



Monitoring report form for CDM project activity
(Version 07.0)

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

MONITORING REPORT

Title of the project activity	Zhangjiakou Chabei Wind Farm Project	
UNFCCC reference number of the project activity	4844	
Version number of the PDD applicable to this monitoring report	2.1	
Version number of this monitoring report	01	
Completion date of this monitoring report	10/03/2020	
Monitoring period number	05	
Duration of this monitoring period	27/05/2018-29/02/2020 (first and last days included)	
Monitoring report number for this monitoring period	N/A	
Project participants	CGN (Chabei) Wind Power Co., Ltd.	
Host Party	People's Republic of China	
Applied methodologies and standardized baselines	ACM0002-"Grid-connected electricity generation from renewable sources" (Version 19.0)	
Sectoral scopes	1: Energy industries (renewable-/non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0 tCO ₂ e	282,810 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	316,941 tCO ₂ e	

SECTION A. Description of project activity

A.1. General description of project activity

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The project located in Chabei District, Zhangjiakou City, Hebei Province, People's Republic of China. The project involves the installation of 67 wind turbines with each capacity of 1,500 kW and totals up an installation capacity of 100.5MW. Therefore, it's expected to generate approximately 213,735MWh per year which are sold to the North China Power Grid (NCPG).

The project helps the local government to promote economic development and to improve the air quality. The project assists China in stimulating and accelerating the commercialization of grid-connected wind power technologies and markets which are an important objective of the Chinese government. The project therefore helps reduce GHG emissions versus the high-growth, coal-dominated business-as-usual scenario. The project improves air quality and local livelihoods, promote sustainable renewable energy industry development.

The Project commenced construction on 09/08/2010. The first wind turbine was put into commercial operation on 25/03/2011 and the last wind turbine was put into commercial operation in 05/2011.

This Monitoring Report is for the 5th phase of monitoring period, which is from 27/05/2018-29/02/2020. The total emission reduction achieved in this monitoring period is 282,810 tCO₂e.

A.2. Location of project activity

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The project is located within Chabei District, Zhangjiakou City, Hebei Province, People's Republic of China. The central geographical coordinates of the project are east longitude 114.8158°E and north latitude 41.4569°N.

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host Party)	CGN (Chabei) Wind Power Co., Ltd.	No

A.4. References to applied methodologies and standardized baselines

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The approved large-scale consolidated methodology applied in the project is ACM0002 "Grid-connected electricity generation from renewable sources" (Version 19.0, EB100, 2018). For more information regarding the methodology please refer to

<http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

The methodology refers to the following tools:

1. "Tool for the demonstration and assessment of additionality (version 07.0.0)".

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

2. "Combined tool to identify the baseline scenario and demonstrate additionality (version 07.0)"

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf>

3. "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 03.0)"

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf>

4. “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 03.0)”

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf>

5. “Tool to calculate the emission factor for an electricity system (Version 07.0)”

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

6. “Tool to determine the remaining lifetime of equipment (Version 01)”

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>

7. “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)”

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>

More information on the methodology and tools listed above is available at the following website:

<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

A.5. Crediting period type and duration

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The renewable crediting period of 7 years \times 3 is chosen.

The second crediting period of the project is from 27/05/2018 to 26/05/2025.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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The project installed 67 wind turbines with a capacity of 1,500 kW each. The equipment is manufactured in China by Xinjiang Goldwind Science & Technology Co., Ltd.. The expected technical lifetime of the Project is 20 years as stated in the registered PDD.

The main technical specifications are listed in Table 1.

Table 1. The main technical specifications of the wind turbines

Item	Specification
Manufacturer	Xinjiang Goldwind Science & Technology Co., Ltd.
Model	77/1500kW
Power Rating	1,500kW
Rotor Diameter	77m
Hub height (Centre)	65m
Cut-in Wind Speed	3m/s
Rating Wind Speed	12m/s
Cut-out Wind Speed	25m/s

The project implementation follows the monitoring plan in the registered PDD. Each turbine has a transformer from 690V to 35kV and is connected with the 220kV substation on the wind farm. The onsite substation is connected to the grid substation via 220kV transmission line. The annual net supplied power of the Project to the grid is monitored by the main meter installed at the onsite substation of the wind farm project. The connection diagram and the location of the monitoring meters are shown in Figure 1.

