Monitoring report form for CDM project activity
(Version 08.0)

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

MONITORING REPORT			
Title of the project activity	Bundled Wind Power Project in Maharashtra & Gujarat by WPPL		
UNFCCC reference number of the project activity	4382		
Version number of the PDD applicable to this monitoring report	Version 07		
Version number of this monitoring report	01		
Completion date of this monitoring report	07/07/2021		
Monitoring period number	03		
Duration of this monitoring period	01/01/2013 to 31/01/2021		
Monitoring report number for this monitoring period	NA		
Project participants	M/s Western Precicast Pvt. Ltd.		
Host Party	India		
Applied methodologies and standardized baselines	AMS I.D Grid Connected Renewable Energy Generation" Version 15.		
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 until 31 December 2020	Amount achieved from 1 January 2021
	NA	27789 tCO_2e	118 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	36,989 tCO_2e		

SECTION A. Description of project activity

A.1. General description of project activity

The proposed project is a bundled project activity which involves establishment of 2.7 MW Wind Power Project enabling generation by Wind Turbine Generators (WTGs). 2.7 MW bundled project consists of 1.5 MW in Maharashtra and 1.20 MW in Gujarat. The project activity involves two sub bundles of different capacities by Amenity Developers & Builders (hereafter ADB) and Western Precicast Pvt. Ltd. (Hereafter WPPL or project participant). WPPL is co-ordinating the project activity. Other promoters have accordingly authorized WPPL.

The bundled project activity consists of –

Sub Bundle I - WPPL Wind Turbines
- 1 no. x 1.5 MW
- Site Maharashtra

Sub Bundle I - ADB Wind Turbines
- 2 nos x 0.6 MW
- Site Gujarat

The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants, thereby contributing to the reduction in emissions including GHG emissions.

Total electricity generated electricity from the project activity is connected and exported to the Indian national grid. Electricity generated from sub bundle1 and sub bundle 2 is selling to the Maharashtra and Gujarat state electricity utilities through long term PPA respectively.

All the WTGS are fully commissioned and operational. Commissioning details of the WTGs are provided below.

Sub bundle	Name of the Sponsor	Installed Capacity (MW)	Unique Identification No.	Technology Used	Substation	WTG Location District / State
1	WPPL	1.5	T-500	Suzlon S-82	Khaprale	Nashik / Maharashtra
2	ADB	0.6	M-481	Suzlon S-52	Nani Khahar	Kutch/ Gujarat
		0.6	M-496			
	Total	2.7				

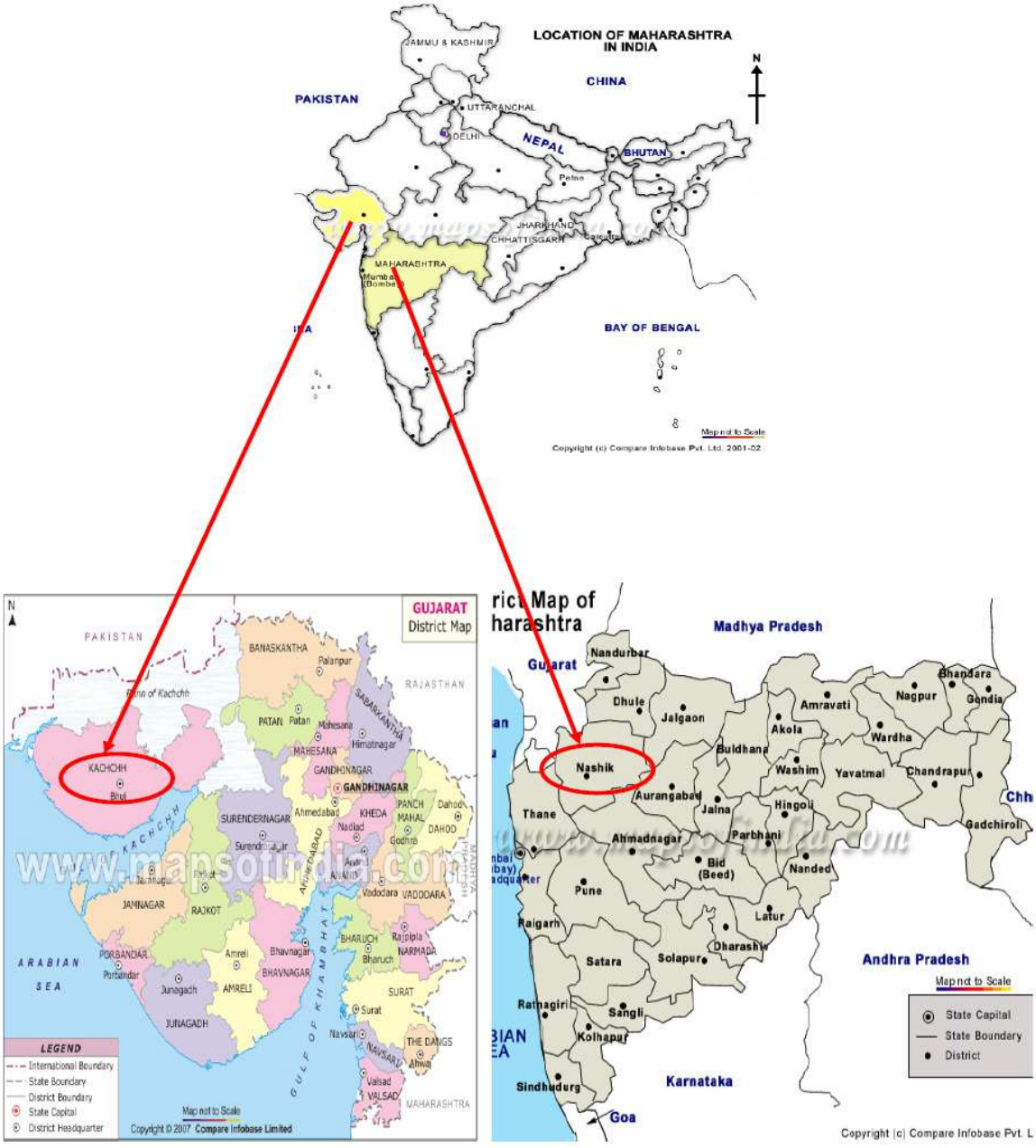
Project activity has been registered on 24/01/2011. Project owner has chosen the fixed crediting period of 10 years starting from 01/02/2011 till 31/01/2021. This monitoring report is prepared for the current monitoring period from 01/01/2013 to 31/01/2021.

