Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT		
Title of the project activity	14 MW Wind Power Project in Maharashtra	
UNFCCC reference number of the project activity	2342	
Version number of the PDD applicable to this monitoring report	04	
Version number of this monitoring report	01	
Completion date of this monitoring report	09/09/2020	
Monitoring period number	07th	
Duration of this monitoring period	01/08/2018 to 07/06/2019 (Inclusive of both days)	
Monitoring report number for this monitoring period	NA	
Project participants	M/s Shah Promoters & Developers (India) MBA Trading Ltd. (France) MBA Trading Ltd. (United Kingdom of Great Britain and Northern Ireland)	
Host Party	India (host)	
Applied methodologies and standardized baselines	AMS-I.D. – Grid connected renewable electricity generation (Version 13) Standardized baselines – Not Applicable	
Sectoral scopes	Sectoral Scope: 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	17,613 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	17,973 tCO_2e	

SECTION A. Description of project activity

A.1. General description of project activity

The implemented project activity by M/s Shah Promoters & Developers is a small-scale project involving installation of 10 wind electric generators (WEGs) of individual capacities 1.25 MW (4 machines) and 1.5 MW (6 machines).
The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to sell the generated electricity to the state electricity utility namely Maharashtra State Electricity Distribution Company Limited (MSEDCL) which falls under Western region grid of India (now part of integrated NEWNE grid) and thus leads to CO_2 emission reduction due to the displacement of equivalent amount of electricity.

Brief description of the installed technology and equipments:

The project activity consists of 10 wind electric generators (WEGs) installed in three phases at various locations within Maharashtra. The project activity does not involve any technology transfer. The details of the windmill e.g. employed technology, model, rated capacity is provided in table A.1.1: Commissioning dates, capacity, location number, supplier and model number, location for the project activity. The details description of technology is provided in section B.1 of Monitoring Report.

Relevant dates for the project activity

The details of the WEG e.g. Commissioning dates, capacity, location number, location for the project activity is provided in table A.1.1.

Table A.1.1: Commissioning dates, capacity, location number, supplier and model number, location for the project activity

Site	WEG Location No.	Installed Capacity (MW)	Technology	Village, District	Substation	Date of Commissioning
Site I	J – 17	1.25	SUZLON, S-70	Jamade, Dhule	Jamade	10/08/2006
	J - 21	1.25	SUZLON, S-70	Jamade, Dhule	Jamade	10/08/2006
	J - 22	1.25	SUZLON, S-70	Jamade, Dhule	Jamade	10/08/2006
	J - 23	1.25	SUZLON, S-70	Jamade, Dhule	Jamade	10/08/2006
Site II	N - 4	1.50	SUZLON, S-82	Nagaj, Sangli	Ghatnandre	30/09/2007
	N - 5	1.50	SUZLON, S-82	Nagaj, Sangli	Ghatnandre	30/09/2007
	N - 6	1.50	SUZLON, S-82	Nagaj, Sangli	Ghatnandre	30/09/2007
	N - 7	1.50	SUZLON, S-82	Nagaj, Sangli	Ghatnandre	30/09/2007
	N - 8	1.50	SUZLON, S-82	Nagaj, Sangli	Ghatnandre	30/09/2007
	N - 9	1.50	SUZLON, S-82	Nagaj, Sangli	Ghatnandre	30/09/2007
Total	**10**	**14 MW**				

All the WEGs of the project activity are in operation from the commissioning and operating satisfactorily during the reported monitoring period.

Total emission reductions achieved in this monitoring period

During the reported monitoring period 01/08/2018 to 07/06/2019 (Inclusive of both days) the project activity has supplied 21,479 MWh (Rounded Down) of electricity, and thus contributing to GHG reductions of 17,613 tCO_2e (Rounded Down).

A.2. Location of project activity

Host Party: India

State: Maharashtra
City/ Town/ Community:
Site I- Village - Jamade, District – Dhule
Site II- Village- Nagaj, District- Sangli
Physical/ Geographical location: GPS coordinates are provided in below table

Site	**Windmill Location No.**	**Addresses**	**Latitude and Longitude**	
Site I	J-17	R. S. No. - 19, Village – Jamade, Taluka - Sakari, Dist - Dhule	21°10’50.8” N	74°21’32.3” E
	J-21	R. S. No. - 19, Village – Jamade, Taluka - Sakari, Dist - Dhule	21°10’45.8” N	74°22’14.1” E
	J-22	R. S. No. - 19, Village – Jamade, Taluka - Sakari, Dist - Dhule	21°10’57.2” N	74°22’13.4” E
	J-23	R. S. No. - 19, Village – Jamade, Taluka - Sakari, Dist - Dhule	21°11’11.9” N	74°22’14.2” E
Site II	N-4	Survey no.-585, Village – Nagaj, Taluka - Kawathe Mahakal, Dist – Sangli	17°09’49.3” N	74°56’58.1” E
	N-5	Survey no.-604, Village – Nagaj, Taluka - Kawathe Mahakal, Dist – Sangli	17°10’00.8” N	74°57’04.3” E
	N-6	Survey no.-604, Village – Nagaj, Taluka - Kawathe Mahakal, Dist – Sangli	17°10’13.4” N	74°57’06.1” E
	N-7	Survey no.-604, Village – Nagaj, Taluka - Kawathe Mahakal, Dist – Sangli	17°10’25.5” N	74°57’04.4” E
	N-8	Survey no.-604, Village – Nagaj, Taluka - Kawathe Mahakal, Dist – Sangli	17°10’37.1” N	74°57’06.9” E
	N-9	Survey no.-604, Village – Nagaj, Taluka - Kawathe Mahakal, Dist - Sangli	17°10’48.8” N	74°57’07.8” E

