



**Monitoring report form for CDM project activity
(Version 07.0)**

MONITORING REPORT

Title of the project activity	Bundled Wind Power Project by Gangamai Industries and Construction Limited	
UNFCCC reference number of the project activity	9330 ¹	
Version number of the PDD applicable to this monitoring report	3	
Version number of this monitoring report	01	
Completion date of this monitoring report	26/08/2019	
Monitoring period number	02	
Duration of this monitoring period	01/03/2014 to 31/07/2019 (both days included)	
Monitoring report number for this monitoring period	Not Applicable	
Project participants	M/s Gangamai Industries and Construction Limited	
Host Party	India	
Applied methodologies and standardized baselines	Methodology: - AMS I.D – Grid connected renewable electricity generation – version 17 Standardised Baseline: Not Applicable	
Sectoral scopes	Sectoral Scope 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	64,520 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	93,913 tCO ₂ e	

¹ <http://cdm.unfccc.int/Projects/DB/SIRIM1356664264.57/view>

SECTION A. Description of project activity**A.1. General description of project activity**

The main purpose of the project activity is to generate electrical energy through sustainable means, for sale to the state electricity grids, using wind power resources and to contribute to climate change mitigation efforts. In the absence of the project activity, the electricity thus supplied would have been generated through fossil fuel based thermal power plants. The project activity thus contributes to reduction in specific emissions (emissions of pollutant) including GHG emissions. The project activity is also responsible for sustainable economic growth and conservation of environment through use of wind as a renewable source.

The project is equivalent to the capacity of 10.9 MW bundled wind power project by Gangamai Industries and Construction Limited (GIACL), Ajeet Seeds Limited (ASL) and Nirman Constructions (NC). GIACL will be responsible for all modalities of communication with UNFCCC. The project activity will be treated as a bundled project by GIACL. This project aims at providing electricity to the state electricity grid through effective utilization of renewable resource which, in the case of the project activity, is wind power. All WTGs except S75 are selling electricity to grid, however for S75, the generated electricity is supplied to third party sale.

The project activity involves the installation of the following Wind Turbine Generators (WTG):

Sr. No.	WTG No.	Ownership	Capacity (MW)	Make	Date of Commissioning
1	CK02	GIACL	2.10	Suzlon S-88	27/10/2009
2	S75	GIACL	1.25	Suzlon S-66	30/03/2010
3	MK145	GIACL	2.10	Suzlon S-88	31/03/2010
4	RKB25	ASL	2.10	Suzlon S-88	31/01/2010
5	RKB26	ASL	2.10	Suzlon S-88	31/01/2010
6	AK201	NC	1.25	Suzlon S-66	31/03/2010

The net anthropogenic emission from the project activity is 64,520 tCO_{2e}

Technology employed

S66_1.25 MW

Parameter	Specification
Rated power	1250 kW
Type	3 Blades, Upwind / Horizontal axis
Diameter	66 m
Rotor blade material	Epoxy bonded fibre glass
Swept area	3421 m ²
Frequency	50 Hz
Cooling system	Air cooled
Tower Type	Tubular tower with welded steel plates
Tower height	72 m
Hub Height	74.5 m
Start up wind speed	3 m/s
Nominal wind speed	14 m/s
Max wind speed	22 m/s
Min rotor speed	13.8 rd/min
Max rotor speed	20.7 rd/min

S88_2.10 MW

Parameter	Specification
Rated power	2100 kW
Type	3 Blades, Upwind / Horizontal axis
Diameter	88 m
Rotor blade material	Epoxy bonded fibre glass
Swept area	6082 m ²
Frequency	50 Hz
Cooling system	Forced oil cooling lubrication system
Tower Type	Tubular tower with welded steel plates
Tower height	77.5 m
Hub Height	80 m
Start up wind speed	4 m/s
Nominal wind speed	14 m/s
Max wind speed	25 m/s
Min rotor speed	15 rd/min
Max rotor speed	17.8 rd/min

A.2. Location of project activity

The project is a bundle project activity located in the state of Rajasthan and Maharashtra in India. The latitude and longitude of the project activity is as follows (For Maharashtra):

