MONITORING REPORT FORM (F-CDM-MR)
Version 02.0

MONITORING REPORT

Title of the project activity	Taegisan Wind Power Project
Reference number of the project activity	2302
Version number of the monitoring report	Version 1.1
Completion date of the monitoring report	26 / 11 / 2012
Registration date of the project activity	15 / 05 / 2009
Monitoring period number and duration of this monitoring period	01 / 06 / 2011 ~ 30 / 09 / 2012 (3rd period)
Project participant(s)	・POSCO Engineering and Construction Co., Ltd ・Eurus Energy Holdings Corporation
Host Party(ies)	Republic of Korea
Sectoral scope(s) and applied methodology(ies)	・Scope : 1 – Energy industries (renewable - / non-renewable sources) ・Methodology : ACM0002 (Version 7.0)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	79,558 tCO_2e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	62,144tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Purpose of the project activity and the measures taken for GHG emission reductions

Taegisan Wind Power Project activity involves construction and operation of 20 numbers of 2MW capacity wind mills at south western area of Gangwon-Do, Republic of Korea.
The type of technology being employed in this project is wind power generation technology thus the proposed project is a renewable energy project that utilizes wind power energy, a renewable energy releasing no greenhouse gases. The generated electricity from the project has been displacing the electricity from existing grid from fossil fuel based power plants. The actual emission reductions of the project activities reached 62,144 tCO_2e (tonnes of carbon dioxide equivalent) during the monitoring period.

Wind power energy used as the electric generation source of the proposed project is one of the clean renewable energy resources without being depleted.
Also currently in Korea, they make efforts to reduce fossil fuel usage in various ways and have great concerns about the renewable energy including wind power.
Under this situation Taegisan Wind Power Project is expected to contribute to decrease the usage of electricity by fossil fuel based power plants. In 2006, those fossil fuel based power plants take 59.47% of electricity generation in Korea according to KEPCO. (KEPCO: Korea Electric Power Co.).

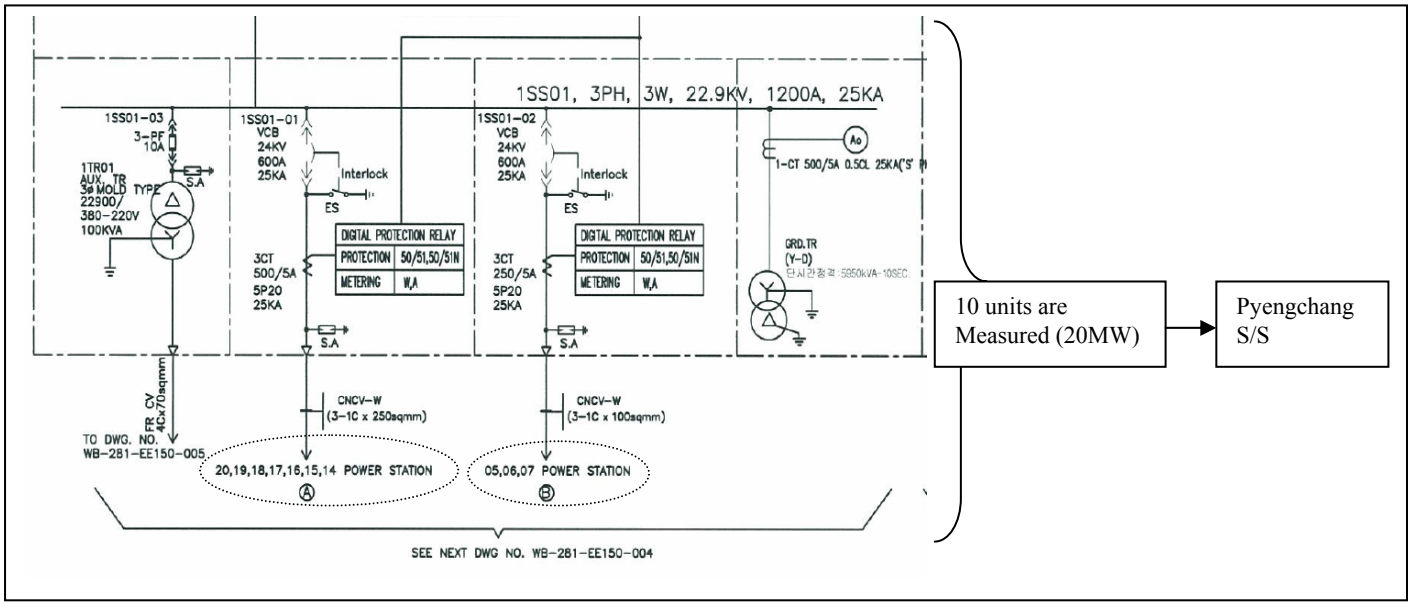
Brief description of the installed technology and equipment

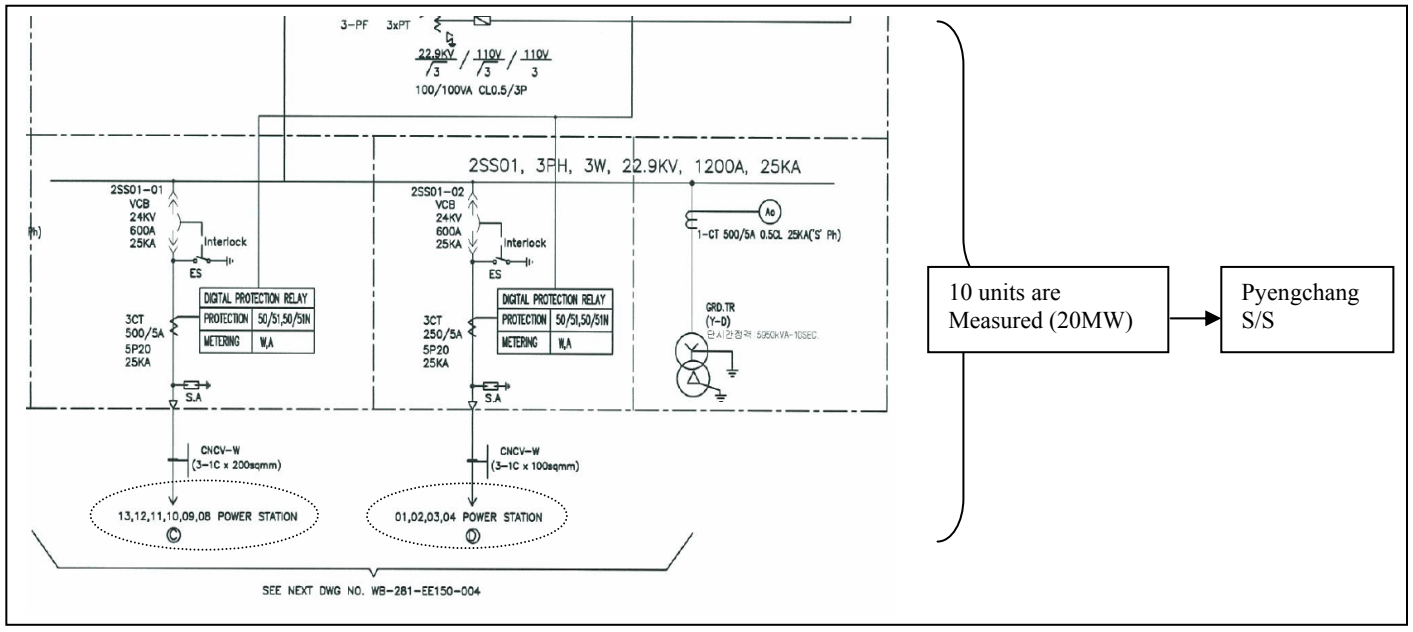
Total installed capacity of the proposed project is 40MW (2MW x 20). And the project is composed of 20 generators (wind power turbines) each with 2MW.
20 Units are classified as two ways which is the administrative district and the measuring electricity supplied to the grid.
For the administrative district, the project site is located between Hoengseong-gun and Pyeongchang-gun in Gangwon Province area. Therefore, 9 units are located in Hoengseon-gun and 11 units are located in Pyeongchang-gun.