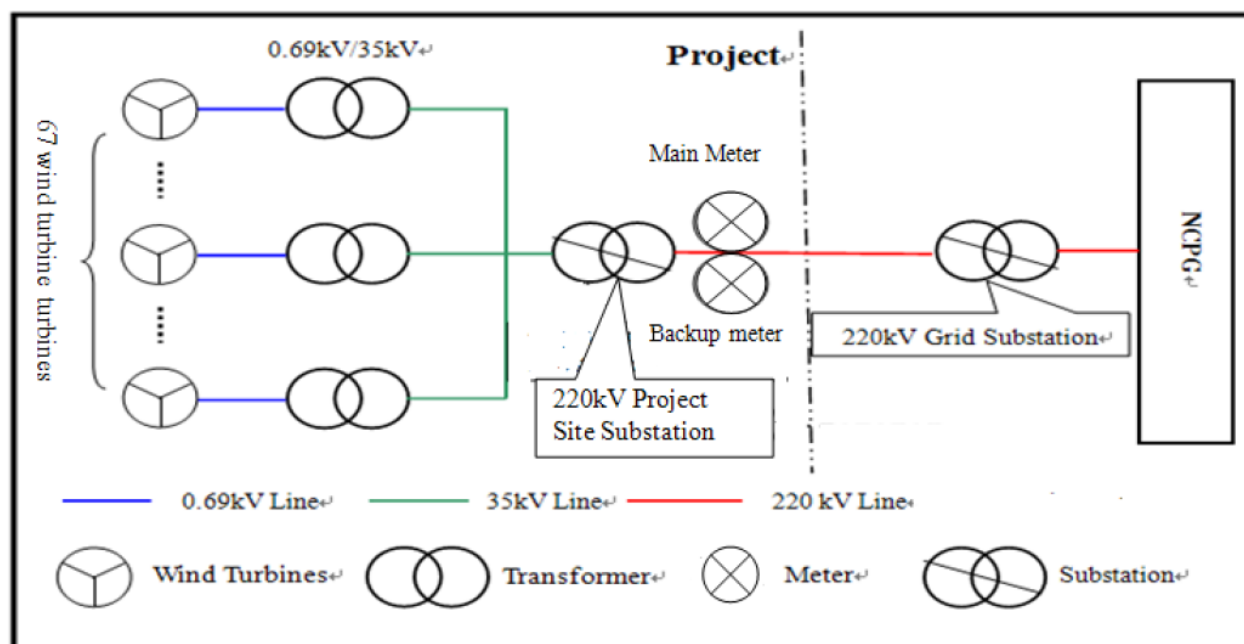


Figure 1. The connection diagram of the project

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 monitoring period, which may impact the applicability of the methodology.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

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There is no temporary deviation has been applied during this monitoring period.

B.2.2. Corrections

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There is no correction to project information or parameter fixed at validation has 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 of the Project is 27/05/2011 to 26/05/2018 (Renewable) (changed from the original crediting period 01/07/2011 to 30/06/2018). The change to start date of crediting period has been approved by EB and can be found on the website:

<https://cdm.unfccc.int/Projects/DB/DNV-CUK1306154648.92/view?cp=1>

The current monitoring report belongs to the second crediting period of the Project, which is from 27/05/2018 to 26/05/2025. The second crediting period started on the day immediately after the expiration of the first crediting period. Thus, there is no change to the start date of the second crediting period.

B.2.4. Inclusion of monitoring plan

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N/A

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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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 change to project design of registered project activity request proposed for the current monitoring period.

B.2.7. Changes specific to afforestation or reforestation project activity

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N/A

SECTION C. Description of monitoring system

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In accordance with the Monitoring Methodology ACM0002 (Version 19.0), the key data that must be monitored ex-post for the specific crediting period (since the emission factor has been calculated ex ante), the monitoring system is specified as below:

1. Introduction

The project adopts the approved consolidated monitoring methodology ACM0002 “Grid-connected electricity generation from renewable sources (Version 19.0) to determine the emission reductions from the net electricity generation from the wind farm.

2. Responsibility

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with the Project owner.

3. Training

The CDM project management office assign and train the dedicated people carrying out the monitoring work. The CDM project manager completed the monitoring personnel training to ensure that relevant personnel are capable of performing their designated tasks to high standards.

Furthermore, a CDM manual was designed as a guideline for the project owner for management of the Project and monitoring of the data during the operation period. Details on the authority and responsibility for monitoring, measurement and reporting, the procedures for the training of monitoring personnel, the procedures for day-to-day records handling, the procedures for internal audits, the procedures for corrective actions and so on are provided in the CDM manual for the Project owner.

