



**Monitoring report form
(Version 06)**

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

MONITORING REPORT

Title of the project activity	Wind Power Project in Madhya Pradesh by OBWPPL	
GS reference number of the project activity	GS4962	
Version number of the PDD applicable to this monitoring report	5.0	
Version number of the monitoring report	2.1	
Completion date of the monitoring report	08/01/2019	
Monitoring period number	Monitoring Period: 01	
Duration of this monitoring period	Duration: 05/05/2016 to 31/03/2018 (Both days included)	
Monitoring report number for this monitoring period	N/A	
Project participant(s)	Orange Bercha Wind Power Private Limited	
Host Party	India	
Sectoral scope(s)	Sectoral Scope 1: Energy Industries(renewable – /non-renewable sources)	
Applied methodologies and standardized baselines	ACM0002 “Grid-connected electricity generation from renewable sources” Version 17.0	
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
	NA	202,064 tCO ₂ e
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	204,143 tCO ₂ e	

SECTION A. Description of project activity

A.1. General description of project activity

Orange Bercha Wind Power Private Limited (OAWPPL) has set up wind power project in and around the village of Sandla in Ratlam district of Madhya Pradesh in India with capacity of 50 MW.

The project activity generates clean electricity with utilization of wind energy. The project consists of 25 Wind Turbine Generators (WTGs) of Gamesa G 97 turbines of 2 MW each.

The electricity generated by the project is exported to the Indian electricity grid. The project activity displaces an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid and thereby has resulted in reduction of the associated CO₂ emissions. The monitoring of emission reduction and sustainable development indicators has been carried out in accordance to respective registered PDD and Passport.

The present monitoring period is from 05/05/2016 to 31/03/2018 through which emission reduction claimed is 202,064 tCO₂e. All the project WTGs were commissioned on the same day i.e, 05/05/2016.

The project proponent has chosen to start the crediting period from 05/05/2016.

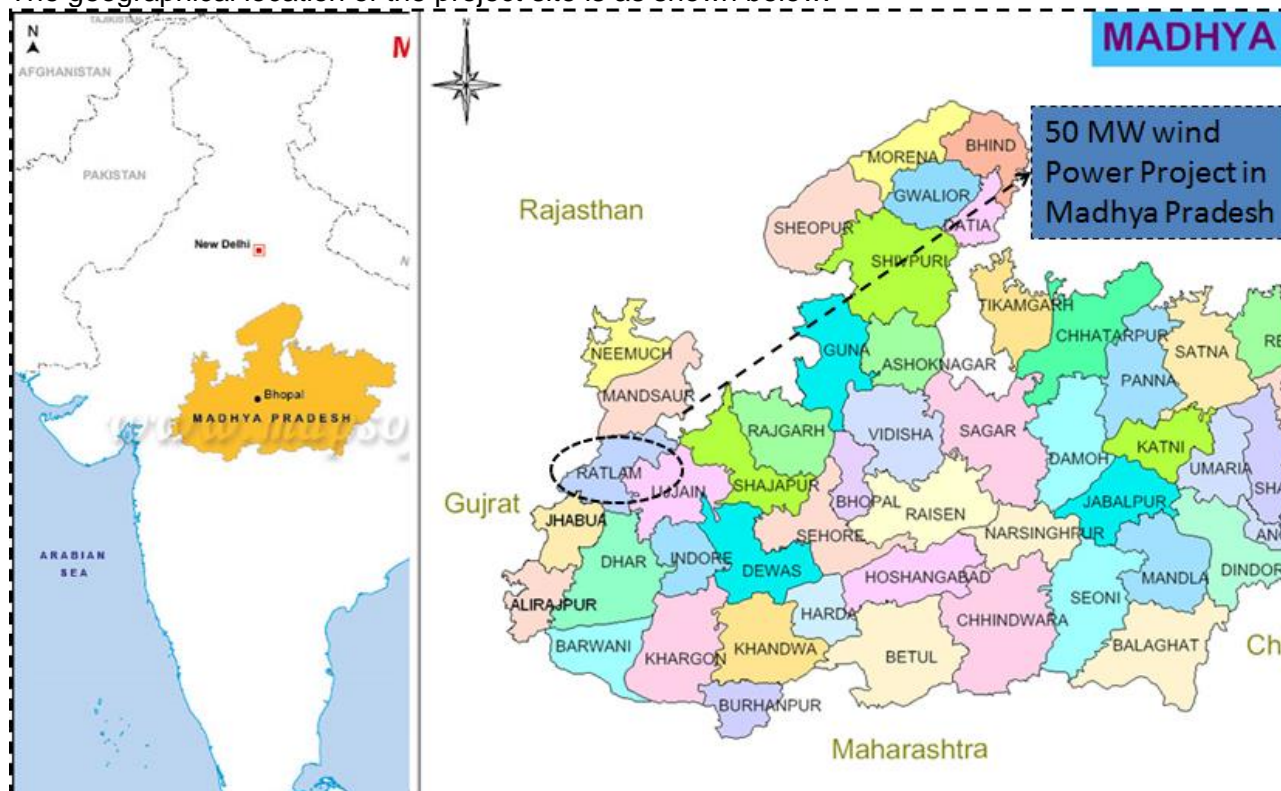
A.2. Location of project activity

The project activity is located in the villages of Jhar, Sandala, Dhanesra, Kamed villages of Ratlam district, in the state of Madhya Pradesh, India. Details of co-ordinates of each WTGs are given below:

No	WTG ID	Latitude N	Longitude E	Tehsil/ District	Village	State
1	B 16	52.2298	25.7294	Ratlam	Jhar	Madhya Pradesh
2	B 4	52.3946	25.7375	Ratlam	Sandala	Madhya Pradesh
3	B 1	52.1672	25.7515	Ratlam	Sandala	Madhya Pradesh
4	B 72	52.3437	25.7426	Ratlam	Jhar	Madhya Pradesh
5	B 90	52.5259	25.7525	Ratlam	Jhar	Madhya Pradesh
6	B 92	52.7864	25.7393	Ratlam	Jhar	Madhya Pradesh
7	B 89	52.5573	25.7325	Ratlam	Sandala	Madhya Pradesh
8	B 86	52.5976	25.7415	Ratlam	Sandala	Madhya Pradesh
9	B 73	52.8737	25.7434	Ratlam	Sandala	Madhya Pradesh
10	B 79	52.8032	25.7356	Ratlam	Sandala	Madhya Pradesh
11	B 38	52.5999	25.7551	Ratlam	Dhanesra	Madhya Pradesh
12	B 87	52.4506	25.7245	Ratlam	Dhanesra	Madhya Pradesh
13	B 80	52.608	25.737	Ratlam	Dhanesra	Madhya Pradesh
14	B 82	52.7876	25.7563	Ratlam	Dhanesra	Madhya Pradesh
15	B 91	52.608	25.737	Ratlam	Dhanesra	Madhya Pradesh
16	B 33	52.6708	25.7399	Ratlam	Dhanesra	Madhya Pradesh
17	B 71	52.8647	25.7629	Ratlam	Kamed	Madhya Pradesh
18	T1	52.7818	25.7614	Ratlam	Kamed	Madhya Pradesh
19	T2	52.7876	25.7563	Ratlam	Kamed	Madhya Pradesh
20	B 77	52.8648	25.7588	Ratlam	Kamed	Madhya Pradesh
21	B 83	52.8737	25.7434	Ratlam	Kamed	Madhya Pradesh

22	B 78	52.8747	25.7401	Ratlam	Kamed	Madhya Pradesh
23	B 85	52.8032	25.7356	Ratlam	Kamed	Madhya Pradesh
24	B 75	52.7864	25.7393	Ratlam	Kamed	Madhya Pradesh
25	B 84	52.735	25.7416	Ratlam	Kamed	Madhya Pradesh

The geographical location of the project site is as shown below:



A.3. Parties and project participant(s)

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	Orange Bercha Wind Power Private Limited	No

A.4. Reference to applied methodologies and standardized baselines

Title: Consolidated baseline and monitoring methodology for “Grid-connected electricity generation from renewable sources”

References: Approved consolidated baseline methodology ACM0002 “Grid-connected electricity generation from renewable sources” (Version 17.0¹)

ACM0002 draws upon the following tool which has been used in the MR:

Methodological Tool: Tool to calculate the emission factor for an electricity system- Version 6.0, EB 97, Annex 7²

¹<https://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNV3LTK1BP3OR24Y5L>

²http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v6.pdf/history_view

A.5. Crediting period type and duration

Type of Crediting Period: Renewable

Start date of the crediting period: 05/05/2016 (Retroactive crediting start date)

Length of the current crediting period: 7 years

The current crediting period is from 05/05/2016 to 04/05/2023.

SECTION B. Implementation of project activity**B.1. Description of implemented project activity**

The project activity comprises of 25 WTGs of Gamesa's G97model 2000kW.

The project has been commissioned as of 05/05/2016 and all the WTGs are currently operational. A total of all the 25 WTGs under the project activity were commissioned on the same day.. The technical details of the WTGs are given below:

Gamesa G-97	
Rated power	2000 kW
Average Annual Wind speed	7.5 m/s
Turbulence Intensity I15%	18 m/s
Reference 10 minute wind speed for 50 years	37.5 m/s
Survival wind speed	52.5 m/s
POWER	
Rated power	2000 kW
Average Annual Wind speed	7.5 m/s
Turbulence Intensity I15%	18 m/s
Reference 10 minute wind speed for 50 years	37.5 m/s
Survival wind speed	52.5 m/s
GENERATOR	
Type	Doubly-fed with coil rotors and slip rings
Rated power	2.0 MW
Voltage	690 V AC
Frequency	50Hz/60Hz
Protection class	IP 54
Power Factor	0.95 CAP – 0.95 IND throughout the power range
ROTOR	

Diameter	97 m
Swept area	7390 sq.m
Speed range (variable)	9:19 rpm
TOWER AND FOUNDATION	
Hub height	104 m
Design	Tubular, Four sections
Foundation type	Floating foundation
GEAR BOX	
Type	1 Planetary stage & 2 Parallel stage
Ratio	1:106.8 (50 Hz), 1:127.2 (60 Hz)