- Hoengseong-gun, Gangwon-do: 2MW × 9 units = 18 MW (5,6,8,9,11~15-the number refers to below figure)
- Pyeongchang-gun, Gangwon-do:2MW × 11 units = 22 MW (1~4,7,10,16~20-the number refers to below figure)

On the other hands, For the measuring electricity supplied to the grid, units are divided into two groups (A, B and C, D). The electricity generated from each group is measured by meters and supplied to the grid through two lines each with 20MW. Unit's number included in A, B, C and D are described as follows:

A: 14~20 / B: 5~7 / C: 8~13 / D: 1~4





Taegisan is the highest mountain in Hoengseong-gun and rises 1,261 meters above the sea level, thus the sites of the project have favorable conditions of location as a wind farm. Annual electric generation was 104,159 MWh. The electricity generated from the wind turbine is transmitted to the grid, KEPCO Pyeongchang transformer substation, through 22.9kV of transmission lines.

And the whole transmission lines reach 33km (Underground 8km and Overhead 25km).Among the whole lines; the 8 km block which goes through rural communities will be constructed underground and make the maximum use of existing roads for environmentally friendly development.

Relevant dates for the project activity

<Table A.1> Implementation of the project

Event	Time
Project starting date	The starting date of the project activity is 12/03 /2007. The starting date chosen is the date when contract for turbine purchase was closed and also it is the earliest date at which the project participant (POSCO E&C) has committed to big expenditures for the project.
Starting date of the construction	- 25/07/2007
Completion of the construction	- 30/01/2009
Commissioning date	- 06/10/2008 ~ 26/12/2008

Total GHG emission reductions achieved in this monitoring period

The 3rd monitoring period is from 01/06/2011 to 30/09/2012(for 1 year and 4 months) and the total amount of GHG emission reductions achieved in the 3rd monitoring period is 62,144 tCO_2e.

A.2. Location of project activity

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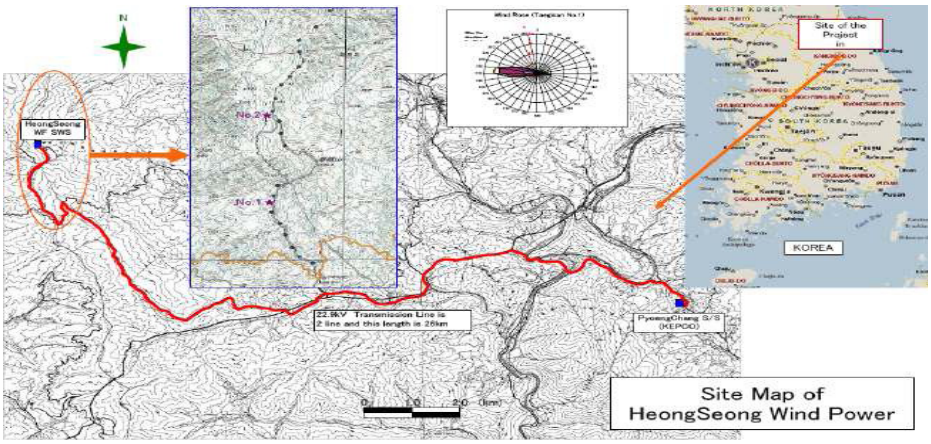
The project site is located over the area of Taegi-ri, Dunnae-myun, Hoengseong-gun and Mui-ri, Bongpyeong-myun, Pyeongchang-gun in Gangwon Province in Republic of Korea. It is situated in the mountainous area of the Taebaek Mountains, neighboring easterly to Pyeongchang-gun and westerly Hoengseong-gun.

The site location's approximate coordinates are east longitude of 128°20' and north latitude of 37°32' as its substation goes.

<Figure A.1> The location of Taegisan Wind farm



<Figure A.2> The location of Taegisan Wind farm

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Korea (Host)	POSCO Engineering and Construction Co., Ltd.	No
Japan	Eurus Energy Holdings Corporation	No

A.4. Reference of applied methodology

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- ACM0002 ver.7 Consolidated baseline methodology for grid-connected electricity generation from renewable sources.
- Tool to calculate the emission factor for an electricity system (Ver. 01)

A.5. Crediting period of project activity

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- Type of the crediting period : Fixed
- Start date of the crediting period : 15/05/2009
- The crediting period of the project : 15/05/2009 ~ 14/05/2019
- The third crediting period of the project : 01/06/2011 ~ 30/09/2012

