



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

**MONITORING REPORT**

<b>Title of the project activity</b>	Zhangbei Manjing Windfarm Project
<b>Reference number of the project activity</b>	0233
<b>Version number of the monitoring report</b>	02
<b>Completion date of the monitoring report</b>	17/10/2012
<b>Registration date of the project activity</b>	23/03/2006
<b>Monitoring period number and duration of this monitoring period</b>	The eighth monitoring period First and last days included (01/03/2012-31/08/2012)
<b>Project participant(s)</b>	Beijing Guotou Energy Conservation Company (BJGT) – P.R. China (host)  First Carbon Fund Ltd - United Kingdom of Great Britain and Northern Ireland  Vitol S.A. - Switzerland
<b>Host Party(ies)</b>	P.R. China
<b>Sectoral scope(s) and applied methodology(ies)</b>	Sectoral scope 1 : Energy industries (renewable - / non-renewable sources)  Applied methodology: AM0005 ver. 01 - Baseline methodology (barrier analysis, baseline scenario development and baseline emission rate, using combined margin) for small grid- connected zero-emissions renewable electricity generation and Monitoring methodology for small grid-connected zero-emissions renewable electricity generation.
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	49,326 <sup>1</sup> tonnes CO <sub>2</sub> equivalent
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	39,157 tonnes CO <sub>2</sub> equivalent

<sup>1</sup> As the monitoring period is for 184 days, multiplying the annual emission reduction volume (97,848 tons) in PDD by 184/365 gives a volume of 49,326 tCO<sub>2</sub>

**SECTION A. Description of project activity****A.1. Purpose and general description of project activity**

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The purpose of the Zhangbei Manjing Windfarm Project (hereafter referred to as “the Project”) is to generate renewable electricity using wind power resources and to sell the generated output to the North China Power Grid (NCPG) on the basis of a power purchase agreement (PPA). The Project generates greenhouse gas (GHG) emission reductions by avoiding CO<sub>2</sub> emissions from electricity generation by fossil fuel power plants that is supplied to NCPG. The Project involves the installation and operation of 30 wind turbines with unit capacity of 1,500 kW. The total installed capacity is 45 MW.

Construction start date	28/07/2004
First wind turbine commission start date	30/12/2005
Full operation commission start date	18/08/2006
Date of CDM registration	23/03/2006
First renewable crediting period	01/01/2006 – 31/12/2012 (renewable)
Monitoring period	
(Volume 1)	01/01/2006 – 31/08/2006
(Volume 2)	01/09/2006 – 31/08/2007
(Volume 3)	01/09/2007 – 30/06/2008
(Volume 4)	01/07/2008 – 31/05/2009
(Volume 5)	01/06/2009 – 30/04/2010
(Volume 6)	01/05/2010 – 28/02/2011
(Volume 7)	01/03/2011 – 29/02/2012
(Volume 8)	01/03/2012 – 31/08/2012

The total emission reductions achieved in the current monitoring period are 39,157 tCO<sub>2</sub>e.

**A.2. Location of project activity**

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Host Party(ies)	People’s Republic of China
Province	Hebei
City	Zhangjiakou
County	Zhangbei
GPS coordinates	114 °32’ E 41 °08’ N

**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)
P.R. China (host)	Beijing Guotou Energy Conservation Company (BJGT)	No
United Kingdom of Great Britain and Northern Ireland	First Carbon Fund Ltd	No
Switzerland	Vitol S.A.	No

**A.4. Reference of applied methodology**

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The approved methodology applied to this project is:

approved baseline and monitoring methodology: AM0005 (Version 01) “Baseline methodology (barrier analysis, baseline scenario development and baseline emission rate, using combined margin) for small grid-connected zero-emissions renewable electricity generation” and “Monitoring methodology for small grid-connected zero-emissions renewable electricity generation”.

The applied methodology please refer to the UNFCCC CDM website

<http://cdm.unfccc.int/methodologies/DB/94GWIOIE6NL20BA94KY9ILMRUP48BN/view.html>

#### **A.5. Crediting period of project activity**

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Renewable crediting period

First renewable crediting period, 7 years from 01/01/2006 to 31/12/2012.

