 <div style="text-align: center;"> Monitoring report form for CDM project activity (Version 07.0) </div>		
MONITORING REPORT		
Title of the project activity	Green House Gas Abatement through installation of a wind power project for export to the Grid.	
UNFCCC reference number of the project activity	5112	
Version number of the PDD applicable to this monitoring report	04	
Version number of this monitoring report	01	
Completion date of this monitoring report	08/12/2020	
Monitoring period number	01	
Duration of this monitoring period	01/01/2013 to 30/11/2020 (Inclusive of both the dates)	
Monitoring report number for this monitoring period	Not Applicable	
Project participants	India Power Corporation Limited	
Host Party	India	
Applied methodologies and standardized baselines	Methodology: ACM0002 (Version 12.1.0) Standardized Methodology: Not Applicable	
Sectoral scopes	01 - 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	273,935 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	383,196 tCO ₂ e	

SECTION A. Description of project activity

A.1. General description of project activity

>>

The project activity is a wind based power project which is one such initiative of India Power Corporation Limited (IPCL). The project activity involves installation of multiple wind energy based electricity generation facilities. The project proponent has installed 31 nos. wind energy based electricity generation units of 800 kW capacities each (a total of 24.8MW). The electricity generated in the project activity is being wheeled to the Western Regional Grid (Now INDIAN Grid).

In absence of the project activity, an equivalent amount of electricity would have been generated by the power plants connected to the Western Regional Grid (now INDIAN Grid). The project activity thus displaces around 53,165 MWh (considering 2% auxiliary consumption) per annum of electricity from the Western Regional Grid by a clean renewable source. The project activity thus results in reduction of around 48,380 tCO₂ (tons of carbon dioxide) per annum and over the ten year crediting period would result in reduction of around 483,800 tCO₂e.

Project's Contribution to Sustainable Development

The contribution of the project activity towards Sustainable Development of India is discussed below:-

Environmental well being:

- Usage of clean source (wind energy) for generation of electricity
- Reduction in GHG emissions
- Conservation of non-renewable fuel resources (coal)
- Reduction in air borne SPM and pollutants (SO_x and NO_x) in ambient air
- Sustainable development of the host country- India

Economic well being:

- The implementation of the project activity has also brought about an increase in the business opportunities for contractors, suppliers and erectors at different phases of its implementation

Social well being:

- Helping in electrification of rural areas in India
- Enhancing local employment and capacity building in the vicinity of the project, which is a rural area; In addition to this, the project proponent, India Power Corporation Limited, who will own the generated CERs from the CDM project activity, will contribute 2% of the revenue realised from the sale of CERs towards different society/community development programmes as per the scheme developed (please refer to Annexure-A for the same). Such expenditure will be made within one year post realization of revenues from the sale of CERs. The details of such expenditure made will be included in the monitoring report for the period following the transaction. The same can be verified by the DOE at the time of verification through the Annual Report of the Company/a certificate from the statutory auditor/a certificate from a Chartered Accountant.

Technological well being:

- The project activity involves power generation from clean technology and therefore it have minimal associated GHG emissions. This assists in accelerating the commercialization of renewable energy technologies.

During the current monitoring period, a total of 273,935 tCO₂e has been avoided.

A.2. Location of project activity

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The site is near village Sumana in district Jamnagar, Gujarat Coordinates: Latitude-22°28' North, Longitude -70°06' East). The site is located about 45 Km to the South of Jamnagar and nearly 80

Km to 100 Km from the west coast. The site is well connected by road network and the nearest railway station is Jamnagar railway station nearly 50 Km from project site. The nearest airport is the Jamnagar Airport nearly 60 Km from project site.

