



**Monitoring report form for CDM project activity  
(Version 06.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**MONITORING REPORT**

<b>Title of the project activity</b>	CGN Inner Mongolia Duerbote Wind farm Project	
<b>UNFCCC reference number of the project activity</b>	2406	
<b>Version number of the PDD applicable to this monitoring report</b>	Version 03	
<b>Version number of this monitoring report</b>	01	
<b>Completion date of this monitoring report</b>	09/08/2018	
<b>Monitoring period number</b>	Fifth monitoring period	
<b>Duration of this monitoring period</b>	01/01/2013 – 19/08/2016 (first and last days included)	
<b>Monitoring report number for this monitoring report</b>	NA	
<b>Project participants</b>	CGN Wind Power Co., Ltd. Carbon Resource Management Ltd. Carbon Resource Management S.A.	
<b>Host Party</b>	People's Republic of China	
<b>Sectoral scopes</b>	1: Energy industries (renewable sources)	
<b>Applied methodologies and standardized baselines</b>	ACM0002 (Version 7) – “Consolidated methodology for grid-connected electricity generation from renewable sources”.	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	<b>Amount achieved before 1 January 2013</b>	<b>Amount achieved from 1 January 2013</b>
	0	388,156
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	437,594	

## SECTION A. Description of project activity

### A.1. General description of project activity

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The purpose of CGN Inner Mongolia Duerbote Wind farm Project is to utilize a wind power facility to generate zero greenhouse gas (GHG) emissions electricity for the North China Power Grid (hereafter referred to as “NCPG”). The Project Developer has obtained permission to sell electricity to the Inner Mongolia Power Grid which is an integral part of NCPG that dominated by fossil-fuel fired power plants.

The project generates renewable electricity by utilizing wind power and sells the generated output to NCPG on the basis of a power purchase agreement (PPA). Based on the conditions of the project site, the project activity has installed 33 wind turbines, each with a capacity of 1,500kW. The total installed capacity of the project activity is 49.5MW. The ex-ante expected net electricity generation of the project activity is approximately 114,110 MWh per year, with a load factor of 26.32%.

The Project started construction on 08/05/2008 and the first two turbine sets put into operation on 20/08/2009 and the last one on 23/09/2009. During this monitoring period, all turbines have come into operation and supplied electricity to the grid.

Based on the calculation in section E of this report, emission reductions of the Project during this monitoring period (01/01/2013-19/08/2016) are 388,156 tCO<sub>2</sub>e.

### A.2. Location of project activity

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- |                                      |   |
|--------------------------------------|---|
| (a) Host country                     | People's Republic of China                      |
| (b) Region/State/Province            | Inner Mongolia Autonomous Region                |
| (c) City/Town/Community              | Wulanchabu City, Wulanhua Town                  |
| (d) Physical/ Geographical location. | Latitude 41°31' North<br>Longitude 111°34' East |

### A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A (host): P.R.China	Private entity A: CGN Wind Power Co., Ltd.	No
Party B: United Kingdom of Great Britain and Northern Ireland	Private entity B: Carbon Resource Management Ltd.	No
Party C: Switzerland	Private entity C: Carbon Resource Management S.A.	No

### A.4. Reference to applied methodologies and standardized baselines

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The approved baseline and monitoring methodology ACM0002 (version 07) - “Consolidated methodology for grid-connected electricity generation from renewable sources” and the approved monitoring methodology ACM0002 (version 07);

Tool for the demonstration and assessment of additionality (version 05.2, 26 August, 2008); Tool to calculate the emission factor for an electricity system" (version 01.1, 29 July, 2008)

More information about the methodology can be obtained at:  
<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

#### **A.5. Crediting period type and duration**

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Crediting period	Renewable crediting period (7 years x3)
Starting date of crediting period	20/08/2009
End date of crediting period	19/08/2016

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

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

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The project activity was started construction on 08/05/2008. The first two turbines were commissioned on 20/08/2009 and the last one on 23/09/2009. Technology and equipments adopted in the Project are consistent with the registered PDD.