During this monitoring period project activity generated 30796 MWh of electricity to the national rid and there by reduces 27907tCO_2 emission reductions.

A.2. Location of project activity

This project activity is located in the states of Maharashtra and Gujarat, India. Location details are given below

Details	Sub Bundle I	Sub Bundle II	
Project Proponent	**WPPL**	**ADB**	**SDB**
Capacity	1.5MW	0.6 MW	0.6 MW
Village	Konambe	Moti Sindholi	Moti Sindholi
Tehsil	Sinnar	Abdasa	Abdasa
District	Nashik	Kutch	Kutch
State	Maharashtra	Gujarat	Gujarat
Commissioning date	23/09/2008	30/09/2007	30/09/2007
Latitude	23° 04' 16" N	19° 51' 00" N	19° 51' 00" N
Longitude	68° 48' 44" E	74° 00' 00" E	74° 00' 00" E



Location Map

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)	Private entity - M/s Western Precicast Pvt. Ltd.	No

A.4. References to applied methodologies and standardized baselines

The project is a small scale CDM project activity. Project activity uses small scale CDM methodology "AMS I.D Grid Connected Renewable Energy Generation" Version 15.
Following tools were applied along with the baseline methodology.[1]

Tool to calculate the emission factor for an electricity system (Version- 01.1)[2].

"Tool for the demonstration and assessment of additionality"(Version- 05.2).[3]

A.5. Crediting period type and duration

Project Proponent has chosen fixed crediting period of 10 years starting from 01/02/2011 to 31/01/2021. Present monitoring period is covered from 01/01/2013 to 31/01/2021.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The proposed project activity involves establishment of a Wind Power Project of 2.7 MW (1.5 MW X 1 No and 0.6 MW X 2 Nos) installed capacity enabling generation of electricity by (1.5 MW X 1 No and 0.6 MW X 2 Nos) Wind Turbine Generators (WTGs). In Sub Bundle I, one WTG (1 X 1.5 MW) are installed at Nashik district of Maharashtra State & in Sub Bundle II, two WTGs (1 X 0.6 MW) are installed at kutch district of Gujarat State, by M/s Western Precicast Pvt. Ltd and M/s. Amenity Developers & Builders.

Project activity uses wing energy generators to generate the power and supply to the national grid.

Technology: In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when it passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby produce electricity.

These gearless wind turbines produce electricity using permanent magnet machines. Traditional wind technology requires moving gears to transmit the power of the slow motion blades to the quickly spinning generator. Permanent magnet machines, on the other hand, allow the motion of the blade to induce a voltage field that directly produces an electrical current.

The large number of blades and the lack of resistance from gears allow the turbine to operate in nearly calm conditions. It can also produce power in those strong breezes that traditional wind

[1] https://cdm.unfccc.int/filestorage/7/Q/X/7QXAZ5036WN8BEYKUDFRPJGL21V4I9/EB50_repan29_AMS-I.D_ver15.pdf?t=cVV8cXVqYjF6fDB9O1FZbUks_-AH-YqM8LcC

[2] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf

[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf

technology cannot handle. This is because the turbine does not need shut down to protect gears from grinding damage caused by high wind speeds.

The project consists of 2 types of Suzlon make WTGs (S 82 – 1 no. & S 52 – 2 nos.). Salient features of these WTGs are as follows.