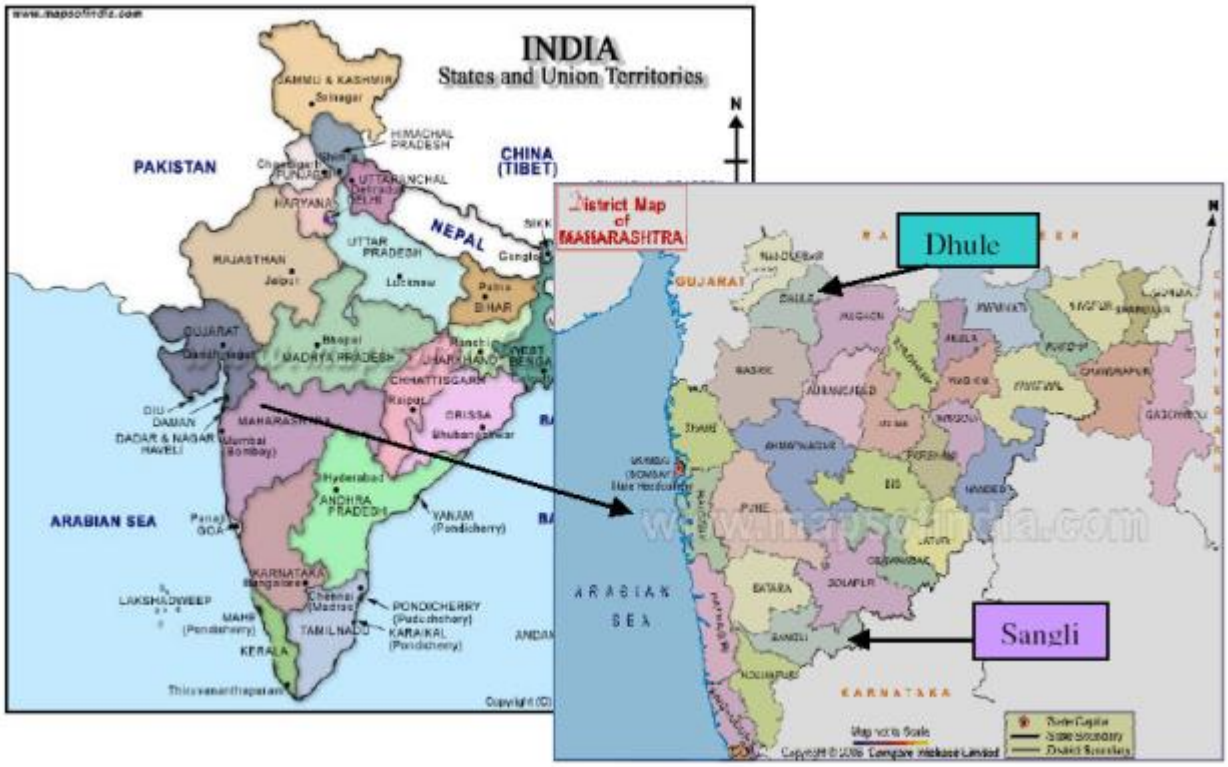


Figure 1. Map of India & Maharashtra

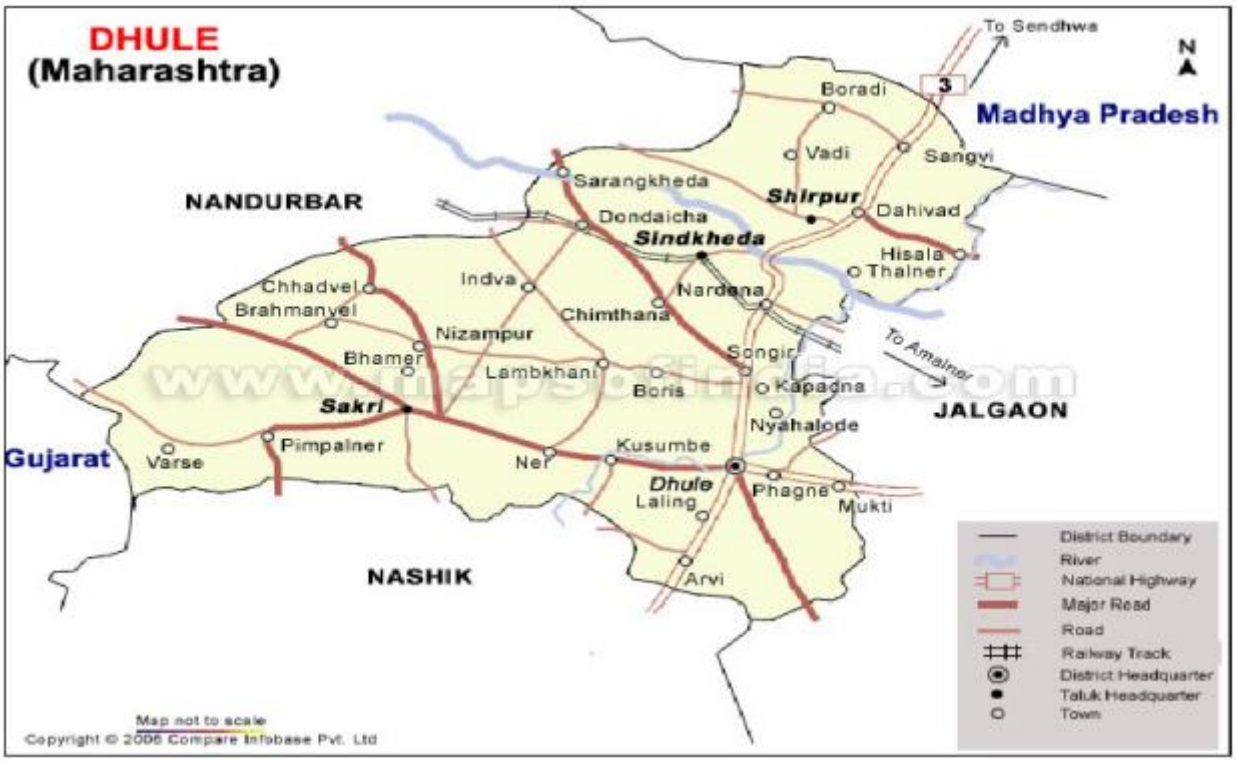


Figure 2. Map of Dhule

The project activity was commissioned before the completion of validation of the project activity and continue to operate at the same location since their commissioning and hence there is no change in the location of WEGs since commissioning and hence since the validation. The latitude and longitude mentioned in the registered CDM PDD was restricted up-to Taluka only i.e. Sakri and Kawathe Mahakal, which does not refer to the specific project activity location. However, the Latitude and Longitude included in the monitoring report corresponds to the WEGs of the project activity.

Furthermore, M/s Suzlon Infrastructure Services Limited has provided Certificate for WEG location number, make/ model of WEG, latitude and longitude of WEG which is more transparent and traceable.