### **SECTION B. Implementation of project activity**

#### **B.1. Description of implemented registered project activity**

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The Project was started construction on 28/07/2004 and totally 30 wind turbines (GE 1.5sle) of 1,500kW were installed and operated. The turbines were manufactured by General Electric Company (GE).

The Project shared one electricity meter (the main meter) at 220kV level with Zhangbei Mijiagou 49.5MW Windfarm Project (UNFCCC ref: 0845), so the meter at 220kV level measures the total electricity exchanged between NCPG and the two wind farms.

During this monitoring period, the wind farm has a good running, smooth data transfer and grid connection, and no special events happened. No events or situations occurred during the current monitoring period that may impact the applicability of the applied methodology.

#### **B.2. Post registration changes**

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

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The Project is implemented as the registered PDD and no deviation applied to this monitoring period.

##### **B.2.2. Corrections**

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The Project is implemented as the registered PDD and no corrections applied to this monitoring period.

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

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The Project has revised its registered monitoring plan and the revised monitoring plan was approved by EB on 19/10/2007.

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

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The Project is implemented as the registered PDD and no changes.

##### **B.2.5. Changes to start date of crediting period**

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N/A

##### **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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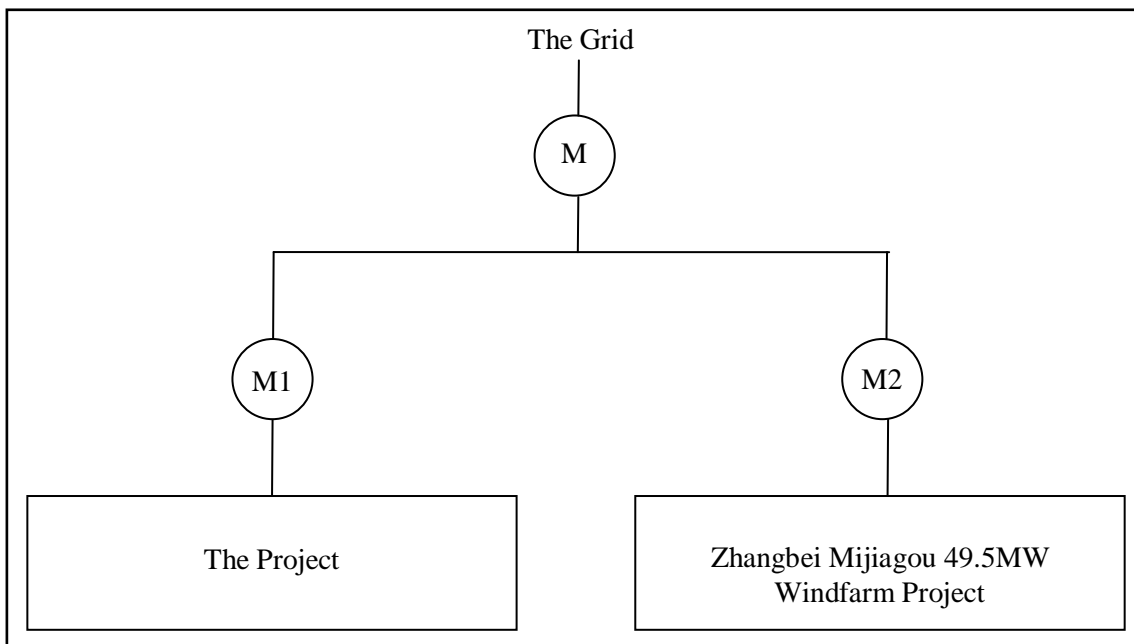
## 1 Data collection procedures

As described in the revised monitoring plan, the Project shared one electricity meter (the main meter) at 220kV level with Zhangbei Mijiagou 49.5MW Windfarm Project (UNFCCC Ref No. 0845), so the meter at 220kV level measures the total electricity exchanged between NCPG and the two wind farms. The net electricity supplied to the grid by the Project (EG<sub>1</sub><sup>2</sup>) is achieved by the following monitored parameters:

