Monitoring report form for CDM project activity
(Version 09.0)

MONITORING REPORT			
Title of the project activity	Wind Power Generation Project activity by Interocean Shipping India Private Limited		
UNFCCC reference number of the project activity	3815		
Version number of the PDD applicable to this monitoring report	04		
Version number of this monitoring report	01		
Completion date of this monitoring report	03/12/2021		
Monitoring period number	03		
Duration of this monitoring period	13/08/2014 to 19/11/2020		
Monitoring report number for this monitoring period	01		
Project participants	1. Interocean Shipping India Private Limited 2. EGL AG		
Host Party	India		
Applied methodologies and standardized baselines	Methodology: AMS I.D version-14, Grid connected renewable electricity generation Standardized baseline: 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 until 31 December 2020	Amount achieved from 1 January 2021
	0 tCO_2e	26,941 tCO_2e	0 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	30,549 tCO_2e		

SECTION A. Description of project activity

A.1. General description of project activity

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The project activity comprises 2 Wind Turbine Generators (WTGs) one in each Maharashtra and Rajasthan states of India respectively. The total installed capacity of the project activity is 2.90 MW. The net electricity generated from this project activity is being sold to respective state electricity boards of respective states, which are part of NEWNE regional grid (now Indian grid).

The purpose of the project activity is to generate electricity using wind energy and supply the net electricity generated to regional grid. The project activity contributes in reducing the GHG emission by displacing the equivalent amount of electricity from NEWNE grid, as in absence of the project activity the equivalent amount of electricity would have been generated in regional grids, thereby resulting GHG emission to atmosphere as the regional grids are dominated by fossil fuel based thermal power plants.

The WTGs employed under project activity 1.25 MW (Suzlon) and 1.65MW (Vestas) are advance technology using speed control and variable pitch, while incorporating the to extract the maximum amount of energy from the wind and to do it as efficiently as possible. The design lifetime of the project activity is of 25 years.

The break up depicting the capacity and the location is illustrated in table below:

Table 1: Details of the WTGs involved in the bundle:

S.N.	Capacity (MW)	Location	Grid	Proponent
1	1.65	Maharashtra	NEWNE	Interocean Shipping India Private Limited
2	1.25	Rajasthan	NEWNE	Interocean Shipping India Private Limited

All the WTGs were operational during the current monitoring period, that is, from 13/08/2014 to 19/11/2020. The net electricity generated during the current monitoring period was 29,740.35 MWh which results in a net emission reduction of 26,941 tCO_2e.

A.2. Location of project activity

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Host Country – India

The proposed project site is spread over the geography covering the following two states:

i. Maharashtra
ii. Rajasthan

Table 2: Village and district details for the project activity-

Village	Taluka	District	State	HTSC No.
Bharewadi	Shirala	Sangli	Maharashtra	GP 10
Satta	Jaisalmer	Jaisalmer	Rajasthan	R 42

The project activity is located in above mentioned villages in districts in Maharashtra and Rajasthan state in India.

Bharewadi is located in Sangli district. Nearest Railway station is Karad about 80 km from Gudepanchagani and nearest airport is Pune about 210 km. The geographic co-ordinates for the site are:

Site	Latitude	Longitude
Gudepanchagani	N 17° 07”.500’	E 73° 59”.130’

Satta is located in Jaisalmer district. The nearest railway station is Jaisalmer about 35 km from site, well connected with road. The geographic co-ordinates for the site are:

Site	Latitude	Longitude
Satta	N 26° 46”31.8’	E 70° 47”08.0’

Fig. Project Sites.

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)	Interocean Shipping India Private Limited (Private entity)	No
Switzerland	EGL AG (Private entity)	No

A.4. References to applied methodologies and standardized baselines

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Methodological Details

Methodology Applicable	**AMS I.D.**
Title	**Grid connected renewable electricity generation**
Version	14
Sectoral scope	01
Dated	Valid from 31 July 2009 onwards
Reference	Microsoft Word - EB48_repan23_AMS_I.D_ver14.doc (unfccc.int)

Tools applicable:

- ✓ ‘Tool to calculate the emission factor for an electricity system’, Version 1.1
  Tool to calculate the emission factor for an electricity system. (Version 01.1). (unfccc.int)

Standardized baseline: Not applied.

