Monitoring report form for CDM project activity
(Version 08.0)

MONITORING REPORT			
Title of the project activity	Wind Power Project in Rajasthan, India by M/s Devki Builders Pvt. Ltd.		
UNFCCC reference number of the project activity	5923		
Version number of the PDD applicable to this monitoring report	09		
Version number of this monitoring report	02		
Completion date of this monitoring report	16/08/2021		
Monitoring period number	02		
Duration of this monitoring period	05/12/2013 to 31/12/2020 (first and last dates included)		
Monitoring report number for this monitoring period	NA		
Project participants	M/s Devki Builders Pvt. Ltd.		
Host Party	India		
Applied methodologies and standardized baselines	Applied Methodologies: AMS-I.D. ver. 17 - Grid connected renewable electricity generation. Standardized baselines: N/A		
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
	0	59,597 tCO_2e	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	72,493 tCO_2e		

SECTION A. Description of project activity

A.1. General description of project activity

The main purpose of the project activity is to generate electricity using wind energy. The power thus generated is being supplied to the state electricity grid and replace the power generated by fossil fuel intensive thermal power plants thus mitigating GHG emissions. The project activity consists of four Wind Turbine Generators (WTGs) of 1.5 MW capacities at Bastwa Mataji village, Jodhpur district, Rajasthan. The project has been commissioned on 30/09/2009. The power generated is being exported to Jaipur Vidyut Vitaran Nigam Limited (hereafter JVVNL).

All the WTGs were operational during current monitoring period i.e. from 05/12/2013 to 31/12/2020; the net electricity wheeled during this verification period is 64,603.85 MWh, which results to a net emission reduction of 59,592 tCO_2e.

Contribution of project activity to sustainable development:

Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met.
This results in excessive demands for electricity and place immense stress on the environment. Changing coal consumption patterns requires a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of Renewable Energy (RE) sources.

Government of India has stipulated following indicators for sustainable development in the interim approval guidelines [1] for CDM projects. The electricity generation from the project activity contributes to GHG reductions estimated at 102,400 tCO_2e over a period of 10 years

Social well-being

- The proposed project activity leads to alleviation of poverty by establishing direct and indirect employment benefits occurring out for manufacturing towers, for erecting the WEGs and for maintenance during operation of the project activity.
- The infrastructure in and around the project area also improves due to project activity. This includes development of road network and improvement of the quality of electricity in terms of its availability and frequency as the generated electricity is fed into a deficit grid.

Economic well-being
-

- The generated electricity is fed into the NEWNE grid through local grid (Now unified INDIAN Grid), thereby improving the grid frequency and availability of electricity to the local consumers (villagers and sub-urban habitants) thereby resulting in greater local employment, ultimately leading to overall development.
- The project activity also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

Environmental well-being

- 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

[1] Ministry of Environment and Forest website:https://www.india.gov.in/official-website-ministry-environment-and-forests-0

contributing to the reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions.

- As wind power projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power. Being a renewable source, using wind energy to generate electricity contributes to resource conservation. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

Technological well-being

- The project activity leads to the promotion of WEGs into the region, demonstrating the success of wind turbines, which feed the generated power into the nearest sub-station, thus increasing energy availability and improving quality of power under the service area of the substation. Hence, the project leads to technological well-being.

A.2. Location of project activity

Host	State	District	Taluka	Village
India	Rajasthan	Jodhpur	Shergarh	Bastwa Mataji