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)	M/s Shah Promoters & Developers	No
France	MBA Trading Ltd.	No
United Kingdom of Great Britain and Northern Ireland	MBA Trading Ltd.	No

A.4. References to applied methodologies and standardized baselines

Type : I - Renewable energy projects
Category : I.D. – Grid connected renewable electricity generation
Version number : (13)
Sectorial Scope : 01
Reference : Appendix B of the simplified M&P for small scale CDM project activities
Tool : Tool to calculate the emission factor for an electricity system" (Version 07, EB 100 Annex 4)

A.5. Crediting period type and duration

Type : Fixed
Duration : 08/06/2009 to 07/06/2019
Current Monitoring Period : 01/08/2018 to 07/06/2019 (Inclusive of both days)

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The present project activity was already commissioned before the registration at UNFCCC (Site I - 1.25 X 4 machines in Dhule in the year 2006 and Site II - 1.50 X 6 machines in Sangli in 2007) with total installed capacity 14 MW. There was change in the installed TVM meters to ABT meters based on the circular issued by MSEDCL for the WTGs N-4/N-5/N- 6/N-7 (Ghatnandre 09) and N-8/N-9 (belonging to Ghatnandre 10).
The detailed status of implementation i.e. start date as well as capacity for each site of the project activity is provided under Table A.1.1: Commissioning dates, capacity, location number, supplier and model number.
Detail locations of individual wind turbine are given under Section A.2

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 passes through the blades of the WEG is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The technology is a clean technology since there are no GHG emissions associated with the electricity generation.

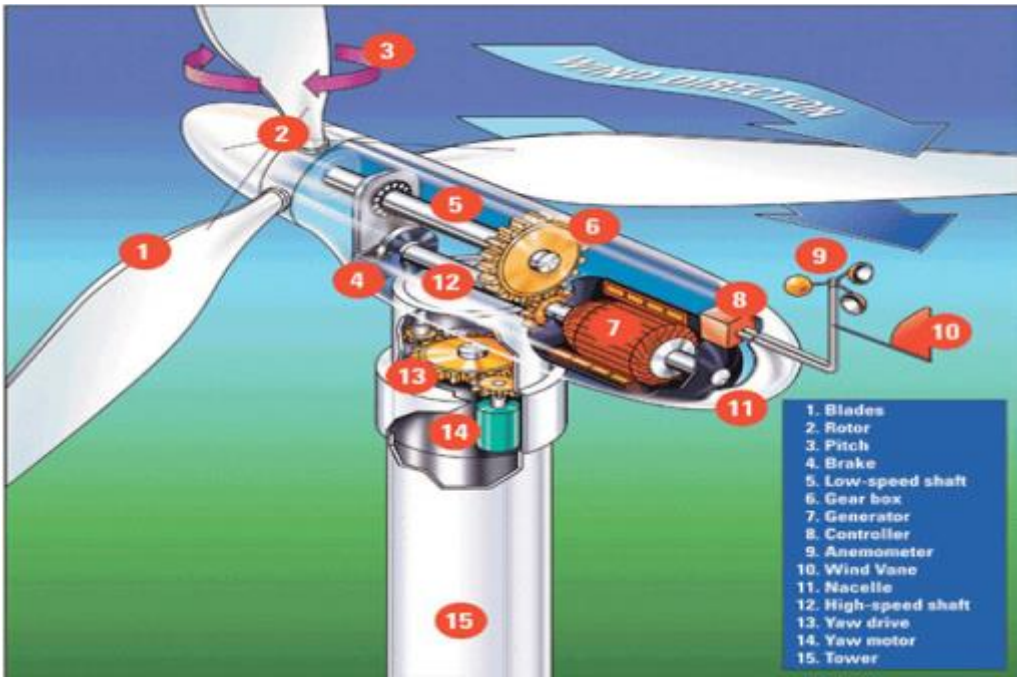


Figure 3. Wind Mill

The important parts of windmill are:

i. Main tower
ii. Blades
iii. Nacelle
iv. Hub
v. Main shaft
vi. Gearbox, bearing and housing
vii. Brake
viii. Generator

Salient Features of Suzlon (S-70) 1250 kW WEG

Rotor diameter	69.1 m
Installed electrical output	1250 kW
Cut –in wind speed	3 m/s
Rated wind speed	12 m/s
Cut-out wind speed	20 m/s
Rotor swept area	3750 m^2
Rational speed	13.2/19.8
Rotor material	GRP
Regulation	Pitch
Generator	Asynchronous Generator, 4/6 poles
Rated output	250/1250 kW
Rotational speed	1010/1515 rpm
Operating voltage	690 v
Frequency	50 Hz
Protection	IP 56
Insulation class	H
Cooling system	Air –cooled
Gear box	3 stage gear box,1 planetary and 2 helical
Manufacturer	Winergy
Gear ratio	77.848
Nominal load	1390 kW

Type of cooling	Oil cooling system
Yaw drive system	4 active electrical yaw motors
Yaw bearing	Polyamide slide bearing
Safety system	
Aerodynamic brake	3 times independent pitch regulation
Mechanical brake	Spring powered disc brake, hydraulically released fail safe
Control unit	Microprocessor controlled, indicating actual operating conditions, UPS back up system
Design standards	GL/IEC

Salient Features of Suzlon (S-82) 1500 kW WEG

Rotor diameter	82.0 m
Installed electrical output	1500 kW
Cut –in wind speed	4 m/s
Rated wind speed	14 m/s
Cut-out wind speed	20 m/s
Rotor swept area	5281 m^2
Rational speed	16.30 RPM
Rotor material	GRP
Regulation	Pitch
Generator	Asynchronous generator,4 poles
Rated output	1500 kW
Rotational speed	1511 rpm
Operating voltage	690 v
Frequency	50 Hz
Protection	IP 54
Insulation class	H
Cooling system	Air –cooled
Gear box	3 stage gear box,1 planetary and 2 helical
Manufacturer	Winergy
Gear Ratio	95.09
Nominal load	1650 kW
Type of cooling	Oil cooling system
Yaw drive system	4 active electrical yaw motors
Yaw bearing	Polyamide slide bearing
Safety system	
Aerodynamic brake	3 times independent pitch regulation
Mechanical brake	Spring powered disc brake, hydraulically released fail safe
Control unit	Microprocessor controlled, indicating actual operating conditions, UPS backup system
Design standards	GL/IEC

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

Not Applicable.

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

Yes, revision of the monitoring plan has been approved on date 22/09/2010. Revised monitoring plan and corresponding supporting documents are available on project page:
http://cdm.unfccc.int/Projects/DB/RWTUV1229007791.61/view

B.2.6. Changes to project design

The project has not been any changes to the project design document.

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

Not Applicable as this project is not afforestation or reforestation project activity.