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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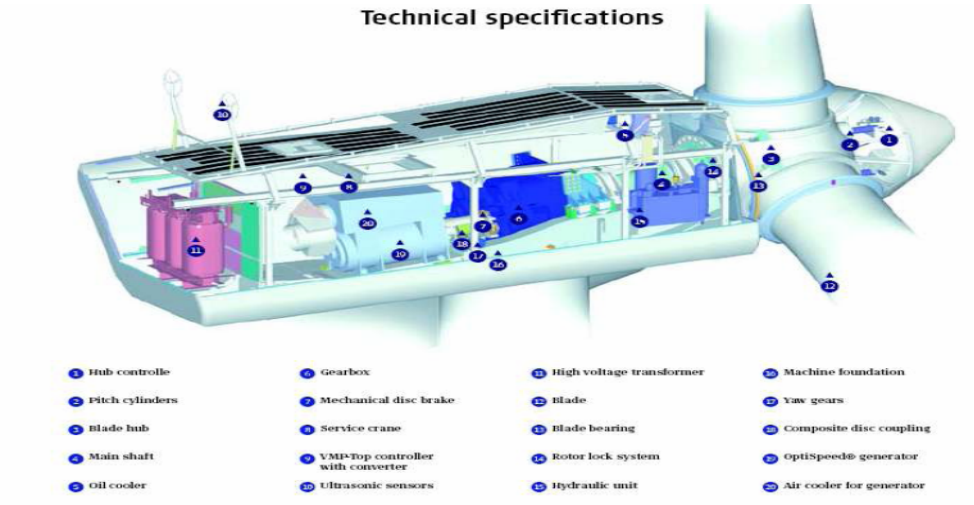
Description of the installed technology, technical process and equipment

Wind power generation uses the current of wind to rotate the blades and gets electric power from it. So the proper amount of wind and choice of the generator which fits to the purpose is very important to build a wind power plant.

Wind, the energy source of wind power generation mostly depends on the terrain. So the project developers considered weather conditions and chose Mt. Taegi area as the plant site, which is the highest mountain of Hoengseong area in Gangwon Province. And total installed capacity of the project is 40MW (2MW x 20), which is composed of 20 generators (wind power turbines) with 2MW. The project uses the turbine technology with OptiSpeed ™[1] and OptiTip®[2] and these generator facilities were imported from Denmark.

The turbine model is VESTAS V80-2.0MW, which has already been installed around the world for large scale wind power generation projects and it was chosen through bids.
The main facilities of the wind farm consist of rotor, nacelle, tower and generator.
And the VESTAS V80-2.0MW turbine being used the project has following features.
The VESTAS V80-2.0MW is a pitch regulated upwind turbine with active yaw and a rotor with three blades. The rotor is converting kinetic energy of wind to rotatory power and it effects on the efficiency of generator. Especially the design of each rotor blade is very important part of the facilities. This turbine has a rotor diameter of 80m and this feature enables the rotor to operate with variable speed (RPM). With pitch regulating system, the angles of the blades are constantly regulated so they are always pitched at the optimal angle for current wind conditions to optimize power production and noise levels. At higher wind speeds, the pitch regulating system keeps the power at normal, regardless of the air temperature and density. At lower wind speeds it optimizes the power output by selecting the optimal RPM and pitch angle.
Also all functions of the wind turbine are monitored and controlled by microprocessor based control units.
A detailed technical specification of VESTAS V80 is shown as followed.



<Figure A.3> VESTAS V80 technical specification

<Table A.1.> Power Curves VESTAS V80-2.0 MW

Rotor	
Diameter	80m
Swept area	5027m2
Rotational speed static, rotor	16.7 RPM
Rotational speed operation interval rotor	9.0 - 19.0 RPM
Rotational direction	Clockwise(front view)
Orientation	Upwind
Tilt	6°
Blade coning	2°
Number of blades	3
Aerodynamic brakes	Full feathering
Tip angle	Pitch regulated
Turbulence	10%

Specification Vestas V80-2MW wind turbine		
Operational data	Cut-in wind speed	4m/s
	Normal wind speed	15m/s
	Cut-out wind Speed	25m/s
Generator	Nominal output	2000kW
	Operation data	50Hz / 60 Hz 690V
Weight	Nacelle	67t
	Rotor	37t

The generated electricity is 104,159 MWh/year and it was transmitted to KEPCO Pyeongchang transformer substation and replaces the electricity generated by fossil fuel in the grid, through 22.9kV of transmission lines which is described in ANNEX2. (Impedance map)
In Korea, KEPCO represents the grid system. Therefore, the boundary of the project could be identified as KEPCO and the proposed project site.

Information on the implementation and actual operation

There were no special events happened to the project during the monitoring period. The project was operational as normal and the electricity produced by the project is daily recorded during the monitoring period. The meters which measure the electricity delivered to the grid were installed and calibrated in October 21 2012. And the meters which measure imported from the grid were installed and calibrated in June 25 2012. The meters met criteria and the result of calibration will be submitted to DOE. At the time of calibration, training course for operating system was held.

<Table B.1> Implementation of the project

Event	Time
Installed meters	- 10/09/2008
Calibration of meters for exported electricity	- 21/08/2012
Calibration of meters for imported electricity	- 25/06/2012
Registration date	- 15/05/2009
Starting date for commercial operation	- 28/01/2009
3rd monitoring period	- 01/06/2011 ~30/09/2012

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

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No request for deviation was applied for this monitoring period.

B.2.2. Corrections

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No request for deviation was applied for this monitoring period.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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On 08 ~ 10 Dec 2010, the first verification (on-site assessment) was conducted for the Taegisan Wind Power Project in the monitoring period (15 May 2009 – 31 May 2010).

At the on-site assessment, we found a problem that actual situation and monitoring plan described in the PDD registered are different.

The differences and reason are explained as below

1. **The matter of accuracy of meters:**

When project participant planed the project, the electricity generated is transferred to the grid through one line. Therefore, accuracy of meters is planed as ±0.2% in accordance with Act on operation of electricity market. But while project participant was discussing about project design, project participant was decided that the electricity generated is transferred to the grid through two lines each with 20MW after PDD was finished. As a result, the meters were installed with accuracy of ±0.5% in accordance with Act on operation of electricity market.

In addition, the right to choice accuracy of meters belongs to KPX so the meter was installed by KPX (Korea Power Exchange) in accordance with Act on operation of electricity market.

2. **The matter of frequency of meter calibration:**

In the PDD, Frequency of meter calibration is every two year. But Korea regulation was amended in December 2007. Therefore, monitoring plan needs to be revised to meet regulation in Korea. It complies with the methodology (ACM0002 ver.07). In the methodology, it is specified that all measurements should be conducted with calibrated measurement equipment according to relevant industry standards. For the project, a relevant industry standard is "Act on operation of electricity market December, 2011".

B.2.4. Changes to project design of registered project activity

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No request for deviation was applied for this monitoring period.

B.2.5. Changes to start date of crediting period

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No request for deviation was applied for this monitoring period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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N. A.

SECTION C. Description of monitoring system

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Monitoring plan is setting up the series of monitoring works on GHG emission reduction of the proposed project.

Monitoring plan includes followings.