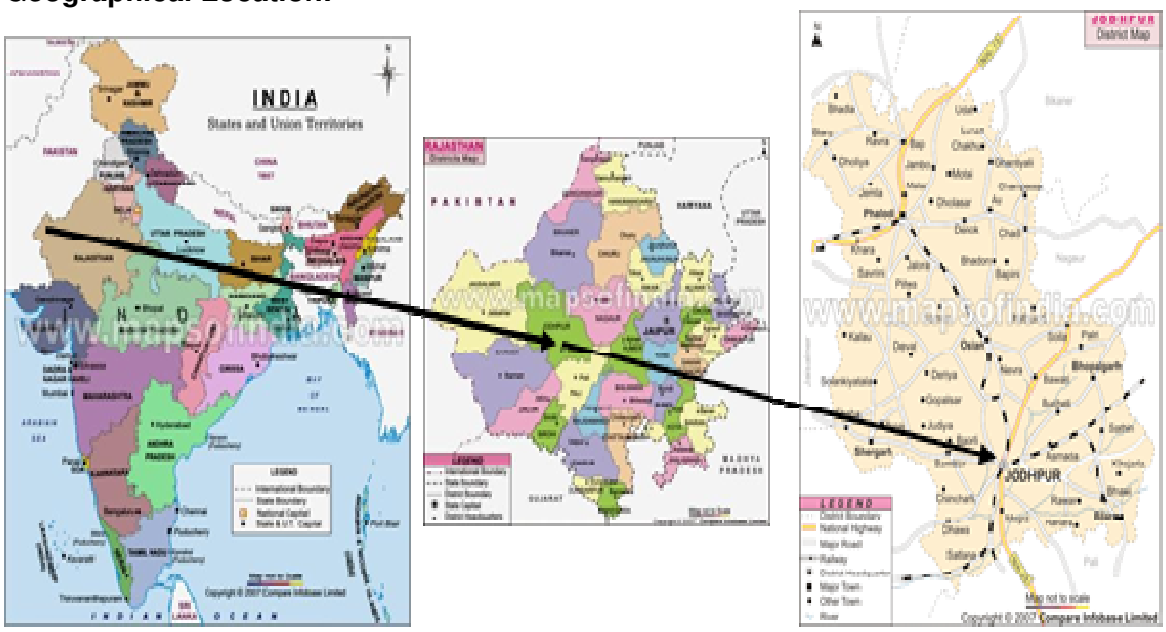
Physical/ Geographical location:

Detail of physical location including unique identification number:

Table 1 Location of project activity

Capacity	1.5 MW	1.5 MW	1.5 MW	1.5 MW
Model	S-82	S-82	S-82	S-82
Unique identification No.	RKBNL6	RKB083	RKB088	RKB089
Survey No.	RKB	RKB	RKB	RKB
Village	Kui Inda	Bastwa Mataji	Bastwa Mataji	Bastwa Mataji
Taluka	Shergarh	Shergarh	Shergarh	Shergarh
District	Jodhpur	Jodhpur	Jodhpur	Jodhpur
State	Rajasthan	Rajasthan	Rajasthan	Rajasthan
Commissioning Date	30/09/2009	30/09/2009	30/09/2009	30/09/2009
Latitude	N 26° 27’ 38.5”	N 26° 30’ 18.0”	N 26° 31’ 23.7”	N 26° 31’ 35.0”
Longitude	E 72° 29’ 21.4”	E 72° 33’ 53.2”	E 72° 34’ 11.8”	E 72° 34’ 05.4”

Geographical Location:



WTGs Satellite Images:

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 Devki Builders Pvt. Ltd.(Private entity)	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 : 17[2]
Sectoral Scope : 01
Tool : Tool to calculate the emission factor for an electricity system[3] (Version 2.0, EB 50, Annex 14)

A.5. Crediting period type and duration

Crediting period type : Fixed
Length of Crediting Period : 10 years 00 Month
Crediting period duration : 23/04/2012 – 22/04/2022

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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.

[2] https://cdm.unfccc.int/methodologies/DB/RSCTZ8SKT4F7N1CFDXCSA7BDQ7FU1X

[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf

Figure 1 Details of WEGs

The technology used in this project is safe, sound and a clean technology, since no greenhouse gas (GHG) emissions associated with the electricity generation. The project installs 4 no. (S-82) Suzlon make WEG of 1.5 MW capacity. Salient features of S-82 WEG are as follows

Table 2: Salient Features of 1.5 MW (S-82) WEG.