A.5. Crediting period type and duration

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The project activity has considered fixed crediting period for 10 years. The crediting period for the project activity is from 20/11/2010 to 19/11/2020.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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The project activity is implemented and operated as per registered PDD during current monitoring period. The project activity consists of two number WTG's of 1*1.25 MW and 1*1.65MW capacities totalling to 2.90 MW capacity and supplying the net generated electricity to NEWNE regional grid (now Indian grid) of India. GP10, 1.65 MW WTG located in Maharashtra was commissioned on 31/12/2006 while R42, 1.25 MW WTG located in Rajasthan was commissioned on 28/09/2008. There has been no major downtime of equipment's, overhaul times or exchange of equipment's in the project activity during the current monitoring period.

The Wind Energy Generators (WEGs) were procured from M/S. Suzlon Energy Ltd. and Vestas. The technology is a clean and safe technology since there are no GHG emissions associated with the electricity generation. The technical details of the WEG are as follows:

Capacity	1250 KW	1650 KW
Make	Sulzon	Vestas
Model	S66	VM82
Rotar Diameter	66 m	82 m
Hub Height	74.5 m	78 m
Cut-in wind speed	4 m/s	3.5 m/s
Rated wind speed	12 m/s	13 m/s
Cut-out wind speed	20 m/s	20 m/s
Survival wind speed	52.5 m/s	--
Swept area	3421 m^2	5281 m^2
Blade type	3 blade horizontal axis	3 blade horizontal axis
Rotation speed	20.62 rpm	14.4 rpm
Generator	Asynchronous, air cooled	Asynchronous water cooled
Rated output	1250 kW	1650 kW
Frequency	50 Hz	50 Hz
Gearbox	Integrated (1 planetary & 2 helical)	Planetary/helical
Power regulation	Active pitch regulation	Active Shell
Braking	Aerodynamic brake, 3 independent systems with blade pitching Mechanical brake, Hydraulic fail-safe disc brake system	Air brake, 3 independent systems with blade pitching Hydraulic fail-safe disc brake system
Control unit	Programmable microprocessor -based; high speed data communication, active multilevel security, sophisticated operating software, advance data collection remote monitoring & control option, UPS back up, Real time operation indication	Microprocessor-based monitoring of all turbine functions with the option of remote monitoring. Output regulation and optimisation via Active-Stall.

Shut Down Details:
WTG GP10 (Maharashtra) was shut down for 2 months, i.e., from 01/01/2020 to 29/02/2020 due delay in the renewal of the PPA. No emission reductions have been claimed for the respective months for GP10 in the monitoring period.

Apart from above, both WTGs were operational with normal O&M during the current monitoring period. There were no situations occurred during current monitoring period, which may impact the applicability of the applied methodology.

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

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No temporary deviation taken place from registered monitoring plan or applied approved methodology during current monitoring period.

B.2.2. Corrections

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No correction applied in fixed parameter mentioned in registered PDD during current monitoring period.

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

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No change in start date of crediting period.

B.2.4. Inclusion of monitoring plan

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No inclusion of monitoring plan.

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

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No Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents.

B.2.6. Changes to project design

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The following are the changes to the project design of the project activity:

- The registered project activity registered as a bundled project activity having 4 sub project activities comprising of 2 WTGs in Tamil Nadu, 1 in Maharashtra and 1 in Rajasthan states of India having total installed capacity of 6.05 MW. PP decided to remove two of the sub project activities (HTSC No. 2503 and 2748 having installed capacity 1.65MW and 1.5MW) commissioned in Tamil Nadu from the project activity. So, the installed capacity of the of the bundle has changed from 6.05 MW to 2.90 MW.
- As the 2 WTGs from Tamil Nadu are excluded from the project activity, the Southern regional grid data is removed too from the project activity as only WTGs of Tamil Nadu supplied electricity to the southern regional grid.
- The removal of 2 WTGs from Tamil Nadu has also triggered removal of monitoring parameter relevant to WTGs commissioned in Tamil Nadu.
- The emission factor of NWNE grid has changed from 0.9062 tCO2e/MWh to 0.9059 tCO2e/MWh due to correction from simple to weighted average of operating margin emission factor, which is conservative.

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

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Not applicable as the project activity is not an afforestation or reforestation project activity.

SECTION C. Description of monitoring system

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As per monitoring plan, for a small scale CDM project activity the only set of data to be monitored is the EGy, net electricity output from the project activity. The net electricity supplied to state EB grid is metered at grid interconnection point.

Responsible entity: The project participants, Interocean Shipping India Private Limited, have undertaken maintenance / services agreement with Suzlon Infrastructure Services Ltd. (SISL) and Vestas RRB Ltd. The project activity is therefore, operated and managed by the respective O&M contractors. Being ISO certified organizations; they follow the documentation practices to ensure reliability and availability of data as required.

