

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 01/04/2011 Title: Korea East-West Power Dangjin small hydro power plant project (5MW) UNFCCC Reference Number: 2366 Monitoring period: 01/01/2010 – 31/03/2011</p>

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

- Purpose of the project activity and Measures taken to reduce greenhouse gas emissions

The main purpose of the project activity is to generate electricity from the potential energy in the circulating cooling water discharged from Dangjin thermal power plant and export the net electricity to the grid.

Since hydro power 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

The Dangjin thermal power plant is operated and maintained by Korea East-West Power Co., Ltd. (EWP). The proposed project of generating capacity is 4.998 MW (each turbine capacity, 1,666 kW x 3 unit).

Item	Dangjin
Unit	3
Generator output power	1,666kW x 3
Total installed Capacity	4,998kW

- Relevant dates for the project activity

Item	Dangjin
Completion of construction	31/12/2009
Commissioning date	01/11/2009 ~ 31/12/2009
Starting date of operation	01/01/2010
The 1st monitoring period	01/01/2010 ~ 31/03/2011

- Total emission reductions achieved in this monitoring period:

From 01/01/2010 to 03/31/2011, the net power supplied to the grid by the project is 32,202.10MWh, corresponds to the emission reductions of 17,424 tCO_{2e}.

A.2. Project Participants

The project participants of Korea East-West Power Dangjin small hydro power plant project

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

A.3. Location of the project activity:

The project is located in Chungcheongnam-Do Province, in West of Korea. The power plant location is in Dangjin County, in the northeast of Chungcheongnam-Do province, approximately 102Km from the capital.

The project site is located in the inside of the Dangjin thermal power plant in Gyoro-Ri, Seckmun-Moen, Dangjin-Gun, Chungcheongnam-Do which is at a longitude of 126.509114 East and a latitude of 37.057190 North.

A.4. Technical description of the project

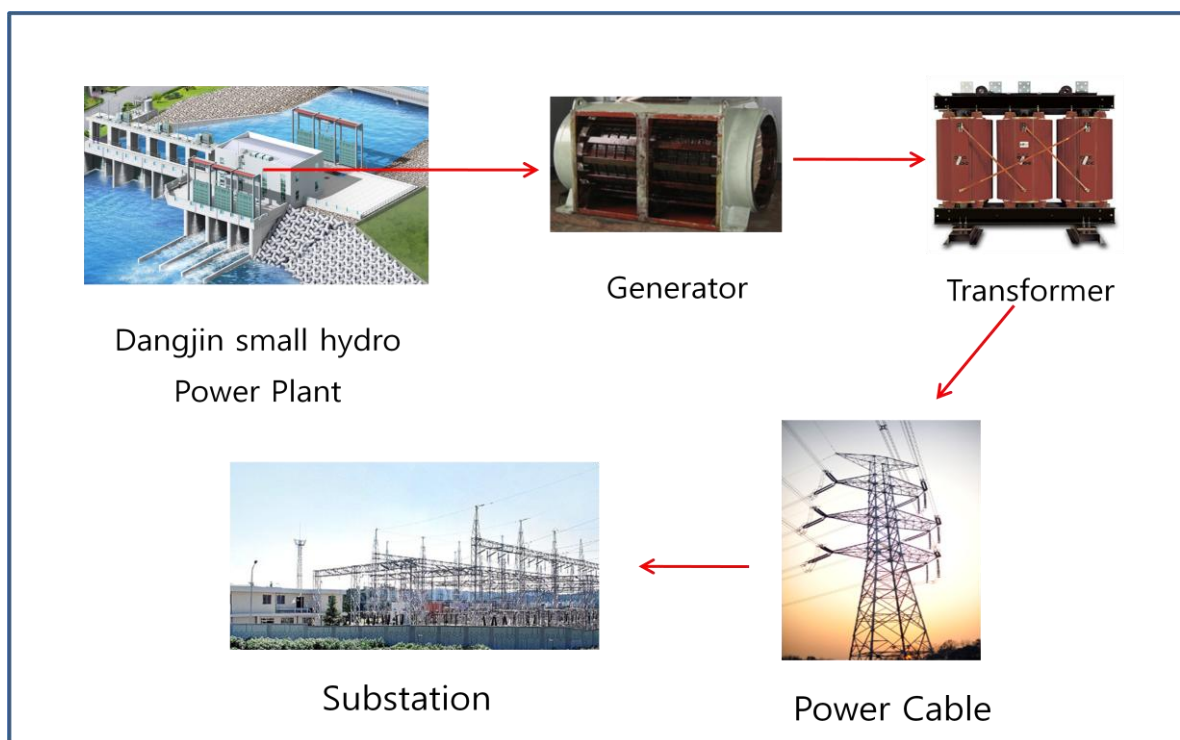
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The Project is used the potential power in the circulating cooling water discharged from Dangjin thermal power plant. The proposed hydro power station is 4.988MW capacity, rated flow 35m³/s ·unit (Based on Rated flows of 1-8 units).