Sr. No.	Particulars	Specifications
1.	Rotor diameter	82 m
2.	Hub height	78 m
3.	Installed electrical output	1500 kW
4.	Cut-in wind speed	4.0 m/s
5.	Rated wind speed	12.0 m/s
6.	Cut-out wind speed	20 m/s
7.	Rotor swept area	5281 m^2
8.	Rotational speed	16.3 rpm
9.	Rotor material	GRP
10.	Power regulation	Independent electrochemical pitch
11.	Generator	Asynchronous Generator, 4 pole with slip ring
14.	Operating voltage	690 V
15.	Frequency	50 Hz
16.	Enclosure class	IP 54
17.	Insulation class	H
18.	Slip control	Unique Macro slip providing slip up to 16.7 %
19.	Gear box	3-stage gearbox, 1 planetary & 2 helical
20.	Gear ratio	1:95.09
21.	Nominal load	1650 kW
22.	Type of cooling	Oil cooling system, Forced lubrication
23.	Yaw drive system	Active electrical yaw motors
24.	Yaw bearing	Polyamide slide bearing
25.	Aerodynamic brake	3 independent system with blade pitching
26.	Mechanical brake	Hydraulic disc brake

27.	Design standards	GL special class

The detailed status of implementation i.e. capacity, model, unique identification no, survey no, village, Taluka, District, commissioning date, latitude, longitude are given in table no.1 of section A.2 “Location of project activity”.

The project has been commissioned on 30/09/2009. The power generated is being exported to Jaipur Vidyut Vitaran Nigam Limited (hereafter JVVNL). Plant is in operation since being commissioned. The installation details of the equipments at the project site are remained the same during this monitoring period and there are no exchange of equipments. Also, there are no events / situations leading to changes in project activity that occurred during the current monitoring period.

B.2. Post-registration changes

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

There is not temporary deviation from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents during the current monitoring period.

B.2.2. Corrections

- Taluka Dharampur changed to taluka Shergarh in Section A.2.3 of PDD v09.
- Name of EB GSS Tiwari changed to Tinwari in Section B.7.3 of PDD v09
- Annex changed to Appendix of PDD 09
- In section B.6.2- The purpose of data is mentioned as per PDD template requirement and no any material change from registered PDD
- In section B.7.1 - The monitoring frequency and purpose of data is mentioned as per PDD template requirement. The reference of section B.7.2 is corrected to B.7.3. These changes are due to latest PDD template requirement and due to shifting of change in section numbers in latest PDD template and no any material change from registered PDD.

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

There is no changes to start date of crediting period during the current monitoring period.

B.2.4. Inclusion of monitoring plan

There is no inclusion of 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

There is no permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents Changes to project design during the current monitoring period.

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 methodology AMS – I.D. Version 17 titled "Grid connected renewable energy generation" requires monitoring of the following parameters:
For the project activity, to establish creditable emission reduction, it has to record the actual electricity supplied to the grid (i.e. the net electricity – $EG_{BL, y}$), which would displace equivalent units of electricity at the operating and build margin of the grid. Since the simple OM emission factor is calculated based on a 3 year average, based on the most recent statistics available at the time of PDD preparation, its updating based on post monitoring is not required.

For BM calculation, option 1 ('Tool to calculate the emission factor for an electricity system (Version 2.0, EB 50, Annex 14)[4] has been chosen, which is calculated ex ante based on the most recent information, hence its monitoring is also not required. Thus, under the monitoring protocol for the said project, it is required to monitor and record only the net electricity supplied to the grid i.e $EG_{BL, y}$

- The project activity requires evacuation facilities for sale to grid and the evacuation facility is essentially maintained by the state power utility (State Electricity Board).
- 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 is carried out jointly at the incoming feeder of the state power utility (State Electricity Board). Turbines for sale to utility is connected to the feeder.
- The joint measurement carries out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties signs 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 and check meter shall be installed and owned by State Electricity Board. 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 the particular day of the following month. At the conclusion of each meter reading an appointed representative of the State Electricity Board and the company signs a document indicating the number of kWh exported to the grid.
- The secondary monitoring, which provides 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 (SCADA). The generation data of individual machine can be monitored as a real- time entity at CMS.

