3)
	28/09/2009 (Area#1)
	29/09/2009 (Area#2)
The 1st monitoring period	01/03/2010 ~ 31/05/2011

- Total emission reductions achieved in this monitoring period:

From 01/03/2010 to 31/05/2011, the net power supplied to the grid by the project is 27,584.87MWh, corresponds to the emission reductions of 16,668. tCO₂e.

A.2. Project Participants

<Project participants>

Name of Party	Private entity	Kindly indicate if the party involved wishes
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involved		to be considered as project participant
Republic of Korea(host)	Private entity: Gochang solarpark Co., Ltd.	No

A.3. Location of the project activity:

The project site is located in #100, Chiryong-Ri, Heungdeuk-Myeun, Gochang-Gun, Jeollabuk-Do, in the southwestern part of Korea. The site's approximate coordinates are east longitude of 35.554203 and north latitude of 126.707049.

A.4. Technical description of the project

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The purpose of the project is to build a photovoltaic power plant with an installed capacity of 14.98 MW. Regarding the technology/measure of the project, Solarworld Co.Ltd's solar cells were chosen and utilized for the proposed project and a total of 175W*57,120, 180W*27,710 pieces of module supplied 16.9% efficiency.

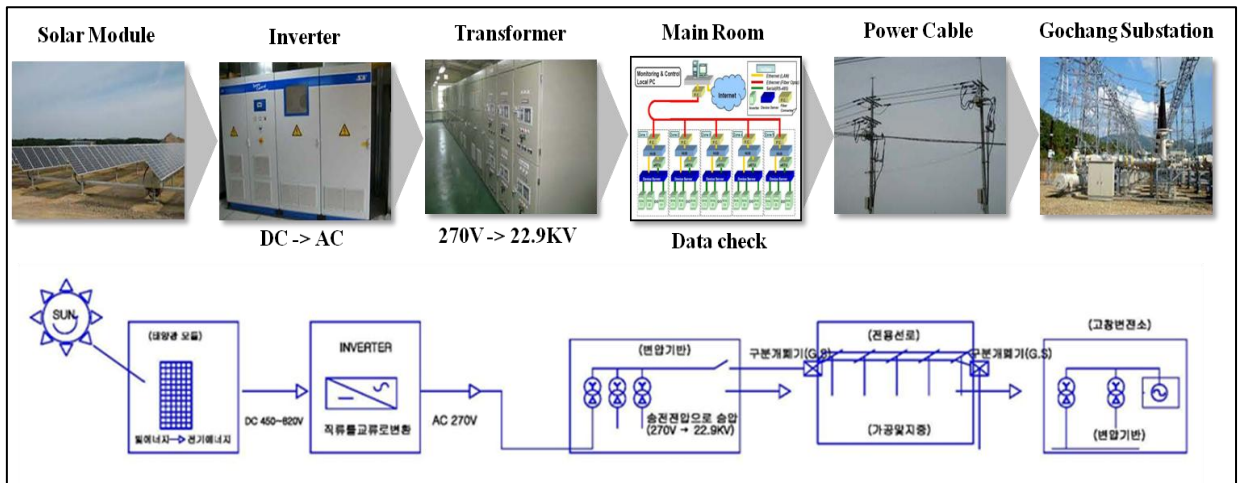
The 5 sections of the solar cell module are connected to junction boxes and linked to an inverter, and the fuses are installed in series so the string can be conducted for the series. This allows for prompt action to be taken in the event the solar cell module malfunctions.. A three-phase observation with current control to observe the important parameters such as voltage and frequency of the grid has been installed.

Also for unmanned operation of the plant, each facility is able to be controlled and supervised in the same way from the on-site main control room, switchboard of the electrical management department and electric control center in the power plant area.

In the communication board of the inverter, it is possible to audit and measure the data by sending electric information such as power generation, voltage, electric current and frequency of photovoltaic generation of electric power to the main computer. It is also possible to audit and measure the data remotely via a LAN(Local Area Network) or modem, and in the event that there is a system malfunction, it can be caught and dealt with quickly from a remote location.