The station provides net 27,898 MWh in every year. The total construction period is approximately 24 months.

Classification		
Wheel	Type	Pit, Horizontal, Bulb type
	Rated Output power	1,736 kW
	Rotation	138.4
	Flow rate(unit)	35 m ³ /sec
	Unit	3
	Manufacturing company	Tianjin TianFa Hydro Co.,LTD
Generator	Type	3-phase, Synchronous
	Rated Output power	1,666 kW
	Rotation	138.4
	Unit	3
	Manufacturing company	Tianjin TianFa Hydro Co.,LTD
Transformer	Type	Mold
	Capacity	8,000 kVa
	Voltage	3,300/22,900 kV
	Connection type	Y-D(Ynd1)
	Unit	1
	Manufacturing company	Hyosung

The participant is operating five thermal power plants and one pumped storage power plant. This Proposed project is the first small hydro power plant. The participant obtains installing and operating skills about small hydro power plant.



System Diagram of wind power project

The hydro power plant and transmission facility is monitored and controlled by onsite central control room. The generated electricity are delivered to Daesan substation via power transmission line.

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: 07 Aug 09

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: 01/01/2010

Length of the total crediting period: 10 years (01/01/2010 ~ 31/12/2019)

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

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Tel: +82-2-3456-8534

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	Dangjin
Completion of construction	31/12/2009
Commissioning date	01/11/2009 ~ 31/12/2009
Starting date of operation	01/01/2010

2. The information regarding the actual operation:

Item	The Dangjin thermal power plant
Overhaul	10 times (Exchange of Runner Gate Bush, Fix of Runner Seal Cover, Exchange of Wicket Gate Bush)
Downtimes	5 times (Error of Lube Oil Tank Level S/W, internal Control Card faulty of GOV Panel)
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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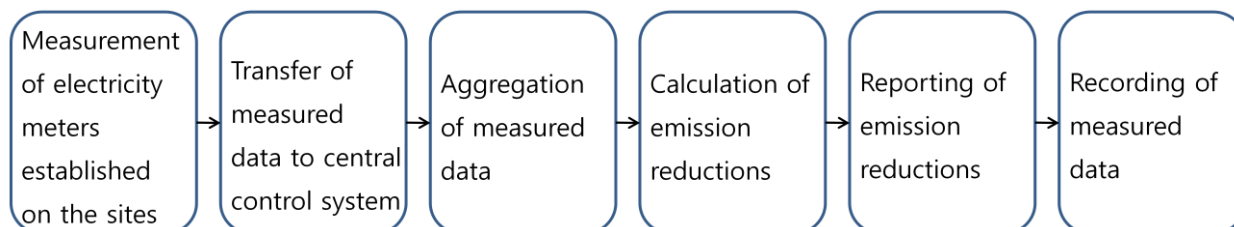
Not applicable

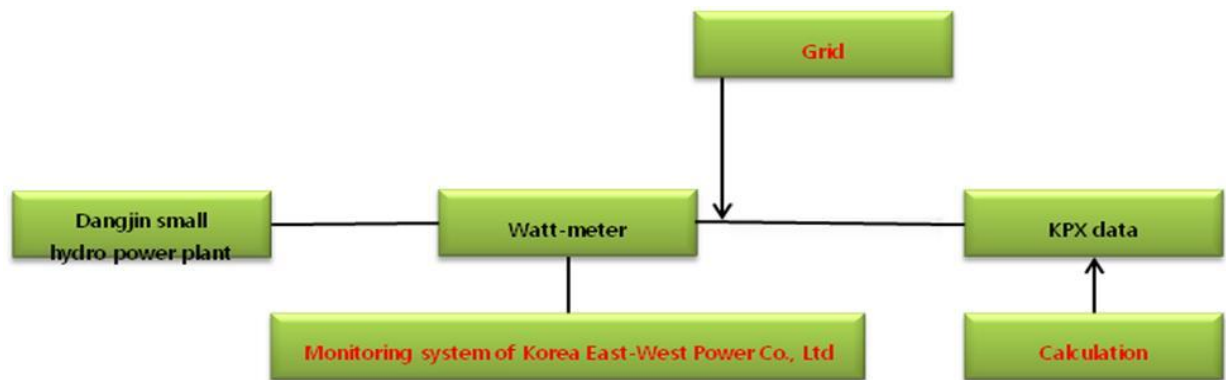
B.4. Notification or request of approval of changes