SECTION C. Description of monitoring system

As emission reductions from the project is determined by the number of units exported to the grid. It is mandatory to have a monitoring system in place and ensure that the project activity produces and exports the rated power at the stipulated norms. The sole objective of having monitoring system is to have a constant watch on the emission reductions.

The delivered energy is metered by Suzlon and MSEDCL at the high voltage side of the step up transformers. Metering is done either for two /three / more wind turbines depending on the location of wind turbines and service connection number. Metering equipments has electronic trivector meters. The metering equipments are maintained in accordance with electricity standards and have the capability of recording daily and monthly readings. Records of joint meter reading are maintained at site and a copy is maintained at the head office. All the meters are tested for accuracy every calendar year with reference to a portable standard meter. As the instruments are calibrated and marked at regular intervals, the accuracy of measurement can be assured at all times. Necessary records of calibration are maintained by both MSEDCL and project proponents.

The project activity essentially involves generation of electricity from wind, the employed WEG can only convert wind energy into electrical energy and cannot use any other input fuel for electricity generation. Thus no special ways and means are required to monitor leakage from the project activity.

- The proposed project activity requires evacuation facilities for sale to grid and the evacuation facility is essentially maintained by the state power utility (MSEDCL).
- The electricity generation measurements are required by the utility and the investors to assess electricity sales revenue and / or wheeling charges.
- 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 is carried out jointly at the incoming feeder of the state power utility (MSEDCL). Machines for sale to utility are connected to the feeder.

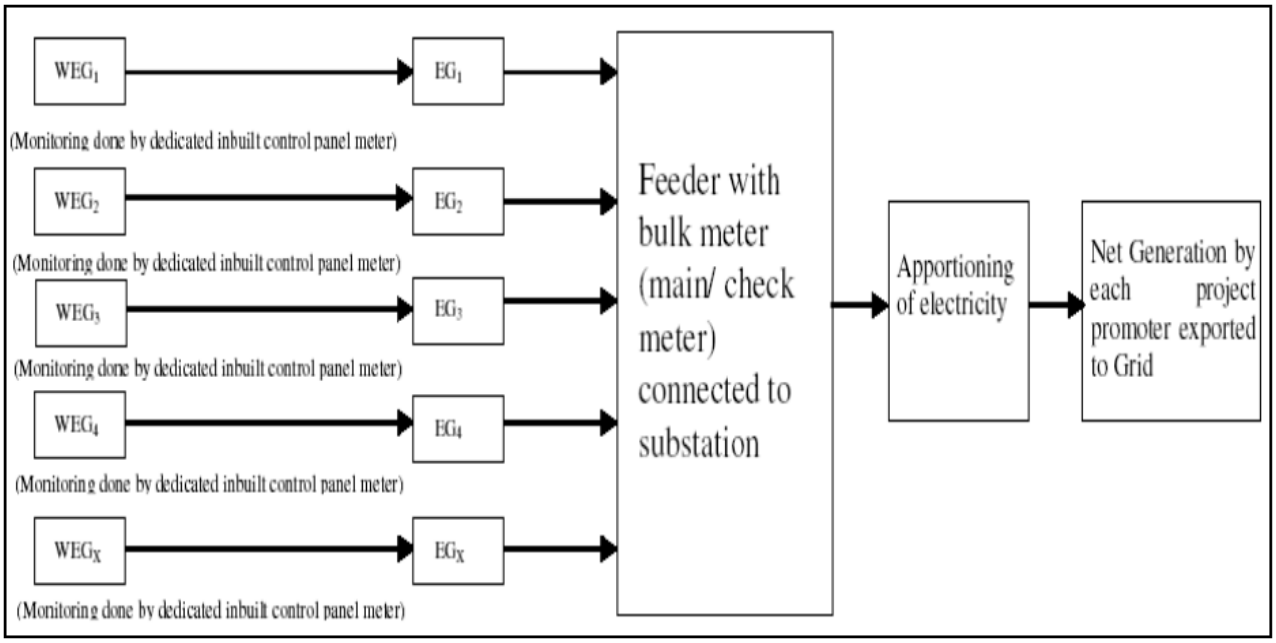
- The joint measurement is carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties sign the recorded reading.
- Metering equipment - Metering is carried out through electronic trivector meters of accuracy class 0.2% required for the project. The main meter was installed and owned by MSEDCL, whereas the project participant owns the check meters. The metering equipments are maintained in accordance with electricity standards.
- 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 WEGs. Each WEG 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 (PLC). The generation data of individual machine can be monitored as a real-time entity at CMS. The snapshot of generation on the last day of every calendar month will be kept as a record both in electronic as well as printed (paper) form.
- Trivector Meter - is a device that measures the amount of electrical energy supplied to the utility. It is called as tri-vector meter because it measures energy consumption of the three phase lines R, Y, B which are 120 phase difference from each other. It measures the consumption in terms of the active energy, reactive energy, apparent energy, power factor.