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf

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

- 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 4 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.

- ISO 9001:2000 standard has been adopted by SUZLON, who is responsible for monitoring, and O & M of the project. Training is an essential part of the ISO system. To comply with the ISO standard the training has to be provided to personnel according to their responsibility with in organization.

Operation and maintenance of wind farms:

1. Operation and maintenance service team
   - Round the clock 365 days a year – operations management
   - Preventive maintenance of installed base of WEGs across India
   - Breakdown maintenance of installed base of WEGs across India
   - Execution of major & minor design changes in WEGs
2. Special task service team provide various services to sites
   - Relocations
   - Blade replacement at site
   - Major breakdown

3. HT operation & maintenance service team
   - Substation
   - HT lines – internal external

4. Facility service team
   - SCADA service
   - E-repair (Electronic components such as PCB)

5. Other service team
   - Customer support services – generation reporting
   - Liaoning with State Electricity Boards & Nodal agencies

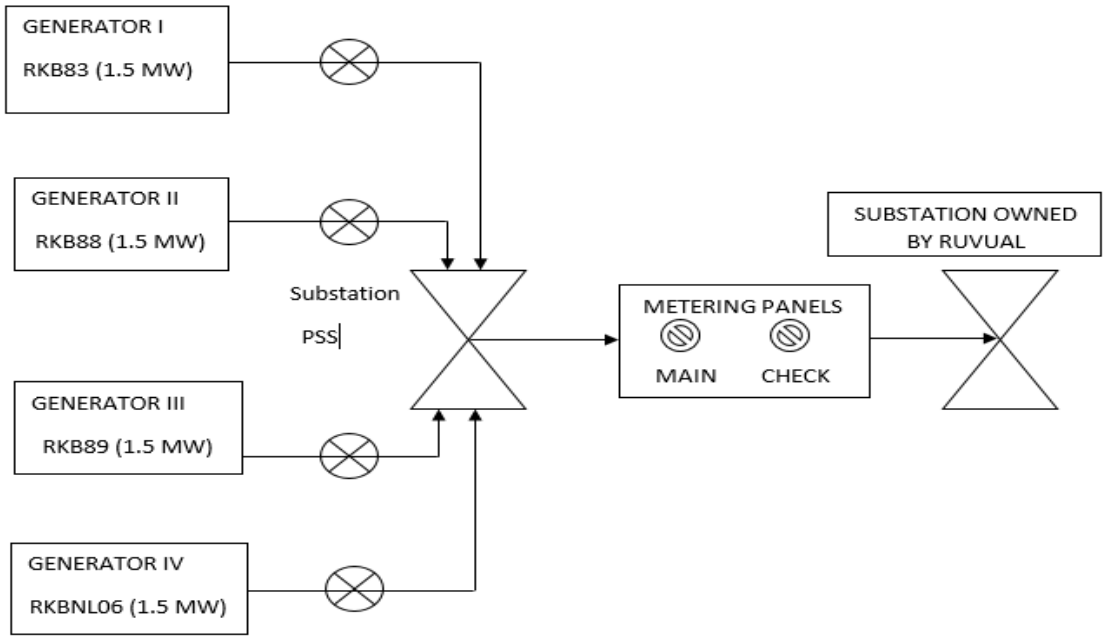


Figure 2 Single line diagram

The organizational hierarchy of SUZLON 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

Apportioning Procedure:

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

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:

The generated electricity is measured through a two-step procedure wherein the first metering is carried out at the controller of the machine with on-board meter. The monitoring of all these wind turbines is done from a common monitoring station as a part of central monitoring system (CMS). The electricity generated from this site is fed to metering arrangement number 58 (Location Nos. RKB 83 + RKB 88 + RKB 89) and metering arrangement number 57 (RKB NL 06) through 33 KV line at 33 KV feeder in 220 KV Ketu Kalan GSS of Suzlon which is further connected to 220 KV

GSS, Tinwari, Dist. Jodhpur. The apportioning of the electricity at Tinwari GSS, Jodhpur, Rajasthan is done as per the following method at the wind farm.