Parameters	Meter Location	Description
EG <sub>total</sub>	220kV substation of power grid (main meter M)	Recording total net electricity supplied to the grid of the two projects at the 220kV substation. Meter readings were read and recorded daily by the Power Grid Company and reported to project owner monthly. The data could be double checked by Electricity Transaction Notes (ETNs).
E1	Exit of 110kV Project site substation (Zhangbei Manjing meter M1)	Recording the electricity generation of the Project. Meter readings were read and recorded by onsite designated staff on a weekly/monthly basis.
E2	Exit of 110kV Mijiagou project site substation (Zhangbei Mijiagou meter M2)	Recording the electricity generation of Zhangbei Mijiagou 49.5MW Windfarm Project. Meter readings were read and recorded by onsite designated staff on a weekly/monthly basis.

The cut-off time during the monitoring period is 24:00 of last day of the month to achieve net electricity supplied to the grid by the Project.

The following diagram shows the monitoring points:



As described in the revised monitoring plan, the net electricity supply from the Project (EG<sub>1</sub>) can be

<sup>2</sup> EG<sub>1</sub> here refers to EG<sub>y</sub> in registered PDD.

calculated as:

$$EG_1 = EG_{total} \times E1 / (E1 + E2)$$

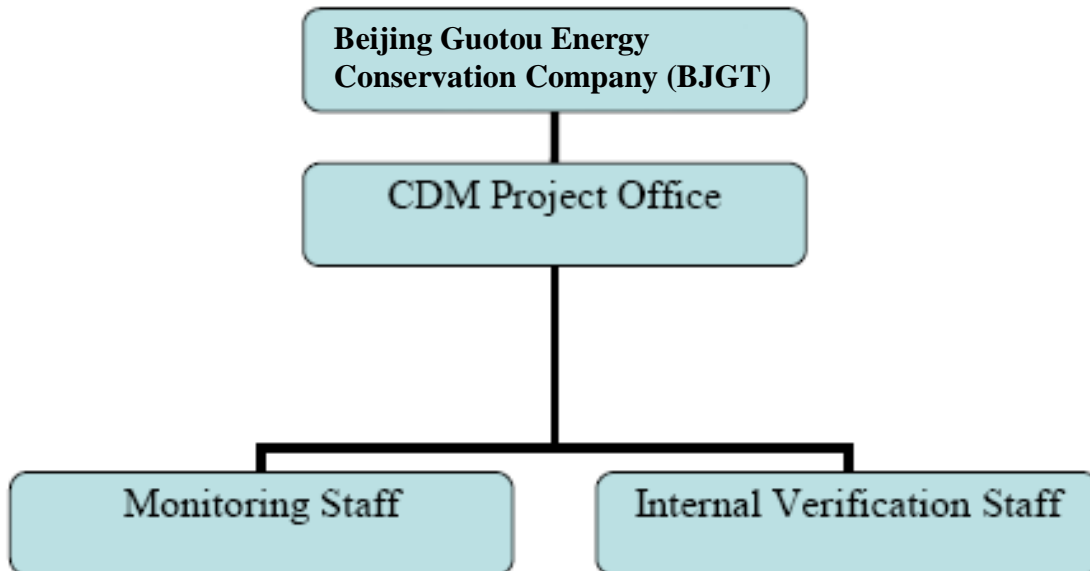
CO<sub>2</sub> emissions factor of the grid (EF<sub>y</sub>) is calculated by  $EF_y = \omega_{OM} * EF_{OM} + \omega_{BM} * EF_{BM}$  where,  $\omega_{OM}$  and  $\omega_{BM}$  are 0.5 according to default weight factor.

Lastest data from the following sources will be obtained to calculate EF<sub>OM</sub> and EF<sub>BM</sub>, including:

- IPCC Guidelines
- China Electric Power Yearbook
- China Energy Statistical Yearbook

## 2 Organizational structure and responsibilities:

Beijing Guotou Energy Conservation Company (BJGT) had established CDM project management office and assigned dedicated people responsible for the monitoring and report the emission reduction due to the Project activity. The operational and management structure of the project operator is as follows:



## 3 Emergency procedures

Should any previous months reading of the main meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the net energy output shall be determined by:

- (a) first, by reading Zhangbei Manjing meter (M1), unless a test by either party reveals it is inaccurate;
- (b) if Zhangbei Manjing meter (M1) is not with acceptable limits of accuracy or is otherwise performing improperly, Beijing Guotou Energy Conservation Company (BJGT) and North China Power Grid shall jointly prepare an estimate of the correct reading;and
- (c) if North China Power Grid and Beijing Guotou Energy Conservation Company (BJGT) fail to agree then the matter will be referred for arbitration according to agreed procedures.