Meter readings: The joint measurements were carried out once in a month in presence of both parties (Developer's representative and officials of the state power utility).

Calibration: The accuracy of the monitoring parameter is ensured by adhering to the calibration and testing procedure as set in the PPA with respective state electricity boards (RSEB/MSEB). The project adhered to all the mandatory and statutory requirements at the state as well as national level. The main electricity meters were calibrated following annual calibration plan.

Data Back up: The secondary monitoring, which will provide a backup (fail-safe measure) in case the primary monitoring is not carried out, was 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. The generation data of individual machine was monitored as a real-time entity at CMS. The generation data was daily sent to the client that can be accessed through client specific password and was kept as a record both in electronic as well as printed (paper) form.

Maharashtra – The project is operated and managed by Vestas. Being an ISO certified organization, they follow 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. The data monitored and required for verification and issuance will be kept in hard copy and electronic format for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure as set in the power purchase agreement. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level. The performance of the WEGs, safety in operation and scheduled / breakdown maintenances are organized and monitored by Vestas. Vestas would monitor the generation of the WEG on regular basis and will maintain a log book recording daily generation details for each WEG comprising the project, as metered at the wind farm. Vestas will also provide daily generation data through e-mail or website.

MSEDCL carries out calibration, periodical testing, sealing and maintenance of meters in the presence of Vestas representative. The frequency of meter testing is annual. All meters are tested only at the metering point. The monitored data can be found from the monthly credit notes reports issued by MSEDCL to the investors.

- Metering – Electricity supplied to the grid is metered by MSEDCL at the high voltage side of the step up transformer installed at the respective feeders.
- Metering Equipment – Metering Equipment at the feeders is electronic tri-vector meters of

accuracy class 0.2. (Although in the registered PDD, the accuracy class is mentioned as 0.5, as per the PPA, project proponent has decided to take 0.2 as the accuracy as this is more accurate.) (both main and check meters). The meters are two way and record both electricity import and export values. Both meters are owned, installed and maintained by MSEDCL.

- Data Measurement Arrangement: The generated electricity is measured through a two step procedure:

1. The first measurement of electricity is carried out at the controller of the WEG with integrated meters. Each WEG is equipped with a microprocessor based intelligent controller specially designed for control of WEG and recording of various parameters. The controllers are connected to the Central Monitoring Station (CMS) of the entire wind farm through a Wireless Radio Frequency (RF) network. The generation data of individual WEG can be monitored as a real-time entity at CMS. The snapshot of generation on the last day of every calendar month is kept as a record in electronic form.
2. The second measurement of electricity is carried out at the grid interconnection point (MSEDCL feeder) where in the Joint Meter Reading (JMR) is carried out every month for the preceding month in presence of the representatives of the project proponents and the state electricity utility (MSEDCL). Monthly credit reports provided by MSEDCL give the net electricity supplied by the WEGs of a particular investor, connected to a feeder.

Every day early morning responsible operator will take reading at location and same reading is uploaded in https://:www.Power2customer.com. Every month in the first week, Asst Engineers from MSEDCL Sangli and JE from Shirla sub division will be coming to site along with site engineer (PP) to take the Group Meter Readings. Based on EB reading, individual meter readings and line loss will be calculated and submitted at MSEDCL. Based on our submitted document, credit note will be issued within 2 weeks from the date of submission. Payment will be issued in 45 days from date of credit note issue.

The monthly credit reports are prepared based on apportioning of electricity generated from individual WEGs and is carried out by the EPC contractor (Vestas), based on the power generation recorded from individual WEGs at the controller point and the generation recorded in the monthly JMR reports of the MSEDCL meter. Based on the information compiled by the EPC contractor, MSEDCL generates monthly credit reports for each investor. Invoices are raised on these reports thereafter, by the investors, which are sent back to MSEDCL.