Total numbers of wind turbines are connected to a substation through 33 KV different feeders at Ketu Kalan GSS and which is evacuated further to SEB GSS at Tinwari GSS. The generation reading is collectively displayed by the Main Billing meter at Tinwari, Jodhpur substation. Back up meters are also installed at all 33KV feeders as well as Ketu Kalan GSS for energy auditing purpose.

The net generation of each of the wind turbine is then calculated considering parameters reading of kWh export (Generation) and kWh import (Consumption).

Credit subdivision report is prepared based on the import and export of the electricity at the Tinwari substation. Calculations in credit subdivision report for this site are considered as follows.

1. Export multiplication factor is calculated based on the total export of EB main billing meter reading (net electricity supplied to the grid) divided by panel reading of entire wind farm (gross generation by all the WEGs at CMS) as

Export Multiplication Factor = (Export of EB main billing meter reading / panel reading of entire wind farm)

2. Import multiplication factor is calculated based on the total import of EB main billing meter reading (electricity imported from grid) divided by panel reading of entire wind farm (gross generation by all the WEGs at CMS) as

Import Multiplication Factor= (Import of EB meter reading / panel reading of entire wind farm)

Based on the multiplication factor and customer panel generation reading export and import units are calculated as follows

3. Export units = Export Multiplication Factor X Customer Panel Generation

4. Import units = Import Multiplication Factor X Customer Panel Generation

Ultimately net export units (net electricity supplied to the grid) by the specific customer (project participant) is calculated as

5. Net export units ($EG_{BL,y}$) = Export Units – Import Units

The responsibility of annual 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 time to time. 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.

Routine Maintenance Services:

Routine maintenance labour 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 Torquing
b. Blade Cleaning
c. Nacelle Torquing and Cleaning
d. Transformer Oil Filtration

e. Control Panel & LT Panel Maintenance
f. Site and Transformer Yard Maintenance

Security Services:

a) This service includes watch and ward and security of the wind farm and the equipment.

Management Services:
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.
c) Maintenance is done every quarter and annually and a checklist is maintained manually for the same.

Note: As SUZLON is an ISO 9001:2008[5] certified company, training their employees for day to day recording and handling and maintenance is an integral part of their Quality Management System procedure.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid, CM, y}$**
Unit	tCO_2 / MWh
Description	Grid Emission Factor
Source of data	Calculated
Value(s) applied	0.9225
Choice of data or measurement methods and procedures	Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement. CEA – CDM - Carbon Dioxide baseline database Version 5[6]
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Value is fixed for crediting period i.e. 10 years.

Data/Parameter	**$EF_{grid, OM, y}$**
Unit	tCO_2 / MWh
Description	Operating Margin
Source of data	CEA – CDM - Carbon Dioxide baseline database Version 5[6]
Value(s) applied	1.005
Choice of data or measurement methods and procedures	Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement.

[5] https://www.suzlon.com/in-en/end-to-end-solutions/supply-chain-management-and-manufacturing/l4.aspx?l1=5&l2=21&l3=34&l4=85

[6] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver5.pdf

Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Value is fixed for crediting period i.e. 10 years.

Data/Parameter	**$EF_{grid, BM, y}$**
Unit	tCO_2 / MWh
Description	Build Margin
Source of data	CEA – CDM - Carbon Dioxide baseline database Version 5
Value(s) applied	0.675
Choice of data or measurement methods and procedures	Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Value is fixed for crediting period i.e. 10 years.