WTG	Village	District	State	Country	Latitude (°N)	Longitude (°E)
CK02	Mandal	Nandurbar	Maharashtra	India	21°17'24.3"	74°20'39.8"
S75	Sadawaghapur	Satara	Maharashtra	India	17°26'25.9"	73°55'35.1"

The latitude and longitude of the project activity is as follows (For Rajasthan):

WTG	Village	District	State	Country	Latitude (°N)	Longitude (°E)
MK145	Tejuva	Jaisalmer	Rajasthan	India	27°10'28.5"	70°48'37.9"
RKB25	Belwa Ranaji	Jodhpur	Rajasthan	India	26°28'49.1"	72°31'06.9"
RKB26	Belwa Ranaji	Jodhpur	Rajasthan	India	26°29'05.0"	72°31'06.5"
AK201	Chord	Jaisalmer	Rajasthan	India	26°45'52.3"	71°07'27.8"

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	M/s Gangamai Industries and Construction Limited	No

A.4. References to applied methodologies and standardized baselines

Title: Grid connected renewable electricity generation

Reference: The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the "Appendix B of the simplified modalities and procedure for small scale CDM project activities".

Methodology: AMS I. D Grid Connected Renewable Electricity Generation (Version 17, EB 61)²

Type I: Renewable Energy Project (Small Scale)

Category: I. "D", Grid Connected Renewable Electricity Generation

Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Tool referred with above methodology is –

- Version 02.2.1 (EB 63, Annex 19)³ of "Tool to calculate the emission factor for an electricity system".

A.5. Crediting period type and duration

Type of crediting period	Fixed
Crediting period from	31/12/2012 to 30/12/2022
Length of the Crediting Period	10 Years

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The main purpose of the project activity is to generate electrical energy through sustainable means, for sale to the state electricity grids, using wind power resources and to contribute to climate change mitigation efforts. In the absence of the project activity, the electricity thus supplied would have been generated through fossil fuel based thermal power plants. The project activity thus contributes to reduction in specific emissions (emissions of pollutant) including GHG emissions. The project activity is also responsible for sustainable economic growth and conservation of environment through use of wind as a renewable source.

The project activity has been commissioned & running successfully. As on 31/03/2010, the project participant has completed the commissioning of all the 6 WEGs. The commissioning details of the project activity are provided in section A.1. The technology used for project activity has been detailed in section A.1 of MR.

No events or situations happened during the reported monitoring period which can alter the applicability of the applied 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

There is no request for deviation applied during this monitoring period.

B.2.2. Corrections

There have not been any corrections to project information or parameters fixed at validation during the current monitoring period.

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

There has not been any change in the start date of crediting period during the current monitoring period.

B.2.4. Inclusion of monitoring plan

There has not been any inclusion of a monitoring plan to registered PDD that was not included at registration during the current monitoring period.

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

Not applicable during the current monitoring period.

B.2.6. Changes to project design

Not applicable during the current monitoring period.

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

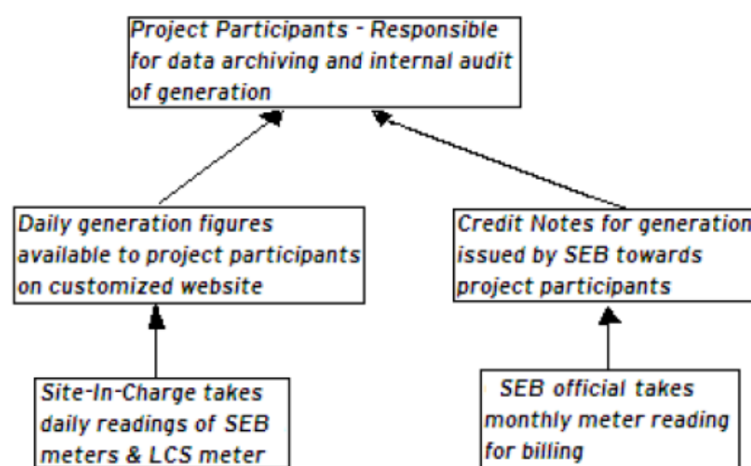
Not Applicable.

SECTION C. Description of monitoring system

The project activity is in accordance with approved small scale methodology AMS I.D, and therefore, can use the monitoring methodology for type I.D of 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 17, - Grid connected renewable electricity generation.