- Apportioning Details: EGny is the electricity generated from an individual WEG measured through its controller meter. The summation of this total electricity generated from the WEGs of the project proponent from individual wind turbine meters in MWh is presented as:

  ∑EG n,y: Whereas, the summation of total electricity generated from the other WEGs in the wind farm attached to the common MSEDCL meter at the substation in MWh is presented as:

  ∑EG m,y : *A ratio based on these two set of measured values would be used for apportioning the net electricity supplied to the MSEDCL grid by the project activity.*

  EGfacility, y – The total net electricity supplied to the grid by the project activity is calculated as follows:

$$EG_{export,y} = \frac{EG_{export,y\,JMR} * \sum EG_{n,y}}{\sum EG_{n,y} + \sum EG_{m,y}}$$

$EG_{export,y,JMR}$ is the total export recorded by the substation meter

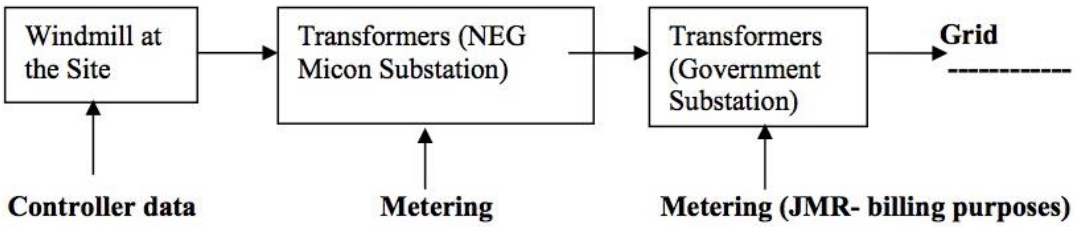
$$EG_{import,y} = \frac{EG_{import,y\,JMR} * \sum EG_{n,y}}{\sum EG_{n,y} + \sum EG_{m,y}}$$

$EG_{import,y,JMR}$ is the total import recorded by the substation meter

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

- Data Archiving: All records related to the project are systematically archived. Monthly credit notes and WEG controller level generation records are available with the EPC contractor, in printed format from the project start date. These are maintained at the project site itself. In addition, the monthly JMR report carrying readings of net electricity delivered to each feeder can also be made available, upon request.
- Meter Test Checking: The main and check meters are tested for accuracy with reference to a portable standard meter. The portable standard meter is owned by MSEDCL. The main and check meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The frequency of meter testing is annual. The responsibility of meter testing lies with the MSEDCL.

Fig 1. Single Line Diagram showing the metering points for WTGs in Maharashtra 1.65MW



Rajasthan - Since this meter is common to project activity and other wind turbines that are not under this project activity, the apportioning of the net electricity would be done based on electricity generated from individual wind turbines.

Apportioning for Rajasthan machine – Apportioning of net electricity uploading is done with reference to the electricity generated from individual Wind turbine generator. The Rajasthan State electricity board will issue a monthly Joint Energy Meter Readings sheet for actual power exported from the wind farm to the grid. Apportioning from the net electricity supplied, as per the Joint Energy Meter Readings sheet, by each project owner is done based on the individual meter readings of each wind turbine. The invoice raised as per the certificate / break-up sheet, issued by state electricity board, will be used to calculate actual GHG emission reductions by the proposed project activity.

The net electricity exported (EGp net) to the grid by project activity is referred from monthly Joint

Meter Readings recorded by the state electricity board representative and the Suzlon O & M team. The main billing meter at Satta substation records total export, and total import by all the connected WTGs to the substation through a feeder. The electricity export and import by a WTG of the PP is then calculated by using the formula as given below. This is the billable reading against which the PP raises invoices to the state electricity board.

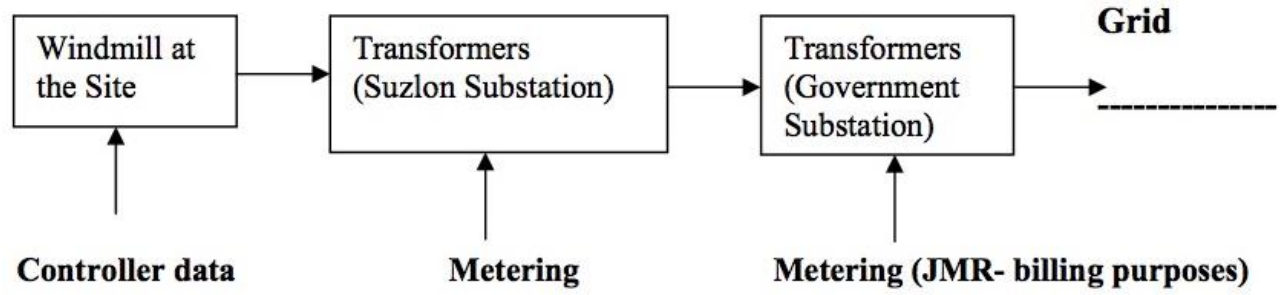
Net generation of a WTG @ for credit: kWh individual @ controller × Total (Import kWh – Export kWh) @ EB / Total Controller Generation of WTGs Connected on a feeder