Table-1: Salient Features of 1.5 MW (S-82) WTG

Sr. No	Particulars	Specification
1	Rotor diameter	82 m
2	Hub height	80 m
3	Installed electrical output	1500 kW
4	Cut-in wind speed	4.0 m/s
5	Rated wind speed	14.0 m/s
6	Cut-out wind speed	20 m/s.
7	Rotor swept area	5281 m2
8	Rotational speed	1511 rpm
9	Rotor material	GRP
10	Regulation	Pitch
11	Generator	Asynchronous Generator, 4 pole with slip ring
12	Operating Voltage	690 V
13	Frequency	50 Hz
14	Enclosure class	IP 54
15	Insulation Class	H
16	Slip control	Unique Macro slip providing slip up to 16.7 %
17	Gear box	3-stage gearbox, 1 planetary & 2 helical.
18	Gear ratio	1:95.09
19	Nominal load	1650 kW
20	Type of cooling	Oil cooling system, Forced lubrication
21	Yaw drive system	Active electrical yaw motors
22	Yaw bearing	Polyamide slide bearing
23	Aerodynamic brake	3 independent system with blade pitching
24	Mechanical brake	Hydraulic disc brake
25	Design standards	GL special class

Table-1: Salient Features of 0.6 MW (S-52) WTG

Sr. No	Particulars	Specification
1	Rotor diameter	52 m
2	Hub height	75 m
3	Installed electrical output	600 kW
4	Cut-in wind speed	4.0 m/s
5	Rated wind speed	13.0 m/s
6	Cut-out wind speed	25 m/s.
7	Rotor swept area	2124 m2
8	Rotational speed	1539 rpm
9	Rotor material	Glass reinforced epoxy, vacuum injected
10	Regulation	Pitch Regulated
11	Generator	Single speed asynchronous generator
12	Rated Output	600 kW
13	Operating Voltage	690 V

14	Frequency	50 Hz
15	Enclosure class	IP 56
16	Insulation Class	H
17	Slip control	Unique Macro slip providing slip up to 16.7 %
18	Gear box	3-stage gearbox, 1 planetary & 2 helical.
19	Gear ratio	1: 63.633
20	Nominal load	660 kW
21	Type of cooling	Oil cooling system
22	Yaw drive system	Active electrical yaw motors
23	Yaw bearing	Polyamide slide bearing
24	Aerodynamic brake	3 independent system with blade pitching
25	Control Limit	Microprocessor control indicating operation conditions. Control includes thyristor switchgear watchdog for operation, monitoring, log with real time, local control and servicing interface. Optional remote monitoring & operation. UPS backup system.
26	Tower	Free standing, lattice tower, hot dip galvanized
27	Mechanical brake	Hydraulic disc brake
28	Design standards	GL Class II

B.2. Post-registration changes

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

>> Not Applicable

B.2.2. Corrections

>> Not Applicable

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

>> Crediting period has been changed from 01 Mar 11 - 28 Feb 21 to 01 Feb 11 - 31 Jan 21

B.2.4. Inclusion of monitoring plan

>> Not Applicable

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

>> Not Applicable

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

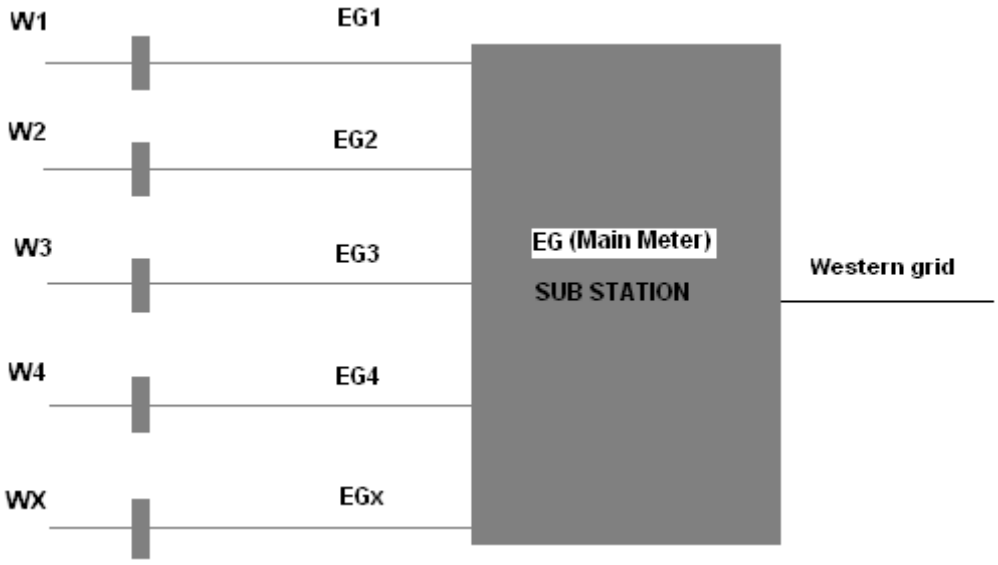
>> Not Applicable

SECTION C. Description of monitoring system

The project participant signed an operation and maintenance agreement with the supplier of the wind turbines i.e. Suzlon. The agreement is for a period of 2 years. The performance of the turbines, safety in operation and scheduled /breakdown maintenances is responsibility of Suzlon and are organized and monitored by them. So the authority and responsibility of project management lies with the O & M contractor.