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of metering the electricity generated by the renewable technology. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline emission factor is based on an ex-ante determination, monitoring of this parameter is not required. The sole parameter for monitoring is the electricity exported to the grid. The Project is operated and managed by Suzlon. Suzlon will have a designated Site-In-Charge (O&M) on site who will be responsible for monitoring the electricity exported from the project activity. The overall flow of information has been depicted using the following hierarchical structure:

**Monitoring Process at Rajasthan**

Metering of wind power is done as under:

- The electricity supplied to the grid will be metered at the 33/132/220 kV level at the RRVPN substation. Representatives of RRVPN and Suzlon will jointly take the main reading and sign the meter reading on the first day of every month. Simultaneously, the joint meter reading at the 33/132/220 kV level of the backup metering system will also be taken by representatives of RRVPN and Suzlon.
- The meters will jointly inspected/tested once in a five year as per CEA notification. Joint inspection and testing will also be carried out as and when difference in monthly meter readings exceeds the sum of maximum error as per accuracy class of main and back up meters.
- Metering Equipment and Arrangement Information
- The meters (main and check meters) used are tri-vector two way meter and measure the electricity import and export and give the net electricity.
- As per the Power Purchase Agreement entered into with the electricity distribution utility, there will be two meters, one main meter and one check meter. Both meters would be two way export import meters that measure both export and import of electricity and provide net electricity exported to the grid. Accordingly, we have proposed that the net electricity exported to grid would be the sole monitoring parameter for the project.
- In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Error correction will be applied to the meter reading.
- Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred. The details of the malfunctioning along with date and time and snaps shot parameters along with load survey will be retrieved from the main meter. The exact nature of the malfunctioning will be determined after analyzing the data so retrieved and the consumption recorded by the main meter will be assessed accordingly.
- If main as well as back up metering system becomes defective, the assessment of energy consumption for the outage period will be done from the backup meters by the concerned parties as mutually agreed or at the level of Metering Committee set up under the Metering Code.
- The main and the backup metering systems will be sealed in presence of representatives of Suzlon and RRVPN.

Additionally, all the WTGs at the site are connected to a central monitoring system located at that site only. This system captures daily generation figures which are later made available to the project participants on the customized website of Suzlon. This will be used to check the generation figures.

Monitoring Process at Maharashtra

The CRM manager is responsible for the monitoring of the WTGs and communicating results to the project participants. The project participants have the overall responsibility for collating the monitored data received from their respective WTG locations. Any failure in the WTG, including in its monitoring system, will trigger the interlocking circuit which will stop generation of electricity immediately.

A particular feeder may comprise of WTGs belonging to owners other than those owned by the project participants but belonging to the same O&M service provider. At the MSEDCL sub-station, the total export & import to this feeder is monitored using the main meter & the check meter, which are electronic tri-vector meters. The total export at this meter is generally arrived at by multiplying the monthly meter reading to the multiplying factor of the meter concerned. The monthly meter reading is arrived at as the difference between the current meter reading and the previous meter reading. The period between these two readings is usually a period of 30 days which may vary. In a similar fashion, total import at this meter is also calculated. Hence, net electricity export is calculated as the difference between total export and total import at the meter. Additionally, MSEDCL receives daily export & import figures for each WTG from the O&M service provider with the help of which it calculates the electricity export by each WTG at the WTG controller. The WTG controller is located within the WTG assembly itself. It then arrives at the export value of each

WTG by apportioning the reading of the main/check meter in the same ratio at which each of the WTG had exported electricity. The formula applied on each WTG of a particular feeder is as follows:

Export of WTG to Grid = (% generation of individual WTG connected to feeder) x (Net Electricity Export @ MSEDCL meter for the feeder)

Where,

% generation of individual WTG connected to feeder = (Controller reading @ Individual WTG)/(Sum of Controller reading of all WTGs connected on feeder)

The electricity export reports are generated by MSEDCL on credit notes and sent to the corresponding project participants through the O&M service provider on a monthly basis. Thus, to further elaborate, it may be said, that every month, the project participants receive credit notes from MSEDCL for each of its WTGs from the O&M service provider. Some of the information mentioned in the credit notes is as follows:

1. Current meter reading of total export of the concerned feeder
2. Previous meter reading of total export of the concerned feeder
3. Current meter reading of total import of the concerned feeder
4. Previous meter reading of total import of the concerned feeder
5. Multiplying factor of meter
6. % generation of individual WTG connected to meter

Upon receipt of these reports, the project participants generate invoices on sale of electricity and sends to MSEDCL. Thereafter MSEDCL makes payments against the invoices. The project participants have overall responsible for storing and archiving data as well as the preparation of monitoring report and communicate with EB of UNFCCC for project performance, registration and verification of the CDM project activity.

Emergency Preparedness

The project promoters have contracted the technology supplier for providing O&M services for the power project. The service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WTGs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WTG controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider would also be responsible for supply of necessary main components of the WTG such as main gearboxes, blades, generators, towers, hubs, main shafts & bearings, ground and top controller and hydraulic systems. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities. Additionally, spare meters would also be kept available at the site for replacement in case of failure of any of the monitoring equipments

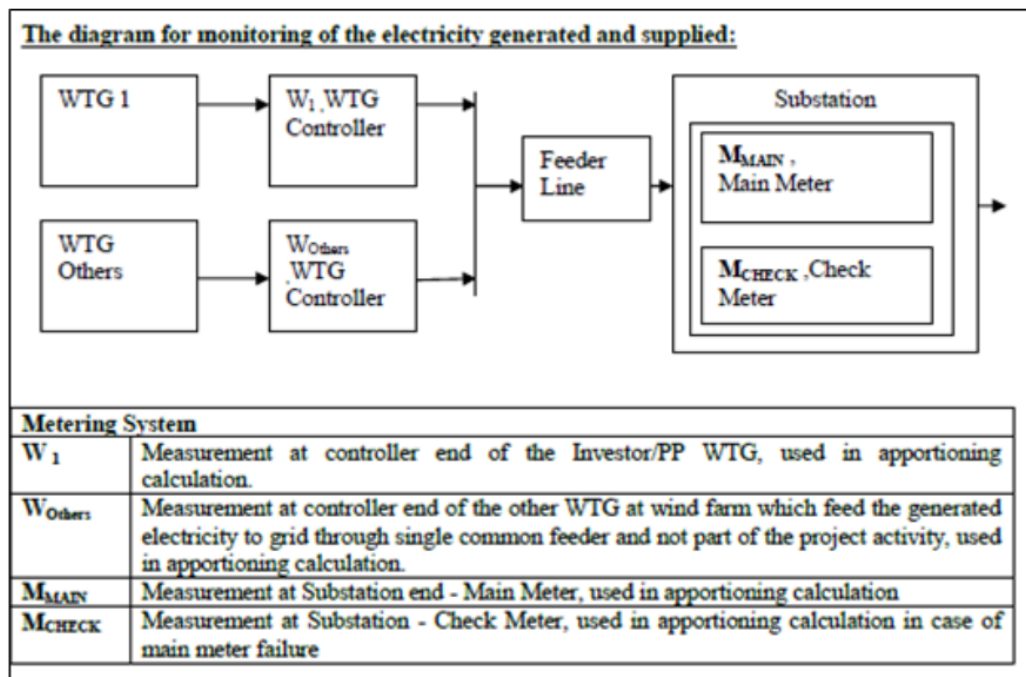
Internal audits & Performance review

The records are regularly audited and checked by the senior officials from project proponent on an annual basis. The officials will monitor the actual emission reduction. The personnel responsible for taking readings at site are adequately trained.

The schematic representation of WTGs, Substation meter and NEWNE Grid is as below. Due to different WTGs are connected to single meter, apportioning required for net electricity supplied to grid by project activity WTGs.