The efficiency of a solar PV plant depends on isolations and other seasonal effect. The standard utilization rate of the proposed project is 16.9% and the output is about 22,183MWh/year. The generated electricity from the plant is connected to KEPCO (: Korea Electric Power Corporation.) electric poles located near the project site.

Item	Type	Technology standards
Solar cells	Type	Sw-175/sw-180
	Capacity	14,983.8kw
	Maximum output power	175w/180w
	Number of Module	175w : 57,120/ 180w : 27,710
	Efficiency	15%
Inverter	Type	Grid connected
	Rated voltage	DC 600v
	Output	500kw
	Control method	Current control (PWM)
	Node form	3-phase, 3-wire
	Number of units	30
	Efficiency	93%



A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

The baseline and monitoring methodology applied to the project activity referred to small-scale project category of Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Methodologies Used: AMS-I.D. (ver. 13) – Grid connected renewable electricity generation

A.6. Registration date of the project activity:

Registration Date: 01 Mar 10

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

Starting date of the first crediting period: 01/03/2010
Length of the total crediting period: 10 years (01/03/2010 ~ 28/02/2020)

A.8. Name of responsible person(s)/entity(ies):

Mr. Jang, Sung-Wook General manager of Gochang Solarpark Co., Ltd.
E-mail : sungwook@solarpark.kr
Tel : 82-61-271-9922

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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1. Relevant dates of project activity:

Item	Gochang
Completion of construction	27/11/2009
Commissioning date	29/05/2009 (Area#1)
Starting date of operation	05/2009 (Area#4)
	07/2009 (Area#5)
	08/2009 (Area#3)
	28/09/2009 (Area#1)
	29/09/2009 (Area#2)

2. The information regarding the actual operation:

Item	Area	Information
Overhaul		N/A
Downtimes	#1	7 times (Exchange of IGBT stack, IGBT DC clamp, Grid Voltage measurement switch)
	#2	1 time (Exchange of SMU Hub)
	#3	3 times (Exchange of IGBT stack, power supply)
	#4	6 times (Exchange of countercurrent observation relay, Exchange of R-IOS Bender, Exchange of DC clamp, Exchange of power supply)
	#5	5 times (Exchange of SMU Hub, Exchange of DC clamp, Exchange of countercurrent observation relay)
Exchange of equipment		N/A

3. Events or situations which may impact on the applicability of the methodology:

There were no events may impact on the applicability of methodology such as increases or decreases in capacity of facilities.

B.2. Revision of the monitoring plan

Not applicable

B.3. Request for deviation applied to this monitoring period

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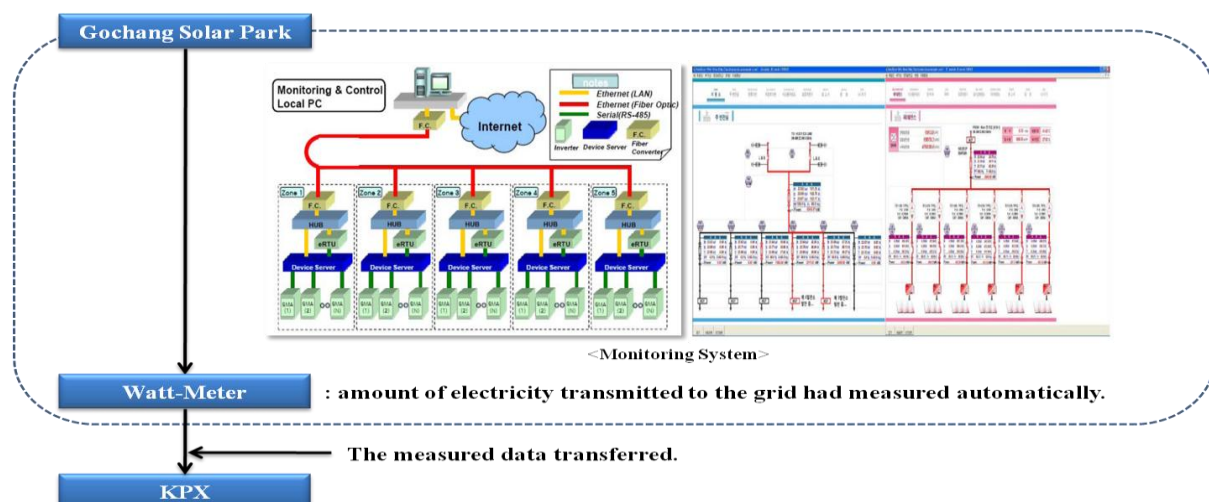
Not applicable

