

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

Title of the project activity	Hebei Guyuan County Dongxinying 199.5MW Wind Power Project
Reference number of the project activity	4853
Version number of the monitoring report	02.1
Completion date of the monitoring report	23/11/2012
Registration date of the project activity	15/09/2011
Monitoring period number and duration of this monitoring period	Monitoring period number 2 from 10/01/2012 to 03/10/2012
Project participant(s)	Hebei Construction Investment New Energy Co., Ltd Shell Trading International Limited(UK)
Host Party(ies)	China
Sectoral scope(s) and applied methodology(ies)	Sectoral scope(s): 1-Energy industries and ACM0002 ver. 12-Consolidated baseline methodology for grid-connected electricity generation from renewable sources.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	313,038 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	311,932 tCO ₂ e



SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The objective of Hebei Guyuan County Dongxinying 199.5MW Wind Power Project (hereinafter referred to as the project) is to generate electricity using wind energy and to sell the generated output to North China Power Grid (NCPG). Total installed capacity of the project is 199.5MW, involving 133 sets of wind turbine-generator (hereinafter referred to as WTG), each set with a rated capacity of 1.5MW. Applying grid-connected electricity generation by wind energy technology and by displacing equal amount electricity generated by NCPG which is dominated by fossil fuel-fired power plants, the project contributes to annual GHG reductions estimated at 427,936 t CO₂e .

The main equipments of the project are 133 sets of WTGs manufactured by Dongfang Steam Turbine Co., Ltd.

Relevant dates for the project are as follows:

- The date to start construction: 25/08/2008¹
- The date of first wind turbine started operation : 25/05/2010²
- The date of all 133 WTGs started full operation: 06/10/2010²
- CDM registration date: 15/09/2011
- CDM crediting period(Renewable) : 15/09/2011 - 14/09/2018

In this monitoring period, 311,932t CO₂e emission reductions were achieved.

A.2. Location of project activity

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The project is located in southern area of Guyuan County, Zhangjiakou City, Hebei Province, P.R.China. The GPS coordinates of the geographical area the project covered are 115.2997° E~115.7508°E, 41.3169°N~41.5661°N. The location of the project is shown in figure 1:

¹ As per the *Construction Start Order*, the construction start date is 25/08/2008

² As per Daily Operation Record, the first WTG and last WTG were put into operation on 25/05/2010 and 06/10/2010 respectively.

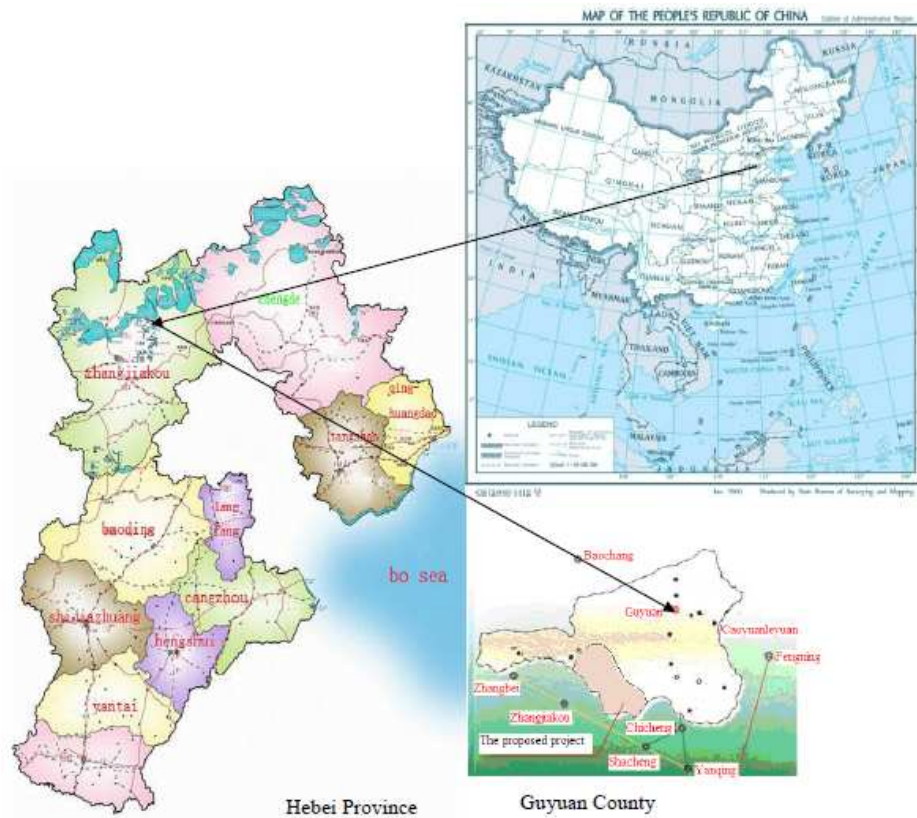


Figure 1 The location of the project

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)
People’s Republic of China(host)	Hebei Construction Investment New Energy Co., Ltd	No
United Kingdom of Great Britain and Northern Ireland	Shell Trading International Limited(UK)	No