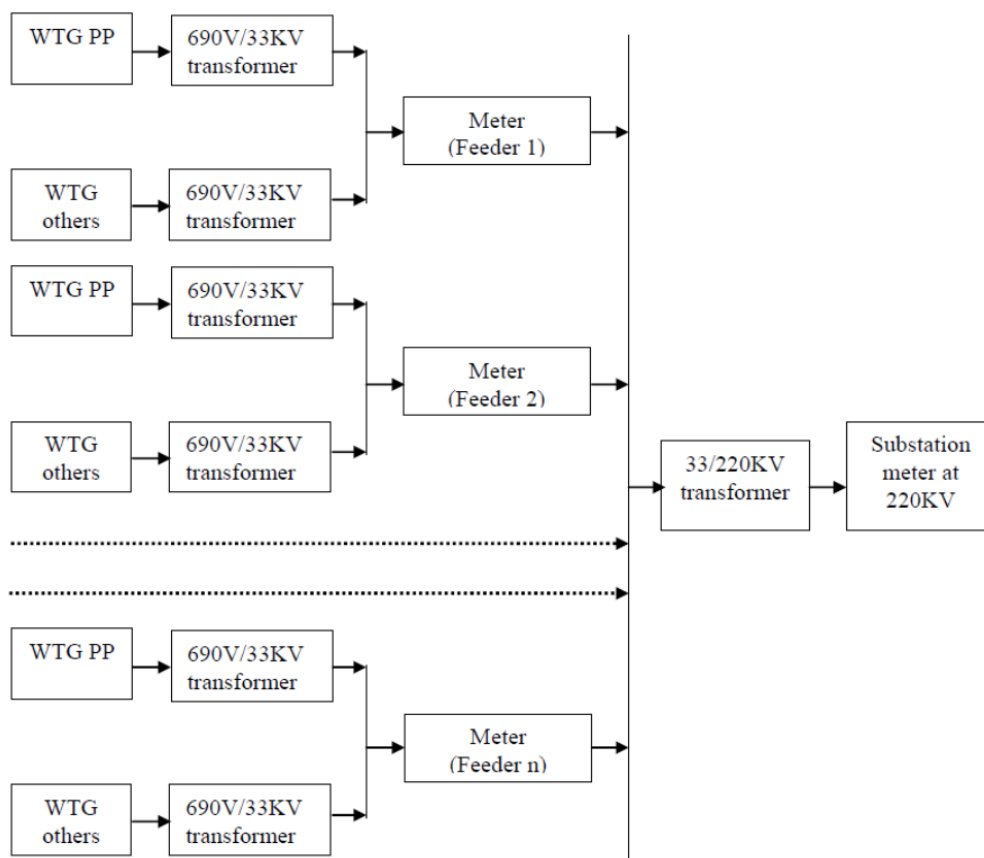
The schematic metering arrangement for WTG CK02 and S-75 (Maharashtra):

The substation main and check meter details are provided in Annexure 1 along with their calibration details.



The schematic metering arrangement for Rajasthan state WTGs i.e WTG MK145, RKB25, RKB26 and AK201:

The substation (33KV sub-station and 220 KV sub-station) main and check meter details are provided in Annexure 1 along with their calibration details.



SECTION D. Data and parameters**D.1. Data and parameters fixed ex ante**

Data/Parameter	EF_{grid,OM,y}
Unit	tCO ₂ /MWh
Description	Weighted average of 3 years (2008-09, 2009-10 and 2010-11) CO ₂ Operating Margin emission factor of the NEWNE grid
Source of data	Central Electricity Authority: CO ₂ Baseline Database, Version 7
Value(s) applied	0.9842
Choice of data or measurement methods and procedures	This value is determined from Central Electricity Authority: CO ₂ Baseline Database, Version 7
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	The value is fixed ex-ante. Data will be kept for crediting period + 2 Years

Data/Parameter	EF_{grid,BM,y}
Unit	tCO ₂ /MWh
Description	CO ₂ Build Margin emission factor of the NEWNE grid
Source of data	Central Electricity Authority: CO ₂ Baseline Database, Version 7
Value(s) applied	0.8588
Choice of data or measurement methods and procedures	This value is determined from Central Electricity Authority: CO ₂ Baseline Database, Version 7
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	The value is fixed ex-ante. Data will be kept for crediting period + 2 Years