Description of net electricity generation for individual WTG calculation/proportioning procedure

An energy meter (main and check meter) at each substation is connected to a number of wind turbines. The total electricity generation reading is collectively displayed by the substation meter. The net electricity generation for individual WTG is then calculated in the following manner:



The generated electricity is measured through a two step procedure wherein the first monitoring at CMS is carried out at the controller of the machine.. The monitoring of all WTGs is done from a common monitoring station at wind farm site. EGn,y is the electricity generated from an individual wind turbine measured through its controller in the control panel. The summation of total Electricity Generated (kWh) from all the wind turbines of the project proponent at a particular site is presented as

$$\sum_{0}^{n} EGn,y$$

And the summation of total Electricity Generated (kWh) at controller end from all the wind turbines connected to the common single meter at particular feeder as measured.

$$\sum_{0}^{n} EGm,y$$

A ratio based on these two set of measured values is used for proportioning the net electricity supplied to the grid by the project activity. The second monitoring is carried out at grid interconnection point at sub station, wherein the Joint Meter Reading (JMR) is carried out, usually in the first week of every month, in presence of both the representatives of the project proponent & the state electricity utility. This JMR is used for calculation of the net electricity supplied to the grid

against which the utility makes the payment to the project proponent. The JMR gives both the values

The proportioning of electricity generated and import from the various wind turbines including project activity is done by the respective state electricity utility based on the $EG_{n,y}$, $EG_{m,y}$, EG(Main Meter reading).State electricity utility issues monthly net electricity generation/ credit report to each PP. Based on this value PP will raise the invoice against sale of electricity. However, the net electricity generation value as per the net electricity generation report/credit report is considered for the emission reduction calculation.

$EG_{BL,y}$ the electricity generation by the project activity is calculated as follows:

$$EG_{BL,y} = \frac{\sum_{0}^{n} EG_{n,y} * EG_{\text{(Main Meter reading)}}}{\sum_{0}^{m} EG_{m,y}}$$

Where

$EG_{BL,y}$	Net generation from all the WTGs of the promoter at a particular site.
$\sum_{0}^{n} EGn,y$	The summation of total Electricity Generated (kWh) at the controller from the project activity connected to single common feeder at a substation on a particular site.
$EG_{\text{(Main Mater reading)}}$	Total net generation from all wind turbines at the common metering point as calculated by $EG_{JMR,export}$ - $EGJ_{MR,import}$ at the substation feeder.
$\sum_{0}^{n} EGm,y$	The summation of total Electricity Generated at the controller from all the WTGs including project activity connected to single feeder at a particular site.

This procedure will be applicable for all the wind turbines of the PP connected to a particular feeder of the substation. The net export to grid from the project activity will be the summation of net export of individual wind mills of the promoter.

The responsibility of calibration, periodical testing, sealing and maintenance of meters is with the respective state utilities. This is done in the presence of representatives of the promoter. The frequency of meter testing is annual or as decided by the state utility. All meters are tested only at the Metering Point. Additionally, each wind turbine is equipped with an integrated electronic meter. The electricity generated is recorded by the O & M staff of the WTG supplier on 24 hour basis.

Each WTG control panel is equipped with an microprocessor based integrated meter. The Panel meter at controller end is consist of the SCS Controller is also a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current / voltage is converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed / stored. Woodward relay is having no display and needs special protocol to view energy readings as this relay is communicating digital signal through special communication protocol hence, it is not possible to calibrate. Moreover, turbine can not run without this relay hence it can not be removed for calibration during operation.

The organizational hierarchy of ENERCON for O& M management is as follows –

Designation	Responsibilities
Project Head	▪ Overall performance monitoring ▪ Project execution
Project Executer and Controller	▪ Operation ▪ Verification of data ▪ Site visit to check authenticity of data and take corrective action, wherever necessary ▪ Storage of data
Site Main Controller	▪ Operation, monitoring and verification of data ▪ Data recording ▪ Storage of data
Operation and Maintenance Contractor	▪ Operation and maintenance ▪ Data recording ▪ Storage of data

Management Services:

a) Data logging in for power generation, grid availability, machine availability.

b) Preparation and submission of monthly performance report in agreed format.

c) Taking monthly meter reading jointly with utility of power generated at Wind Farm and supplied to grid from the meter/s maintained by utility for the purpose and co-ordinate to obtain necessary power credit report/ certificate.

Technical Services:

a) Visual inspection of the WTGs and all parts thereof.

b) Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services.

The project activity essentially involves generation of electricity from wind, the employed WTGs can only convert wind energy into electrical energy and cannot use any other input fuel for electricity generation. As the operation of WTGs is emission free and no emissions are produced during the lifetime of the WTGs.

Although it is being anticipated that there would be no unintended emissions/leakages from this project, however, if any such condition arises, and leakage effect is found due to the project, such leakage will be accounted accordingly as mentioned in the chosen applied baseline methodology.

- The proposed project activity requires evacuation facilities for sale to grid and the evacuation facility is essentially maintained by the state power utility (MSEDCL & GETCO).

- The electricity generation measurements are required by the utility and the investors to assess electricity sales revenue.

- The project activity has therefore envisaged two independent measurements of generated electricity from the wind turbines.