Not applicable

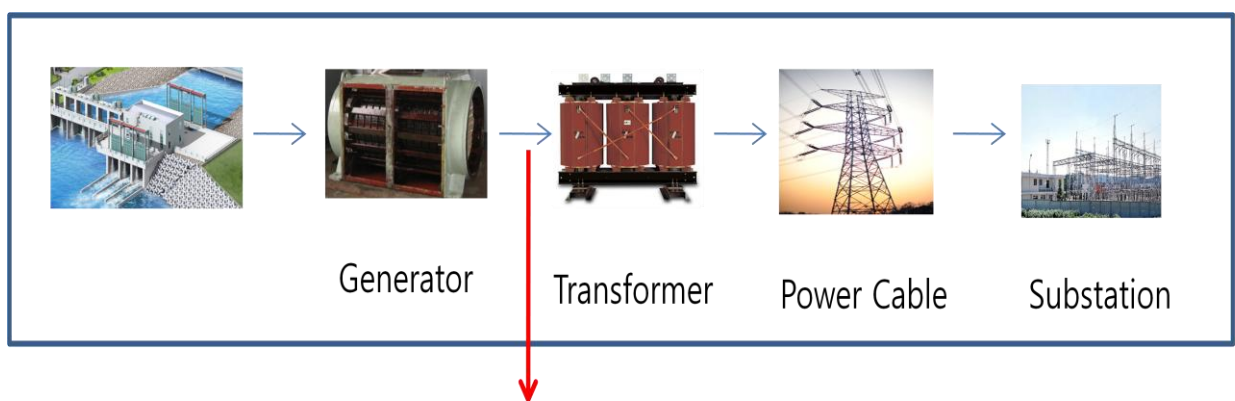
SECTION C. Description of the monitoring system

1. Data collection procedure:





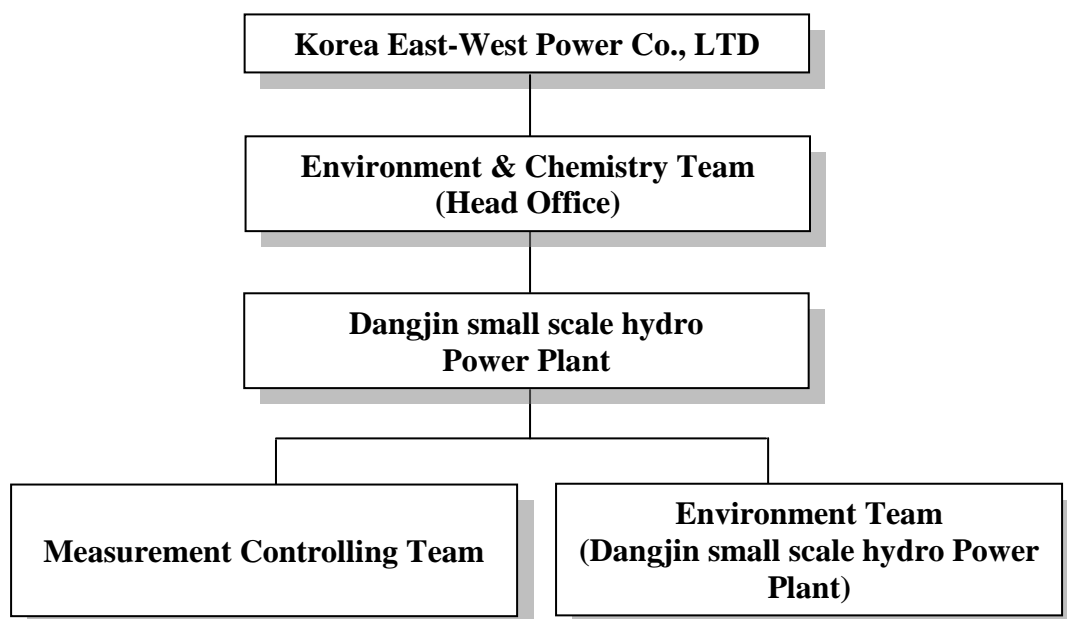
2. Monitoring Point for the project:



Monitoring Point

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

3. Operational and management structure:



Environment & Chemistry Team

The Environment & Chemistry Team of the Head office manages the overall monitoring procedure for the management of emissions reduction.

The Environment & Chemistry Team of the Head office is responsible for collecting the monitoring result and managed monitoring report and approvals.

- Dangjin small scale hydro Power Plant

The General Manager of Dangjin small scale hydro power Plant is responsible for the monitoring of the CDM project and provided the monitoring result regularly to the Environment & Chemistry team of the Head Office.