Data/Parameter	EF_{grid,CM,y}
Unit	tCO ₂ /MWh
Description	Combined Margin Grid emission factor for NEWNE Grid
Source of data	Central Electricity Authority: CO ₂ Baseline Database, Version 7
Value(s) applied	0.9528
Choice of data or measurement methods and procedures	This value is determined from Central Electricity Authority: CO ₂ Baseline Database, Version 7
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	The value is fixed ex-ante. Data will be kept for crediting period + 2 Years

D.2. Data and parameters monitored

Data/Parameter	EG_y
Unit	MWh
Description	Electricity exported to grid by each WTG
Measured/calculated/default	Measured
Source of data	Invoices for sale of power
Value(s) of monitored parameter	65,259.90 MWh

Monitoring equipment	Monitoring: Monitored through the main meter and check meter readings. Both the energy meters are bi-directional trivector meters. Data type: Measured continuously and recorded monthly Archiving: Electronic Recording Frequency: Monthly Responsibility: The plant management shall be responsible for the regular recording of data. Calibration Frequency: The meters shall be calibrated once in five years.
Measuring/reading/recording frequency	Measured continuously and recorded monthly
Calculation method (if applicable)	NA
QA/QC procedures	Meter calibration shall be conducted once in five years in accordance with the local calibration standards and internal audit system is in place as mentioned in Section C. Meter accuracy: 0.2s of the meter at respective substations that would be used for the exported electricity metering.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Data/Parameter	ECy
Unit	MWh
Description	Electricity imported from grid by each WTG
Measured/calculated/default	Measured
Source of data	Invoices for sale of power
Value(s) of monitored parameter	2,456.30 MWh
Monitoring equipment	Monitoring: Monitored through the main meter and check meter readings. Data type: Measured continuously and recorded monthly Archiving: Electronic Recording Frequency: Monthly Responsibility: The plant management shall be responsible for the regular recording of data. Calibration Frequency: The meters shall be calibrated once in five years
Measuring/reading/recording frequency	Measured continuously and recorded monthly
Calculation method (if applicable)	NA
QA/QC procedures	The cumulative electricity import by the project is calculated by adding individual WTG values. The difference of two values ($EG_{BL,y}$) will be taken for emission reduction calculation. Meter calibration shall be conducted once in five years in accordance with the local calibration standards and internal audit system is in place as mentioned in Section C. Meter accuracy: 0.2s of the meter at respective substations that would be used for the electricity metering.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	Data archived: Crediting period + 2 yrs.

D.3. Implementation of sampling plan

Not applicable

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

The baseline is the kWh/MWh produced by the renewable generating unit multiplied by an emission coefficient calculated in a transparent and conservative manner as the weighted average emissions.

$$\begin{aligned}\text{Baseline Emissions (BE}_y\text{)} &= \text{EF}_{\text{grid,CM,y}} \times \text{EG}_{\text{BL,y}} \\ &= 0.9528 \text{ tCO}_2/\text{MWh} \times 67,716.20 \text{ MWh} \\ &= 64,520 \text{ tCO}_2\end{aligned}$$

Emission Reduction Calculation:

$$\begin{aligned}\text{ER}_y &= \text{BE}_y - \text{PE}_y - \text{LE}_y \\ &= 64,520 - 0 - 0 \\ &= 64,520 \text{ tCO}_2\text{e}\end{aligned}$$

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

Since the project activity is a renewable energy project which generates electricity using wind power therefore there are no resulting project emissions

E.3. Calculation of leakage emissions

No leakage is considered from the project activity as per approved methodology AMS-I.D

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	64,520	0	0	0	64,520	64,520

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)
64,520 tCO ₂ e	93,913 tCO ₂ e

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

As per the CDM registered PDD, the amount of CERs generated annually is 17,321 tCO₂e.

Therefore, the amount of estimated ex ante for this monitoring period is identified as explained below.

The total number of days in this monitoring period is 1,979 days.

$$\begin{aligned}\text{Hence, the amount of estimated ex ante for this monitoring period} &= 17,321 \times (1,979 / 365) \\ &= 93,913 \text{ tCO}_2\text{e}\end{aligned}$$

E.6. Remarks on increase in achieved emission reductions

From E.5 above, we can observe that actual emission reduction for the monitoring is lower than estimated emission reductions by 31.30%, which is due to the lower performance of the wind machines during the current monitoring period.

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

Not Applicable

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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		