During this monitoring period (01/01/2013-19/08/2016), the wind farm has a good running, smooth data transfer and grid connection, and no special events happened. All the equipments and metering systems worked normally. There was no significant malfunction or any emergency overhaul times, downtimes of equipment, exchange of equipment during this monitoring period from 01/01/2013 to 19/08/2016.

In conclusion, no events or situations which may impact the applicability of the methodology occurred during this monitoring period.

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

##### **B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines**

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There is no any temporary deviations have been applied during this monitoring period.

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

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There are no any corrections to project information or parameters fixed at validation have been approved during this monitoring period.

##### **B.2.3. Changes to the start date of the crediting period**

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The first crediting period has been changed from 24/05/2009 – 23/05/2016 to 20/08/2009 - 19/08/2016, and is listed on the project page. The crediting period is renewable.

##### **B.2.4. Inclusion of monitoring plan**

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NA

#### **B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools**

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There is no permanent change from registered monitoring plan or applied methodology or applied standardized baseline.

#### **B.2.6. Changes to project design**

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There is no notification or request of approval of changes from the project activity as described in the registered CDM-PDD.

### **SECTION C. Description of monitoring system**

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The Monitoring set up for this project has been developed to ensure that from the start, the project was well organised in terms of the collection and archiving of complete and reliable data.

#### **1. Monitoring of the Quantity of net electricity supplied to the grid by the project**

##### **a) Data generation, aggregation, recording, calculation and reporting**

The net electricity supplied to the grid is continuously measured by the main meter installed at the substation of the grid company. This main meter is bidirectional and has two-way metering, recording both electricity exports to the grid (Gen) and imports from the grid (Cons); net electricity supplied to the grid by the project (EG<sub>y</sub>) is calculated as exports minus imports.

Every month the project developer obtains the monthly monitoring results based on the data presented in the electricity transaction notes (including Gen and Cons) issued by the power grid substation. The amount of net electricity generation is calculated according to the data monitored by the main meter is sufficient for the purpose of billing and emission reductions, as long as the error in the main meter is within the agreed limits. The main meter reading records used for billing is also the main meter reading records used for emission reduction calculations. The backup meter was also installed at the substation of the power grid for the electricity measurement.

Physical document such as paper-based maps, diagrams and environmental assessments are collated in a central place, together with the applied CDM monitoring plan. In order to facilitate auditors' reference of relevant literature relating to the CGN Inner Mongolia Duerbote Wind farm Project, the project material and monitoring results are indexed. All paper-based information is stored by the technology department of CGN Wind Power Co., Ltd. and the entire materials have a copy for backup.

In addition, at the project site, electricity generated from the wind turbines and the electricity submitted to the 220kv transmission lines has been monitored by relevant equipments installed on the project site, and these data has been used as references to the net electricity supplied to the grid.

The staffs undertake the monitoring tasks including watching metering equipments, collecting electricity data and completing records, checking and analyzing the data, archiving relevant records, reporting to company administrator or supervisor. The data collection procedures are as follows:

1. Monthly cut-off time at 24:00 of the last day in each month from July 2011 to February 2012, and at 24:00 of 20<sup>th</sup> of each month since March 2012, the grid company reads the main meter and records the data from the main meter and the backup meter at the grid side.
2. The project owner makes a monthly record of electricity exports to the grid (Gen) and imports from the grid (Cons) after obtaining the meter readings from the grid company.
3. The sales receipts issued by the grid based on the readings of the main meter serve as a double check reference.

4. The project owner carries out an internal audit on the meter readings and calculations, and report to DOE for verification.

The meter readings were double checked with the sales receipts, and in the procedure of the calculation of the ERs, the conservative values are selected, which means that the minimum value of the electricity exported and the maximum value of the electricity imported are chose. All CDM relevant data are measured and collected as detailed in Section D. All data required for verification and issuance are backed-up and retained for at least two years after the end of the crediting period or the last issuance of CERs of the Project, whichever occurs later.