A.4. Reference of applied methodology

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The project applies the approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 12.1.0).

The methodology also refers to the latest approved versions of the following tools:

- Tool to calculate the emission factor for an electricity system (Version 02);
- Tool for the demonstration and assessment of additionality (Version 05.2);

For more information regarding the methodology and the tools as well as their consideration by the Executive Board, please refer to <http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

A.5. Crediting period of project activity

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A 7yrs × 3 renewable crediting period has been chosen by the project. The first crediting period is from 15/09/2011 to 14/09/2018. The start date of the crediting period has been requested to change from 01/12/2011 to 15/09/2011 and the request has been accepted by the Board.

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

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The project has been put into operation since 25/05/2010. During this monitoring period, the project was under normal and smooth operation as per the registered CDM PDD (version 6.0) without any emergencies or special events including overhaul times, downtimes of equipment, exchange of equipment.

The project applies WTG-box transformer unit to boost voltage of the generated electricity from 690V to 35kV. Then the electricity will be transmitted to the main transformers via 35kV collection lines. After boosted its voltage to 220kV by the main transformers, the electricity will be transmitted to Xiaochang Substation and exported to NCPG.

The main equipments of the project are 133 sets of WTGs manufactured by Dongfang Steam Turbine Co., Ltd. Key technical parameters are listed in table 1.

Table 1 Key technical parameters of the WTG

Parameter	Unit	Value
Type of turbine	-	FD77B
Type of generator	-	double-fed asynchronous motor
Nominal output	kW	1500
Rotor diameter	m	77
Hub height	m	61.5
Rated voltage	V	690
Cut-in wind speed	m/s	3
Nominal wind speed	m/s	12

B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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N/A

B.2.2. Corrections

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N/A

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

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The monitoring plan has been revised in PDD version 7.0 dated 27/07/2012.

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

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N/A

B.2.5. Changes to start date of crediting period

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The start date of the crediting period has been requested to change from 01/12/2011 to 15/09/2011 and the request has been accepted by the Board.

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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The project owner, Hebei Construction Investment New Energy Co., Ltd., is the user of this monitoring plan and is responsible for this monitoring plan. The project owner must maintain credible, transparent, and adequate data estimation, measurement, collection, and tracking systems to maintain the information required for an audit of an emission reduction project.

These records and monitoring systems are needed to allow the DOE to verify project performance as part of the verification and certification process.

Emission reductions will be achieved through displacing part of the electricity from the NCPG due to the power generated by the proposed project. The net grid-connected output is therefore defined as the key data to monitor.

The monitoring plan is established according to the request of approved baseline and monitoring methodology ACM0002 (Version 12.1.0).

1. Monitoring subject

The net electricity ($EG_{\text{facility},y}$) supplied to the grid by the project will not be measured directly. It is the difference of the following parameters.

- 1) $EG_{\text{export},y}$ is the electricity exported to the grid by the project through the main power line;
- 2) $EG_{\text{import},y}$ is the electricity imported from the grid by the project through the main power line;
- 3) $EG_{\text{backupline},y}$ is the electricity delivered to the project through the backup line.

2. Project Integrate Management

This monitoring plan has been implemented by Hebei Construction Investment New Energy Co., Ltd., the project owner. The project manager is responsible for the implementation and monitoring of the monitoring activity. There are two departments organized for data report, quality control. There is a manager responsible for data report and quality control department. The manager will take charge of the employment administration, as well as the operation implementation and monitoring; staffs will carry on the concrete assignment based on the guide of their manager.