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

<b>Data/Parameter</b>	N/A
<b>Unit</b>	N/A
<b>Description</b>	N/A
<b>Source of data</b>	N/A
<b>Value(s) applied</b>	N/A
<b>Purpose of data</b>	N/A
<b>Additional comment</b>	N/A

**D.2. Data and parameters monitored**

<b>Data/Parameter</b>	$EF_y$
<b>Unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	CO <sub>2</sub> emissions factor of the grid
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Calculated as the average of operating margin and build margin (50:50)
<b>Value(s) of monitored parameter</b>	0.7027
<b>Monitoring equipment</b>	N/A
<b>Measuring/Reading/Recording frequency</b>	N/A
<b>Calculation method (if applicable)</b>	$EF_y$ is given by $EF_y = w_{OM} \times EF_{OM,y} + w_{BM} \times EF_{BM,y}$ with respective weight factors $w_{OM}$ and $w_{BM}$ (where $w_{OM} + w_{BM} = 1$ ), and by default, are weighted equally ( $w_{OM} = w_{BM} = 0.5$ ).
<b>QA/QC procedures</b>	N/A
<b>Purpose of data</b>	Baseline emission calculation
<b>Additional comment</b>	N/A



<b>Data/Parameter</b>	EF_OM
<b>Unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	CO <sub>2</sub> emissions factor of the grid (operating margin)
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Calculated as TEM divided by TGEN, excluding the zero and low operating cost generating sources. Related data is from China Electric Power Yearbook (2011) and China Energy Statistical Yearbook (2011)
<b>Value(s) of monitored parameter</b>	0.9485
<b>Monitoring equipment</b>	N/A
<b>Measuring/Reading/Recording frequency</b>	N/A
<b>Calculation method (if applicable)</b>	$EF\_OM_y = TEM_y / TGEN_y = [\sum_i F_{i,y} \times COEF_i] / [\sum_j GEN_{j,y}]$ <p>Where  TEM<sub>y</sub> and TGEN<sub>y</sub> are the total GHG emissions and electricity generation supplied to the grid by the power plants connected to the grid excluding zero- or low-operating cost sources in year y.  F<sub>i,y</sub> and COEF<sub>i</sub> are the fuel consumption in year y and associated carbon coefficient of the fossil fuel i consumed in the grid.  GEN<sub>j,y</sub> is the electricity generation at the plant j connected to the grid excluding zero- or low-operating cost sources in year y.  Details calculation refers to attached Excel sheet.</p>
<b>QA/QC procedures</b>	N/A
<b>Purpose of data</b>	Baseline emission calculation
<b>Additional comment</b>	N/A



<b>Data/Parameter</b>	EF_BM
<b>Unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	CO <sub>2</sub> emissions factor of the grid (build margin)
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Calculated as the build margin in the last few years, which is about 20% additions and the most conservative. First the build margin is calculated for the two years nearest 20% additions (above and below). Then the most conservative (lowest) is chosen. Related data is from China Electric Power Yearbook (2008, 2009, 2010 and 2011)
<b>Value(s) of monitored parameter</b>	0.4570
<b>Monitoring equipment</b>	N/A
<b>Measuring/Reading/Recording frequency</b>	N/A
<b>Calculation method (if applicable)</b>	$EF_{BM_y} = \sum_i S_{i,y} \times CEF_i$ Where S <sub>i</sub> is the share in added generation from technology/fuel i in year y. CEF <sub>i</sub> is the CO <sub>2</sub> emission factor for technology/fuel i. Details calculation refers to attached Excel sheet.
<b>QA/QC procedures</b>	N/A
<b>Purpose of data</b>	Baseline emission calculation
<b>Additional comment</b>	N/A