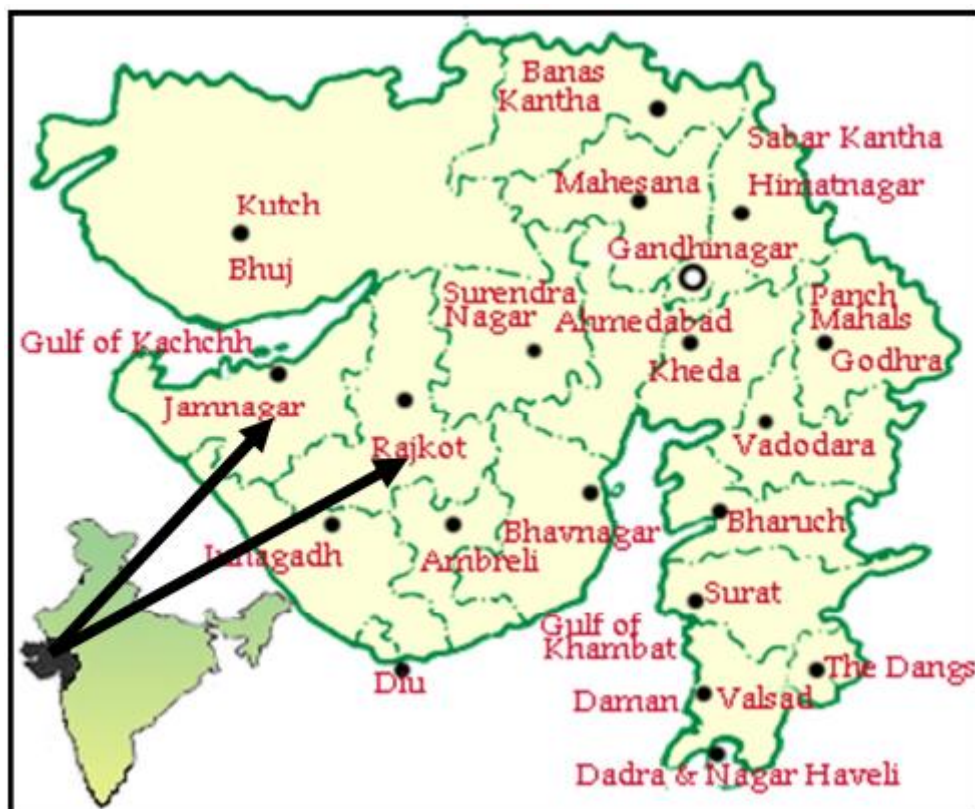


Figure 1. Project Location

Village	District	Loc. No.	Latitude			Longitude		
			Deg.	Minutes	Seconds	Deg.	Minutes	Seconds
Umrالا	Jamnagar	115	22	1	53.2	70	17	28.08
Umrالا	Jamnagar	116	22	1	47.22	70	17	24.69
Umrالا	Jamnagar	117	22	1	41.1	70	17	28.07
Umrالا	Jamnagar	118	22	1	34.51	70	17	29.73
Umrالا	Jamnagar	119	22	1	29.97	70	17	38.28
Umrالا	Jamnagar	120	22	1	11.09	70	17	37.39
Umrالا	Jamnagar	121	22	1	4.76	70	17	36.61
Umrالا	Jamnagar	122	22	0	58.45	70	17	43.15
Umrالا	Jamnagar	123	22	0	50.01	70	17	20.36
Umrالا	Jamnagar	124	22	0	55.54	70	17	15.75
Umrالا	Jamnagar	125	22	1	1.27	70	17	13.25
Umrالا	Jamnagar	126	22	1	7.8	70	17	13.58
Umrالا	Jamnagar	127	22	1	30.93	70	17	11.93
Umrالا	Jamnagar	128	22	1	39.65	70	17	11.62
Umrالا	Jamnagar	129	22	1	46.35	70	17	9.23
Umrالا	Jamnagar	130	22	1	51.06	70	17	4.99
Umrالا	Jamnagar	131	22	1	55.59	70	16	59.01
Umrالا	Jamnagar	132	22	1	59.81	70	16	56.68
Methan	Jamnagar	152	22	0	51.17	70	14	22.48
Methan	Jamnagar	153	22	1	0.23	70	14	28

Methan	Jamnagar	154	22	1	5.56	70	14	24.71
Methan	Jamnagar	155	22	1	12.36	70	14	21.6
Vadali	Rajkot	515	21	59	7.73	70	15	37.21
Vadali	Rajkot	516	21	59	12.96	70	15	27.61
Vadali	Rajkot	517	21	59	19.32	70	15	56.09
Vadali	Rajkot	518	21	59	24.4	70	15	58.77
Vadali	Rajkot	519	21	59	34.8	70	15	57.17
Vadali	Rajkot	520	21	59	40.19	70	15	52.33
Vadali	Rajkot	521	21	59	45.69	70	15	44.92
Vadali	Rajkot	523	21	59	59.85	70	15	48.68
Haripar	Jamnagar	524	22	0	6.32	70	15	47.36