- Establishing and keeping the appropriate and transparent monitoring system for the generated electricity from the project
- Measuring instrument management, maintenance and quality control.
- Role and demands of the person in charge of monitoring
- Data management and storage system
- Preparations and coping with the third parties audit

1. Data collection procedure

· **Electricity supplied to the grid**

First, the electricity is generated by 20 sets of wind power generators using current of 4m/s~25m/s wind. In the control room, the status of output, direction of the wind, and wind speed is monitored in real time.
Second, the electricity is transferred to Taegisan substation where the electricity generated is primarily gathered.
Third, it goes through both of comparison meters and main meters. At this time, the amount of electricity generated from the generators is measured. The measured data is automatically sent to KPX's data base. A

person in charge records the data every day through KPX's homepage and examines the receipt of the records against the data in six times a month.
Forth, the electricity is transferred to Pyeongchang transformer substation through transmission line
Finally, it is sold to KPX.

· **Electricity imported from the grid**

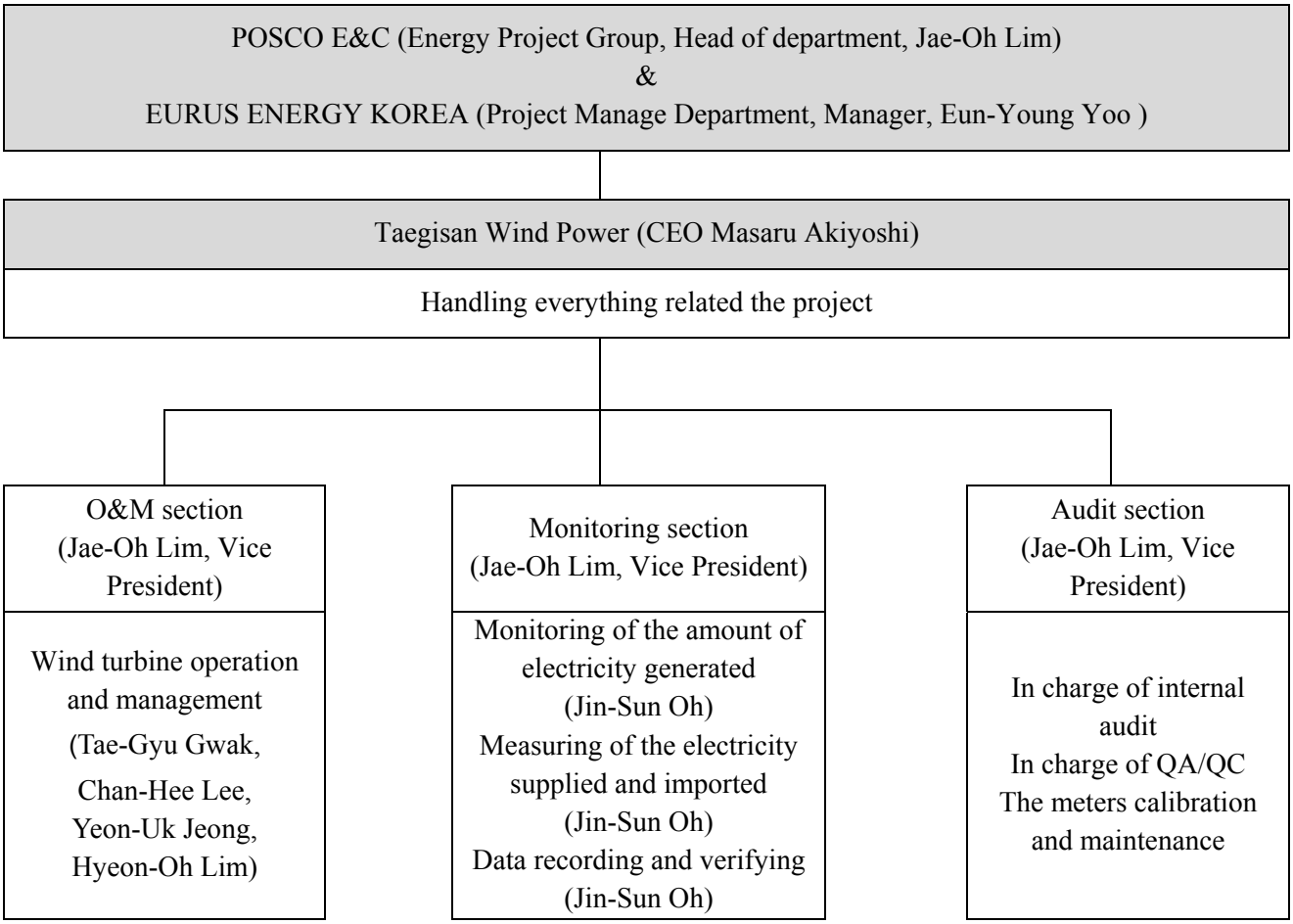
Taegisan Wind Power Plant uses electricity from the grid for its start up and operation. The amount of electricity consumed is measured by electric meter. A person from KEPCO and Taegisan Wind Power records the data every month by reading the meter. And KEPCO sends the receipt to Taegisan Wind Power every month. A person in Taegisan Wind Power compares the data with its receipt for accuracy.

2. Monitoring Organization

The generated electricity supplied to the KEPCO grid is the main data to be monitored. And CDM project manager will be in charge of all related matters including monitoring of reduction, collecting and keeping of the data, QA/QC and audit.

Project owner(s) of the Taegisan wind power plant are POSCO E&C and Eurus Energy Holdings Corporation. The former, POSCO E&C will take charge of engineering, purchasing the equipment including generators and other construction work etc.
And the latter,Eurus Energy Holdings Corporation will undertake management of the SPC (Taegisan wind power company) and project financing. And the SPC (Taegisan wind Power Company) is the manager of project.
So Taegisan wind Power Company will take charge of overall operation, monitoring and audit of the plant. There are two sections under the Taegisan wind power company: monitoring section and auditor section.

Monitoring section manager will undertake monitoring, gathering and storage required according to the monitoring plan. And the gathered information is recorded and sent to the CDM project manager and auditor section monthly.
Also auditor section manager will audit the monitoring section's work and proceeds QA/QC process according to the monitoring plan.
CDM project manager will take the responsibility for entire compliance of the monitoring plan including confirmation of monitoring plan, emission reduction and report and also will be in charge of making efforts to protect and manage information by appropriately distributing information and preparing measures to trespass and destroy information.
In addition, the CDM project manager does not use and process information in an inappropriate manner.
Following figure describes the operational structure to perform the monitoring plan.