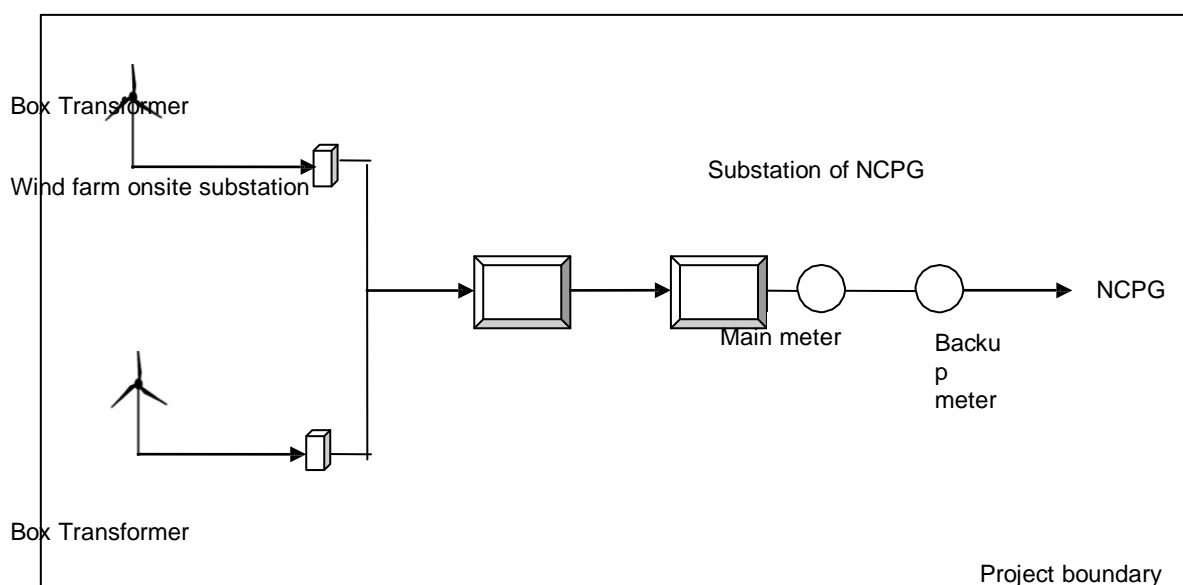
Table 1 Meter and monitored electricity

Variable	Description	Source of data
Gen	the electricity exported to the grid	Monitored by the bidirectional main meter in the substation of the power grid
Cons	the electricity imported from the grid	Monitored by the bidirectional main meter in the substation of the power grid

The net electricity supplied to the grid by the project ( $EG_y$ ) can be calculated as below:

$$EG_y = \text{Gen} - \text{Cons}$$

The line diagram showing all relevant monitoring points is as following:



b) Maintenance and calibration of monitoring equipment

The electricity meter(s) are calibrated in line with *JJG1055-1997 Technical Norm of the Calibration of AC Watt hour meters at place of installation*. This ensures that the equipment operates at the stated level of accuracy.

c) Data Quality Control and Quality Assurance

All data collected on-site are checked internally before being compiled in an electronic format, to ensure that it is complete and of appropriate quality.

## 2. Monitoring Organisation

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with the CGN Wind Power Co., Ltd. The staffs from technology and financial departments undertake the monitoring tasks including watching metering equipments, collecting electricity data and completing records, checking and analyzing the data, archiving relevant records, reporting to company administrator or supervisor.

The concerned staffs had been trained on monitoring and measurement to ensure the implementation of this monitoring plan according to the requirements.

Organizing structure of the team is shown as figure 2.