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 Party)	India Power Corporation Limited (Private entity)	No

A.4. References to applied methodologies and standardized baselines

Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources

Reference: ACM0002 ver. 12 (Version 12.1.0)¹

The project also refers to the Methodological tools used which are mentioned below:

- Tool for demonstration and assessment of additionality, version 5.2 adopted at EB39 Annex 10²
- Tool to calculate the emission factor for an electricity system, version 2.2.0 adopted at EB 61 Annex 12³

A.5. Crediting period type and duration

Type of crediting period	Fixed
Crediting period from	01/01/2013 – 31/12/2022
Length of the Crediting Period	10 Years
Monitoring period from	01/01/2013 to 30/11/2020 (both days included)

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>>

The first purchase order for the project activity was given to Enercon on 05/09/2006 for implementation of the project activity in Karnataka. However, on 26/09/2006 Enercon suggested the project proponent to shift their project activity from Karnataka to Gujarat as Mangalore DISCOM (distribution company) and Bangalore DISCOM were the only healthy DISCOMs in Karnataka (as they do not delay in making payments for power purchased) and both of them had in Toto reached the 10% cap of renewable energy and hence, were not available to the project activity. Based on the

¹ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>

³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.0.pdf>

above, the board of IPCL on 27/10/2006 approved the project activity to be shifted to Gujarat. Subsequently, the purchase orders as above were amended on 06/12/2006 and 13/12/2006 by the project proponent. Therefore, for the project activity the start of the project activity is before the board approval date.

The project activity involves setting up of 31 nos. 800 KW rated capacity (a total of 24.8 MW considering all the facilities) of wind based electricity generation units. The kinetic energy of the wind blowing in the atmosphere is used to generate electricity by rotating the blades of the wind mills installed for the purpose. The mechanical energy generated by the rotation of the blades of the wind mills are used to rotate the turbines to generate electricity.

The electricity generated from the 31 nos. wind energy based electricity generation facilities (generated at 0.4KV and stepped upto 33KV) at Villages: Methan,Umarala,Haripar at Jamnagar District And Village: Vadali at Rajkot District is wheeled to the substation at Moti Paneli, Jamnagar (where it is further stepped up to 220 KV) from where it is dispatched to the Western Regional Grid. The technical specifications of the wind energy based electricity generation units are mentioned below:

1. Turbine Model	Enercon E-48
2. Rated Power	800KW
3. Rotor diameter	48m
4. Hub height	56m (Steel Tower)
5. Turbine Type	Gearless horizontal axis wind turbine with variable rotor speed
6. Power regulation	Independent electromechanical Pitch system for each blade
7. Cut-in Wind Speed	3m/s
8. Rated Wind Speed	12m/s
9. Cut-out Wind Speed	28-34m/s
10. Extreme Wind Speed	59.5m/s
11. Rated Rotational Speed	31.5rpm
12. Operating range rotational speed	16-31.5 rpm
13. Orientation	Upwind
14. No. of blades	3
15. Blade Material	Glass Fibre reinforced Epoxy
16. Gear box type	Gear less
17. Generator type	Synchronous Generator
18. Braking	Aerodynamic
19. Output Voltage	400V
20. Yaw System	Active yawing with 4 electric Yaw drives with brake motor and friction bearing
21. Tower	56 m Steel

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 correction 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

>>

Changes regarding state date of crediting period has been informed to UNFCCC via email by PP and same is approved. Please refer UN web page of same project. The earlier crediting period was from 01/01/2012 to 31/12/2021 and it is changed to 01/01/2013 to 31/12/2022.

B.2.4. Inclusion of monitoring plan

>>

There has not been any change in the monitoring plan 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

B.2.6. Changes to project design

>>

There has not been any change in the PDD during the current monitoring period.