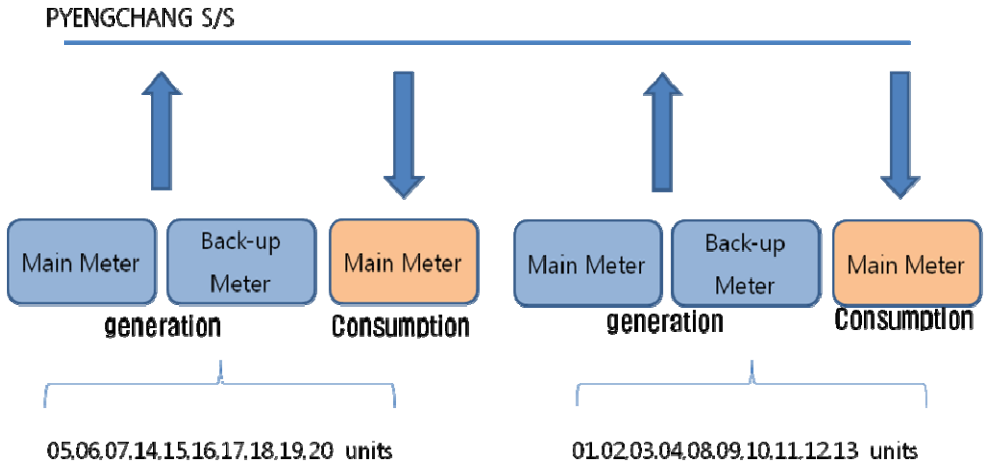


Name	Role & responsibility
Jae-oh Lim	● In charge of management for Taegisan Wind Power from both inside and outside
Tae-Gyu Gwak, Chan-Hee Lee, Yeon-Uk Jeong, Hyeon-Oh Lim	● Operate and maintain wind power generators ● Supervise operation and maintenance for transmission line ● Manage meters
Jin-Sun Oh	● Manage and record every kinds of data ● Account service ● Manage the metering for the electricity supplied ● Monitor and analyze the electricity generated ● Maintain the generators
Hyun-No Kim	● Repair transmission line and the generators ● Maintain transmission line and the generators ● Manage materials

<Figure C.1> Operational and management structure

CDM project manager should report any important changes of the outline and fulfillment of entire monitoring plan to the project owner.

3. Monitoring Equipment



<Figure C.2> Monitoring Point

Electricity meters for measuring the amount of electricity shall be set up transparently in accordance with the Korean law "Law regarding measurement" and "Act on operation of electricity market", and they shall be sealed after confirmation on the correct set up.
The meters shall be investigated according to "Act on operation of electricity market" by certificated examination standard.
Calibration for meters that measure electricity supplied and imported shall be performed according to "Act on operation of electricity market" after the installation. The first calibration was conducted the 10 September 2008 when the meters were installed. Its result was confirmed by KPX (Korea Power Exchange) and KEPCO (Korea Electric Power Co.) and proven by the related document. The frequency of meter calibration is every 3.5year (±6month) in accordance with standard of "Act on operation of electricity market". Therefore the calibration of meters for exported electricity is implemented on 21/08/2012 and the calibration of meters for imported electricity is implemented on 25/06/2012.
The proposed project will be maintained in accordance with the process defined on the "Law regarding measurement" and "Act on operation of electricity market".
The electricity delivered to the grid and imported from the grid is measured by the meters installed on the project site. And the relevant monitoring point is described in ANNEX1 and Figure C.2.

◈ Act on operation of electricity market (December, 2011)
The measuring equipment' inspection period is as below table.

Capacity	More than 1MW	Less than 1MW
Test Period	3 years 6 months ±6months	Exemption

4. Data Collection and Management

The amount of electricity transmitted to the grid shall be measured automatically by the established meters as described above. The measured variables are simultaneously transferred to central control system of KPX.
The measured amount of electricity shall be collected hourly, daily and monthly and shall be archived in electronic way.
The electricity imported from the grid for start up of the generators is measured automatically by the meters. The measured data is recorded monthly and checked out against receipts for accuracy and reliance.

Additionally, according to "Act on operation of electricity market", KPX shall keep and maintenance the transmitted data from the electricity meters of the proposed project in its data base.
The measured amount of electricity shall be compared with receipt to ensure quality of the data.
If the two variables compared are different, KPX checks its data base to compare the receipt with its data base. And the electricity meters and other equipment shall be checked if they are working properly by internal investigation and procedures regulated in the related laws. Then the results will be reported to the CDM project manager for appropriate follow-up measures.
Even after the internal investigation and procedures in related laws, if the reason why those two variables are different is not found, then data stored in SCADA will be used in the first place according to "Act on operation of electricity market"
If SPC (Taegisan wind Power Company) cannot send the data to KPX through the line, SPC would send it by Fax or E-mail.

If the data related to generated electricity cannot be sent to KPX because of failure in the meters and SCADA, the average on the data measured in recent 10 days is applied to calculate generated electricity but will be applied differently at weekend and business day.
Collected data record for monitoring will be archived electronically at least for 2 years after the crediting period (10years) to which the records pertain.

5. Training

The project developers and manager will continue the training and maintenance over the equipment of wind power plant. And people related the CDM project is trained with monitoring manual.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter.)

Data/Parameter	**Fuel Consumption, $F_{i, m, y}$**
Unit	Ton or kℓ
Description	Fuel consumption i : bituminous, heavy oil, diesel, LNG m : sample group consisting of power capacity additions that comprises 20% of system generation and that have been built most recently. y : 2006
Source of data	2006 STATISTICS OF ELECTRIC POWER IN KOREA
Value(s) applied	Referred to Statistics of Electronic Power in KOREA
Purpose of data	Baseline emission calculations
Additional comment	This is used to determine the emission factor of national grid in Korea

Data/Parameter	**Power Generation, $PG_{j,y}$**
Unit	MWh
Description	The electricity generation by source j in year y of power plants connected to National Grid
Source of data	Statistics of Electronic Power in KOREA (2004, 2005, 2006) (KEPCO)
Value(s) applied	Referred to Statistics of Electronic Power in KOREA
Purpose of data	Baseline emission calculations
Additional comment	This is used to determine the emission factor of national grid in Korea

Data/Parameter	**Calorific Value, CV_i**
Unit	kcal/kg or kcal/ℓ
Description	The calorific value (energy content) per mass or volume unit of a fuel *i*.
Source of data	Statistics of Electronic Power in KOREA (2004, 2005, 2006) (KEPCO)
Value(s) applied	Referred to Statistics of Electronic Power in KOREA
Purpose of data	Baseline emission calculations
Additional comment	This is used to determine the emission factor of national grid in Korea

Data/Parameter	**Emission Factor, $EF_{CO2,i}$**
Unit	tCO_2/Gj
Description	CO_2 emission factor of fuel i i : bituminous, heavy oil, diesel oil, LNG
Source of data	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.6426
Purpose of data	Baseline emission calculations
Additional comment	Emission factor will be fixed during the credit period of the project