- The primary recording of the electricity fed to the state utility grid will be carried out jointly at the incoming feeder of the state power utility (MSEDCL & GETCO). Turbines for sale to utility will be connected to the feeder.

- The joint measurement will be carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties will sign the recorded reading.

- Metering equipment - Metering is carried out through electronic trivector meters required for the project. The main meter and check meter shall be installed and owned by MSEDCL & GETCO. The metering equipments are maintained in accordance with electricity standards.

- Meter readings - The monthly meter readings (both main and check meters) at the project site and the receiving station shall be taken simultaneously and jointly by the parties on a pre-determined day of the following month. At the conclusion of each meter reading an appointed representative of the MSEDCL & GETCO and the company signs a document indicating the number of kWh supplied to the grid.

  The secondary monitoring, which will provide a backup (fail-safe measure) in case the primary monitoring is not carried out, would be done at the individual WTGs. Each WTG is equipped with an integrated electronic meter. These meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through a wireless Radio Frequency (RF) network (SCADA). The generation data of individual machine can be monitored as a real time entity at CMS.

  All the relevant data & reports for maintaining accuracy in future monitoring and reporting of GHGs emission reductions is with the Suzlon on behalf of project participant, which follows Quality Management System (QMS) procedure as per ISO 9001 and is ISO certified organization.

  Project promoters have appointed a full time project in-charge to manage the overall project activity after commissioning. The project in-charge supervises the functioning of the wind farm in close coordination with the officials & technical personnel of Suzlon Energy Limited (SEL).

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid, CM, y}$**
Unit	t CO_2 / MWh
Description	Ex-ante Combined Margin CO2 emission factor for the NEWNE regional grid connected power generation in year y.
Source of data	Baseline CO2 Emission Database, Version 4.0
Value(s) applied	0.90618
Choice of data or measurement methods and procedures	The combined margin emission factor is calculated based on the OM & BM values. The values for OM and BM have been calculated by Ministry of Power, Central Electricity Authority, Govt. of India hence are authentic and reliable. **EF grid, CM, y** is calculated as per the version 1.1 of "Tool to calculate the emission factor for an electricity system" http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
Purpose of data/parameter	To calculate the emission reductions
Additional comments	-

Data/Parameter	**$EF_{grid, OM, y}$**
Unit	t CO_2 / MWh
Description	CO2 Operating Margin (including import) Emission Factor of theNEWNE Regional Grid

Source of data	Baseline CO2 Emission Database, Version 4.0
Value(s) applied	1.00900
Choice of data or measurement methods and procedures	The values for OM have been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable. http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm The EF grid OM, y is calculated by the CEA, Govt. Of India as per the version 1.1 of "Tool to calculate the emission factor for an electricity system"
Purpose of data/parameter	To calculate the emission reductions
Additional comments	-

Data/Parameter	**$EF_{grid, BM, y}$**
Unit	t CO_2 / MWh
Description	CO2 Build Margin Emission Factor of the NEWNE Regional Grid
Source of data	Baseline CO2 Emission Database, Version 4.0
Value(s) applied	0.59771
Choice of data or measurement methods and procedures	The values for BM have been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable. http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm The EF grid BM, y is calculated by the CEA, Govt. Of India as per the version 1.1 of "Tool to calculate the emission factor for an electricity system"
Purpose of data/parameter	To calculate the emission reductions
Additional comments	-

D.2. Data and parameters monitored

The following parameters are monitored for Sub Bundle I of this project activity:

Data/Parameter	**$EG_{BL,y}$**
Unit	kWh
Description	It refers to the net electricity supplied by the project activity to the grid
Measured/calculated/ default	Calculated based on measured parameters
Source of data	Monthly credit report issued by the MSEDCL is used for this parameter. This monthly credit report provides the total generation of the all the WTGs connected to this feeder of the substation (to which the project activity is also connected) along with the percentage share of energy supplied by the project activity. Opportionated energy supplied by the project activity from the credit report is considered for the calculation of emission reductions.
Value(s) of monitored parameter	16,025,510

<table>
<tr><td>Monitoring equipment</td><td>Trivector energy meters are installed at the substation to monitor and record the energy.

<table>
<tr><th>Meter</th><th>Meter details</th><th>Calibration frequency</th><th>Date of last calibration</th><th>Validity</th></tr>
<tr><td>Main Meter</td><td>14796425
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly once</td><td rowspan="2">25/08/2012
03/10/2013
01/12/2014
31/11/2015
15/12/2016
18/09/2017
30/05/2021</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>14796423
Type: Tri Vector
Ac. Class: 0.2</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuous monitoring, hourly measurement and monthly recording by state electricity utility in the form of electricity generation report.</td></tr>
<tr><td>Calculation method
(if applicable)</td><td>Net electricity exported is calculated as below.

Monthly Joint meters readings for total wind farm is provided by MSEDCL of total WTGs connected to that substation. From the total energy it will be apportionated based on the provided percentage for the respective WTGs connected by the project owners. From the apportionated energy net electricity exported is calculated as below.

Net export units (EGy) = Export Units – Import Units</td></tr>
<tr><td>QA/QC procedures</td><td>Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters will be done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, will be matched every month.