D.2. Data and parameters monitored

Data/Parameter	**$EG_{BL,y}$**
Unit	kWh
Description	Net Electricity supplied by project activity to the grid
Source of data	Monthly credit report/ Share of electricity generation by state electricity utility.
Value(s) of monitored parameter	64,603,849.43
Monitoring equipment	Data Type: calculated based on measured parameter. Frequency: Calculated on monthly basis. Archiving Policy: Paper & Electronic Responsibility: State electricity utility is responsible for the proportioning of electricity and provides the net electricity generation report to each WTG owner who supplies electricity to grid through common metering system at state utility substation. The details of energy meter and calibration dates are mentioned over Appendix 1 Energy Meter Calibrations.
Measuring/reading/recording frequency	Frequency: monthly basis.
Calculation method (if applicable)	Data Type: calculated based on measured parameter. Detail calculation approach is incorporated in section B. 7.3 of PDD. Frequency: Calculated on monthly basis. Archiving Policy: Paper & Electronic Responsibility: State electricity utility is responsible for the proportioning of electricity and provides the net electricity generation report to each WTG owner who supplies electricity to grid through common metering system at state utility substation.
QA/QC procedures	The meters are of high accuracy class (0.2s). The meters are monitored continuously by Suzlon personnel. These are sealed by State Electricity Board officials to avoid malfunctioning with meter readings. The officials frequently check the meters for tempering and malfunctioning with the meters. The meters are checked as per IEC-60687 standards. Check meter is placed to verify main meter readings. It can be used as a source of reading in case of main meter failure. Meters are calibrated annually by State Electricity Board officials in the presence of Suzlon representative. There was delay in calibration of meters installed at GSS Tinwari S/s

	(RJB 320 & RJB 319 and RJB 90216 and RJB 90217[7]) and at 220 KV Ketu Kalan GSS (Location 57 and 58) occurred during current monitoring period and hence correction factor has been applied for the delayed period. It is to be noted that the data recorded through meters installed 220 KV Ketu Kalan GSS (Location 57 and 58) are not directly used for calculation of net Electricity supplied by project activity to the grid. As a conservative approach the error factor is applied for the delayed period to address the delay in calibration for the meters installed at 220kV Tinwari GSS as well as the meters installed at 220kV Ketu Kalan GSS of Suzlon.
Purpose of data/parameter	For calculation of baseline emissions
Additional comments	The archive of data is maintained for crediting period + 2 years.

Data/Parameter	$\sum_{0}^{n} EGn,y$
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.
Source of data	Log sheet records in Suzlon database at CMS.
Value(s) of monitored parameter	70,358,013.10
Monitoring equipment	Controller meter. .
Measuring/reading/recording frequency	Continuous measurement and monthly recording
Calculation method (if applicable)	$EG_{n,y}$ is the sum of electricity generated at controller from project activity continuously measured by controller connected to CMS through SCADA network. State electricity utility used this figure to calculate net electricity generation by the project activity. This is continuously measured and summarized monthly.
QA/QC procedures	The controller end generation of each WTG is continuously recorded & monitored at CMS. The controller end generation & other sensitive parameter monitoring followed are cross verified at CMS database.
Purpose of data/parameter	For calculation of baseline emissions
Additional comments	Data archived during the whole crediting period + 2 years

Data/Parameter	$\sum_{0}^{n} EGm,y$
Unit	kWh
Description	The summation of total Electricity Generated (kWh) at the controller from the project activity connected to single feeder of a particular site.
Source of data	Log sheet records in Suzlon database at CMS.
Value(s) of monitored parameter	1,76,24,95,571.20

[7] Meter Sr. no RJB 00320 is replaced with RJB 90216 and RJB 00319 is replaced with RJB 90217 on 24/01/2017