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

>>

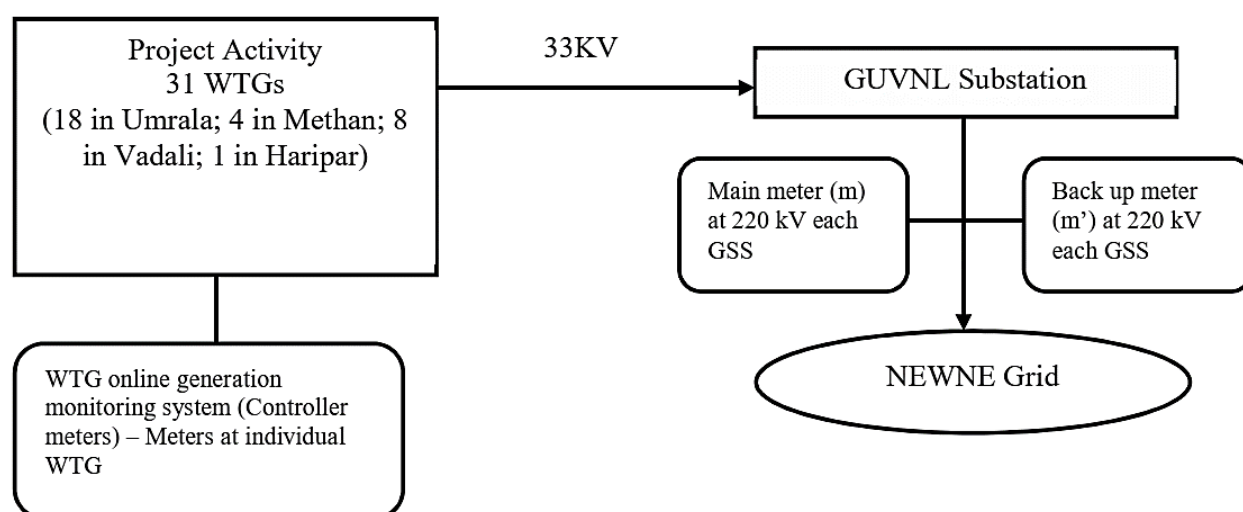
This project is not an afforestation or reforestation project activity

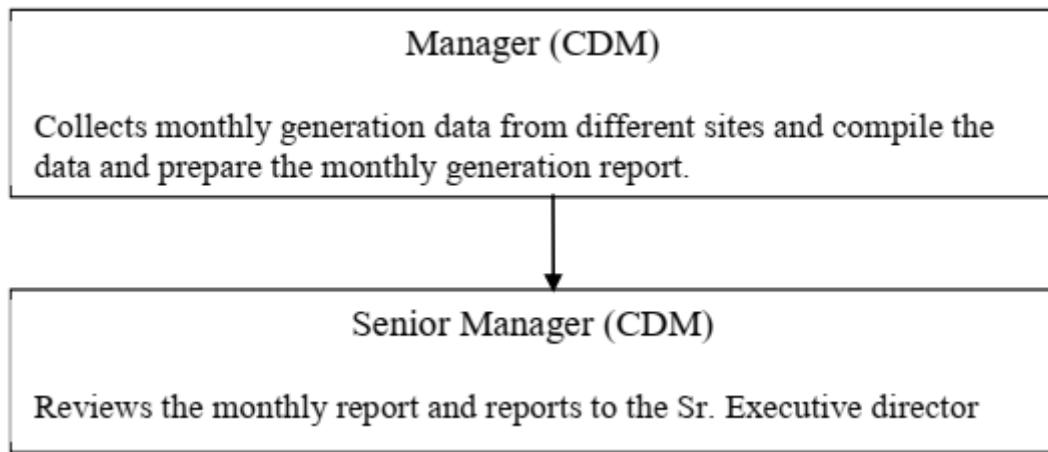
SECTION C. Description of monitoring system

>>

The monitoring plan is being devised as per approved consolidated monitoring methodology ACM0002 Version 12.1.0

The Project is operated by ENERCON (O&M contractor for the project activity) and managed by the PP. The operational and maintenance contract for the project is with ENERCON. ENERCON is an ISO 9001:2000 certified Quality Management system from Germanischer Lloyd. ENERCON follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

**Monitoring roles and responsibilities**



Calibration Procedure

Calibration of all the meters is undertaken at an interval of three years and faulty meters would be duly replaced immediately. The data is cross checked with sales receipts. Calibration is carried out by state electricity utility as per the schedule followed by the state electricity utility.