In case of delay in the calibration meters after the due date project proponent has applied the correction of 0.2% to the energy export and import for the period of such delay.</td></tr>
<tr><td>Purpose of data/parameter</td><td>To calculate the emission reductions</td></tr>
<tr><td>Additional comments</td><td>Data will be archived during the whole crediting period + 2 years.</td></tr>
</table>

The parameters used by the state electricity utility to calculated/derive the net electricity generation by the project activity ($EG_{BL,y}$) are as follows:

Data/Parameter	$\sum_{0}^{n} EG_{n,y}$
Unit	kWh
Description	The summation of total Electricity Generated (kWh) at the controller from the project activity connected to single common feeder at a substation on a particular site.
Measured/calculated/ default	Measured
Source of data	Records in Suzlon database at CMS.
Value(s) of monitored parameter	----

Monitoring equipment	Monitored through inbuilt WTG Controller meter. The inbuilt control panel meter is auto calibrated.
Measuring/reading/recording frequency	Monthly Recording
Calculation method (if applicable)	$EG_{m,y}$ is the sum of electricity generated at controller from project activity continuously measured by controller reported to CMS through SCADA network. State electricity utility used this figure to calculate net electricity generation by the project activity. This has been continuously measured and summarized monthly.
QA/QC procedures	--
Purpose of data/parameter	Used to calculate the baseline emission calculation (net electricity generation by the project activity)
Additional comments	Data will be archived during the whole crediting period + 2 years.

Data/Parameter	$\sum_{0}^{n} EG_{m,y}$
Unit	kWh
Description	The summation of total Electricity Generated at the controller from all the WTGs including project activity connected to single feeder at a particular site.
Measured/calculated/ default	Measured
Source of data	Records in Suzlon database at CMS.
Value(s) of monitored parameter	----
Monitoring equipment	Monitored through inbuilt WTG Controller meter. The inbuilt control panel meter is auto calibrated.
Measuring/reading/recording frequency	Monthly Recording
Calculation method (if applicable)	$EG_{m,y}$ is the sum of electricity generated from all wind turbine (including project activity) continuously measured by controller reported to CMS through SCADA network. State electricity utility used this figure & sum for all WTGs (including project activity) connected to single common feeder. This will be continuously measured and summarized monthly
QA/QC procedures	--
Purpose of data/parameter	Used to calculate the baseline emission calculation (net electricity generation by the project activity)
Additional comments	Data will be archived during the whole crediting period + 2 years.

Data/Parameter	$EG_{JMR\ Export}$
Unit	kWh
Description	Total electricity export by all WTGs (including project activity) connected to single common feeder measured at the respective substation feeder meter..
Measured/calculated/ default	Measured

<table>
<tr><td>Source of data</td><td>Joint meter reading sheet/ Energy breakup sheet monitored by state electricity utility through respective feeder meter at substation.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>----</td></tr>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><th>Meter</th><th>Meter details</th><th>Calibration frequency</th><th>Date of last calibration</th><th>Validity</th></tr>
<tr><td>Main Meter</td><td>14796425
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly once</td><td rowspan="2">25/08/2012
03/10/2013
01/12/2014
31/11/2015
15/12/2016
18/09/2017
30/05/2021</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>14796423
Type: Tri Vector
Ac. Class: 0.2</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Monthly Recording</td></tr>
<tr><td>Calculation method (if applicable)</td><td>The value of total electricity export from the all WTGs connected to the single common feeder is monitored through main meter & check meter at the substation</td></tr>
<tr><td>QA/QC procedures</td><td>Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters will be done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, will be matched every month.

In case of delay in the calibration meters after the due date project proponent has applied the correction of 0.2% to the energy export and import for the period of such delay.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Used to calculate the baseline emission calculation (net electricity generation by the project activity)</td></tr>
<tr><td>Additional comments</td><td>Data will be archived during the whole crediting period + 2 years.</td></tr>
</table>

<table>
<tr><td>Data/Parameter</td><td>$EG_{JMR\ import}$</td></tr>
<tr><td>Unit</td><td>kWh</td></tr>
<tr><td>Description</td><td>Total electricity import by all WTGs (including project activity) connected to single common feeder measured at the respective substation feeder meter..</td></tr>
<tr><td>Measured/calculated/ default</td><td>Measured</td></tr>
<tr><td>Source of data</td><td>Joint meter reading sheet/ Energy breakup sheet monitored by state electricity utility through respective feeder meter at substation.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>----</td></tr>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><th>Meter</th><th>Meter details</th><th>Calibration frequency</th><th>Date of last calibration</th><th>Validity</th></tr>
<tr><td>Main Meter</td><td>14796425
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly once</td><td rowspan="2">25/08/2012
03/10/2013
01/12/2014
31/11/2015
15/12/2016
18/09/2017
30/05/2021</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>14796423
Type: Tri Vector
Ac. Class: 0.2</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Monthly Recording</td></tr>
</table>

Calculation method (if applicable)	The value of total electricity export from the all WTGs connected to the single common feeder is monitored through main meter & check meter at the substation
QA/QC procedures	Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters will be done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, will be matched every month. In case of delay in the calibration meters after the due date project proponent has applied the correction of 0.2% to the energy export and import for the period of such delay.
Purpose of data/parameter	Used to calculate the baseline emission calculation (net electricity generation by the project activity)
Additional comments	Data will be archived during the whole crediting period + 2 years.