4. Installation of meter

The annual net supplied power of the proposed project activity to the grid is monitored by the main meter at the onsite substation of the wind farm project, recording the quantity of annual electricity exported to the grid ($EG_{export,y}$) and the quantity of annual electricity imported to the grid ($EG_{import,y}$). Annual net generation is calculated as $EG_{export,y}$ minus $EG_{import,y}$. The backup meter is installed at the onsite substation. The accuracy of the main meter and backup meter is 0.2S. The main meter monitors the flow continuously and are reported monthly. The main meter is read by the qualified operating staff of the wind farm. A monthly report of the net on-grid electricity from the main meter installed at the onsite substation is established on the basis of the data.

5. Calibration

The metering equipment is calibrated and checked for accuracy in accordance with industry standards. The accuracy of the main meter and backup meter are 0.2S. The net generation output by the meter alone suffices for the purpose of billing and emission reduction verification during the monitoring period.

The metering equipment shall be jointly inspected and sealed on behalf of the parties concerned and shall not be interfered with by either party except in the presence of the other party or its accredited representatives.

Calibration is carried out by the qualified entity with the records being supplied to the project owner, and these records has been maintained by the project owner.

The metering equipment installed shall be tested by qualified entity after: the detection of a difference larger than the allowable error in the readings of main meter; the repair of all or part of meter caused by the failure of one or more parts to operate in accordance with the specifications.

If any errors are detected the party owning the meter shall repair, recalibrate or replace the meter giving the other party sufficient notice to allow a representative to attend during any corrective activity.

Should any previous months reading of the main meter be inaccurate by more than the allowable error, 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 owner and the Power Grid Company shall jointly prepare an reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative when DOE undertakes verification; and
- (c) if the Power Grid Company and the project owner fail to agree then the matter will be referred for arbitration according to agreed procedures.

No events or situations that occurred during this monitoring period.

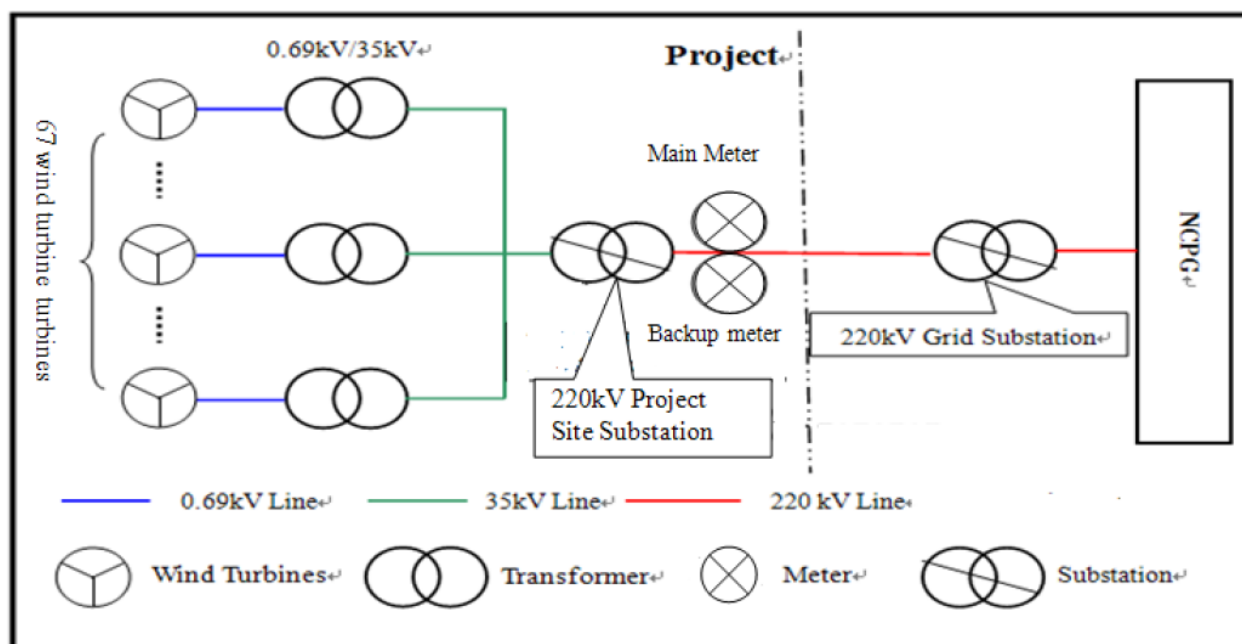
6. Monitored data

Grid-connected electricity generated by the project is monitored through the main metering equipment. Every month the project owner obtains the on-grid electricity generation from the substation.

Due to the regulation of the local Grid Company, the monthly cut-off time for electricity supplied to and imported from the grid is at 24:00 on the last day of every month. The records of the electricity supplied to the grid by the project and the electricity imported from the grid are issued based on the power purchase agreement (PPA) signed between the project entity and the power grid company and the readings from the main meter. The net electricity generation is calculated as exports to the grid minus imports from the grid.