Procedures for handling uncertainty:

a. In case main meter is faulty – As per the PPA, in the event that the metering system is not in the service as result of maintenance, repairs or testing, then the back metering system shall be issued during the period the main metering system is not in service and the provisions above shall apply to the reading of the backup metering system
b. In case both the meters are faulty – When the main metering system and/or backup metering system and/or any component is thereof is found to be outside the acceptable limit of accuracy or otherwise not functioning properly, it shall be repaired, recalibrated or replaced as soon as possible by the power producer / developers or by the RVNP / Discom at Power Producer / Developer's cost. RVNP/ Discom will ensure that metering system is tested for accuracy at least once in year and report furnished along with joint meter reading.

Any meter seal(s) shall be broken only by the authorized officer of RVPN's / DISCOM's in the presence of representative of Power Producers / Developers, whenever the main metering system or the backup metering system is to be inspected, tested, adjusted, repaired or replaced. In case the crediting period starts mid-month, the reading for that month will be apportioned based on the daily electricity export data given by the O & M contractor. This will be also checked with the average daily export arrived from the months JMR and the conservative of the two will be used for the emission reduction calculation.

Fig 4. Single Line Diagram showing the metering points for WTGs in Rajasthan 1.25 MW



Apportioning of 'net electricity supply' from individual WTGs for common EB meter.
In Maharashtra and Rajasthan, the grid has no individual meters for each WTG and a common meter at the nearest sub-station is used to apportion the net electricity supply by the individual WTGs – after accounting for line losses and the individual imports. The formulae used for the calculations is

Break up Energy Export: EB Meter Export (JMR) **/** Total Controller Export (Feeder) ***** Individual Controller Export generation

Break up Energy Import: EB Meter Import (JMR) **/** Total Controller Export (Feeder) ***** Individual Controller Export generation

Line Loss calculation: (Individual generation at controller-Break up Energy Export) **/** Individual

generation at controller

Mode of Archiving: The monitored data was maintained as hard copy in the form of Joint Meter Reading (JMR). A copy of this data is available with the respective state electricity board's officials and Interocean.

Operational and Management Structure: The O & M Structure implemented by Interocean along with Suzlon and Vestas are as follows:

Figure: Operational and Management Structure

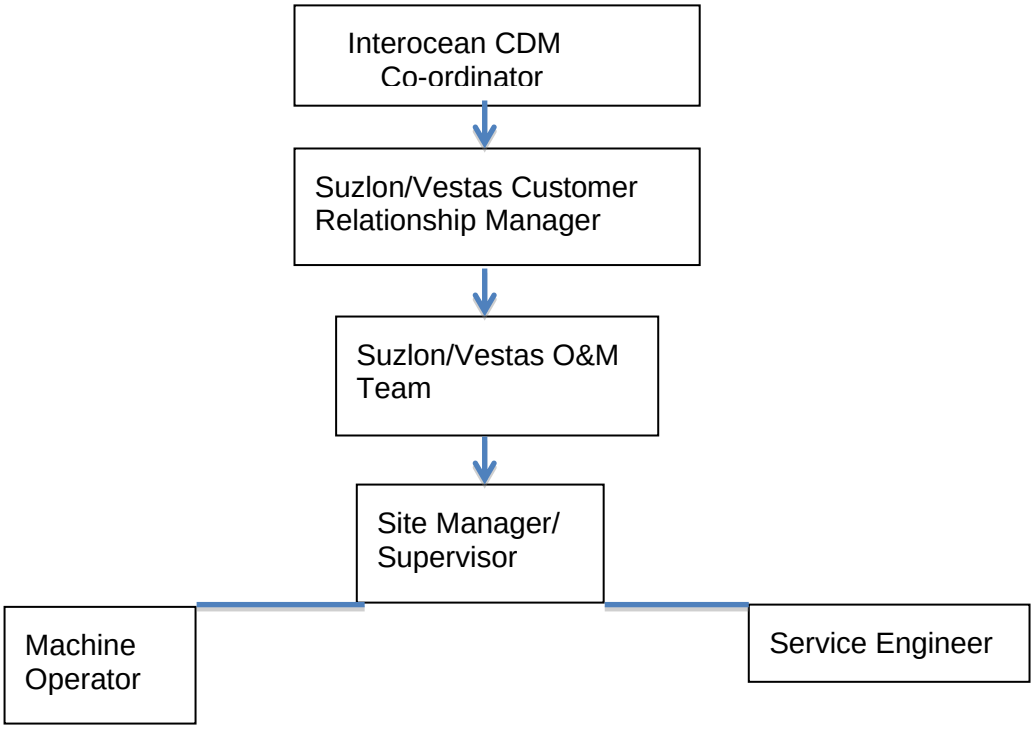


Table: Responsibility Chart

Designation	Responsibilities
Interocean CDM Co-ordinator	- Internal Audit - Review - Any corrective action, if required
Suzlon / Vestas Customer Relation Manager (CRM)	- Reviewing and forwarding the data to the CDM Co- ordinator
Suzlon / Vestas – O & M Team	- Collection of the monitoring data
Site Manager/Supervisor	- Verification of the data - Site visit to check authenticity of data and take corrective action, wherever necessary
Machine Operator	- Operation and monitoring of the data - Data Recording - Reporting the data - Archiving of data
Service Engineer	- Check, if any, disturbance in the functioning of the WTG meter. - Rectify the source of error at the earliest.

Emergency Procedure:

If during testing, both the Main and Check Meter are found within the permissible limit of error i.e. 0.2 %, the energy consumption will be as per the Main meter. If during test, any of the Main meters

is found to be within the permissible limits of error but the corresponding Check meter is beyond the permissible limit, the energy computation will be as per the Main meter. The Check meter shall be calibrated immediately.

If during the tests, the Main meter is found to be beyond permissible limits of error, but the corresponding Check meter is found to be within the permissible limits of error, then the energy computation for the month to date and time of such test check shall be in accordance with Check meter. The Main meter shall be calibrated immediately and the energy for the period thereafter shall be as per the calibrated Main meter.

Procedure for apportioning of electricity supplied to the grid where dates of monitoring period are not matching with dates of joint meter reading reports:
As the claim of emission reductions for WTGs under project falls in middle of month, the apportioning has been done to arrive at electricity supplied reading for that certain period. The following apportioning procedure has been followed, where the crediting period date of the project activity falls in between the meter reading cycles:

The apportioning is being done as calculation of total electricity exported to grid for corresponding number of days falling in monitoring period calculated from total electricity export recorded in monthly joint meter reading and actual generation at controller for corresponding number of days. The daily net electricity generated at controller / CMS is measured by the contractor and sent to the project participant. The net electricity has been calculated as minimum of above two less import for corresponding monitoring period.

Example: Let us assume,
X = Total electricity generation at controller of the WTG of the project activity during the partial period of the corresponding period of main meter reading (kWh)

Y = Total electricity exported to grid by WTG during the corresponding full period of main meter reading (kWh)

Therefore, the total electricity exported to grid during the partial period (Z) = (Y* partial period)/full period

If E = Total electricity supplied by the WTG of the project activity to the grid during the partial period of main meter reading (kWh).

Then total electricity supplied by the WTG(s) of the project activity to the grid during the partial period = Min (X, Z)

I = Total electricity imported from grid by WTG during the corresponding full period of main meter reading (kWh)

Therefore, the total electricity imported from grid during the partial period (Q) = (I* partial period)/full period

Therefore, net electricity exported to grid= E - Q

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{OM,\ NEWNE\ Regional\ Grid}$
Unit	tCO_2/MWh
Description	Operating margin grid emission factor for NEWNE Regional grid

Source of data	"CO_2 Baseline Database for the Indian Power Sector", Version 04 published by Central Electricity Authority, Ministry of Power, Government of India in October 2008
Value(s) applied	1.0086
Choice of data or measurement methods and procedures	To obtain homogeneity in the approach in the country to establish authentic and consistent quantification of the CO_2 emission baseline in the Indian power sector, CEA values have been used. This database by CEA is an official publication of GOI for purpose of CDM Baselines and is based on most recent data available.
Purpose of data/parameter	To calculate combined margin emission factor
Additional comments	This data is fixed ex - ante for the entire crediting period

Data/Parameter	**EF_{BM} , NEWNE Regional grid**
Data unit	tCO_2/MWh
Description	Build margin grid emission factor for NEWNE Regional Grid
Source of data	"CO_2 Baseline Database for the Indian Power Sector", Version 04 published by Central Electricity Authority, Ministry of Power, Government of India in October 2008
Value(s) applied	0.5977
Choice of data or measurement methods and procedures	To obtain homogeneity in the approach in the country to establish authentic and consistent quantification of the CO_2 emission baseline in the Indian power sector, CEA values have been used. This database by CEA is an official publication of GOI for purpose of CDM Baselines and is based on most recent data available.
Purpose of data	To calculate combined margin emission.
Additional comment	This data is fixed ex - ante for the entire crediting period