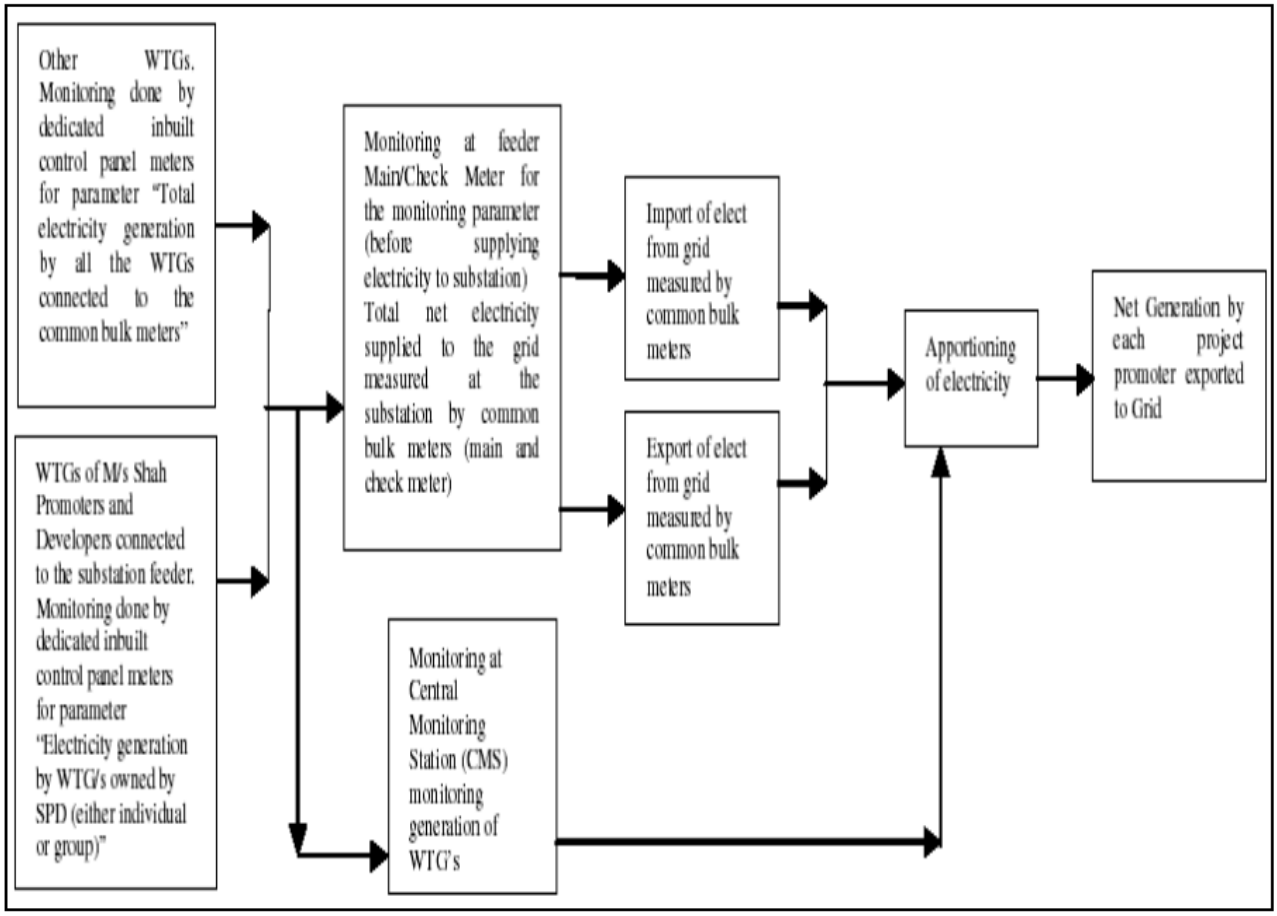
Description of calibration of WEG Controller

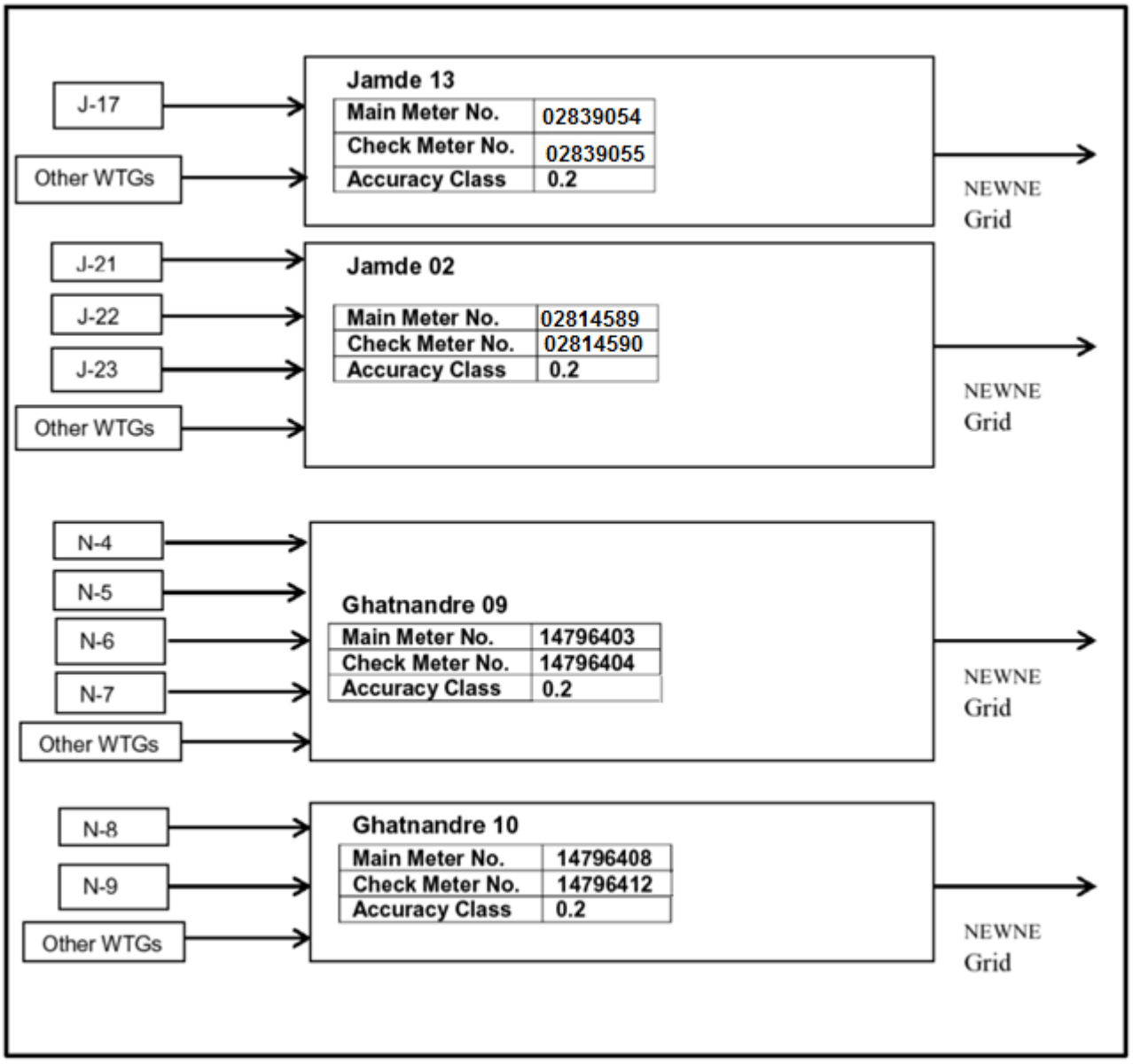
SCS Controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi-function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current/voltage are converted 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 does not have a display and needs special protocol to view energy readings as this relay communicates digital signal through special communication protocol hence, it is not possible to calibrate. Moreover, turbine cannot run without this relay hence it cannot be removed for calibration during operation.