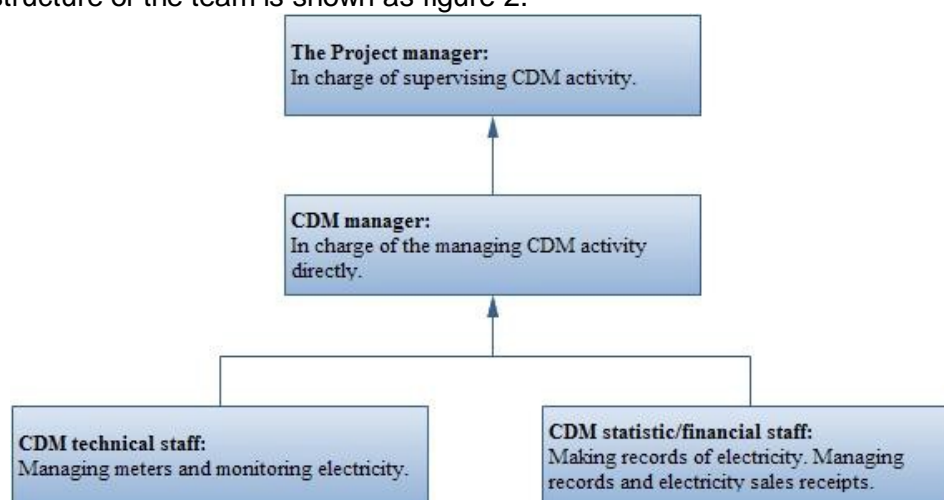


Figure 2 Structure of the team

Training for the above staff is conducted on-site to ensure that staffs are capable of performing their designated tasks to high standards. This includes CDM specific training to warrant that they understand the importance of complete and accurate data and records for CDM monitoring.

## 3. Emergency procedures

The meters were calibrated and checked for accuracy. Calibration was carried out by the qualified entity. Meters had been jointly inspected and sealed on behalf of the parties concerned. No errors occurred during this monitoring period.

The monthly cut off time is set as 24:00 at 20<sup>th</sup> day of each month. In case any previous months reading of the main meter be inaccurate or otherwise functioned improperly, the net generation output shall be determined by:

- (a) first, by reading backup meter, unless a test by either party reveals it is inaccurate;
- (b) if the backup system is not within acceptable limits of accuracy or operation is performed improperly the project operator and NCPG shall jointly prepare an reasonable and conservative

estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative; and

(c) if the NCPG and CGN Wind Power Co., Ltd. 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

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO <sub>2</sub> /MWh
Description	Combined margin emission factor
Source of data	Registered PDD
Value(s) applied	1.0548
Choice of data or measurement methods and procedures	NA
Purpose of data/parameter	Baseline emission calculation
Additional comments	The baselines emission factor was determined ex ante and will be used throughout the first crediting period.

### D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	$EG_y$
Unit	MWh
Description	Net electricity supplied to the grid by the project in period y.
Measured/calculated/default	Monitored continuously through the main meter installed at the substation of the power grid. This main meter is bidirectional and has two-way metering, recording both exports to the grid (Gen) and imports from the grid (Cons); net electricity supplied to the grid ( $EG_y$ ) is calculated as exports minus imports.
Source of data	Monthly reading records of the main meter and backup meter installed in the substation of the power grid.
Value(s) of monitored parameter	367,990.62
Monitoring equipment	Monitored continuously through the main meter installed at the substation of the power grid.
Measuring/reading/recording frequency	Continuously measurement and monthly recording
Calculation method (if applicable)	$EG_y = \text{Gen} - \text{Cons}$
QA/QC procedures	The meter reading records (including Gen and Cons) are Double checked with the receipts of sales. Back-up meter is installed at substation of the power grid company.
Purpose of data/parameter	Baseline emission calculation
Additional comments	-

### D.3. Implementation of sampling plan

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NA

**SECTION E. Calculation of emission reductions or net anthropogenic removals****E.1. Calculation of baseline emissions or baseline net removals**

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Baseline emissions ( $BE_y$  in tCO<sub>2</sub>e) are the product of the baseline emission factor ( $EF_{grid,CM,y}$  in tCO<sub>2</sub>e/MWh) multiplied by the net electricity delivered by the Project to the grid in period y. ( $EG_y$  in MWh):

$$BE_y = EG_y \times EF_{grid,CM,y}$$

Where

$EG_y$  — Net electricity supplied to the grid by the project in period y. (MWh).