Data/Parameter	**EFy ,NEWNE Regional Grid**
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for NEWNE regional grid
Source of data	"**CO2 Baseline Database for the Indian Power Sector**", Version 04 published by Central Electricity Authority, Ministry of Power, Government of India in October 2008
Value(s) applied	0.9059
Choice of data or measurement methods and procedures	To obtain homogeneity in the approach in the country to establish authentic and consistent quantification of the CO_2 emission baseline in the Indian power sector, CEA values have been used. This database by CEA is an official publication of GOI for purpose of CDM Baselines and is based on most recent data available.
Purpose of data	to calculate baseline emission factor.
Additional comment	• Calculated as per combined margin approach (detailed in B.4) based on 75% of OM and 25% of BM values. • Value is calculated based on ex-ante approach and the same will be used for the crediting period

D.2. Data and parameters monitored

Data/Parameter	**EG_y, Maharashtra**
Unit	MWh

Description	Net electricity supplied to the grid by the WTGs situated in Maharashtra
Measured/calculated/ default	Calculated
Source of data	Electricity supplied to the grid as per the joint meter readings
Value(s) of monitored parameter	19,838.27
Monitoring equipment	Energy Meter **Main Meter**: Sr. No: 04863121 Type: Alpha S+ Accuracy: 0.2s Date of Calibration: 09/06/2014 The above meter was replaced with a new energy meter with below details on 27/11/2014 Sr. No: HT 01140203 Make: Wallaby Type: MK6E (ABT) Accuracy: 0.2s Date of Calibration: 27/11/2014, 23/10/2015, 08/07/2016, 06/07/2017,03/07/2018, 26/06/2019, 18/06/2020. **Check Meter**: Sr. No: 05253102 Type: Alpha S+ Accuracy: 0.2s Date of Calibration: 09/06/2014 The above meter was replaced with a new energy meter with below details on 27/11/2014 Sr. No: HT 01140204 Make: Wallaby Type: MK6E (ABT) Accuracy: 0.2s Date of Calibration: 27/11/2014, 23/10/2015, 08/07/2016, 06/07/2017,03/07/2018, 26/06/2019, 18/06/2020.
Measuring/reading/recording frequency	Continuous monitoring, monthly recording
Calculation method (if applicable)	Net electricity supplied to the grid has been measured at JMR. Total import is subtracted from the total electricity export readily available in the JMR.
QA/QC procedures	The quantity of net electricity supplied is cross-verified from the invoice raised on respective EBs by the project proponent.
Purpose of data/parameter	To calculate baseline emission
Additional comments	Data will be kept for crediting period +2 years

Data/Parameter	**$EG_{y,\ Rajasthan}$**
Unit	MWh
Description	Net electricity supplied to the grid by the WTGs situated in Maharashtra
Measured/calculated/ default	Calculated
Source of data	Electricity supplied to the grid as per the joint meter readings
Value(s) of monitored parameter	9,902.08
Monitoring equipment	Energy Meter **Main Meter**: Sr. No: RJB00337 Make: Secure Type: E3M025 Accuracy: 0.2s Date of Calibration: 19/01/2014, 15/01/2015, 12/01/2016, 11/01/2017, 08/01/2018, 05/01/2019, 02/01/2020. **Check Meter**: Sr. No: RJB00327 Make: Secure Type: E3M025 Accuracy: 0.2s Date of Calibration: 19/01/2014, 15/01/2015, 12/01/2016, 11/01/2017, 08/01/2018, 05/01/2019, 02/01/2020.
Measuring/reading/recording frequency	Continuous monitoring, monthly recording
Calculation method (if applicable)	Net electricity supplied to the grid has been measured at JMR. Total import is subtracted from the total electricity export readily available in the JMR.

QA/QC procedures	The quantity of net electricity supplied is cross-verified from the invoice raised on respective EBs by the project proponent.
Purpose of data/parameter	To calculate baseline emission
Additional comments	Data will be kept for crediting period +2 years

D.3. Implementation of sampling plan

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Not applicable as all the parameters were monitored.

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

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Baseline Emission is calculated as per equation B in section B.6.1 of the registered PDD

$BE_y = EG_{BL,y} * EF_y$

Where,

$EG_{BL,y}$ is Energy in baseline in year y, kWh

EF_y is CO_2 emission factor of the grid in tCO_2/kWh

$EG_{BL,y} = EG_y$

Where,

EG_y is the net electricity generated by the WTG.