3. Metering System

The electricity generated by the project will be transmitted to on-site transformers which increase the voltage to 220 kV, and then delivered to Xiaochang Substation by 220kV transmission line. The simplified electrical grid connection diagram is shown in the following figure 4:

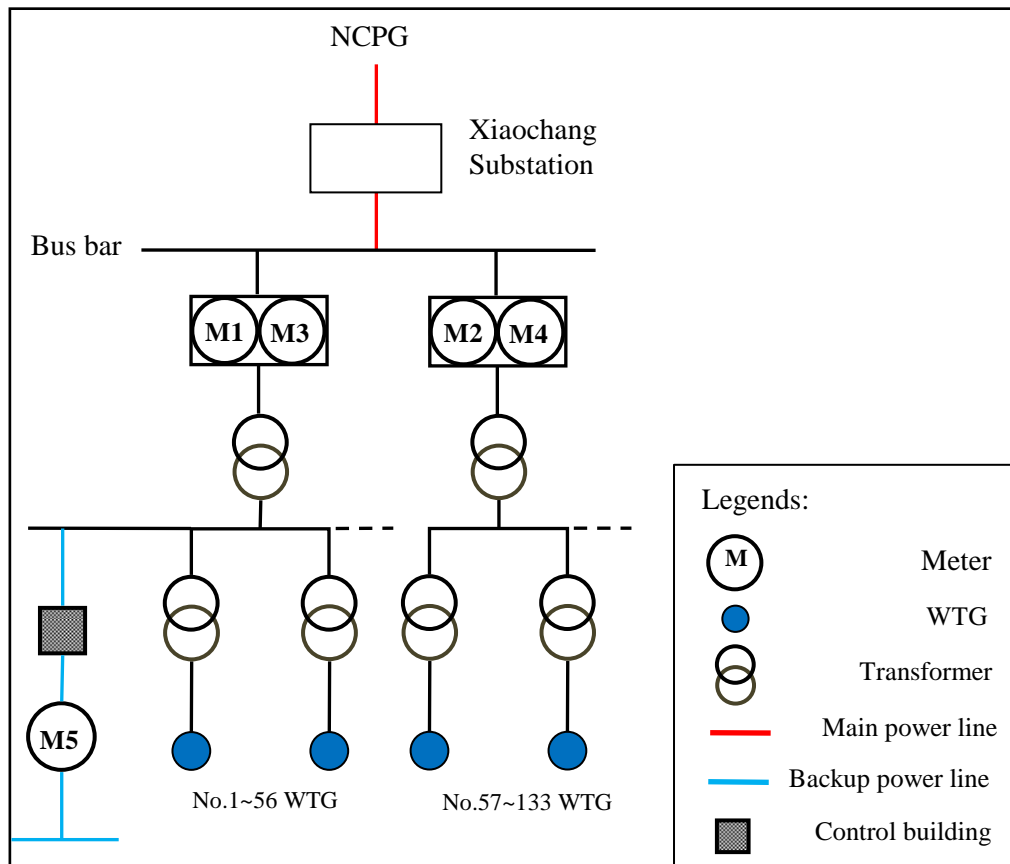


Figure 2 Simplified electrical grid connection diagram

The power line supplying electric power to the grid can also deliver power from the grid to the wind farm. The metering equipment runs in two directions and will record two readings, i.e. electricity exported to the grid ($EG_{\text{export},y}$) and electricity imported from the grid ($EG_{\text{import},y}$). Net electricity supplied to the grid is calculated as exports minus imports.

M1 is installed at high voltage side of No. 1 main transformer; M2 is installed at the high voltage side of No. 2 main transformer. Both M1 and M2 are bi-directional meters. M1 is used for measurement of electricity exported by Group 1 WTGs ($EG_{\text{export},y,1}$) and electricity imported from the grid by Group 1 WTGs ($EG_{\text{import},y,1}$). M2 plays the same role as M1, that is, measuring electricity exported by Group 2 WTGs ($EG_{\text{export},y,2}$) and electricity imported from the grid by Group 2 WTGs ($EG_{\text{import},y,2}$). $EG_{\text{export},y,1}$ plus $EG_{\text{export},y,2}$ makes total electricity exported to the grid by the project ($EG_{\text{export},y}$). Similarly, $EG_{\text{import},y,1}$ plus $EG_{\text{import},y,2}$ make total electricity imported from the grid by the project ($EG_{\text{import},y}$).

The meter M3 which is of the same type, accuracy and function and serves as the backup meter of M1, can also record electricity of Group 1 WTGs bidirectionally and works with M1 simultaneously; the meter M4 also acts as backup meter of M2 and measures electricity of Group 2 WTGs together with M2 simultaneously.