The details of WTGs and the feeders connected are mentioned below

Feeder	WTGs
Feeder 1	B-01, B-04, B-16, B-72, B-73, B-79, B-82, B-86, B-89, B-90, B-91, B-92
Feeder 2	B-33, B-38, B-71, B-75, B-77, B-78, B-80, B-83, B-84, B-85, B-87, T-01, T-02

B.2. Post-registration changes

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

>> NA

B.2.2. Corrections

>> NA

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

>> NA

B.2.4. Inclusion of monitoring plan

>> NA

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

>> NA

B.2.6. Changes to project design

>> NA

SECTION C. Description of monitoring system

The project proponent has entered into agreement with the WTG Suppliers (Gamesa) for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well-equipped O&M team for day to day Operation and maintenance of each WTG. O&M contractor will

provide a monthly report, which includes generation data, major breakdown events and machine availability.

Monthly Generation Data for the Monitoring Period:

	Export (kWh)	Import (kWh)	Net Generation (kWh)
May-16	10354100	7200	10346900
Jun-16	13719400	12000	13707400
Jul-16	13699700	6500	13693200
Aug-16	16325700	15900	16309800
Sep-16	8630700	23800	8606900
Oct-16	5067500	41800	5025700
Nov-16	1923400	106700	1816700
Dec-16	3611000	87100	3523900
Jan-17	6689500	44000	6645500
Feb-17	6950100	31800	6918300
Mar-17	8336300	36600	8299700
Apr-17	12330600	9900	12320700
May-17	15091700	6500	15085200
Jun-17	15028800	12100	15016700
Jul-17	18634400	8500	18625900
Aug-17	11166100	9700	11156400
Sep-17	5956900	43200	5913700
Oct-17	4021800	31300	3990500
Nov-17	4022900	77400	3945500
Dec-17	7663000	43600	7619400
Jan-18	4378500	66800	4311700
Feb-18	4197800	68700	4129100
Mar-18	9712000	34200	9677800
Total			206686600

Key Reasons for Downtime during the Current Monitoring Period:

Month-Year	WTG stoppage (Hrs)	Unscheduled Maintenance (Hours)	Scheduled Maintenance (Hours)
May-16	831.5	801.5	30.0
Jun-16	347.0	347.0	0
Jul-16	358.0	316.9	41.1
Aug-16	298.8	298.8	0.0
Sep-16	143.8	73.8	70.0
Oct-16	335.4	270.3	65.1
Nov-16	234.2	85.6	157.6
Dec-16	389.5	125.9	272.6
Jan-17	210.3	137.8	72.5
Feb-17	557.4	500.4	57.0

Mar-17	1207.	306.5	899.5
Apr-17	657.5	657.5	0.0
May-17	951.8	901.8	50.0
Jun-17	457.0	336.2	120.8
Jul-17	358.0	316.9	41.1
Aug-17	298.8	298.8	0.0
Sep-17	143.8	73.8	70.0
Oct-17	335.4	270.3	65.1
Nov-17	234.2	85.6	157.6
Dec-17	389.5	125.9	272.6
Jan-18	210.3	137.8	72.5
Feb-18	558.5	460.9	97.6
Mar-18	1466.5	394.8	1071.7
Total			

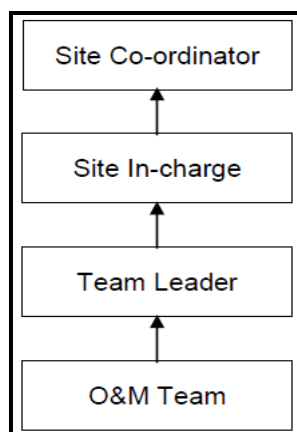
The project activity has entered a power purchase agreement for a period of 25 years with the State utility (DISCOM). The electricity is fed in the Integrated Indian grid. Monitoring consists of metering the net electricity supplied to the grid ($EG_{facility,y}$). This parameter is based on the monthly JMRs (share certificates) undertaken by DISCOM and Gamesa which is continuously through energy meter. The PP will then raise monthly electricity sales invoices to DISCOM based on the JMR reading. All the meters used in the project activity will be calibrated on an annual basis.

Data storage and Archiving

In accordance with the methodology all the data collected during the crediting period will be archived electronically and kept for at least two years after the end of crediting period. 100% of the data is monitored and the meters owned by DISCOM/PP are calibrated at regular intervals to ensure low uncertainty in the monitored data.

O&M contractor (Gamesa) will provide a monthly report, which includes generation data, major breakdown events and machine availability. Project manager is responsible for recording of monthly meter readings of export and import. Monthly power export and import data will be sent regularly to site in charge.

The data for the project is compiled by the O&M Contractor and subsequently stored by the PP, the reporting and data flows as per the below mentioned flow chart starting from Site O&M team which monitors day to day operational data and monthly recording. The roles and responsibilities for the project are described as below;



The monitored data will be reported by the PP to the GS consultant on a monthly basis for the calculation and estimation of emission reductions. This data will be checked against invoices raised.