B.4. Notification or request of approval of changes

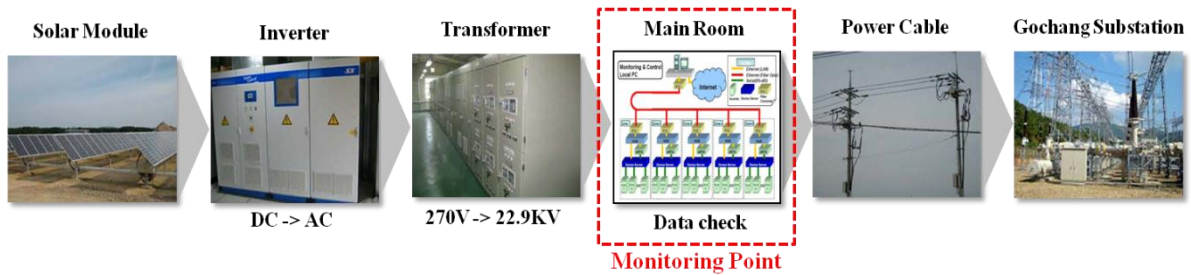
Not applicable

SECTION C. Description of the monitoring system

1. Description of the monitoring system

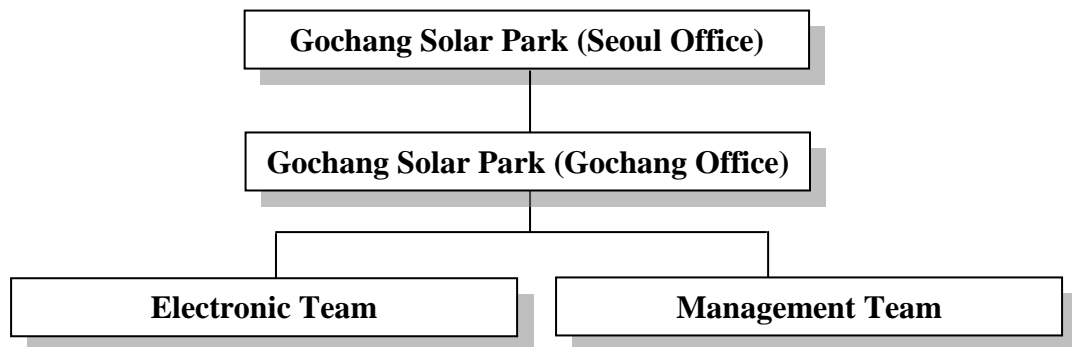


2. Monitoring Point for the project:



Monitoring Points are located onsite main room. Electricity monitored by watt-hour meter with accuracy range $\pm 0.5\%$ is delivered to the grid.

3. Operational and management structure:



- Gochang Solar Park (Seoul Office)

The Head office (Seoul) Gochang Solar Park manages the overall monitoring procedure for the management of emissions reduction. Seoul office is responsible for collecting the monitoring result and monitoring report management and approvals.

- Gochang Solar Park (Gochang Office)

Gochang Office of Gochang Solar Park is responsible for the monitoring of the CDM project and provided the monitoring result regularly to the Head Office.