In case of emergencies and when the wind farm does not produce enough power for auxiliary power use, the project will use the power through the backup line. Power delivered to the project through a backup power line ($EG_{\text{backupline},y}$) is metered by instruments at M5 in Figure 4 which is operated by the grid company.

Net electricity supplied to the grid by the proposed project is calculated on a monthly basis as:

$$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backupline},y}$$

Where:

$EG_{\text{facility}, y}$ is the calculated power generation from the proposed project;

$EG_{\text{export}, y}$ is the electricity exported to the grid through the main power line metered by the instruments at M1 and M2 (or backup meter M3 and M4);

$EG_{\text{import}, y}$ is the electricity imported from the grid through the main power line metered by the instruments at M1 and M2 (or backup meter M3 and M4);

$EG_{\text{backupline}, y}$ is the electricity delivered to the project through the backup line metered by the instruments at M5.

4. Quality Assurance and Quality Control

The metering equipments will be properly calibrated and checked annually by an independent third party according to relevant national standard, e.g. the DL/T448—2000 or other national standard, to ensure its accuracy. The accuracy of meter M1, M2, M3 and M4 which have been installed are 0.2s. The accuracy of meter M5 is 0.5s.

The relative recording files will be supplied to the project owner. These recording files will be preserved by the project owner and provide to DOE in Verification.

The relevant training will be implemented by the project owner and the equipment manufacturer before operation of the proposed project.

5. Information collection and management

It is the responsibility for the project owner to provide necessary information and data for validation and verification. The measurement of the whole production data is controlled and stored by the project owner.

All physical documents including the readings in electronic and manual form of the Meters, billing receipts will be stored by the project owner and kept one copy in order to facilitate the verification of DOE.

The monthly records of power supplied to the grid and received from the grid, relevant accounting documents and billing receipts and the results of calibration shall be collected in a central place by the project owner. All data collected as part of monitoring will be kept at least for 2 years after the end of the last crediting period by the project owner.

6. Procedure in case of damaged metering equipment

In case metering equipment is damaged and no reliable readings can be recorded the project owner will estimate net supply by the proposed project activity according to the following procedure:

a. In case the main meter is damaged only:

By reading the backup meter.

b. In case both the main meter and the backup one are damaged:

The project owner and the grid company will jointly calculate a conservative estimate of power supplied to the grid. A statement will be prepared indicating

- The background to the damage to metering equipment;
- The assumptions used to estimate net supply to the grid for the days for which no record could be recorded the estimation of power supplied to the grid.

7. Monitoring Report

The Project owner will annually prepare a monitoring report which will include among others metering values of power supplied to and received from the grid, copies of electricity receipts, a report on

calibration and calculation of emission reductions.

All the data shall be kept until two years after the end of the first crediting period.

SECTION D. Data and parameters

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

Data/Parameter	EF_{Grid,CM,y}
Unit	t CO ₂ e/MWh
Description	Baseline emission factor
Source of data	Registered CDM PDD
Value(s) applied	1.05485
Purpose of data	It is used for baseline emission reduction calculation
Additional comment	This parameter is ex-ante determined in the registered CDM-PDD and fixed in the first crediting period.

D.2. Data and parameters monitored

Data/Parameter	EG_{export,y}		
Unit	MWh		
Description	Annual electricity exported to the grid by the proposed project.		
Measured/Calculated /Default	Measured		
Source of data	Project activity site and measured by electricity meters (M1 and M2)		
Value(s) of monitored parameter	309,517.450		
Monitoring equipment	Name	M ₁	M ₂
	Type	ACE8000	ACE8000
	Accuracy class	0.2s	0.2s
	Serial number	ZG37006390	ZG37002994
	Calibration frequency	Annually	Annually
	Date of calibration	12/12/2011.	12/12/2011.
	Validity	yes	yes
	Calibration institute ³	Zhangjiakou Electric Energy Measurement Centre	
	Name	M ₃	M ₄
	Type	DSSD331	DSSD331
	Accuracy class	0.2s	0.2s
	Serial number	09080144840023	09080144840005
	Calibration frequency	Annually	Annually
	Date of calibration	05/01/2012	05/01/2012
Calibration institute ⁴	Hebei Electric Power Research Institute		

³ Calibration to meter M1 and M2 was conducted by Zhangjiakou Electric Energy Measurement Centre, with the certificate code of (Ji) Fa Ji [2008] No.D011 which is valid from 18/02/2008 to 17/02/2011 and Approval letter of extending the authorisation period to 31/12/2011 with code of Ji Zhijianhan No. (2011) 145, granted by Bureau of Quality and Technical Supervision of Hebei Province.