Personal Training:

The training for operating and maintaining the plant will be provided to the O&M team whenever there would be necessity or any technological up gradation

Monitoring Process at project site

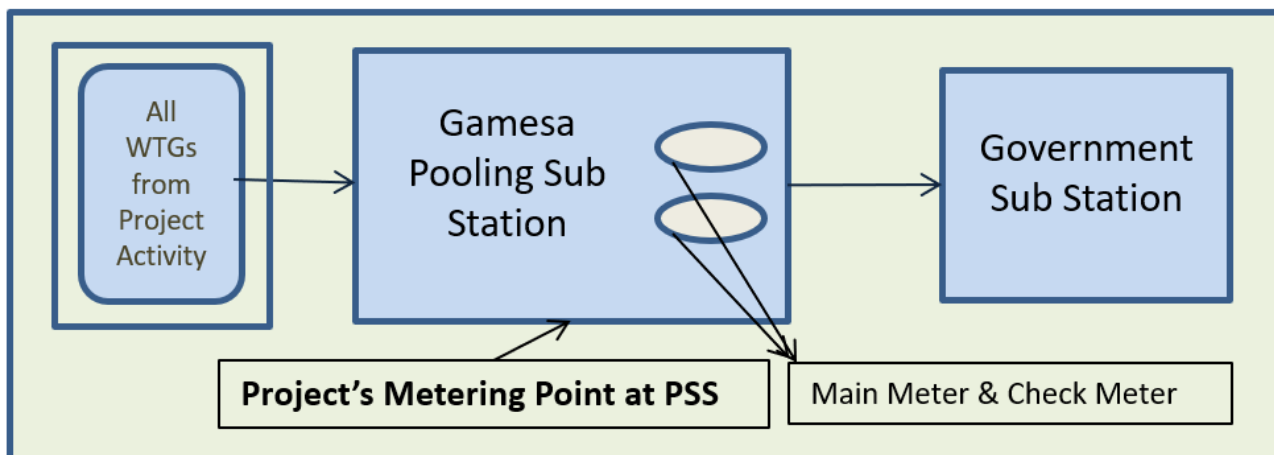
Joint monthly meter reading shall be taken from substation meter by representative of DISCOM and O&M team/service provider (on behalf of the project proponent). It must be noted here that the meter readings as mentioned above shall be calculated as the product of meter multiplication factor and the difference of the current and previous meter readings

Based on the above procedure, the Monthly Wind Energy Certificates shall be provided to the project proponent. This is to be noted that the detail procedure of monitoring is illustrated here for the sake of understanding; for the preparation of monitoring report during periodic verifications, only the net electricity generation value calculated from energy certificates shall be used for emission reduction calculation. No other parameters as explained above shall be used and presented in the monitoring report.

Emergency preparedness:

In case Main meter or Check meter is found to be outside the acceptable limits of accuracy or faulty or not functioning properly, it will be repaired, recalibrated or replaced as soon as possible. In the event that the Main meter is not in service as a result of maintenance, repairs or testing, the Check meter will be used for readings

The project's **metering arrangement** representation:



SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data / Parameter	$EF_{OM, y}$
Unit	tCO ₂ e/MWh
Description	Operating Margin Emission Factor of Indian Grid

Source of data	Central Electricity Authority: "CO2 Emission Database CEA CO2 Baseline database Version 11" published by Central Electricity Authority (CEA), Ministry of Power, Government of India.
Value(s) applied	0.9941
Choice of data or Measurement methods and procedures	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the Simple OM approach in accordance with the procedures prescribed in the approved " <i>Tool to calculate the emission factor for an electricity system</i> "
Purpose of data/parameter	The data is used to calculate baseline emission reductions.
Additional comment	The operating margin emission factor is a 3-year generation-weighted average (2012-15). The operating Margin is calculated ex ante and fixed during the crediting period

Data / Parameter	$EF_{BM, y}$
Unit	tCO ₂ e/MWh
Description	Build Margin Emission Factor of INDIAN Grid
Source of data	Central Electricity Authority: "CO2 Emission Database CEA CO2 Baseline database Version 11" published by Central Electricity Authority (CEA), Ministry of Power, Government of India.
Value(s) applied	0.9285
Choice of data or Measurement methods and procedures	Build Margin Emission Factor has been calculated by the Central Electricity Authority with the approved " <i>Tool to calculate the emission factor for an electricity system</i> ".
Purpose of data/parameter	The data is used to calculate baseline emission reductions.
Additional comment	The Build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data (2014-15) available has been used and the build margin is calculated.