Archiving of Data

Field data is stored on computer electronically and archived at Project site. Monthly monitoring report is made available at both the Project site and IPCL's administrative office electronically. All data would kept up to 2 years after the end of crediting periods or the last issuance of CERs, which occur later.

Training & Implementation

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the WEGs, it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that ENERCON's service staffs is capable of handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.

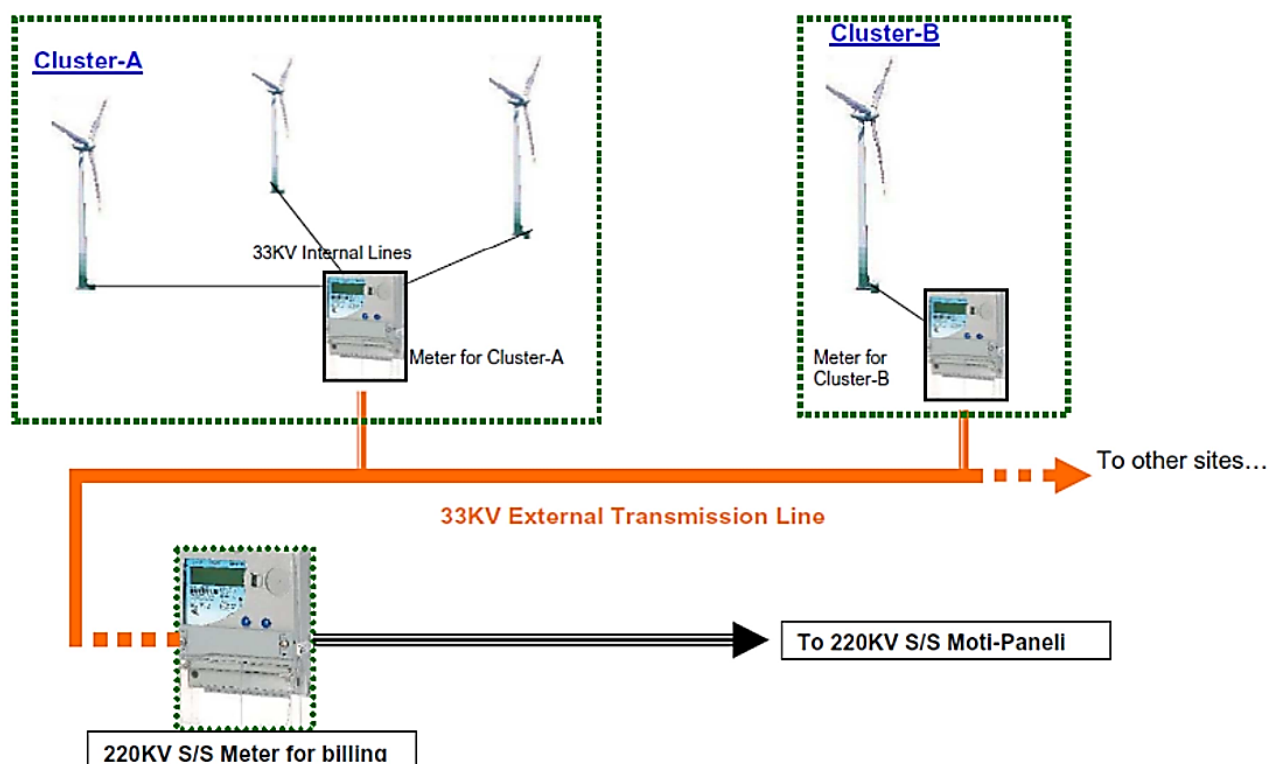


Figure 2. Below is a schematic diagram showing meters

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 CO ₂ 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”.
Source of data	CO ₂ Baseline Database Version 04, (Combined Margin Emission Factor for NEWNE Grid) published by Central Electric Authority (CEA), India
Value(s) applied	0.91
Choice of data or measurement methods and procedures	Information available from authorized government agencies – National standard value has been calculated by Central Electricity Authority (CEA) as per guidelines of ACM0002 methodology. This ensures its reliability.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	NA