At 24:00 of the last day of each month, assigned staff of the project owner and a designated person from the grid company jointly recorded the main meter and supplied the monthly readings of the main meter to the Grid Company, then the Grid Company issues records for sold electricity to the wind farm. The records for sold electricity issued by the grid based on the readings of the main meter serve as a double check reference. Both the export electricity and import electricity can be crosschecked with the records for sold electricity.

A diagram shows how parameters are monitored is presented as follows:



7. Quality control

Monthly net generation data is approved and signed off by CDM manager before it is accepted and stored.

This audit checks compliance with operational procedures in this monitoring plan.

This internal audit also identifies potential improvements to procedures to improve monitoring and reporting in future years.

8. Data management system

Physical document such as paper-based maps, diagrams and environmental assessments has been collected in a central place, together with this monitoring plan. In order to facilitate auditors' reference of relevant literature relating to the proposed project, the project material and monitoring results will be indexed. All paper-based information has been stored by the technology department of the project owner and all the materials have a copy for backup.

And all data including calibration records is kept until 2 years after the end of the total crediting period of the CDM project.

9. Reporting and Verification

The project owner records readings from the main meter monthly. The project owner carries out an internal audit on the readings and calculations.

The project owner, after the internal audit, reports the readings, grid data and calculations to the DOE for verification.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	EF _{grid,CM,y}
Unit	tCO ₂ /MWh
Description	Combined margin emission factor

Source of data	Registered PDD
Value(s) applied	0.84045
Choice of data or measurement methods and procedures	Calculated follow the “Tool to calculate the emission factor for an electricity system” (Version 07.0)
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

Data/Parameter	EG _{export,y}			
Unit	MWh			
Description	Quantity of annual electricity exported to the grid by the proposed project			
Measured/calculated/default	Measured			
Source of data	Monitored from bidirectional electricity meter (s)			
Value(s) of monitored parameter	337,750.143			
Monitoring equipment	The main meter (or the backup meter) installed at the onsite substation of the wind farm project. The detailed information of the meters are as follows:			
	Meters	Serial No.	Accuracy class	Calibration frequency
	Main Meter	96212980	0.2s	annually
	Backup Meter	96212981	0.2s	annually
Measuring/reading/recording frequency	Continuously measurement and monthly recording			
Calculation method (if applicable)	N/A			
QA/QC procedures	The metering equipment is calibrated annually for accuracy by a qualified third party in accordance with industry standard. Monthly generation data will be approved and signed off by CDM manager before it is accepted and stored. The supply of electricity to the grid is cross-checked against records for sold electricity.			
Purpose of data/parameter	Baseline emission calculation			
Additional comments	No additional capacity is connected and shared the same transmission line, substation or metering equipment with the project during the monitoring period.			

Data/Parameter	EG_{import,y}
Unit	MWh
Description	Quantity of annual electricity imported from the grid by the proposed project
Measured/calculated/default	Measured
Source of data	Monitored from bidirectional electricity meter (s)
Value(s) of monitored parameter	1,251.395

Monitoring equipment	The main meter (or the backup meter) installed at the onsite substation of the wind farm project. The detailed information of the meters are as follows:			
	Meters	Serial No.	Accuracy class	Calibration frequency
	Main Meter	96212980	0.2s	annually
	Backup Meter	96212981	0.2s	annually
Measuring/reading/recording frequency	Continuously measurement and monthly recording			
Calculation method (if applicable)	N/A			
QA/QC procedures	The metering equipment is calibrated annually for accuracy by a qualified third party in accordance with industry standard. Monthly data of electricity imports will be approved and signed off by CDM manager before it is accepted and stored. The electricity import from the grid is cross-checked against records for sold electricity.			
Purpose of data/parameter	Baseline emission calculation			
Additional comments	No additional capacity is connected and shared the same transmission line, substation or metering equipment with the project during the monitoring period.			