Data/parameter:	$EF_{CM, y}$
Unit	tCO ₂ e/MWh
Description	Combined Margin Emission Factor of INDIAN Grid
Source of data	Central Electricity Authority: "CO ₂ Emission Database CEA CO2 Baseline database Version 11" published by Central Electricity Authority (CEA), Ministry of Power, Government of India.
Value(s) applied)	0.9777
Choice of data or measurement methods and procedures	Combined Margin Emission Factor has been calculated with the approved " <i>Tool to calculate the emission factor for an electricity system</i> " as weighted average of 75% of OM (three years average) and 25% of BM for the latest year.
Purpose of data/parameter	The data is used to calculate baseline emission reductions.
Additional comments	-

D.2. Data and parameters monitored

For Emission Reduction

(Copy this table for each piece of data and parameter)

Data/parameter:	EG _{facility,y}
Unit	MWh

Description	Quantity of net electricity supplied to the grid during the year y.																
Measured/calculated/default	Calculated (based on the measured values of electricity exported and imported)																
Source of data	Share Certificate Issued by Gamesa and JMR (Joint Meter Reading)																
Value(s) of monitored parameter	<p>206,673 MWh</p> <table border="1"> <thead> <tr> <th>Vintage</th> <th>Export (MWh)</th> <th>Import (MWh)</th> <th>Net Generation (MWh)</th> </tr> </thead> <tbody> <tr> <td>Year 2016</td> <td>73332</td> <td>301</td> <td>73025</td> </tr> <tr> <td>Year 2017</td> <td>115892</td> <td>355</td> <td>115531</td> </tr> <tr> <td>Year 2018</td> <td>18288</td> <td>170</td> <td>18117</td> </tr> </tbody> </table>	Vintage	Export (MWh)	Import (MWh)	Net Generation (MWh)	Year 2016	73332	301	73025	Year 2017	115892	355	115531	Year 2018	18288	170	18117
Vintage	Export (MWh)	Import (MWh)	Net Generation (MWh)														
Year 2016	73332	301	73025														
Year 2017	115892	355	115531														
Year 2018	18288	170	18117														
Monitoring equipment	<p>Net electricity supplied will be calculated based on the difference between values of “export” and “import” on the energy meter at the Government sub station (evacuation point). (Net Electricity = Export – Import)</p> <p>The net electricity will be calculated by State electricity board and provided in the monthly generation statement/JMR/B-form. Hence, the net electricity reading will be directly sourced from the monthly generation statement/JMR/B-form.</p> <p>As per the registered PDD, calibration of meters is under the control of State Utility and frequency of calibration is not within the control of PP. However, as the PDD the PP shall ensure at least once in five year calibration as per the national standard. During the monitoring period the meters have been calibrated and there has been no error or fault in the meters identified during the latest calibration as well.</p> <p>Below are the details of meter numbers and calibration dates, The meters are calibrated before commissioned and post commissioning during the monitoring period have been calibrated as detailed below:</p> <table border="1"> <thead> <tr> <th colspan="3">Energy Meter Serial No Details</th> <th>Calibration Date</th> <th>Calibration Due Date</th> </tr> </thead> <tbody> <tr> <td rowspan="2">PSS Meters</td> <td>Main Meter</td> <td>XC576471</td> <td>04/01/2016</td> <td>03/01/2021</td> </tr> <tr> <td>Check Meter</td> <td>XC576472</td> <td>04/01/2016</td> <td>03/01/2021</td> </tr> </tbody> </table> <p>*All the meters are of “Secure Make: with 0.2s Accuracy class.</p>	Energy Meter Serial No Details			Calibration Date	Calibration Due Date	PSS Meters	Main Meter	XC576471	04/01/2016	03/01/2021	Check Meter	XC576472	04/01/2016	03/01/2021		
Energy Meter Serial No Details			Calibration Date	Calibration Due Date													
PSS Meters	Main Meter	XC576471	04/01/2016	03/01/2021													
	Check Meter	XC576472	04/01/2016	03/01/2021													
Measuring/reading/recording frequency:	Measuring Frequency: Continuous Frequency of Recording: Monthly																
Calculation method (if applicable):	Net Electricity is calculated difference between export & import which is measured by energy meter.																
QA/QC procedures:	The net electricity is crosschecked with the invoice copies.																
Purpose of data/parameter	Calculation of baseline emission																
Additional comments:	-																

Sustainable Development Parameters monitored

No	1
Indicator	Air quality
Mitigation measure	<p>In order to reduce dust emissions during the construction phase, the following dust suppression measures stipulated and implemented:</p> <ul style="list-style-type: none"> - Spraying water and covering material trucks’ body to minimize dust; - Reuse of water for sprinkling of unpaved roads. - Imposition of speed controls for vehicles and unpaved site roads;

		<p>- Well-maintained diesel-powered mechanical equipment to avoid black smoke emissions;</p> <p>- Shut-down of diesel-powered mechanical equipment or trucks inside the worksites when they are not in operation.</p> <p>During the operational phase (monitoring period) the scope of dust emission is none to minimal. Vehicles are run under controlled speed to avoid any dust generation.</p>
Chosen parameter		Electricity generation and equivalent of PM, NOx and SOx avoided and dust generation
Baseline situation of parameter		In the baseline situation, equivalent amount of associated SOx, NOx will be emitted from the operation of grid-connected power plants. Ex-ante and baseline is the same thing.
Value for the current monitoring period		<p>206,673 MWh of electricity is generated from the project during the monitoring period.</p> <p>Every MWh of electricity generated by the project activity prevents further emissions of PM, NOx and SOx which is not quantified due to lack of public data about baseline.</p> <p>No dust has been generated from the project during the monitoring period due to implementation appropriate mitigation measures listed in the table.</p> <p>The project makes positive impact on this parameter. It results in emission reductions hence is helping in climate change mitigation</p> <p>202,064</p>
Future target for parameter		NA
Way of monitoring	How	Project logbook, or interview with maintenance staff
	When	Yearly once
	By who	Project/Plant Manager