D.2. Data and parameters monitored

Data/Parameter	$EG_{facility,y}$
Unit	MWh
Description	Electricity supplied by the project activity to the grid (net export)
Measured/calculated/default	Measured
Source of data	Power Export bills
Value(s) of monitored parameter	301,027.0

Monitoring equipment	Six energy meters fitted with three feeders (1 main and 1 check meters with each feeder) at the Moti Paneli Substation serving as the export meter shall be used for the meter readings. GUVNL is apportioning the exported power based on the ratio found out by considering data from the individual WEG energy meter vis-à-vis data from all WEGs energy meter. Each WEG is equipped with an integrated electronic meter known as LCS meter. These meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through communication cables. The generation data of individual WEG can be monitored as a real-time entity at CMS managed by ENERCON. This data for each individual WEG is being recorded electronically.
Measuring/reading/recording frequency	Continuous reading monthly monitoring
Calculation method (if applicable)	Main and check electronic energy meters is installed at the grid interconnection point to continuously measure the net electricity supplied to the grid.
QA/QC procedures	Meter reading is noted both electronically and on paper. Meter is owned and calibrated by GUVNL. The LCS meters cannot be calibrated. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system/programmable logic; the machine has stopped working and generate the error report.
Purpose of data/parameter	Calculation of baseline emission
Additional comments	This data is used for determining the power fed to the grid and hence the emission reductions. The data is 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	$EG_{Cluster,i,y}$
Unit	MWh
Description	Net Electricity exported (Export-Import) by cluster meters, j, of the project proponent connected to feeder, i
Measured/calculated/default	Measured
Source of data	Generation report provided by Enercon
Value(s) of monitored parameter	317108.68
Monitoring equipment	These meters are used to record the energy production for a cluster of WEGs of the project proponent. Meter reading is noted both electronically and on paper.
Measuring/reading/recording frequency	Measured continuously and the same is recorded once in a month.
Calculation method (if applicable)	Main and check electronic energy meters is installed at the grid interconnection point to continuously measure the net electricity supplied to the grid.
QA/QC procedures	These meters are installed on behalf of GEDA after approval be GEDA. These meters shall be calibrated once in three years
Purpose of data/parameter	Calculation of baseline emission
Additional comments	This data is used for apportioning the net electricity supplied to the grid by all the WEGs connected to a particular feeder between all promoters. The data is kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

D.3. Implementation of sampling plan

>>

Not required

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are calculated as follows:

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

Where,

BE_y	Baseline emissions in year y (tCO ₂ /yr)
$EG_{PJ,y}$	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)
$EF_{grid,CM,y}$	Combined margin CO ₂ 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" (tCO ₂ /MWh)

Calculation of $EG_{PJ,y}$

The project activity is a greenfield plant where no renewable power plant was operated prior to the implementation of the project activity. Hence $EG_{PJ,y}$ is determined in the following manner:

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

Where,

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

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

>>

The Project Emissions are calculated in the following manner:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where,

PE_y	Project emissions in year y (tCO ₂ e/yr)
$PE_{FF,y}$	Project emissions from fossil fuel consumption in year y (tCO ₂ /yr). The same is taken as 0 as there is no project emission from fossil fuel consumption as the project involves wind power generation.
$PE_{GP,y}$	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO ₂ e/yr). The same is taken as 0 as the project does not involve setting up a geothermal power plant but wind power units.
$PE_{HP,y}$	Project emissions from water reservoirs of hydro power plants in year y (tCO ₂ e/yr). The same is taken as 0 as the project does not involve setting up a hydro power plant but wind power units.

Hence, $PE_y = 0$.

E.3. Calculation of leakage emissions

>>

As per the methodology no leakage emissions are considered.

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	273,935	0	0	0	273,935	273,935

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)
273,935	383,196

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

>>

A total of 29% less emission reduction achieved.

As per CDM registered PDD, 48,380 tCO₂e is the amount of CERs generated annually. Therefore, following unitary method, the amount of estimated ex ante for this monitoring period is identified. The total number of days in this monitoring period is 2891.

$$= (48,380/365) * 2891$$

$$= 383,196 \text{ tCO}_2\text{e}$$

E.6. Remarks on increase in achieved emission reductions

>>

Actual emission reduction is less as compared to the estimated emission reduction.

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

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This is not a small scale project activity.

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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		