$EF_{grid,CM,y}$  — Baseline Emission Factor (tCO<sub>2</sub>e /MWh) (1.0548tCO<sub>2</sub>e /MWh, as calculated ex-ante in the registered PDD and was not updated during the crediting period).

The net electricity by the Project to the grid is listed as below:

Monitoring Period		Electricity exported to grid (Gen) (MWh)			Electricity imported from grid (Cons) (MWh)			Net electricity supplied to the grid (EGy)(MWh)
		Values from meter readings	Values from electricity sales receipts	Conservative	Values from meter readings	Values from electricity sales receipts	Conservative	
start	end	A1	A2	A=MIN(A1, A2)	B1	B2	B=MAX(B1, B2)	C=A-B
2013/1/1	2013/1/20	4,903.05	4,903.05	4,903.05	19.89	19.89	19.89	4,883.16
2013/1/21	2013/2/20	8,568.52	8,568.52	8,568.52	38.31	38.31	38.31	8,530.21
2013/2/21	2013/3/20	5,974.48	5,974.48	5,974.48	37.50	37.50	37.50	5,936.98
2013/3/21	2013/4/20	10,336.57	10,336.57	10,336.57	32.41	32.41	32.41	10,304.16
2013/4/21	2013/5/20	12,358.58	12,358.58	12,358.58	31.04	31.04	31.04	12,327.54
2013/5/21	2013/6/20	12,958.58	12,958.58	12,958.58	15.07	15.07	15.07	12,943.51
2013/6/21	2013/7/20	12,183.03	12,183.03	12,183.03	19.06	19.06	19.06	12,163.97
2013/7/21	2013/8/20	9,487.10	9,487.10	9,487.10	29.74	29.74	29.74	9,457.36
2013/8/21	2013/9/20	10,580.93	10,580.93	10,580.93	23.70	23.70	23.70	10,557.23
2013/9/21	2013/10/20	11,458.91	11,458.91	11,458.91	30.22	30.22	30.22	11,428.69
2013/10/21	2013/11/20							



**CDM-MR-FORM**

0/21	1/20	10,566.06	10,566.06	10,566.06	34.21	34.21	34.21	10,531.85
2013/1 1/21	2013/1 2/20	5,656.65	5,656.65	5,656.65	20.69	20.69	20.69	5,635.96
2013/1 2/21	2014/1/ 20	5,209.91	5,209.91	5,209.91	27.27	27.27	27.27	5,182.64
2014/1/ 21	2014/2/ 20	8,789.30	8,789.30	8,789.30	19.33	19.33	19.33	8,769.97
2014/2/ 21	2014/3/ 20	6,096.01	6,096.01	6,096.01	55.47	55.47	55.47	6,040.54
2014/3/ 21	2014/4/ 20	7,350.59	7,350.59	7,350.59	29.32	29.32	29.32	7,321.27
2014/4/ 21	2014/5/ 20	7,943.25	7,943.25	7,943.25	32.86	32.86	32.86	7,910.39
2014/5/ 21	2014/6/ 20	13,778.06	13,778.06	13,778.06	19.59	19.59	19.59	13,758.47
2014/6/ 21	2014/7/ 20	6,410.14	6,410.14	6,410.14	32.08	32.08	32.08	6,378.06
2014/7/ 21	2014/8/ 20	9,439.66	9,439.66	9,439.66	24.16	24.16	24.16	9,415.50
2014/8/ 21	2014/9/ 20	5,686.02	5,686.02	5,686.02	30.43	30.43	30.43	5,655.59
2014/9/ 21	2014/1 0/20	7,034.62	7,034.62	7,034.62	42.10	42.10	42.10	6,992.52
2014/1 0/21	2014/1 1/20	9,517.24	9,517.24	9,517.24	22.27	22.27	22.27	9,494.97
2014/1 1/21	2014/1 2/20	8,290.25	8,290.25	8,290.25	23.26	23.26	23.26	8,266.99
2014/1 2/21	2015/1/ 20	9,565.33	9,565.33	9,565.33	15.22	15.22	15.22	9,550.11
2015/1/ 21	2015/2/ 20	8,148.35	8,148.35	8,148.35	31.45	31.45	31.45	8,116.90
2015/2/ 21	2015/3/ 20	5,122.74	5,122.74	5,122.74	28.51	28.51	28.51	5,094.23
2015/3/ 21	2015/4/ 20	9,725.86	9,725.86	9,725.86	17.79	17.79	17.79	9,708.07
2015/4/ 21	2015/5/ 20	9,459.09	9,459.09	9,459.09	26.13	26.13	26.13	9,432.96
2015/5/ 21	2015/6/ 20	13,078.05	13,078.05	13,078.05	23.42	23.42	23.42	13,054.63
2015/6/ 21	2015/7/ 20	7,936.01	7,936.01	7,936.01	25.17	25.17	25.17	7,910.84
2015/7/ 21	2015/8/ 20	6,478.19	6,478.19	6,478.19	36.05	36.05	36.05	6,442.14
2015/8/ 21	2015/9/ 20	4,464.43	4,464.43	4,464.43	46.51	46.51	46.51	4,417.92