No		2
Indicator		Quality of employment
Mitigation measure		None
Chosen parameter		Details of Trainings & workshops conducted (& its relevance) for employees and O&M staffs
Baseline situation of parameter		In absence of the project activity no trainings or workshops will be conducted and local people have no such opportunities to be trained on the technology and the monitoring of the plant operation, and the emergency and safety procedures. Ex-ante and baseline is the same thing.
Value for the current monitoring period		<p>Trainings & workshops were conducted to the O&M staffs by management of Gamesa.</p> <ol style="list-style-type: none"> 1) HSE Training Record 2) Regular Drill Record 3) Handling of Equipment Training 4) Soft Skill Training <p>The list of training programmes conducted during the monitoring period is included under this table.</p> <p>The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but adds to growth of individual employees. Thus the project has a positive impact on the parameter.</p>
Future target for parameter		Continuation of regular trainings/workshops for employees & O&M staffs
Way of monitoring	How	Training Records, HSE & HR Records
	When	Yearly once
	By who	O & M Contractor

No	3	
Indicator	Livelihood of the poor	
Mitigation measure	None	
Chosen parameter	Health Camps, Knowledge and information dissemination regarding natural disasters through seminars.	
Baseline situation of parameter	No activity except Government facilities	
Value for the current monitoring period	<p>PP conducted survey during construction phase of the project in the villages near project locations to check the requirement of facilities by the villages. From the survey, PP has identified several scope of developmental activities such as health camps, furniture, sports kits and toilet requirements in government schools, drinking water requirements etc.</p> <p>PP has started implementing the CSR activities. During the monitoring period the CSR activities like:</p> <ol style="list-style-type: none"> 1) Distribution of furniture to schools (Chairs, stools, benches and books) 2) Construction of Toilets at school for Girls if required. 3) Promotion of greenery and plantation in project region. 4) Establishment of water purifier with cooler <p>The activities carried out are focused to upheld the livelihood of the poor as, it is the poor in the project region who are mostly deprived of the basic facilities such as sanitation, education and medical attention. The table preceding has more details.</p> <p>The project will have positive impact on this parameter as there were no socially oriented CSR activities before the project activity. Thus the project has positive impact on the indicator.</p>	
Future target for parameter	Health Camps, Knowledge and information dissemination regarding natural disasters are done by PP based on the requirement in the project location.	
Way of monitoring	How	CSR records and photographic evidence.
	When	Yearly once
	By who	Project Coordinator

S. No.	Location	Area as per schedule VII of companies Act	Requirement	Details of Beneficiary	Date
1	Ratlam	(iv) Promotion of healthy Environment	Tree plantation on world environment day	Girls college, Ratlam	04-05 th June 2016
2	Jhar, Sandla	(ii) Promotion of education	General stationary kits distribution to the students on independence day	50 Students of primary schools of jhar and sandla village	02 nd October 2016
3	Laptiya	(ii) Promotion of education	Tree plantation on world environment day	Nearby area of laptiya village	04-05 th June 2017
4	Ratlam	(i) Promotion of healthcare, sanitation and drinking water facility.	Support of Swacch Bharat abhiyan by cleaning up of Guest House at Ratlam and Further distributed Bicycle, clothes, fruits, toys, and ceiling fans in orphanage and old age homes in Ratlam city.	Around 100 people of Ratlam city	05-6 th November 2017
5	Ratlam	(iv) Promotion of healthy Environment	Tree plantation on world environment day	Morning Star school Ratlam	04-06 th June 2017
6	Laptiya	(ii) Promotion of education	Tree plantation on world environment day	Surrounding community	05-06 th June 2017

7	Bilpank police station	(i) Promotion of healthcare, sanitation and drinking water facility.	Installation of RO Water Purifier along with Water cooler	Police Staff and Aprox 500 People nearby villages	31 st March 2018
8	Kamed	Target-Promotion of healthcare, sanitation and drinking water facility.	Installation of RO Water Purifier along with Water cooler	Target- Aprox. 250 students of nearby villages	31 st March 2018

No	4		
Indicator	Access to affordable and clean energy services		
Mitigation measure	None		
Chosen parameter	Net electricity supplied to grid		
Baseline situation of parameter	No electricity is generated		
Value for the current monitoring period	206,673 MWh of electricity supplied to grid by the project activity		
	Vintage	Net Generation (MWh)	
	Year 2016	73025	
	Year 2017	115531	
	Year 2018	18117	
Future target for parameter	Similar units of electricity supplied to grid by the project activity		
Way of monitoring	How	Monitored through energy meter. Net electricity will be calculated by DISCOM and O&M operator on monthly basis and provided in the share certificate.	
	When	Continuously monitored & recorded monthly	
	By who	DISCOM and O&M operator	