- Electronic Team & Management Team

The Electronic Team & Management Team manage tasks regarding calibration/maintenance of the meters, system management and select a person in charge of the monitoring installation management. Also the General Manager should arrange roles for the person in charge of the monitoring installation management.

The Electronic Team & Management Team is responsible for collecting and documentation of the net electricity data supplied to the grid, and check and review the collected monitoring data (net electricity).

4. Quality control (QC) and quality assurance (QA) procedures

- Electricity measuring meters were set up transparently in accordance with “Laws regarding measurement” and “Act on operation of the electricity market” and shall be sealed after receiving the affirmation of Korea Power Exchange.
- The meters were calibrated when they are installed, after which recalibration should be made when necessitated by abnormal conditions.
- The amount of electricity transmitted to the grid was measured automatically by the established Watt-meter. The measured data was simultaneously transferred to the central control system of the KPX(Korea Power Exchange).

- The measured amount of electricity in the field was collected daily, weekly, and monthly and was archived electronically
- The collected data was compared with that of the Korea Power Exchange.
- If the two sets of compared data differ from expected values, the operational status of the electricity meters and other equipment was examined. In the event that the meters are being operated improperly, an internal investigation and correction procedure was followed and certified by the final decision maker and the Korea Power Exchange.

5. Emergency procedure

- In case unexpected accident which affects Emission Reductions is occurred, the person in charge of monitoring should report to the responsible department Gochang Solar Park (Seoul Office) and act according to the internal manual in emergency.
- When an accident occurs, an accident alarm was sent to personal mobile phones via an internet phone service.
- In case meters are improperly operated or the transfer of data is in error, internal investigation and correction procedure is followed and is certified by the final decision-maker and KPX(Korea Power Exchange).

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	EFy
Data unit:	tCO ₂ /MWh
Description:	The combined margin emission factor in the Republic of Korea grid
Source of data used:	The registered PDD
Value(s) :	0.6096 tCO ₂ /MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data (EFy) is used for baseline emission calculation.
Additional comment:	This parameter was calculated ex-ante as 0.6096tCO _{2e} /MWh in the registered PDD and will be fixed during the first crediting period.

D.2. Data and parameters monitored

Data / Parameter:	EGy
Data unit:	MWh
Description:	The Electricity amounts supplied to the grid by the project
Measured /Calculated /Default:	Directly measured
Source of data:	Measured by the watt meter.
Value(s) of monitored parameter:	Total values in this monitoring period: 27,584.87MWh For the detail value in the monitoring period, refer to the ER spreadsheet.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This data is used for Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Measuring: Watt-hour meter of The total five 1.Type: AC3P4W 2. Accuracy: 0.5S. 3. Serial number:

			Serial Number	
	#1		46026116	
	#2		46026119	
	#3		46026124	
	#4		51001427	
	#5		46026128	
	4. Calibration frequency : within 3 years 5. Date of last calibration: 04/06/2008(#1,#2,#3,#5) 16/07/2009(#4) 6. Validity period: 04/06/2008 - 03/06/2011(#1,#2,#3,#5) 16/07/2009 – 15/07/2012(#4)			
Measuring/ Reading/ Recording frequency:	Hourly measuring and monthly Recording			
Calculation method (if applicable):	Not applicable			
QA/QC procedures applied:	- QA/QC procedure for this is planned. - The amount of electricity transmitted to the grid was automatically measured and transferred to Korea Power Exchange (KPX) and, so it was double checked by both entities. - According to KPX’s regulation “Act on the operation of electricity market”, the watt meter is managed and controlled.			