The following parameters are monitored for Sub Bundle II of this project activity:

Data/Parameter	**$EG_{BL,y}$**
Unit	kWh
Description	It refers to the net electricity supplied by the project activity to the grid
Measured/calculated/ default	Calculated based on measured parameters
Source of data	Monthly GEDA share of electricity certificate will be used for this variable. The reason is that reading from common meter as well as individual meters is used by GEDA personnel to calculate share of each WTG on pro-rata basis. This data source has been selected because it incorporates transmission loss. Qualifying net electricity sold to grid is derived as per the apportioning procedure mentioned in section B. 7.2 of PDD.
Value(s) of monitored parameter	14,770,951
Monitoring equipment	Trivector energy meters are installed at the substation to monitor and record the energy.

Meter	**Meter details**	**Calibration frequency**	**Date of last calibration**	**Validity**
Main Meter	11068579 Type: Tri Vector Ac. Class: 0.2	Yearly once	20/03/2012 26/12/2012 26/12/2013	One year
Check Meter	11068580 Type: Tri Vector Ac. Class: 0.2			
Main Meter	15624843 Type: Tri Vector Ac. Class: 0.2	Yearly Once	09/03/2017	One year
Check Meter	15624844 Type: Tri Vector Ac. Class: 0.2			

Measuring/reading/recording frequency	Continuous monitoring, hourly measurement and monthly recording by state electricity utility in the form of electricity generation report.

Calculation method (if applicable)	Net electricity exported is calculated as below. Monthly Joint meters readings for total wind farm is provided by GETCO of total WTGs connected to that substation. From the total energy it will be apportionated based on the provided percentage for the respective WTGs connected by the project owners. From the apportionated energy net electricity exported is calculated as below. Net export units (EGy) = Export Units – Import Units
QA/QC procedures	Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters will be done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, will be matched every month. In case of delay in the calibration meters after the due date project proponent has applied the correction of 0.2% to the energy export and import for the period of such delay.
Purpose of data/parameter	To calculate the emission reductions
Additional comments	Data will be archived during the whole crediting period + 2 years.

The parameters used by the state electricity utility to calculated/derive the net electricity generation by the project activity ($EG_{BL,y}$) are as follows:

Data/Parameter	$\sum_{0}^{n} EG_{n,y}$
Unit	kWh
Description	The summation of total Electricity Generated (kWh) at the controller from the project activity connected to single common feeder at a substation on a particular site.
Measured/calculated/ default	Measured
Source of data	Records in Suzlon database at CMS.
Value(s) of monitored parameter	-------
Monitoring equipment	Monitored through inbuilt WTG Controller meter. The inbuilt control panel meter is auto calibrated.
Measuring/reading/recording frequency	Monthly Recording
Calculation method (if applicable)	$EG_{n,y}$ is the sum of electricity generated at controller from project activity continuously measured by controller reported to CMS through SCADA network. State electricity utility used this figure to calculate net electricity generation by the project activity. This has been continuously measured and summarized monthly.
QA/QC procedures	--
Purpose of data/parameter	Used to calculate the baseline emission calculation (net electricity generation by the project activity)
Additional comments	Data will be archived during the whole crediting period + 2 years.

Data/Parameter	$\sum_{0}^{n} EG_{m,y}$
Unit	kWh
Description	The summation of total Electricity Generated at the controller from all the WTGs including project activity connected to single feeder at a particular site.
Measured/calculated/ default	Measured
Source of data	Records in Suzlon database at CMS.
Value(s) of monitored parameter	----
Monitoring equipment	Monitored through inbuilt WTG Controller meter. The inbuilt control panel meter is auto calibrated.
Measuring/reading/recording frequency	Monthly Recording
Calculation method (if applicable)	$EG_{m,y}$ is the sum of electricity generated from all wind turbine (including project activity) continuously measured by controller reported to CMS through SCADA network. State electricity utility used this figure & sum for all WTGs (including project activity) connected to single common feeder. This will be continuously measured and summarized monthly
QA/QC procedures	--
Purpose of data/parameter	Used to calculate the baseline emission calculation (net electricity generation by the project activity)
Additional comments	Data will be archived during the whole crediting period + 2 years.

Data/Parameter	$EG_{JMR\ Export}$
Unit	kWh
Description	Total electricity export by all WTGs (including project activity) connected to single common feeder measured at the respective substation feeder meter..
Measured/calculated/ default	Measured
Source of data	Joint meter reading sheet/ Energy breakup sheet monitored by state electricity utility through respective feeder meter at substation.
Value(s) of monitored parameter	----

<table>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><th>Meter</th><th>Meter details</th><th>Calibration frequency</th><th>Date of last calibration</th><th>Validity</th></tr>
<tr><td>Main Meter</td><td>11068579
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly once</td><td rowspan="2">20/03/2012
26/12/2012
26/12/2013</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>11068580
Type: Tri Vector
Ac. Class: 0.2</td></tr>
<tr><td>Main Meter</td><td>15624843
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly Once</td><td rowspan="2">09/03/2017</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>15624844
Type: Tri Vector
Ac. Class: 0.2</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Monthly Recording</td></tr>
<tr><td>Calculation method
(if applicable)</td><td>The value of total electricity export from the all WTGs connected to the single common feeder is monitored through main meter & check meter at the substation</td></tr>
<tr><td>QA/QC procedures</td><td>Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters will be done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, will be matched every month.