No	5			
Indicator	Quantitative employment and income generation			
Mitigation measure	None			
Chosen parameter	1. Cost spent for O&M 2. Number of O&M staffs involved in the project			
Baseline situation of parameter	No employment generation			
Value for the current monitoring period	The total number of O&M staffs employed by the Gamesa and Orange for the operation & maintenance of the project activity is provided below along with expenditure under O&M :			
		2016	2017	2018
	O&M Cost (INR Lakhs)	0	0	0
	Gamesa O&M	8	9	8
	O&M Support	12	14	17
	Gamesa Admin Staff	4	5	6
	Security	30	34	34
	Orange	4	2	2
	The first two years (05/05/2016 to 04/05/2018) of O&M cost is included in the supply order and hence there is no cost. However, from the third year onwards, the cost of O&M will be over 21.5 lakhs per WTG which works at 537.5 lakhs for the project per year. The current monitoring period falls under the no cost O&M period.			

		The parameter has a positive impact as the project results in direct employment and income generation.
Future target for parameter		Continued employment of O&M staff and security. Explore opportunity to engage more villagers. The project security staffs are local villagers and hence the project has also generated employment and income for local villagers.
Way of monitoring	How	Plant employment records
	When	Yearly once
	By who	O & M Contractor

No		6
Indicator		Soil Erosion
Mitigation measure		<ul style="list-style-type: none"> • General soil erosion and sediment control measures would include: <ul style="list-style-type: none"> - Keep open areas of excavation to a minimum and construction activities restricted to dry months to avoid heavy rainfalls; - Using existing roads and lanes used by land owner. - Stockpiles of materials placed away from drainage lines and formed with sediment control structures placed immediately down slope; - Construction debris and excavated material were cleared up at regular intervals - Excavated material stock piled and used for backfilling of foundations, platforms etc. - Minimization of traffic in construction zones and use of a dedicated parking area, i.e. site compound; - Re-vegetation taken up as necessary after construction, in order to reduce the risk of soil erosion. <p>Specific mitigation measures followed in the operational phase of the project: Waste oil generated shall be stored separately in containers in a secured location in the maintenance room. The storage location and the containers are properly marked.</p> <p>The waste / used waste oil from the WTGs to be disposed off to a CPCB/SPCB authorized vendor.</p> <p>A hazardous waste inventory is maintained as per the provisions of the Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008.</p>
Chosen parameter		Any Project Related Activities Altering Soil Condition
Baseline situation of parameter		No soil erosion due to project operations
Value for the current monitoring period		<p>The O&M log book records no physical activity or deployment of heavy vehicles during monitoring period which would need additional mitigation measures.</p> <p>This parameter has a neutral (0) impact as there has been no activity causing disturbance to top soil, no incidences of oil leakage during the monitoring period.</p>
Future target for parameter		Regular review of mitigation measures proposed under monitoring plan and revision as per grievance expressed (if any)
Way of monitoring	How	Project logbook, or interview with maintenance staff.
	When	Yearly once
	By who	Project/Plant Manager , O & M Contractor

No		7
Indicator		Maintenance of Landscape visual impact
Mitigation measure		<p>Detailed ESIA study conducted to understand if any of the location needs to be altered.</p> <p>Locals were consulted where ever a WTG location or access road was in vicinity to a settlement.</p>

		The WTGs are painted with non-reflect paints and are not glary. Re-vegetation taken up as necessary after construction, in order to reduce the risk of soil erosion.
Chosen parameter		Aesthetics
Baseline situation of parameter		There was no project activity and hence no resultant visual or landscape impact of the same.
Value for the current monitoring period		No significant visual impact observed and no grievances received. Vegetation has been grown where ever possible in the project's land. Apart from this the project proponent has planted a number of trees to improve the landscape visual impact. The parameter has a neutral (0) impact as there are no grievances received or registered. The WTGs are spread across the terrain and hence have minimalistic presence.
Future target for parameter		Minimalistic visual impact/No stakeholders' complaints
Way of monitoring	How	Project Grievance register, or interview with local villagers
	When	Yearly once
	By who	Project/Plant Manager, O & M Contractor

No		8
Indicator		Species Mortality & Bird Strikes (Bird & Bat Deaths)
Mitigation measure		<ol style="list-style-type: none"> 1. During the siting activity it was ensured that there are no water bodies beside WTGs. 2. Water pits are not allowed around the WTGs. 3. None of the area of WTGs erection or transmission lines are under sensitive or under areas of conservation importance 4. The transmission lines wherever required has reflectors 5. Storm water control around within 100m of every WTG
Chosen parameter		Bird carcass
Baseline situation of parameter		No action taken
Value for the current monitoring period		<p>The O&M team maintenances a Bird strike register. As per the record, there are no observed carcasses in vicinity of the WTGs.</p> <p>The project activity's micro-siting had been done considering possible impact on flora and fauna. The choice of sites has been carefully done considering the preliminary recommendation of the ESIA report. None of the WTGs are near to water bodies and PP takes deliberate steps to ensure there no water holes around the WTGs.</p> <p>The project proponent actively takes regular feedback from local villagers about project and has also set up a grievance mechanism in place. There has been no reported bird death in the project vicinity.</p> <p>The impact of parameter is neutral as there is no impact observed during the current monitoring period. The DoE has been provided with details of observations.</p>
Future target for parameter		Strictly follow the control measures to prevent & control any bird strikes
Way of monitoring	How	Bird Strike register, or interview with local villager
	When	Yearly once
	By who	Project/Plant Manager, O & M Contractor