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data/Parameter	**Electricity Quantity, $EG_{output,y}$**
Unit	MWh
Description	Electricity supplied to the grid
Measured/Calculated /Default	Measured
Source of data	Meters
Value(s) of monitored parameter	104,159
Monitoring equipment	- Type : Electric meter - Accuracy class : 0.5s - Serial Number : Main1 - 46026112, Main2 - 46026114 Backup1 - 46026111, Backup2 - 46026113 - Calibration frequency: 3years 6month ±6month (Act on operation of electricity market) - Date of last calibration : 21/08/2012 - Expected next calibration : 21/08/2015~21/08/2016
Measuring/Reading/ Recording frequency	measured each hourly and recorded monthly
Calculation method (if applicable)	
QA/QC procedures	The Measurement will be in compliance with the National Guidelines and requirement of the KPX(Korea Power Exchange) for accuracy and reliability. The calibration will be carried out according to Act on operation of electricity market by authorized organization. Double checked by receipt of sales.
Purpose of data	Baseline emission calculations
Additional comment	

Data/Parameter	Electricity Quantity, $EG_{import,y}$
Unit	MWh
Description	Electricity purchased from the grid
Measured/Calculated /Default	Measured
Source of data	Recorded data
Value(s) of monitored parameter	500
Monitoring equipment	- Type : Electric meter - Accuracy class : 0.5s - Serial Number: Before 25/06/2012 - No.0067477, No.0067467 After 25/06/2012 - No.02112005008 , No.02112004932 - Calibration frequency: 3years 6month ±6month (Act on operation of electricity market) - Date of last calibration : 25/06/2012 - Expected next calibration : 25/06/2015~25/06/2016
Measuring/Reading/ Recording frequency	recorded monthly
Calculation method (if applicable)	
QA/QC procedures	The Measurement will be in compliance with the National Guidelines. The allowable error of data must be within ±0.5%. Double checked by receipt of sales.
Purpose of data	Baseline emission calculations
Additional comment	

D.3. Implementation of sampling plan

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N.A.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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$BE_y = EG_y * EF_y$

Where:

EG_y is net electricity supplied by the project activity to the grid in year y, in MWh

EF_y is baseline emission factor in year y, in tCO_2e/MWh(according to the registered PDD)

$EG_y = EG_{output,y} - EG_{import,y}$

Where;

EG_y -Net electricity supplied to the grid during the monitoring period (MWh);

$EG_{output,y}$–Electricity supplied to the grid (MWh);
$EG_{import,y}$– Electricity purchased from the grid (MWh).

The following table provides the calculation of the baseline emissions during the monitoring period. The monitoring period is from 1 June 2011 to 30 September 2012. Electricity supplied to the grid and purchased from the grid is measured based on the period from the first day of the month to the last day of the month.

<Table E.1> Net electricity during the Monitoring Period

The first monitoring period	Electricity supplied to the grid, $EG_{output,y}$ (MWh)	Electricity purchased from the grid, $EG_{import,y}$ (MWh)	The net electricity supplied to the grid, EG_y (MWh)
01/06/2011 ~ 30/06/2011	6,196	32	6,164
01/07/2011 ~ 31/07/2011	4,968	33	4,935
01/08/2011 ~ 31/08/2011	5,025	40	4,985
01/09/2011 ~ 30/09/2011	6,775	34	6,741
01/10/2011 ~ 31/10/2011	4,604	48	4,556
01/11/2011 ~ 30/11/2011	6,881	25	6,856
01/12/2011 ~ 31/12/2011	8,056	14	8,043
01/01/2012 ~ 31/01/2012	7,972	19	7,953
01/02/2012 ~ 28/02/2012	7,105	21	7,083
01/03/2012 ~ 31/03/2012	9,989	24	9,965
01/04/2012 ~ 30/04/2012	10,132	15	10,117
01/05/2012 ~ 31/05/2012	4,360	33	4,327
01/06/2012 ~ 30/06/2012	4,401	53	4,348
01/07/2012 ~ 31/07/2012	5,937	31	5,906
01/08/2012 ~ 31/08/2012	6,904	36	6,868
01/09/2012 ~ 30/09/2012	4,855	42	4,812
Total	**104,159**	**500**	**103,659**

The wind park is located on a mountain ridge and supplies electricity to the public grid using an internal 33km 22.9kV power line to the local substation of the Korea Electrical Power Corporation (KEPCO). The same power line is used for electricity obtained from the grid.
Since the approved methodology of ACM 0002 specifies “grid-connected electricity generation from renewable resource”, Project Participant provided the transmission loss of the generated electricity power, there should be the clear evidence of either following case of the actual project situation;
Case-1: If there is no measuring meters of the State Grid and the generated electricity is monitored only by the Project-site meters,

1. PPA (purchase Power Agreement) clearly states that the position of the transferring the property of the generated electricity from the Project Owner to the State Grid as if there would be such measuring meters of the State Grid at that point.

2. Besides the relevant correctly calculated Transmission Loss from the Project site to that point.

Or

Case-2: If there are such measuring meters of the State Grid, then such places should be clearly specified in the PDD with the absolute position description and also in the summarized flow chart of the PDD.

In case of the Taegisan Wind Power Project, there are no measuring meters of the State Grid and the generated electricity is monitored only by the Project-site meters (CASE-1). Thus the transmission loss described as below was calculated by EXCEL (calculating emission reduction) which will be provided to DOE.

Transmission line map is explained in ANNEX2 and resistance is calculated in ANNEX3. Evidences about resistance and length of transmission line will be provided to DOE to explain transmission line (33km) and resistance.