Monitoring equipment	Controller meter. .
Measuring/reading/recording frequency	Continuous measurement and 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 connected to CMS through SCADA network. State electricity utility used this figure & sum for all WTGs (including project activity) connected to single common feeder. This is continuously measured and summarized monthly.
QA/QC procedures	The controller end generation of each WTG is continuously recorded & monitored at CMS. The controller end generation & other sensitive parameter monitoring followed arecross verified at CMS database.
Purpose of data/parameter	For calculation of baseline emissions
Additional comments	Data 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.
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	65,069,013.78
Monitoring equipment	The details of energy meter and calibration dates are mentioned over Appendix 1 Energy Meter Calibrations.
Measuring/reading/recording frequency	measured hourly and recorded monthly
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. Monitoring: tri vector meter is used for monitoring Data Type: measured parameter. Recording Frequency: measured hourly and recorded monthly Archiving Policy: Paper & Electronic.
QA/QC procedures	Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, matched every month.
Purpose of data/parameter	For calculation of baseline emissions
Additional comments	Archiving Policy: Paper & Electronic

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.
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	437,542.00
Monitoring equipment	The details of energy meter and calibration dates are mentioned over Appendix 1 Energy Meter Calibrations.
Measuring/reading/recording frequency	measured hourly and recorded monthly
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. Monitoring: tri vector meter is used for monitoring Data Type: measured parameter. Recording Frequency: measured hourly and recorded monthly Archiving Policy: Paper & Electronic.
QA/QC procedures	Other than main meter, there is check meter to verify the accuracy of main meter. The calibration of the meters done by state utility as per the schedule mentioned in PPA. Other than periodic calibration of the meters the reading of both meters, matched every month.
Purpose of data/parameter	For calculation of baseline emissions
Additional comments	Archiving Policy: Paper & Electronic

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 Combined Margin (tCO_2/MWh) of the current generation mix.

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

Where,

BE_y : Baseline Emissions in year y ($t CO_2$)

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

$EF_{CO2, grid,y}$:CO_2 emission factor of the grid in year y ($t CO_2/MWh$).

BE_y = 64,603.85 *0.9225

=59,597 t CO_2e (Rounded down to nearest integer)

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.
Hence, $PE_y = 0$

E.3. Calculation of leakage emissions

As there is no transfer of energy generating equipment from another activity nor the existing equipment is transferred to another activity,
Hence, $PL_y = 0$

Emission Reductions:

$ER_y = BE_y – PE_y – L_y$

Where:
ER_y Emissions reductions in year y, (tCO_2e/y)
BE_y Baseline Emissions in year y, (tCO_2e/y)
PE_y Project emissions in year y, (tCO_2/y)
L_y Leakage emissions in year y, (tCO_2/y)

Since project emission and leakage values are zero the above equation reduces to: $ER_y = BE_y$
$ERy=59,597$ (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 until 31/12/ 2020	From 01/01/ 2021	Total amount
Total	59,597	0	0	0	59,597	0	59,597

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)
59,597	72,493

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

Considering the annual average emission reductions as per the registered PDD which is 10,240 tCO_2e per year, the number of days since commissioning covered during the current monitoring period comes out to be 2584 days. The amount estimated is using unitary method i.e. 10,240/365*2,584= 72,493 tCO_2e.

E.6. Remarks on increase in achieved emission reductions

The achieved emission reduction is 17.79% lower than the estimated emission reductions. This is due to lower PLF achieved during the current monitoring period as compared to the estimated PLF in the registered PDD.

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

The project activity remains as a Small scale project activity for the entire crediting period.

Appendix 1. Energy Meter Calibrations[8]

Meter details	Main meter	Calibration valid till	Backup meter	Calibration valid till	Identified months which are not covered in calibration validity
Meter serial no.	RJB 00320		RJB 00319		
Meter make	Secure meters Ltd.		Secure meters Ltd.		
Accuracy class	0.2S		0.2S		
Calibration date	20/12/2012	19/12/2013	20/12/2012	19/12/2013	
Calibration date	15/01/2014	14/01/2015	15/01/2014	14/01/2015	Dec 13 and Jan 14
Calibration date	25/02/2015	24/02/2016	25/02/2015	24/02/2016	Jan 15 and Feb 15
Calibration date	22/02/2016	21/02/2017	22/02/2016	21/02/2017	
Meter Sr. no RJB 00320 is replaced with RJB 90216 and RJB 00319 is replaced with RJB 90217 on 24/01/2017					
Meter serial no.	RJB 90216		RJB 90217		
Meter make	SECURE		SECURE		
Accuracy class	0.2S		0.2s		
Calibration date	24/01/2017	23/01/2018	24/01/2017	23/01/2018	
Calibration date	16/05/2018	15/05/2019	16/05/2018	15/05/2019	Jan 18 to May 18
Calibration date	25/04/2019	24/04/2020	25/04/2019	24/04/2020	
Calibration date	07/11/2020	06/11/2021	07/11/2020	06/11/2021	Apr 20 to Nov 20