2015/9/21	2015/10/20	7,811.91	7,811.91	7,811.91	13.81	13.81	13.81	7,798.10
2015/10/21	2015/11/20	7,337.57	7,337.57	7,337.57	18.52	18.52	18.52	7,319.05
2015/11/21	2015/12/20	6,919.30	6,919.30	6,919.30	57.48	57.48	57.48	6,861.82
2015/12/21	2016/1/20	8,102.87	8,102.87	8,102.87	26.40	26.40	26.40	8,076.47
2016/1/21	2016/2/20	5,303.43	5,303.43	5,303.43	39.28	39.28	39.28	5,264.15
2016/2/21	2016/3/20	6,144.84	6,144.84	6,144.84	7.30	7.30	7.30	6,137.54
2016/3/21	2016/4/20	8,110.01	8,110.01	8,110.01	21.17	21.17	21.17	8,088.84
2016/4/21	2016/5/20	9,067.87	9,067.87	9,067.87	12.90	12.90	12.90	9,054.97
2016/5/21	2016/6/20	10,702.68	10,702.68	10,702.68	11.58	11.58	11.58	10,691.10
2016/6/21	2016/7/20	7,247.29	7,247.29	7,247.29	32.79	32.79	32.79	7,214.50
2016/7/21	2016/8/19	7,898.85	7,898.85	7,898.85	30.10	30.10	30.10	7,868.75
<b>Total</b>		<b>369,202.18</b>	<b>369,202.18</b>	<b>369,202.18</b>	<b>1,211.56</b>	<b>1,211.56</b>	<b>1,211.56</b>	<b>367,990.62</b>

As shown above, the net electricity supplied to the grid from the 01/01/2013 to 19/08/2016 is 367,990.62MWh.

The baseline emission is:

$$BE_y = EG_y \cdot EF_{\text{grid,CM,y}} = 367,990.62 \text{MWh} \times 1.0548 \text{tCO}_2\text{e/MWh} = 388,156 \text{ tCO}_2\text{e}$$

## E.2. Calculation of project emissions or actual net removals

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According to the registered PDD of the project, no project emission is to be counted by the Project.

Hence,  $PE_y = 0$

## E.3. Calculation of leakage emissions

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According to the registered PDD of the project, No leakage was considered.

$Ly = 0$

**E.4. Calculation of emission reductions or net anthropogenic removals**

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Total</b>	388,156	0	-	0	388,156	388,156

**E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD**

Amount achieved during this monitoring period (t CO <sub>2</sub> e)	Amount estimated ex ante (t CO <sub>2</sub> e)
388,156	437,594

**E.6. Remarks on increase in achieved emission reductions**

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The actual value of emission reductions in this period is lower than that estimated in the PDD.