Taking into account the transmission loss,

The value of TLy is calculated as follow:

kWh Loss $= I^2R_3 \times T$
kW Loss $= I^2R_3$
I $= Ip/P.F$
IP $= P/(1.732 \times 22.9 \times T)$

Where,
P = Electricity generation (kWh)
T = Time (period) = 24 × days
I = the current (A)
P.F = Power factor (%): 97
R_1 = the phase resistance (Ω): 3.4402 - One phase resistance (Refer to ANNEX2 and ANNEX3)
R_1(M1 and M2) = (a *22)＋(b*3)+(c*8)

		Specifications	Distance(Km)	R(Ω)
Overhead line	a	ACSR-AW/OC 240sq	22	2.6026
	b	ABC-W 150sp*3	3	0.549
Underground line	c	CNCV-W 250sq	8	0.2886

R_3 = the phase resistance (Ω): - three transmission line
R_3=3x R_1 three phase resistance
22.9 = the voltage of power line from Taegisan Wind Park to the Substation. Unit: kV

<Table E.2> Transmission loss for electricity supplied during the Monitoring Period

Month	**(a) $TL_{y, supply}$** Transmission Loss for Electricity supplied(MWh)	Transmission Loss (%)
01/06/2011 ~ 30/06/2011	372	6.00
01/07/2011 ~ 31/07/2011	231	4.66
01/08/2011 ~ 31/08/2011	237	4.71
01/09/2011 ~ 30/09/2011	444	6.56
01/10/2011 ~ 31/10/2011	199	4.31
01/11/2011 ~ 30/11/2011	459	6.66
01/12/2011 ~ 31/12/2011	608	7.55
01/01/2012 ~ 31/01/2012	596	7.47
01/02/2012 ~ 28/02/2012	506	7.12
01/03/2012 ~ 31/03/2012	935	9.36
01/04/2012 ~ 30/04/2012	994	9.81
01/05/2012 ~ 31/05/2012	178	4.09
01/06/2012 ~ 30/06/2012	188	4.26
01/07/2012 ~ 31/07/2012	330	5.56
01/08/2012 ~ 31/08/2012	447	6.47
01/09/2012 ~ 30/09/2012	228	4.70
Total	**6,951**	

<Table E.3> Transmission loss for electricity imported during the Monitoring Period

Month	**(a) $TL_{y, import}$** Transmission Loss for Electricity Export(MWh)	Transmission Loss (%)
01/06/2011 ~ 30/06/2011	0.010	0.03
01/07/2011 ~ 31/07/2011	0.010	0.03
01/08/2011 ~ 31/08/2011	0.015	0.04
01/09/2011 ~ 30/09/2011	0.011	0.03
01/10/2011 ~ 31/10/2011	0.021	0.04
01/11/2011 ~ 30/11/2011	0.006	0.02
01/12/2011 ~ 31/12/2011	0.002	0.01
01/01/2012 ~ 31/01/2012	0.003	0.02
01/02/2012 ~ 28/02/2012	0.005	0.02
01/03/2012 ~ 31/03/2012	0.005	0.02
01/04/2012 ~ 30/04/2012	0.002	0.01

01/05/2012 ~ 31/05/2012	0.010	0.03
01/06/2012 ~ 30/06/2012	0.027	0.05
01/07/2012 ~ 31/07/2012	0.009	0.03
01/08/2012 ~ 31/08/2012	0.012	0.03
01/09/2012 ~ 30/09/2012	0.017	0.04
Total	**0.167**	

Baseline emission is calculated as follow:

<TableE.4> Baseline Emission during the Monitoring Period

Month	(a) $EG_{output,y}$ (MWh)	(b) $EG_{import,y}$ (MWh)	(c) $TL_{y,supply}$ (MWh)	(d) $TL_{y,import}$ (MWh)	NE (MWh) (a-b-c-d)	BE (tCO_2e) (NE*EF)
6	6,196	32	372	0.010	5,792	3,722
7	4,968	33	231	0.010	4,704	3,023
8	5,025	40	237	0.015	4,748	3,051
9	6,775	34	444	0.011	6,297	4,046
10	4,604	48	199	0.021	4,357	2,800
11	6,881	25	459	0.006	6,397	4,111
12	8,056	14	608	0.002	7,434	4,777
1	7,972	19	596	0.003	7,357	4,728
2	7,105	21	506	0.005	6,578	4,227
3	9,989	24	935	0.005	9,030	5,803
4	10,132	15	994	0.002	9,123	5,862
5	4,360	33	178	0.010	4,148	2,666
6	4,401	53	188	0.027	4,160	2,673
7	5,937	31	330	0.009	5,576	3,583
8	6,904	36	447	0.012	6,422	4,127
9	4,855	42	228	0.017	4,584	2,946
Total	**104,159**	**500**	**6,951**	**0.167**	**96,707**	**62,144**

E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

PE_y is project emissions during a given year y. According to ACM 0002(version 07) methodology, in renewable energy, PE_y is considered as "0".

$PE_y = 0$

E.3. Calculation of leakage

>>

According to ACM0002 (Version 07), the leakage from the project is zero.

$LE_y=0$

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_{2e})	Leakage (tCO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO_2e)
01/06/2011 ~ 30/06/2011	3,722	0	0	3,722
01/07/2011 ~ 31/07/2011	3,023	0	0	3,023
01/08/2011 ~ 31/08/2011	3,051	0	0	3,051
01/09/2011 ~ 30/09/2011	4,046	0	0	4,046
01/10/2011 ~ 31/10/2011	2,800	0	0	2,800
01/11/2011 ~ 30/11/2011	4,111	0	0	4,111
01/12/2011 ~ 31/12/2011	4,777	0	0	4,777
01/01/2012 ~ 31/01/2012	4,728	0	0	4,728
01/02/2012 ~ 28/02/2012	4,227	0	0	4,227
01/03/2012 ~ 31/03/2012	5,803	0	0	5,803
01/04/2012 ~ 30/04/2012	5,862	0	0	5,862
01/05/2012 ~ 31/05/2012	2,666	0	0	2,666
01/06/2012 ~ 30/06/2012	2,673	0	0	2,673
01/07/2012 ~ 31/07/2012	3,583	0	0	3,583
01/08/2012 ~ 31/08/2012	4,127	0	0	4,127
01/09/2012 ~ 30/09/2012	2,946	0	0	2,946
Total	**62,144**	**0**	**0**	**62,144**

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO_2e)	79,558 tCO_2e	62,144 tCO_2e

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

>>

The expected electricity supplied to the grid is 123,808 MWh/yr which is specified in the registered PDD to compare with actual value. But the actual electricity generated 103,659 MWh/yr during the monitoring period (01/06/2011 ~30/09/2012).

There are several reasons for the gap between expected output and actual output. 78 events of troubleshooting in the monitoring period happened as below.