Description of billing calculation from net meter to individual meters

Each substation is connected to a number of wind turbines. The generation reading is collectively displayed by the substation meter. The net generation of each of the wind turbines is then calculated in the following manner:




Other WTGs. Monitoring done by dedicated inbuilt control panel meters for parameter "Total electricity generation by all the WTGs connected to the common bulk meters"
WTGs of M/s Shah Promoters and Developers connected to the substation feeder. Monitoring done by dedicated inbuilt control panel meters for parameter "Electricity generation by WTG/s owned by SPD (either individual or group)"
Monitoring at feeder Main/Check Meter for the monitoring parameter (before supplying electricity to substation) Total net electricity supplied to the grid measured at the substation by common bulk meters (main and check meter)
Monitoring at Central Monitoring Station (CMS) monitoring generation of WTG's
Import of elect from grid measured by common bulk meters
Export of elect from grid measured by common bulk meters
Apportioning of electricity
Net Generation by each project promoter exported to Grid



Meter change: For feeder Number Jamde 13, on 07/11/2017 Main meter (4737790) and Check meter (4737791) was changed with meter serial number 02839054 and 02839055 respectively.

For feeder Number Jamde 02, on 29/06/2016 Main meter (4725800) and Check meter (4725804) was changed with meter serial number 2814589 and 2814590 respectively. Refer Appendix 1 for Meter Calibration details.

The generated electricity is measured through inbuilt control panel meter of the WEGs. The monitoring of electricity generation from all these wind turbines is done at common monitoring station as a part of central monitoring system. The system consists of a state of- the- art controlling and monitoring and well trained staff personnel of O&M contractor, Suzlon Energy Limited, are always present on site to monitor various parameters of power generation and deal with any problems related to generation, transmission or maintenance. The Electricity Generated from the wind turbine/s (either individual or group) of the project proponent in MWh is presented as

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

And the summation of total Electricity Generated from all the wind turbines at the given site and connected to common bulk meter in MWh as measured at inbuilt control panel meters of the WEGs is presented as;

$$\sum_{0}^{m} EG_{m,y}$$

A ratio based on these two set of measured values is used for apportioning the net electricity supplied to the western regional grid (Now integrated in to NEWNE Grid) by the project activity. The second metering is carried out at grid interconnection point (substation) wherein the Joint Meter Reading (JMR) is carried out, usually in the first week of every month, in presence of the representatives of the project proponent & the state electricity utility (MSEDCL). This JMR is used for calculation of the amount of electricity supplied to the grid against which the utility makes the payment to the project proponent. The JMR gives both the "export" (EGJMR,export) and "import" (EGJMR, import) of the electricity to/ from the western grid (Now integrated in to NEWNE Grid). There are common bulk meter which monitors both the export and import of electricity to the grid.

$$EG_y = \frac{\sum_{0}^{n} EG_{n,y}}{\sum_{0}^{m} EG_{m,y}} x\ EG_{MSEDCL}$$

Where

EG_y	Net Electricity exported to the grid by the Project Activity.
$\sum_{0}^{n} EG_{n,y}$	Electricity generation by WTG/s owned by SPD (either individual or group) included in this project activity (monitored).
EG_{MSEDCL}	Total net electricity supplied to the grid measured at the substation by common bulk meter (main and check meter).
$\sum_{0}^{m} EG_{m,y}$	Total electricity generation by all the WTGs connected to the common bulk meters

MSEDCL is responsible for calibration, periodical testing, sealing and maintenance of meters in the presence of SPD representative. The frequency of meter testing is annual. All meters are tested only at the Metering Point. The meters are tested and maintained as per the Metering Code of Maharashtra. Additionally, each wind turbine is equipped with an integrated electronic meter. The electricity generated is recorded by the O & M staff of the EPC contractor on 24 hour basis.

The Accounts department of SPD receives the data from both the sources and keeps track of electricity generation. The project performance is communicated to the higher management by the accounts department.

For this project, the feeder connections are as follows:

Site I: Village – Jamade, Dhule

WEG Location No.	Substation	Feeder Number
J-17	Jamade	13
J-21	Jamade	02
J-22	Jamade	02
J-23	Jamade	02

Site II: Village –Nagaj, Sangli

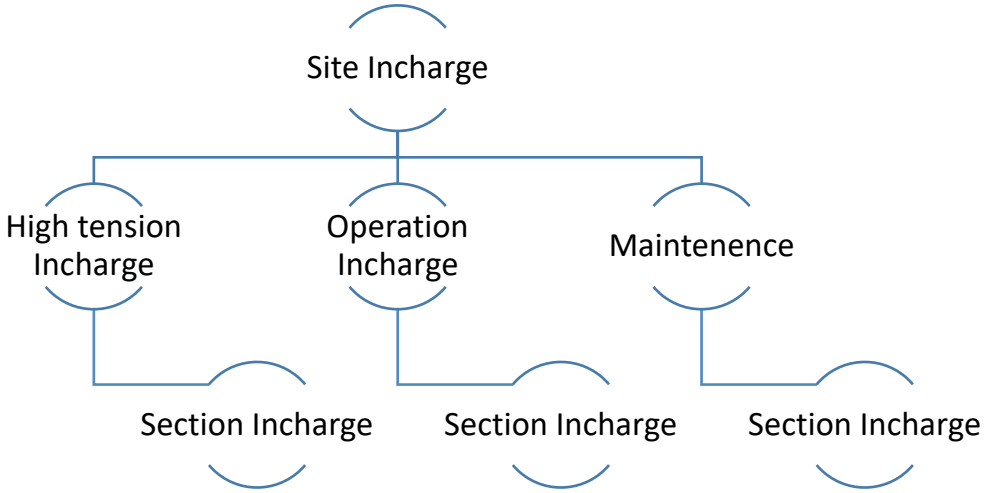
WEG Location No.	Substation	Feeder Number
N-4	Ghatnandre	9
N-5	Ghatnandre	9
N-6	Ghatnandre	9
N-7	Ghatnandre	9

N-8	Ghatnandre	10
N-9	Ghatnandre	10

Recording of generation at the joint meter is usually from 1st of one month to 1st or 2nd of next month. The project participant has signed an operation and maintenance agreement with the supplier of the wind turbines i.e. Suzlon. The performance of the turbines, safety in operation and scheduled /breakdown maintenances is responsibility of Suzlon and is organized and monitored by them. So the authority and responsibility of project management lies with the O & M contractor.

ISO standard has been adopted by Suzlon, who is responsible for monitoring, calibration and O & M of the project. Training is an essential part of the ISO system. To comply with the ISO standard, training has to be provided to personnel according to their responsibility with in organization.