	Net Electricity Supplied to grid (in MWh) from 13th Aug 2014 to 19th Nov 2020 (Rajasthan)						
Month/Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Jan	--	52.39	38.14	100.74	48.27	68.55	89.12
Feb	--	5.25	75.36	79.88	51.31	70.63	101.80
Mar	--	27.23	115.40	83.90	75.33	92.89	116.59
Apr	--	110.23	131.61	202.67	133.67	86.31	134.12
May	--	149.70	202.31	202.12	155.73	165.37	178.89
June	--	197.80	212.67	284.54	317.29	209.54	217.07
July	--	270.27	326.50	225.75	278.09	371.68	127.23
Aug	74.86	267.46	123.54	237.56	298.69	184.92	160.70
Sep	175.16	149.41	234.04	104.13	147.69	105.69	78.96
Oct	79.60	146.51	105.67	50.13	56.19	57.59	55.50
Nov	57.93	86.88	41.00	37.55	37.81	109.03	34.44
Dec	41.84	52.10	49.22	108.28	60.17	107.94	--
Total (in MWh)	**429.40**	**1,515.22**	**1,655.49**	**1,717.24**	**1,660.23**	**1,630.10**	**1,294.39**
Total MWh	**9,902.08**						
	Net Electricity Supplied to grid (in MWh) from 13th Aug 2014 to 19th Nov 2020 (Maharashtra)						
Month/Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Jan	--	68.60	59.02	70.14	33.45	62.80	0.00
Feb	--	74.57	100.72	134.08	45.04	88.45	0.00
Mar	--	117.00	162.63	151.27	128.77	211.58	163.16
Apr	--	175.46	244.14	224.09	188.22	231.63	171.67

May	--	336.19	372.84	329.86	316.82	323.69	196.39
June	--	488.38	495.89	477.09	430.21	417.50	295.56
July	--	745.33	547.33	716.84	831.49	698.41	380.10
Aug	206.67	489.83	655.17	462.63	750.43	682.38	687.49
Sep	405.85	220.23	414.59	174.00	261.17	488.03	169.23
Oct	112.37	84.26	149.24	85.74	107.58	124.92	102.31
Nov	133.99	176.65	101.64	110.92	98.57	107.20	58.20
Dec	125.16	184.64	195.18	188.41	117.29	99.90	
Total (in MWh)	**984.03**	**3,161.15**	**3,498.40**	**3,125.07**	**3,309.03**	**3,536.49**	**2,224.10**
Total MWh	**19,838.27**						

EG_y = $EG_{y,Rajasthan}$ + $EG_{y,Maharashtra}$
= 9.902.08 + 19,838.27
= 29,740.35 MWh
So,
$EG_{BL,y}$ = 29,740.35 MWh

BE_y = 29,740.35 x 0.9059

BE_y = 26,941 tCO_2e (rounded down)

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

>>
Since wind power is a GHG emission free source of energy, the project emissions by sources of GHGs due to the project activity within the project boundary are zero. This approach is also in line with the registered PDD.

Hence, $PE_y = 0$

E.3. Calculation of leakage emissions

>>
In accordance with methodology AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity. This approach is also in line with the registered PDD.

This is not applicable here,
Hence, $L_y = 0$

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	26,941	0	0	0	26,941	0	26,941

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 ($t CO_2e$)

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
26,941	30,549

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

>>
Duration of monitoring period = 13/08/2014 to 19/11/2020
Number of days in monitoring period = 2,291 days
Estimated annual average emission reduction w.r.t the registered PDD = 4,867 tCO_2e
Estimated emission reduction for current monitoring period = (4,867/365) x 2,291
= 30,549 tCO_2e

E.6. Remarks on increase in achieved emission reductions

>>
The emission reduction achieved during the current monitoring period is 11.81% lower than the estimated emission reduction in the registered PDD. This is mainly due to variation in availability of wind energy at the respective time.

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

>>
The project activity is a small-scale type-I renewal resource (wind energy) based electricity generation project. The installed capacity of the project activity of registered project activity was 6.05MW, due to removal of 2 WTGs from state of Tamil Nadu of India, the revised installed capacity reduces to 2.90 MW, there were no other addition by the PP. Hence, project activity has operated as small-scale project and installed capacity was well below small scale threshold of 15MW.

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Document information

Version	*Date*	*Description*
09.0	8 October 2021	Revision to: • Ensure consistency with version 03.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN).
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.

Version	*Date*	*Description*
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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