Month	**2011**							**2012**								
	6	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Number of Events	6	7	4	2	3	5	8	4	8	2	6	2	3	8	5	5

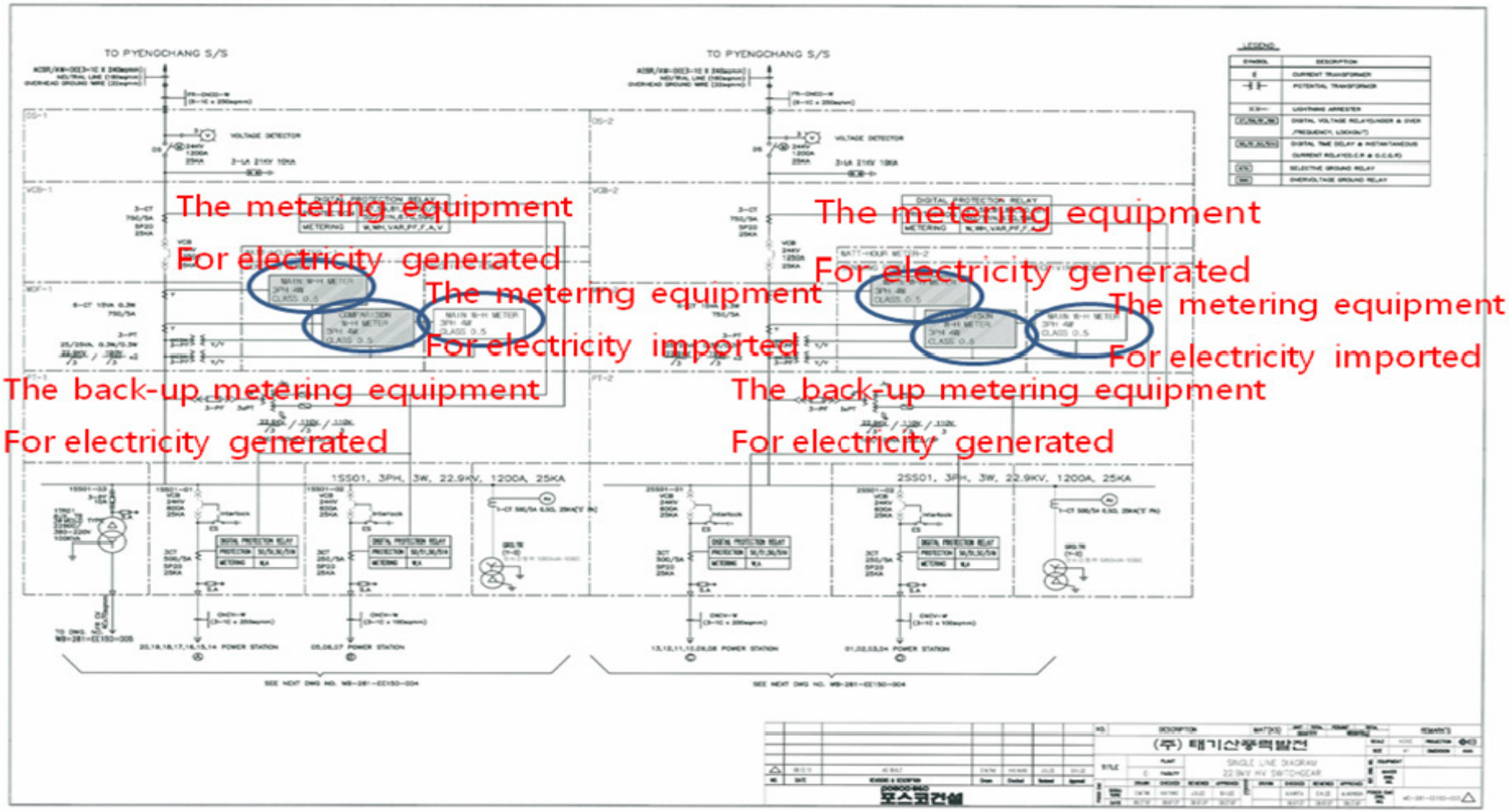
For these reasons, the actual output is lower than expected output.

- - - - -

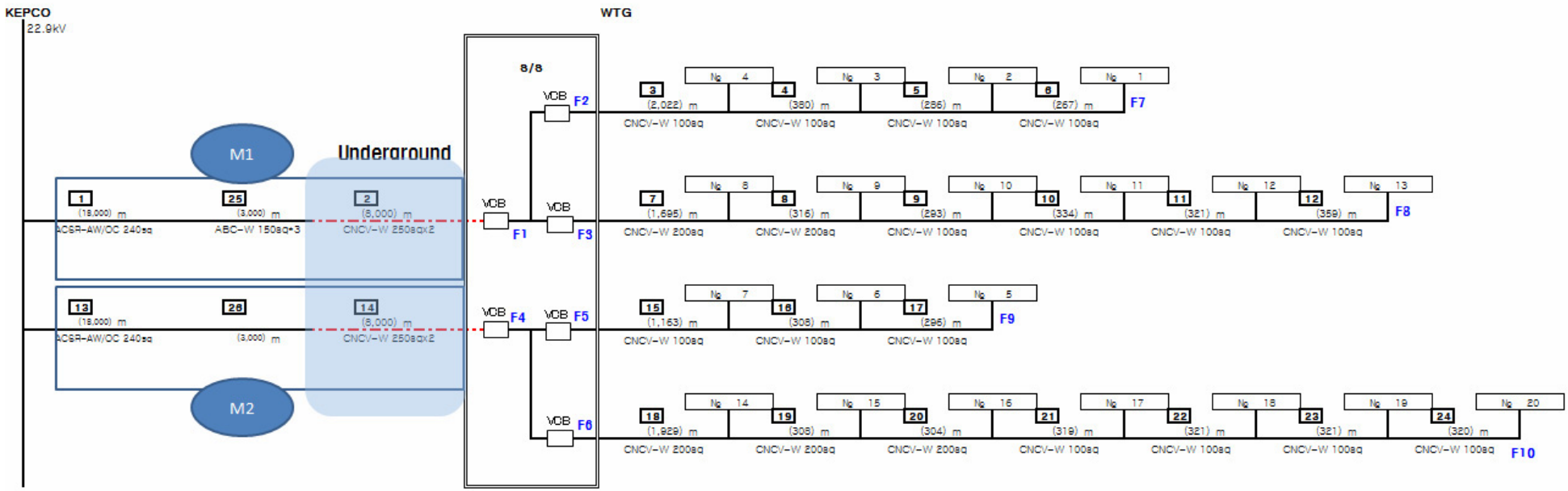
History of the document

Version	**Date**	**Nature of revision**
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Form **Business Function**: Issuance		

Annex 1. Monitoring Point



Annex 2. Transmission line map



Annex 3. Resistance

ACSR-AW/OC	R(Ω)
240sqmm	0.1183
FR-ABC-W	R(Ω)
150sq	0.183
CNCV-W	R(Ω)
250sq	0.07215

	Order	Specifications	Distance(Km)	R(Ω)
Overhead line	1, 13	ACSR-AW/OC 240sq	22	2.6026
	25, 26	ABC-W 150sp*3	3	0.549
Underground line	2, 14	CNCV-W 250sq	8	0.2886

M1(1,2,25)	3.4402
M2(13,14,26)	3.4402