<b>Data/Parameter</b>	E1					
<b>Unit</b>	MWh					
<b>Description</b>	The electricity generation metered from the Project site					
<b>Measured/Calculated /Default</b>	Measured					
<b>Source of data</b>	Meter reading record of onsite Zhangbei Manjing meter (M1)					
<b>Value(s) of monitored parameter</b>	Detailed monthly data and calculation is presented in section E1 of the monitoring report.					
<b>Monitoring equipment</b>	Zhangbei Manjing meter (M1).					
	Type	Serial No.	Accuracy	Calibration done on	Validity	Calibration frequency
	Electricity meter	30089907	0.5S	02/11/2011	Yes	Annually
<b>Measuring/Reading/Recording frequency</b>	Measuring continuously and recording weekly/monthly					
<b>Calculation method (if applicable)</b>	N/A					
<b>QA/QC procedures</b>	Electricity was measured continuously by the meter M1. Trained Staff recorded the meter readings manually on a weekly/ monthly basis (each Sunday at 0:00 and each 24:00 of the last day of the month). Reading records were saved as both hard and electrical copy. The meter readings were also transferred via a remote transmission line to the grid company. The meter was calibrated according to the national standard. The calibration is carried out annually by a qualified organization with the records being supplied to the grid company and project owner.					
<b>Purpose of data</b>	Baseline emission calculation					
<b>Additional comment</b>	N/A					



<b>Data/Parameter</b>	E2					
<b>Unit</b>	MWh					
<b>Description</b>	The electricity generation metered from the Zhangbei Mijiagou 49.5MW Windfarm Project site					
<b>Measured/Calculated /Default</b>	Measured					
<b>Source of data</b>	Meter reading record of onsite Zhangbei Mijiagou meter (M2)					
<b>Value(s) of monitored parameter</b>	Detailed monthly data and calculation is presented in section E1 of the monitoring report.					
<b>Monitoring equipment</b>	Zhangbei Mijiagou meter (M2)					
	Type	Serial No.	Accuracy	Calibration done on	Validity	Calibration frequency
	Electricity meter	0007049 D0145	0.5S	02/11/2011	Yes	Annually
<b>Measuring/Reading/Recording frequency</b>	Measuring continuously and recording weekly/monthly					
<b>Calculation method (if applicable)</b>	N/A					
<b>QA/QC procedures</b>	Electricity was measured continuously by the meter M2. Trained Staff recorded the meter readings manually on a weekly/ monthly basis (each Sunday at 0:00 and each 24:00 of the last day of the month). Reading records were saved as both hard and electrical copy. The meter readings were also transferred via a remote transmission line to the grid company. The meter was calibrated according to the national standard. The calibration is carried out annually by a qualified organization with the records being supplied to the grid company and project owner.					
<b>Purpose of data</b>	Baseline emission calculation					
<b>Additional comment</b>	N/A					



<b>Data/Parameter</b>	EG_total					
<b>Unit</b>	MWh					
<b>Description</b>	The total net electricity supplied to the grid of the two projects at the 220kV substation					
<b>Measured/Calculated /Default</b>	Calculated					
<b>Source of data</b>	Meter reading record of main meter (M) at 220kV substation.					
<b>Value(s) of monitored parameter</b>	Detailed monthly data and calculation is presented in section E1 of the monitoring report.					
<b>Monitoring equipment</b>	Main meter (M) at 220kV substation of power grid					
	Type	Serial No.	Accuracy	Calibration done on	Validity	Calibration frequency
	Electricity meter	20040700 7Z0062	0.2S	07/01/2012	Yes	Annually
<b>Measuring/Reading/Recording frequency</b>	Measuring continuously and recording daily/monthly					
<b>Calculation method (if applicable)</b>	Calculated by the electricity exported to the grid minus electricity imported from the grid by the two projects measured by the main meter (M).					
<b>QA/QC procedures</b>	Electricity was measured continuously by grid company at 220kV substation. The data were daily recorded and monthly summarized. ETNs from grid company were issued, stamped and sent to project owner. The meter was calibrated according to the national standard. The calibration is carried out annually by a qualified organization with the records being supplied to the grid company and project owner.					
<b>Purpose of data</b>	Baseline emission calculation					
<b>Additional comment</b>	N/A					