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



Routine Maintenance Services:
The project proponents have signed an "Operation and maintenance" agreement with the supplier of the wind turbines for the operation of the wind farm. The O & M management structure is as follows:

Routine Maintenance Labor Work involves making available suitable manpower for operation and maintenance of the equipment and covers periodic preventive maintenance, cleaning and upkeep of the equipment including –

a) Tower Torqueing
b) Blade Cleaning
c) Nacelle Torqueing and Cleaning
d) Transformer Oil Filtration
e) Control Panel & LT Panel Maintenance
f) Site and Transformer Yard Maintenance

Security Services: This service includes watch, ward, and security of the wind farm and the equipment.

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 WEGs 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 responsibilities of CDM project team is presented below

Designation	Responsibilities
Project Head (Head of WPP)	▪ Overall performance monitoring ▪ Project Execution
Project Executer and Controller (Project In-charge SPD)	▪ Operation ▪ Verification of data ▪ Site visit to check authenticity of data and take corrective action, wherever necessary ▪ Storage of data
Site Main Controller (Suzlon Site Engineer), (Suzlon O & M Team)	▪ Operation, Monitoring and Verification of data ▪ Data recording ▪ Storage of data

Training:

Training of staff operating and maintaining the WEGs is carried out by the WEG manufacturer and supplier (Suzlon). Special emphasis is given to the training of the employees to enable them to develop their skills to meet changing WEG technology and to provide efficient and effective O&M services. There is an initial learning programme as well as continuous learning programmes for all employees. All newly-hired employees are required to attend an intensive two- to four-week, full-time training programme to familiarize them with business and operations.

Besides the usual training programs for their staff Suzlon conducts specific familiarization capsules for customers, such that they are fully aware of the capabilities of the highly sophisticated WEGs of Suzlon.

The training program focuses mainly on the management, monitoring and maintenance, and safety and reliability aspects of wind power.

The objectives include:

1 Understanding the various stages and aspects in the management of Wind Power systems
2 Understanding the importance of monitoring and maintenance of Wind Power systems and hence the various tasks involved in this
3 Understanding the importance of safety and reliability aspects involved with Wind Power and the measures taken.
4 Managing generation and other data for future reference.

The project activity essentially involves generation of electricity from wind. The employed WEGs can only convert wind energy into electrical energy and cannot use any other input fuel for electricity generation. As the operation of WEGs is emission free and no emissions will be produced during the lifetime of the WEGs.
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.
SPD has appointed a full time project in-charge to manage the overall project activity. The project in-charge supervises the functioning of the wind farm in close coordination with the officials & technical personnel of Suzlon.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	Section is left blank on purpose (as there is no ex-ante value validated during validation)
Unit	-
Description	-
Source of data	-
Value(s) applied	-
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	-
Additional comments	-

D.2. Data and parameters monitored

Data/Parameter	EG_y
Unit	MWh
Description	Net Electricity export to the grid by the project activity
Measured/calculated/ default	Calculated
Source of data	Joint meter reading issued by MSEDCL for promoter with the help of O & M contractor by applying logic of apportioning described in Section C of MR.
Value(s) of monitored parameter	21049.682 MWh
Monitoring equipment	Please refer Appendix 1 of Monitoring Report.
Measuring/reading/recording frequency	Monthly Recorded
Calculation method (if applicable)	Net Electricity exported to the grid by the Project Activity is calculated based on the monitoring parameter $\sum_0^n EG_{n,y}$, EG_{MSEDCL} and $\sum_0^m EG_{m,y}$. $EG_y = \frac{\sum_0^n EG_{n,y}}{\sum_0^m EG_{m,y}} x\ EG_{MSEDCL}$
QA/QC procedures	The project revenue is based on the net units displaced as calculated by applying apportioning logic on the values that are monitored with the help of metering system involving common bulk meter and inbuilt control panel meter of WTGs. The common bulk meters constitute main meter and check meter. The calibration of the common bulk meters (main & check meter) is done by state utility normally on annual basis or as per the schedule of MSEDCL. Check meter is placed to verify main meter readings. It can be used as a source of reading in case of main meter failure. The calibration of main & check meter is done as per the guidelines set by CERC
Purpose of data/parameter	Used for baseline emission Calculation
Additional comments	--

Data/Parameter	$\sum_{0}^{n} EG_{n,y}$
Unit	MWh
Description	Electricity generation by WTG/s owned by SPD (either individual or group)
Measured/calculated/ default	Measured
Source of data	Monitored through inbuilt control panel meters of the WTGs. The O & M contractor further aggregates (calculates) the monitored readings to arrive at "Total electricity generation by WTGs owned by SPD.
Value(s) of monitored parameter	24,042.093 MWh
Monitoring equipment	Monitored through inbuilt WTG Controller meter.
Measuring/reading/recording frequency	The electricity generated by the WTGs of SPD is monitored with the help of inbuilt control panel meters installed on all the WTGs. The data is continuously measured at each WTG by inbuilt control panel meter and monthly recorded at CMS maintained by O & M contractor.
Calculation method (if applicable)	The electricity generated by the WTGs of SPD is monitored with the help of inbuilt control panel meters installed on all the WTGs. The data is continuously measured at each WTG by inbuilt control panel meter and recorded at CMS maintained by O & M contractor. The aggregated or individual monthly readings of "Total electricity generation by WTGs owned by SPD" is provided by O & M contractor to MSEDCL for apportioning and calculating the net electricity exported by the individual WTG in Joint Meter Reading Report issued by MSEDCL.
QA/QC procedures	As per letter provided by the technology supplier the inbuilt control panel meters cannot be calibrated. Please also refer to detailed description under "Description of calibration of WEG Controller" in section C of MR.
Purpose of data/parameter	Used for baseline emission Calculation
Additional comments	--

Data/Parameter	$\sum_{0}^{m} EG_{m,y}$
Unit	MWh
Description	Total electricity generation by all the WTGs connected to the common bulk Meters
Measured/calculated/ default	Measured
Source of data	Monitored through inbuilt control panel meters of the WTGs. The O & M contractor further aggregates (calculates) the monitored readings to arrive at "Total electricity generation by all the WTGs connected to the common bulk meter".
Value(s) of monitored parameter	333,616.075 MWh
Monitoring equipment	Monitored through inbuilt WTG Controller meter.
Measuring/reading/recording frequency	The electricity generated by all the WTGs (including WTGs of SPD) is monitored with the help of inbuilt control panel meters installed on all WTGs (which are connected to common bulk meters i.e. main meter & check meter). The data is continuously measured at each WTG by inbuilt control panel meter and monthly recorded at CMS.