Meter details(SEL 57)	Main meter	Calibration valid till	Backup meter	Calibration valid till	
Meter serial no.	RJB 00323		RJB 00322		
Meter make	Secure meters Ltd.		Secure meters Ltd.		
Accuracy class	0.2S		0.2S		
Calibration date	20/12/2012	19/12/2013	20/12/2012	19/12/2013	
Calibration date	29/01/2014	28/01/2015	29/01/2014	28/001/2015	March 2013 to Jan 14
Calibration date	20/02/2015	19/02/2016	20/02/2015	19/02/2016	Jan 15 to Feb 15
Calibration date	21/02/2016	20/02/2017	21/02/2016	20/02/2017	Feb-16
Calibration date	23/05/2017	22/05/2018	23/05/2017	22/05/2018	Feb 17 to May 17
Calibration date	15/05/2018	14/05/2019	15/05/2018	14/05/2019	
Calibration date	24/04/2019	23/04/2020	24/04/2019	23/04/2020	

[8] There was delay in calibration of meters installed at GSS Tinwari S/s (RJB 320 & RJB 319 and RJB 90216 and RJB 90217) and at 220 KV Ketu Kalan GSS (Location 57 and 58) occurred during current monitoring period and hence correction factor is applied for the delayed period. It is to be noted that the data recorded through meters installed 220 KV Ketu Kalan GSS (Location 57 and 58) are not directly used for calculation of net electricity supplied by project activity to the grid. As a conservative approach the error factor is applied for the delayed period to address the delay in calibration for the meters installed at 220kV Tinwari GSS as well as the meters installed at 220kV Ketu Kalan GSS of Suzlon.

Calibration date	05/11/2020	04/11/2021	05/11/2020	04/11/2021	April 20 to Nov 20

Meter details(SEL 58)	**Main meter**	**Calibration valid till**	**Backup meter**	**Calibration valid till**	
Meter serial no.	RJB 00315		RJB 00324		
Meter make	SECURE		SECURE		
Accuracy class	0.2S		0.2s		
Calibration date	20/12/2012	19/12/2013	20/12/2012	19/12/2013	
Calibration date	29/01/2014	28/01/2015	29/01/2014	28/01/2015	March 2013 to Jan 14
Calibration date	20/02/2015	19/02/2016	20/02/2015	19/02/2016	Jan 15 to Feb 15
Calibration date	21/02/2016	20/02/2017	21/02/2016	20/02/2017	Feb-16
Calibration date	24/05/2017	22/05/2018	24/05/2017	22/05/2018	Feb 17 to May 17
Calibration date	15/05/2018	14/05/2019	15/05/2018	14/05/2019	
Calibration date	24/04/2019	23/04/2020	24/04/2019	23/04/2020	
Calibration date	05/11/2020	04/11/2021	05/11/2020	04/11/2021	April 20 to Nov 20

Appendix 2. Breakdown details

Duration	Breakdown in Hrs
05/12/2013 to 30/11/2014	6461.40
01/12/2014 to 30/11/2015	1756.20
01/12/2015 to 30/11/2016	1241
01/12/2016 to 30/11/2017	1213.60
01/12/2017 to 30/11/2018	1111.10
01/12/2018 to 30/11/2019	902.90
01/12/2019 to 31/12/2020	1299.50

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.

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