Data/Parameter	EG _{facility,y}			
Unit	MWh			
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y			
Measured/calculated/default	Calculated			
Source of data	Electricity meter (s), monitoring supply to the grid and imports from the grid			
Value(s) of monitored parameter	336,498.748			
Monitoring equipment	The main meter (or the backup meter) installed at the onsite substation of the wind farm project. The detailed information of the meters are as follows:			
	Meters	Serial No.	Accuracy class	Calibration frequency
	Main Meter	96212980	0.2s	annually
	Backup Meter	96212981	0.2s	annually
Measuring/reading/recording frequency	Continuously measurement and monthly recording			
Calculation method (if applicable)	Net generation is calculated as exports minus imports. $EG_{facility,y} = EG_{export,y} - EG_{import,y}$			
QA/QC procedures	The metering equipment is calibrated and checked annually for accuracy by the qualified third party in accordance with relevant industry standards. The error resulting of the meters will not exceed 0.5%. Monthly net generation data will be approved and signed off by CDM manager before it is accepted and stored.			
Purpose of data/parameter	Baseline emission calculation			
Additional comments	No additional capacity is connected and shared the same transmission line, substation or metering equipment with the project during the monitoring period.			

D.3. Implementation of sampling plan

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The parameters monitored described in section D.2 above do not involve the sampling approach.

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

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The baseline emission BE_y (tCO₂) during the monitoring period results from:

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

$$EG_{PJ,y} = EG_{facility,y}$$

$$EG_{facility,y} = EG_{export,y} - EG_{import,y}$$

Where:

BE_y is Baseline emissions in year y (tCO₂/yr).

$EG_{PJ,y}$ is the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).

$EF_{grid,CM,y}$ is the Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh).

$EG_{export,y}$ is the quantity of annual electricity exported to the grid by the project(MWh);

$EG_{import,y}$ is the quantity of annual electricity imported from the grid by the project(MWh);

$EG_{facility,y}$ is the quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh).

The monitored data of the main meter and calculation of $EG_{facility,y}$:

Monitoring period	Electricity exported to the grid ($EG_{export,y}$) unit: MWh	Electricity imported from the grid ($EG_{import,y}$) unit: MWh	Quantity of net electricity generation supplied to the Grid ($EG_{facility,y}$) unit: MWh
27/05/2018-31/05/2018	2928.560	6.769	2921.791
01/06/2018-30/06/2018	15242.397	80.620	15161.777
01/07/2018-31/07/2018	11645.940	88.785	11557.155
01/08/2018-31/08/2018	12626.833	15.233	12611.600
01/09/2018-30/09/2018	16477.901	55.820	16422.081
01/10/2018-31/10/2018	16419.167	46.893	16372.274
01/11/2018-30/11/2018	22015.127	75.669	21939.458
01/12/2018-31/12/2018	23937.662	78.825	23858.837
01/01/2019-31/01/2019	18968.220	25.258	18942.962
01/02/2019-28/02/2019	9961.498	80.589	9880.909
01/03/2019-31/03/2019	21458.055	98.582	21359.473
01/04/2019-30/04/2019	19077.877	40.334	19037.543
01/05/2019-31/05/2019	19350.350	49.285	19301.065
01/06/2019-30/06/2019	12295.366	40.003	12255.363
01/07/2019-31/07/2019	8915.692	37.096	8878.596
01/08/2019-31/08/2019	13113.004	99.118	13013.886
01/09/2019-30/09/2019	9792.551	83.285	9709.266
01/10/2019-31/10/2019	15863.451	52.223	15811.228

01/11/2019-30/11/2019	17674.610	38.690	17635.920
01/12/2019-31/12/2019	22378.089	33.305	22344.784
01/01/2020-31/01/2020	19,283.450	30.445	19,253.005
01/02/2020-29/02/2020	8,324.343	94.568	8,229.775
Total	337,750.143	1,251.395	336,498.748

According to the registered PDD, the emission factor of the grid is determined ex-ante; the ex-ante determined emission factor is 0.84045 tCO₂e/MWh.

$$BE_y = EG_{facility,y} \times EF_{grid,CM,y} = 336,498.748 \text{ MWh} \times 0.84045 \text{ tCO}_2\text{e/MWh} = 282,810 \text{ tCO}_2\text{e}.$$

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

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According to ACM0002 (Version 19.0), for the project is a renewable energy project activity, hence, $PE_y = 0 \text{ tCO}_2\text{e}$.

E.3. Calculation of leakage emissions

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According to the applied methodology (Version 19.0), no leakage is considered for the project.

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

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	282,810	0	0	0	282,810	282,810

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 ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
282,810	316,941

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

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Based on the registered PDD, the annual emission reductions estimated ex ante of the project is 179,633 tCO₂e. The duration of this monitoring period is 644 days, thus the total amount estimated ex ante for this monitoring period is 179,633 tCO₂e / 365 days * 644 days = 316,941 tCO₂e.

E.6. Remarks on increase in achieved emission reductions

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The comparison shows that the actual emission reduction is a little lower than the expectation in the registered PDD.

E.7. Remarks on scale of small-scale project activity

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N/A

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		