Measuring/Reading/Recording frequency	Continuously measurement and monthly recording.
Calculation method (if applicable)	$EG_{\text{export},y} = EG_{\text{export},y,1} + EG_{\text{export},y,2}$ <p>Here, $EG_{\text{export},y}$ refers to annual electricity exported to the grid and equals to sum of $EG_{\text{export},y,1}$ and $EG_{\text{export},y,2}$. $EG_{\text{export},y,1}$ and $EG_{\text{export},y,2}$ refer to annual electricity exported to the grid by the two groups of wind turbine generators respectively.</p> <p>All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period.</p>
QA/QC procedures	The metering equipments at the substation will be calibrated at least once a year according to national standard.
Purpose of data	Used for baseline emission calculation
Additional comment	-

Data/Parameter	$EG_{\text{import},y}$
Unit	MWh
Description	Annual electricity imported from the grid to the proposed project.
Measured/Calculated/Default	Measured
Source of data	Project activity site with electricity meter (M1 and M2).
Value(s) of monitored parameter	344.025
Monitoring equipment	The parameters listed above are also measured by bilateral meter M_1 (M_3) and M_2 (M_4). Relevant information to the meters refers to the corresponding section of parameter $EG_{\text{export},y}$.
Measuring/Reading/Recording frequency	Continuously measurement and monthly recording.
Calculation method (if applicable)	$EG_{\text{import},y} = EG_{\text{import},y,1} + EG_{\text{import},y,2}$ <p>Here, $EG_{\text{import},y}$ refers to annual electricity imported from the grid and equals to sum of $EG_{\text{import},y,1}$ and $EG_{\text{import},y,2}$. $EG_{\text{import},y,1}$ and $EG_{\text{import},y,2}$ refer to annual electricity imported from the grid by the two groups of wind turbine generators respectively.</p> <p>All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period.</p>
QA/QC procedures	The metering equipments at the substation will be calibrated at least once a year according to national standard.
Purpose of data	Used for baseline emission calculation

⁴ Calibration to meter M3 and M4 was conducted by Hebei Electric Power Research Institute with certificate code of (Ji) Fa Ji [2011] No. D030 which is valid from 14/02/2011 to 13/02/2014 granted by Bureau of Quality and Technical Supervision of Hebei Province.

Additional comment	-
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Data/Parameter	$EG_{\text{backupline},y}$			
Unit	MWh			
Description	Electricity delivered to the project through the backup line.			
Measured/Calculated/Default	Measured			
Source of data	Project activity site with electricity meter (M5).			
Value(s) of monitored parameter	3.990			
Monitoring equipment	Name	M5	Serial number	B24T0P812403001807
	Type	DSSD22	Date of Calibration	12/12/2011
	Accuracy	0.5s	Calibration frequency	annually
	Validity	yes		
Measuring/Reading/Recording frequency	Continuously measurement and monthly recording. All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period.			
Calculation method (if applicable)	N/A			
QA/QC procedures	Calibration has been conducted to guarantee the accuracy and normal functions of M5, according to relevant national or industrial standards by qualified institution; Sales receipts are used for cross-check.			
Purpose of data	Used for baseline emission calculation			
Additional comment	-			

Data/Parameter	$EG_{\text{facility},y}$			
Unit	MWh			
Description	Net electricity supplied to the grid by the proposed project in year y.			
Measured/Calculated/Default	Calculated			
Source of data	Calculation			
Value(s) of monitored parameter	295,712.244			
Monitoring equipment	N/A			
Measuring/Reading/Recording frequency	-			
Calculation method (if applicable)	Calculated by $EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backupline},y}$ and cross-check with sale receipts.			
QA/QC procedures	Net electricity supplied to the grid by the project activity will be cross-checked with electricity sales receipts.			
Purpose of data	Used for baseline emission calculation			
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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The monitoring data used for baseline emission reductions calculation are listed in the following tables:

 Table 2 Electricity supplied to the Grid ($EG_{\text{export,y}}$)(MWh)