Calculation method (if applicable)	The electricity generated by all the WTGs (including WTGs of SPD) is continuously measured at each WTG by inbuilt control panel meter and recorded at CMS. The readings are aggregated by the O & M contractor and provided to the MSEDCL for apportioning and calculating the net electricity exported by WTG's. The reading of "Total electricity generation by all the WTGs connected to the common bulk meters" is monitored by O & M contractor at CMS.
QA/QC procedures	As per letter provided by the technology supplier the inbuilt control panel meters cannot be calibrated. Please also refer to detailed description under "Description of calibration of WEG Controller" in section C of MR.
Purpose of data/parameter	Used for baseline emission Calculation
Additional comments	--

Data/Parameter	EG_{MSEDCL}
Unit	MWh
Description	Total net electricity supplied to the grid measured at the substation by common bulk meters (main and check meter).
Measured/calculated/ default	Calculated
Source of data	Total net electricity supplied to the grid measured at the substation by common bulk meters (main and check meter).
Value(s) of monitored parameter	321,542.559 MWh
Monitoring equipment	Please refer Appendix 1 of Monitoring Report.
Measuring/reading/recording frequency	Monthly Recorded
Calculation method (if applicable)	Net export from all the WTGs is calculated by subtracting import from the export. Export and import of electricity is measured at the common bulk meters (i.e. main meter & check meter)The readings at the common bulk meter is taken on a monthly basis, in presence of the representative of MSEDCL & O & M contractor (PP's representative).
QA/QC procedures	The common bulk meters constitute main meter and check meter. The meters are of accuracy class 0.2. The accuracy of the main meter and check meter can be verified by comparing with each other. The calibration of the common bulk meters (main & check meter) is done by state utility normally on annul basis or as per the schedule of MSEDCL.
Purpose of data/parameter	Used for baseline emission Calculation
Additional comments	--

Data/Parameter	$EF\ Grid, y$
Unit	tonnes of CO_2 eq /MWh
Description	Weighted average grid emission factor
Measured/calculated/ default	Calculated
Source of data	The value has been provided by Central Electricity Authority (Version 15)[1]
Value(s) of monitored parameter	0.82 (Rounded down to second decimal)
Monitoring equipment	Not Applicable
Measuring/reading/recording frequency	Latest CEA database for reported Monitoring Period

[1] Appendix C table A of http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf

Calculation method (if applicable)	The used data is from an official source.
QA/QC procedures	The value has been taken from official statistics published by Central Electricity Authority, which is an official data available in public domain.
Purpose of data/parameter	**Used for the Baseline emission calculation**
Additional comments	--

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

As described in the section above, the total emission reduction achieved in a year would be
$ER_y = BE_y – PE_y – LE_y$

Where,
ER_y is the Emission reductions during the year y
BE_y is the Baseline emissions during the year y
PE_y is the Project emissions during the year y
LE_y is the Leakage emissions during the year y

Baseline emissions:
The baseline emissions are calculated based on the given formula:
$BE_y = EF_{Grid,y} * EG_y$
EGy = 21,479.268 MWh

BEy = 21,479.268 MWh x 0.82 tCO_2/MWh
= 17,613 tCO_2e (Rounded Down)

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

Being a wind energy project, the project activity does not lead to any form of emission; hence project emission has not been considered in this case.

Therefore,
$PE_y = 0\ tCO_2e$

E.3. Calculation of leakage emissions

As wind energy projects fall under clean energy sources for electricity generation, the emission from the project is taken as zero. Therefore,

$LE_y = 0\ tCO_2e$

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	Total amount
Total	17,613	0	0	0	17,613	17,613

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)
17,613	17,973

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

The current monitoring period involves variation in wind flow and this is nature dependent and not in control of PP. It is to be noted that there is no change in design of project activity and all the parameters has been monitored as per the Monitoring Plan mentioned in the Registered SSC-PDD, hence there is no any post registration changes applicable. The actual ER is -2% lower than estimated values for the current monitoring period. This is due to low CUF achieved during current monitoring period.

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

The size of the project is still the same as registered in CDM PDD and there is no any design changes.

Appendix 1. Calibration Details

WTG Location No.	WTG Connected on 220 KV/33KV Feeder	Meter Details				Date of Calibration	Validity	Application of Para 366 VVS Version 2.0,
		Type	Accuracy Class	Meter Serial No.				
J-17	Jamde 13	Electronic Trivector Meter	0.2	Main Meter	4737790*	16/07/2015	15/07/2016	NA
						28/09/2016	27/09/2017	
						09/03/2017	08/03/2018	
					02839054**	23/03/2018	22/03/2019	
			0.2	Check Meter	4737791*	16/07/2015	15/07/2016	
						28/09/2016	27/09/2017	
						09/03/2017	08/03/2018	
					02839055**	23/03/2018	22/03/2019	
J-21, J-22, J-23	Jamde 02	Electronic Trivector Meter	0.2	Main Meter	4725800***	03/07/2015	02/07/2016	NA
					02814589*	09/03/2017	08/03/2018	
						23/03/2018	22/03/2019	
			0.2	Check Meter	4725804***	03/07/2015	02/07/2016	
					02814590*	09/03/2017	08/03/2018	
						23/03/2018	22/03/2019	
N-4, N-5, N-6, N-7	Ghatnandre 09	Electronic Trivector Meter	0.2	Main Meter	14796403	03/08/2015	02/08/2016	NA
						19/09/2016	18/09/2017	
						04/07/2017	03/07/2018	
						18/07/2018	17/07/2019	
			0.2	Check Meter	14796404	03/08/2015	02/08/2016	
						19/09/2016	18/09/2017	
						04/07/2017	03/07/2018	
						18/07/2018	17/07/2019	
N-8, N-9	Ghatnandre 10	Electronic Trivector Meter	0.2	Main Meter	14796408	03/08/2015	02/08/2016	NA
						19/09/2016	18/09/2017	
						04/07/2017	03/07/2018	
						18/07/2018	17/07/2019	
			0.2	Check Meter	14796412	03/08/2015	02/08/2016	
						19/09/2016	18/09/2017	
						04/07/2017	03/07/2018	
						18/07/2018	17/07/2019	

* Meter Change on 07/11/2017
** New Meter
***Meter Change on 29/06/2016

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Document information

Version	*Date*	*Description*
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).
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.

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