<b>Data/Parameter</b>	EG_1
<b>Unit</b>	MWh
<b>Description</b>	The calculated power generation from the Project
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	Meter readings from E1, E2, and EG_total
<b>Value(s) of monitored parameter</b>	Detailed monthly data and calculation is presented in section E1 of the monitoring report.
<b>Monitoring equipment</b>	N/A
<b>Measuring/Reading/Recording frequency</b>	N/A
<b>Calculation method (if applicable)</b>	It was calculated from equation: $EG_1 = EG_{total} \times E1 / (E1 + E2)$ More details are described in SECTION E
<b>QA/QC procedures</b>	The data are calculated by project owner before reported to DOE. Internal auditing reduced the risk of error caused by data transfer and calculation mistakes.
<b>Purpose of data</b>	Baseline emission calculation
<b>Additional comment</b>	N/A

### 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 baseline emissions in year y is calculated as

$$BE_y = EG_y \times EF_y = EG_{-1} \times EF_y$$

$$EF_y = w_{OM} \times EF_{OMy} + w_{BM} \times EF_{BMy}$$

$$EF_{OMy} = TEM_y / TGEN_y = [\sum_i F_{i,y} \times COEF_i] / [\sum_j GEN_{j,y}]$$

$$EF_{BMy} = \sum_i S_{i,y} \times CEF_i$$

The detailed calculation of  $EF_{OMy}$  and  $EF_{BMy}$  are provided in the emission reductions calculation spreadsheet.

$$EF = w_{OM} \times EF_{OMy} + w_{BM} \times EF_{BMy} = 0.5 \times 0.9485 + 0.5 \times 0.4570 = 0.7027 \text{ tCO}_2\text{e/MWh}$$

$$EG_y = EG_{-1} = EG_{total} \times E1 / (E1 + E2)$$

Monitoring Period	$EG_y (EG_{-1})$ (MWh)	$EF_y$ (tCO <sub>2</sub> e/MWh)	$BE_y$ (tCO <sub>2</sub> e)
01/03/2012- 31/08/2012	55,724.954	0.7027	39,157

The detailed calculation of  $EG_y$  is calculated below<sup>3</sup>:

Unit: MWh

Period	E1	E2	Electricity exported by the two projects	Total electricity imported by the two projects	EG <sub>total</sub>	EG <sub>y</sub> (EG <sub>-1</sub> )
	A	B	C	D	E=C-D	F=E*A/(A+B)
01/03/2012-31/03/2012	9,747.760	8,712.880	18,312.756	130.812	18,181.944	9,600.600
01/04/2012-30/04/2012	12,616.560	11,374.000	23,886.192	34.716	23,851.476	12,543.416
01/05/2012-31/05/2012	10,024.080	9,257.600	19,098.948	50.952	19,047.996	9,902.593
01/06/2012-30/06/2012	9,980.960	9,760.960	19,587.480	33.132	19,554.348	9,886.129
01/07/2012-31/07/2012	7,142.080	5,796.560	12,816.804	56.364	12,760.440	7,043.714
01/08/2012-31/08/2012	6,858.720	3,510.320	10,272.108	69.696	10,202.412	6,748.502
Total			-			55,724.954

<sup>3</sup> The monitoring results are fully consistent with the electricity transaction notes issued by the grid company. Thus, only the monitored values are listed here.

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

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According to the applied methodology and the registered PDD, as a renewable energy project, the project emissions of the Project are zero.

**E.3. Calculation of leakage**

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According to the applied methodology and the registered PDD, as a renewable energy project, the leakage of this project is zero.

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

Time Period (01/03/2012- 31/08/2012)	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2e</sub> )	Project emissions or actual net GHG removals by sinks (tCO <sub>2e</sub> )	Leakage (tCO <sub>2e</sub> )	Emission reductions or net anthropogenic GHG removals by sinks (tCO <sub>2e</sub> )
<b>Total</b>	39,157	0	0	39,157

**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 <sub>2e</sub> )	49,326 (see footnote 1)	39,157

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

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The actual emission reduction achieved during the current monitoring period is lower than it was estimated in registered PDD.

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**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