Monitoring period		Meter readings			Data on ETNs	Data for ERs calculation
		M1	M2	$EG_{\text{export,y}}$	$EG_{\text{export,y}}$	$EG_{\text{export,y}}$
From	To	A	B	C=A+B	D	E=min(C,D)
10/01/2012	31/01/2012	5,080.075	7,528.950	12,609.025	11,683.925	11,683.925
01/02/2012	29/02/2012	16,561.600	24,566.300	41,127.900	39,186.312	39,186.312
01/03/2012	31/03/2012	16,537.400	23,841.400	40,378.800	38,660.358	38,660.358
01/04/2012	30/04/2012	24,751.100	31,625.825	56,376.925	54,057.927	54,057.927
01/05/2012	31/05/2012	19,015.975	26,488.825	45,504.800	43,638.969	43,638.969
01/06/2012	30/06/2012	16,454.350	23,804.000	40,258.350	38,607.965	38,607.965
01/07/2012	31/07/2012	13,847.625	18,938.150	32,785.775	31,446.635	31,446.635
01/08/2012	31/08/2012	9,227.350	12,309.825	21,537.175	20,646.241	20,646.241
01/09/2012	30/09/2012	6,244.425	9,831.525	16,075.950	15,385.326	15,385.326
01/10/2012	03/10/2012	1,324.400	1,538.350	2,862.750	2,746.601	2,746.601
Total		129,044.300	180,473.150	309,517.450	296,060.259	296,060.259

 Table 3 Electricity imported via 110kV line ($EG_{\text{import,y}}$)(MWh)

Monitoring period		Meter readings			Data on ETNs	Data for ERs calculation
		M1	M2	$EG_{\text{import,y}}$	$EG_{\text{import,y}}$	$EG_{\text{import,y}}$
From	To	F	G	H=F+G	I	J=max(H,I)
10/01/2012	31/01/2012	32.175	83.325	115.500	115.500	115.500
01/02/2012	29/02/2012	2.750	6.050	8.800	8.800	8.800
01/03/2012	31/03/2012	11.825	23.375	35.200	35.200	35.200
01/04/2012	30/04/2012	8.525	7.150	15.675	15.675	15.675
01/05/2012	31/05/2012	9.625	5.775	15.400	15.400	15.400
01/06/2012	30/06/2012	10.450	3.575	14.025	14.025	14.025
01/07/2012	31/07/2012	15.125	9.900	25.025	25.025	25.025
01/08/2012	31/08/2012	18.975	12.375	31.350	31.350	31.350
01/09/2012	30/09/2012	42.350	39.325	81.675	81.675	81.675
01/10/2012	03/10/2012	0.550	0.825	1.375	1.375	1.375
Total		152.350	191.675	344.025	344.025	344.025

 Table 4 Electricity imported via 10kV line($EG_{\text{backupline,y}}$) (MWh)

From	To	Meter readings (M5)	Data on ETNs	Data for ERs calculation
		K	L	M=max(K,L)
10/01/2012	31/01/2012	0.000	0.000	0.000
01/02/2012	29/02/2012	0.000	0.000	0.000
01/03/2012	31/03/2012	0.000	0.000	0.000
01/04/2012	30/04/2012	0.000	0.000	0.000
01/05/2012	31/05/2012	0.000	0.000	0.000
01/06/2012	30/06/2012	0.000	0.000	0.000
01/07/2012	31/07/2012	0.000	0.000	0.000
01/08/2012	31/08/2012	0.000	0.000	0.000

01/09/2012	30/09/2012	3.990	3.990	0.000
01/10/2012	03/10/2012	0.000	0.000	0.000
Total		0.000	0.000	0.000

As per the monitoring plan, $EG_{\text{facility},y}$ is calculated as:

$$\begin{aligned} EG_{\text{facility},y} &= EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backuptline},y} \\ &= 296,060.259 - 344.025 - 3.990 \\ &= 295,712.244 \text{ MWh} \end{aligned}$$

Then, BE_y is calculated as:

$$\begin{aligned} BE_y &= EG_{\text{facility},y} \times EF_{\text{Grid, CM, y}} \\ &= 295,712.244 \times 1.05485 \\ &= 311,932 \text{ t CO}_2\text{e} \end{aligned}$$

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

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As per ACM0002, project emissions are 0 for most renewable power generation project activities, including wind power project, i.e. $PE_y=0$

E.3. Calculation of leakage

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As per ACM0002, no leakage emissions are considered, i.e. $L_y=0$

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 ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e)
Total	311,932	0	0	311,932

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 (tCO₂e)	313,038 ⁵	311,932

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

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Compared with the estimated ERs during the same time period, the actual ERs slightly decrease by 0.73%.

⁵ It is calculated as $427,936 \times 268/365 = 313,038$, where 268 is the number of days this monitoring period covered.

**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		