In case of delay in the calibration meters after the due date project proponent has applied the correction of 0.2% to the energy export and import for the period of such delay.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Used to calculate the baseline emission calculation (net electricity generation by the project activity)</td></tr>
<tr><td>Additional comments</td><td>Data will be archived during the whole crediting period + 2 years.</td></tr>
</table>

Data/Parameter	$EG_{JMR\ import}$
Unit	kWh
Description	Total electricity import by all WTGs (including project activity) connected to single common feeder measured at the respective substation feeder meter..
Measured/calculated/ default	Measured
Source of data	Joint meter reading sheet/ Energy breakup sheet monitored by state electricity utility through respective feeder meter at substation.
Value(s) of monitored parameter	----

<table>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><th>Meter</th><th>Meter details</th><th>Calibration frequency</th><th>Date of last calibration</th><th>Validity</th></tr>
<tr><td>Main Meter</td><td>11068579
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly once</td><td rowspan="2">20/03/2012
26/12/2012
26/12/2013</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>11068580
Type: Tri Vector
Ac. Class: 0.2</td></tr>
<tr><td>Main Meter</td><td>15624843
Type: Tri Vector
Ac. Class: 0.2</td><td rowspan="2">Yearly Once</td><td rowspan="2">09/03/2017</td><td rowspan="2">One year</td></tr>
<tr><td>Check Meter</td><td>15624844
Type: Tri Vector
Ac. Class: 0.2</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Monthly Recording</td></tr>
<tr><td>Calculation method
(if applicable)</td><td>The value of total electricity export from the all WTGs connected to the single common feeder is monitored through main meter & check meter at the substation</td></tr>
<tr><td>QA/QC procedures</td><td>Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters will be done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, will be matched every month.

In case of delay in the calibration meters after the due date project proponent has applied the correction of 0.2% to the energy export and import for the period of such delay.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Used to calculate the baseline emission calculation (net electricity generation by the project activity)</td></tr>
<tr><td>Additional comments</td><td>Data will be archived during the whole crediting period + 2 years.</td></tr>
</table>

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

Baseline emissions are calculated as the kWh produced by the project activity multiplied by an emission coefficient for the NEWNE Regional grid, calculated as the weighted average emissions (tCO2/MWh) of the current generation mix

$$EG_y = EG_{BL,Y} * EF_{grid,CM,y}$$

Where

BE_y = Baseline emissions in a year y (tCO_2)

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,CM,y}$ = CO_2 emission factor of the grid in year y (tCO_2/MWh)

BE_y = 30796 MWh * 0.90618 tCO_2 = 27907 tCO_2e

Summary of Baseline emission calculations

Parameter	Units	Value	Symbol
Net electricity exported from sub bundle I	MWh	16025	A
Net electricity exported from sub bundle II	MWh	14771	B
Total net electricity exported by project activity ($EG_{BL,y}$)	MWh	30796	C=(A+B)
CO_2 emission factor of the grid (fixed ex-ante) ($EF_{grid,CM,y}$)	tCO_2/MWh	0.90618	D
Baseline Emissions (BE_y)	tCO_2e	27907	C*D

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

In accordance with the applied methodology and the registered PDD, there are no project emissions for the project activity.

Therefore $PE_y = 0$

E.3. Calculation of leakage emissions

In accordance with the applied methodology and the registered PDD, there are no leakage emissions for the project activity.

Therefore $LE_y = 0$

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

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)			
				Before 01/01/ 2013	From 01/01/ 2013 until 31/12/ 2020	From 01/01/ 2021	Total amount
Total	27909	0	0	0	27789	118	27907

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_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
27907	36,989

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 4,572 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 of 01/01/2013 -31/01/2021(first and last day included) is 2953 days. Hence, the amount of estimated ex ante for this monitoring period
= 4572 * (2953/365) = 36,989 tCO_2e.

E.6. Remarks on increase in achieved emission reductions

Emission reductions achieved in this monitoring period is lower than the estimated value in the PPD. Hence No justification required.

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

The project activity remained within the limit of small scale project activity in each year of the crediting period as the emission reductions are less than the limit of small scale CDM Project activity.

Document information

Version	*Date*	*Description*
08.0	6 April 2021	Revision to: • Reflect the "Clarification: Regulatory requirements under temporary measures for post-2020 cases" (CDM-EB109-A01-CLAR).
07.0	31 May 2019	Revision to: • 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: • 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: • 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: • 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 *F-CDM-MR* to *CDM-MR-FORM*; • 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).

Version	*Date*	*Description*
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report