The General Manager of Dangjin small scale hydro power Plant provides the monitoring guidelines and trains the staff in charge by the help of the contents of the United Nations Framework Convention on Climate Change in order to improve the skill relating to monitoring and makes a final check and review on the monitoring data which are used for CDM project.

- Measurement Controlling Team

The General Manager of the Measurement Controlling Team shall 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.

- Environment Team

The General Manager of Operation Section 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 “Law regarding measurement” and “Act on operation of electricity market” then sealed after affirmation of Korea Power Exchange.
- The meters were calibrated when they were installed, and re-calibrated within 3 and a half years after installation.
- Electricity supplied to the grid was monitored by metering devices installed. The electricity sale receipt was provided by Korea Power Exchange for the project owner’s double check of the amount of electricity supplied and accepted by Korea Power Exchange. And the participants monitored the imported electricity by metering device.
- The collected data of Dangjin small scale power plant was double checked with those of 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(Environment & Chemistry Team) and act according to the internal manual in emergency.
- In case meters are improperly operated or the transfer of data is in error, internal investigation and correction procedure shall be followed and be certified by the final decision-maker and 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:	EF _y
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) :	0.5411 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 0.5411tCO _{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: 32,246.296MWh 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 value is used for Baseline emission calculations.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Measurement equipment: Watt-hour meter 1.Type: AC3P4W 2. Accuracy: 0.5S. 3. Serial number: 51002207 4. Calibration frequency : within 3 and a half years 5. Date of last calibration: 18/05/2009 6. Validity period: 18/05/2009 - 17/11/2012
Measuring/ Reading/ Recording frequency:	Continually Measuring and hourly 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.

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 (tCO_{2e})

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

EFy: Baseline emission factor (tCO_{2e}/MWh)

1) Net electricity supplied to the grid by the project

Periods	Electricity			Remarks
	EGout	EGin	Net	
01/01/2010 - 31/12/2010	25,370.344	35.713	25,334.631	
01/01/2011 - 31/03/2011	6,875.952	8.487	6,876.46	
Total	32,246.296	44.2	32,202.096	

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

The Baseline Emission Factor is calculated ex-ante 0.5411 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;

$$BEy = EGy * EFy$$

$$\approx (32,202.096 \text{ MWh} * 0.5411 \text{ tCO}_2\text{e /MWh})$$

$$\approx 17,424.554 \text{ tCO}_2\text{e}$$

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, PEy = 0 tCO₂e

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, LEy = 0 tCO₂e

E.4. Emission reductions calculation / table

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Emission reductions are calculated as follows:

$$ERy = BEy - PEy - LEy$$

Where:

ERy Emission reductions in year y (tCO₂e/y)

BEy Baseline Emissions in year y (tCO₂e/y)

PEy Project emissions in year y (tCO₂e/y)

LEy Leakage emissions in year y (tCO₂e/y)

$$\begin{aligned} ERy &= BEy - PEy - LEy \\ &= 17,424.554 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} \\ &= 17,424.554 \text{ tCO}_2\text{e} \\ &\approx 17,424 \text{ tCO}_2\text{e} \end{aligned}$$

Thus, emission reduction generated in this monitoring period is 17,424 tCO₂e

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 are as follows;

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO ₂ e)	18,870 tCO ₂ e (15,096+15,096*3/12month)	17,424 tCO ₂ e

From above the actual emission reduction of 17,424 tCO₂e is slightly less than the estimated value of 18,870 tCO₂e

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

This monitoring period (from 01 Jan. 2010 to 31 Mar. 2011) is 1 year and 3month. The actual emission reduction amounts are 17,424 tCO₂, which are less than that estimated in the CDM-PDD (18,870 tCO₂) by 7.7%. It is due to the availability of water resources.

<Electricity Generated & Emissions Reductions>

Month/year	BEy Baseline Emissions (tCO ₂)	PEy Project Emissions	PLy Leakage	ERy Emission Reduction (tCO ₂)
Jan-10	929.491	0	0	929.491
Feb-10	999.394	0	0	999.394
Mar-10	1,290.689	0	0	1,290.689
Apr-10	1,188.137	0	0	1,188.137
May-10	1,061.317	0	0	1,061.317
Jun-10	1,071.543	0	0	1,071.543
Jul-10	1,151.831	0	0	1,151.831
Aug-10	1,262.541	0	0	1,262.541
Sep-10	902.137	0	0	902.137
Oct-10	1,251.426	0	0	1,251.426
Nov-10	1,259.804	0	0	1,259.804
Dec-10	1,340.253	0	0	1,340.253
Jan-11	1,359.567	0	0	1,359.567
Feb-11	1,135.49	0	0	1,135.490
Mar-11	1,220.927	0	0	1,220.927
Total	17,424.547	0	0	17,424