No		9
Indicator		Involuntary Resettlement & expropriation
Mitigation measure		<p>The project activity does not involve in any involuntary resettlement. Further all the land purchased is private land purchased from on mutual consent. The project proponent ensured the following during land purchase:</p> <ol style="list-style-type: none"> 1. No land with existing structures was purchased 2. No land from any marginalized farmers was purchased 3. No WTG land was within vicinity of settlements

		4. All the purchase process followed national and state laws for land purchase. As the purchase of land is a voluntary process it does not involve “The National Rehabilitation and Resettlement Policy, 20073, There is no change in the monitoring period, as no land has been purchased after construction.
Chosen parameter		Resettlement or Grievance
Baseline situation of parameter		No resettlement involved in absence of the project activity.
Value for the current monitoring period		There is no change in the monitoring period, as no land has been purchased after construction nor any associated resettlement.
Future target for parameter		No resettlement or grievance
Way of monitoring	How	Interview with local villagers & Grievance register
	When	Yearly once
	By who	Project/Plant Manager

No		10
Indicator		Safety of workers
Mitigation measure		The EHS team is responsible for ascertaining the safety procedures are followed, some being: <ul style="list-style-type: none"> - Proper training to all the workers at site - Safety gear mandatory while Working at heights and inside the site location - Job card in conformity with safety protocol released before taking up any task by O&M team - Implementation of Loading & Unloading protocols - Use of vehicles with PUC & proper maintenance of vehicles Control speed of vehicles
Chosen parameter		Safety procedures followed: <ul style="list-style-type: none"> • Operating staffs are provided with helmet, shoes & gloves • Conduct safety training to the O&M staffs yearly
Baseline situation of parameter		Ex-ante & baseline are same.
Value for the current monitoring period		.
Future target for parameter		All Appropriate safety procedures are followed
Way of monitoring	How	Records of helmet, shoes & gloves distributed to staffs & Records of safety training
	When	Yearly once
	By who	Project/Plant Manager

D.3. Implementation of sampling plan

No sampling process is involved, hence not applicable. The details of sampling any of carried out during the course of verification will be included.

SECTION E. Calculation of emission reductions or net anthropogenic removals

As per the applied approved methodology ACM0002 (Version 17.0) Emission Reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

³ <http://www.dolr.nic.in/nrrp2007.pdf>

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)
 BE_y = Baseline emissions in year y (t CO₂/yr)
 PE_y = Project emissions in year y (t CO₂e/yr)
 LE_y = Leakage emissions in year y (t CO₂e/yr)

However, LE_y has been neglected as per the guidelines of the methodology.

Hence as per PDD, emission reduction is calculated as below:

$$ER_y = BE_y - PE_y$$

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

Baseline Emissions for the amount of electricity supplied by project activity, BE_y is calculated as

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad (01)$$

Where,

BE_y = Baseline emissions in year y (tCO₂/yr)
 $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).
 $EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh)

For this monitoring period, the emission reduction is calculated as below:

$$\begin{aligned}
 &= 206,673(\text{MWh}) * 0.9777 \text{ (tCO}_2\text{/MWh)} \\
 &= 202,064 \text{ tCO}_2 \text{ (rounded down)}
 \end{aligned}$$

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

As mentioned in the PDD, the project activity involves the generation of electricity from the installation of wind turbines. Hence, as per ACM0002, Version 17.0 there is no project emission for windmill projects. Therefore, project emissions are zero.

E.3. Calculation of leakage emissions

As per PDD, No leakage emissions are considered in the project activity. Hence leakage emission is neglected.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	202,064	0	0	NA	202,064	202,064

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period (05/05/2016 to 31.03.2018)
Emission reductions or GHG removals by sinks (t CO ₂ e)	204,143	202,064
Year 2016	70,687	71,397
Year 2017	107,058	112,954
Year 2018	26,398	17,713

E.6. Remarks on increase in achieved emission reductions

The actual achieved emission reduction for this monitoring period is less (1.0%) than estimated value in the PDD. The PP would like to clarify that such variation is possible due to various factors such as annually varying capacity utilization factor of the machines (WTGs) and ancillary facilities. For the year 2016 the generation is higher by 1,00%. This is due to the reason that the data covered in monitoring for 2016 is only for the months of May to December which have the peak seasons monthly involved. The year 2017 resulted in generation higher by 5.51% which is due to varying wind availability year on year. This variation is well within the applied project sensitivity.

Particularly for the 2018 the generation is lower by 32.90%, this is due to the reason that the data covered in monitoring is only for the months of January to March which are non-peak seasons. Most of the generation for wind projects comes from the months of June to September.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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