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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Follow the registered PDD in accordance with AMS-ID (version 13), the Baseline emissions (BEy) during the monitoring period is calculated as follows:

$$BEy = EGy * EFy$$

Where;

BEy: Baseline Emissions (tCO₂e)

EGy: Net electricity amount supplied to the grid by the project. (MWh)

EFy: Baseline emission factor (tCO₂e/MWh)

1) Net electricity supplied to the grid by the project

Periods	Electricity			Remarks
	EGout	ELin	Net	
01/03/2010 - 31/12/2010	17,703.000	177.303	17,525.696	
01/01/2011 - 31/05/2011	9,881.867	64.864	9,817.003	
Total	27,584.867	242.167	27,342.699	

2) EFy – Emission Factor of grid. (tCO₂e/MWh)

The Baseline Emission Factor is calculated ex-ante 0.6096 tCO₂e/MWh in the registered PDD and will be fixed during the first crediting period.

3) Baseline Emission (BEy)

The baseline emission BEy (tCO₂e) during this monitoring period is calculated as followings;

$$BEy = EGy * EFy$$

$$= (27,342.699 \text{ MWh} * 0.6096 \text{ tCO}_2\text{e /MWh})$$

$$\cong 16,668 \text{ tCO}_2\text{e}$$

E.2. Project emissions calculation

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Follow the registered PDD in accordance with AMS-ID (version 13), the project activity utilizes renewable wind power and there is no anthropogenic emissions by sources of GHG due to the project activity. Thus the project activity emissions equal to zero.y.

Hence, $PE_y = 0 \text{ tCO}_2\text{e}$

E.3. Leakage calculation

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Follow the registered PDD in accordance with AMS-ID (version 13), leakage does not need to be considered. Thus, $LE_y = 0 \text{ tCO}_2\text{e}$

E.4. Emission reductions calculation / table

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Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y Emission reductions in year y ($\text{tCO}_2\text{e}/\text{y}$)

BE_y Baseline Emissions in year y ($\text{tCO}_2\text{e}/\text{y}$)

PE_y Project emissions in year y ($\text{tCO}_2\text{e}/\text{y}$)

LE_y Leakage emissions in year y ($\text{tCO}_2\text{e}/\text{y}$)

$$\begin{aligned} ER_y &= BE_y - PE_y - LE_y \\ &= 16,668 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} \\ &= 16,668 \text{ tCO}_2\text{e} \\ &\cong 16,668 \text{ tCO}_2\text{e} \end{aligned}$$

Thus, emission reduction generated in this monitoring period is 16,668 tCO_2e

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

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Comparison of actual values of the emission reductions achieved during the monitoring period with the estimation in the registered PDD is as follows;

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	16,903 tCO_2e (13,523+13,523*3/12month)	16,668 tCO_2e

From above the actual emission reduction of 16,668 tCO_2e is slightly less than the estimated value of 16,903 tCO_2e

E.6. Remarks on difference from estimated value in the PDD

This monitoring period (from 01 Mar. 2010 to 31 May. 2011) is 1 year and 3 months. The actual emission reduction amounts are 16,668 tCO_2 , which are less than that estimated in the CDM-PDD (16,903 tCO_2) by 1.3%. It is due to the sunshine.

<Electricity Generated & Emissions Reductions>

(unit: CO2)

Month-year	BEy Baseline Emissions (tCO2)	PEy Project Emissions (tCO2)	Ply Leakage (tCO2)	ERy Emission Reduction (tCO2)
Mar-10	902.96	0.00	0.00	902.96
Apr-10	1336.14	0.00	0.00	1336.14
May-10	1468.05	0.00	0.00	1468.05
Jun-10	1355.51	0.00	0.00	1355.51
Jul-10	1150.40	0.00	0.00	1150.40
Aug-10	1085.34	0.00	0.00	1085.34
Sep-10	1041.25	0.00	0.00	1041.25
Oct-10	981.81	0.00	0.00	981.81
Nov-10	814.70	0.00	0.00	814.70
Dec-10	547.50	0.00	0.00	547.50
Jan-11	739.50	0.00	0.00	739.50
Feb-11	845.43	0.00	0.00	845.43
Mar-11	1488.15	0.00	0.00	1488.15
Apr-11	1501.87	0.00	0.00	1501.87
May-11	1409.50	0.00	0.00	1409.50
Total	16,668.10	0.00	0.00	16,668.00