21.8 MW WIND POWER PROJECT AT JANGI VANDHIYA, GUJARAT BY POWERICA LIMITED

Document Prepared by EKI Energy Services Limited

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Project Title	21.8 MW Wind Power Project at Jangi Vandhiya, Gujarat by Powerica Limited
Version	03
Report ID	VVER1823
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Monitoring Period	01-January-2021 to 31-December-2021 (inclusive of both start and end dates)
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1 ROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity involves installation and operation of 11 WTGs of 2.0 MW comprising a total capacity of 22.0 MW by utilising the V100 model of WTGs supplied of Vestas. All the WTGs involved in the project are commissioned at Bhachau Taluka of Kutch district of Gujarat.

The project activity is a greenfield project for generation of electrical energy using wind which is a renewable source of energy. In wind energy generation, kinetic energy of the wind is converted into mechanical energy and subsequently into electrical energy. Wind turbines capture the wind's energy with three propeller-like blades, which are mounted on a rotor, to generate electricity. The turbines sit high atop towers, taking advantage of the stronger and less turbulent wind. As the wind blows through the blades of the windmill, a pocket of low-pressure air forms on the downwind side of the blade. The low-pressure air pocket then pulls the blade towards it, causing the rotor to spin. The rotor turns the shaft that further spins the connected generator. The spinning of this generator produces the required electricity. Since power is generated from wind energy, no emissions are attributed to the project emissions and due to that equivalent amount of fossil-fuel dominated grid can be displaced due to the project activity.

A technical detail of major equipment's and commissioning details are summarized in section 3.1. The date on which Powerica Limited signed the supply agreement with Vestas Wind Technology India Private Limited (Vestas) i.e. 31-December-2013 is considered as the start date of the project activity. The project start date is before the webhosting of PDD for GSC and after 02-August-2008. Therefore, the project falls under 'new project activity'. As required the Project participant has informed UNFCCC and DNA on 08-October-2013, even before the start date of the project (31-December-2013). The project start date is 12-June-2014 which is the date of commissioning of the first phase of the 22 MW wind power project.

The total GHG emissions reductions achieved by this project activity in the monitoring period from 01-January-2021 to 31-December-2021 is 41,555 tCO_2e by displacing 42,621.22 MWh of electricity from fossil-fuel dominated electricity grid with electricity generation using wind energy resources. The project is running smoothly since commissioning, there were no any instances occurred that would alter the GHG reductions, methodology applicability and monitoring procedure.

1.2 Sectoral Scope and Project Type

Sectoral scope 1 : Energy Industries (renewable / non-renewable sources).

Project type : Renewable energy project (Wind)

The project activity is not a grouped project

1.3 Project Proponent

Organization name	Powerica Limited
Contact person	Mr. Pradeep Gupta
Title	Head - Wind Energy Division
Address	9th Floor, Godrej Coliseum, Sion (E), Mumbai – 400022, Maharashtra, India
Telephone	+ 91 22 4001 2000
Email	pradeep.gupta@powericaltd.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Shital Patil
Title	Project Manager
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India
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1.5 Project Start Date

The project start date is 12-June-2014 which is the date of commissioning of the first phase of the 22 MW wind power project.

1.6 Project Crediting Period

The crediting period of the project activity is for 10 years (fixed).

Project crediting period: 12-June-2014 to 11-June-2024.

The project is registered under Clean Development Mechanism (CDM) of UNFCCC with 10 years crediting period (Fixed) (Reference No: 10042[1]) on 17-October-2014. The Crediting period of the project under CDM starts on 17-October-2015 and ends on 16-September-2025.

1.7 Project Location

The project activity is located at Village – Jangi, Lakhapar, Vadhiya, Lakhdhirgadh and Godpar, Taluka – Bhachau, District - Kutch in the state of Gujarat. The geo-coordinates of each WTG are as follows:

S.I No	WTG No.	Village	Latitude	Longitude
1	JW04	Jangi	23°12' 41.3'' N	70°34' 28.8'' E
2	JW11	Jangi	23°13' 05.5'' N	70°32' 15.6'' E
3	JW33	Lakhapar	23°12' 46.6'' N	70°38' 00.0'' E
4	JW41	Vadhiya	23°12' 18.3'' N	70°35' 59.7'' E
5	JW50	Lakhdhirgadh	23°14' 52.2'' N	70° 35' 41.2'' E
6	JW52	Godpar	23°13' 06.3'' N	70° 36' 58.4'' E
7	JW53	Lakhdhirgadh	23°14' 49.6'' N	70°34' 59.9'' E
8	JW60	Lakhdhirgadh	23°14' 26.6'' N	70°35' 07.8'' E
9	JW68	Lakhdhirgadh	23°15' 10.3'' N	70° 35'56.3'' E
10	JW69	Vadhiya	23°14' 23.1'' N	70°36' 26.9'' E
11	JW72	Vadhiya	23°14' 24.5'' N	70°37' 02.3''

1.8 Title and Reference of Methodology

Methodology : ACM0002 ver. 15.0
Methodology Title : "Grid-connected electricity generation from renewable sources"

The methodology also refers to the latest approved versions of:

- Tool for the demonstration and assessment of additionality, Version 07.0.0[2]
- Combined tool to identify the baseline scenario and demonstrate additionality, Version 05.0.0[3]
- Tool to calculate the emission factor for an electricity system, Version 04.0[4]

[1] https://cdm.unfccc.int/Projects/DB/RWTUV1411994965.49/view

[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

[3] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v5.0.0.pdf

[4] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

1.9 Participation under other GHG Programs

The project activity has also been registration with UNFCCC under Clean Development Mechanism (CDM) program, Registration reference number is 10042[5]. The project proponent has provided undertaking that it will not claim any GHG credits for UNFCC CDM during the current monitoring period. There is no CERs are claimed under CDM mechanism.

Details of credits issued are mentioned below:

Period	Mechanism
12-June-2014 to 30-September-2018	VCS
01-October-2019 to 31-December-2019	VCS
01-January-2020 to 31-December-2020	VCS

1.10 Other Forms of Credit

India is Non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity. The project is registered under CDM and UNFCCC Registration ID 10042)[6]. The project proponent (PP) has submitted undertaking that they will not claim same GHG emission reductions of the project from CDM and VCS. PP would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions. PP has also submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration.

1.11 Sustainable Development Contributions

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment and Forests (MoEF) has mentioned four indicators for the sustainable development. The project participant's view on the contribution of this project activity towards sustainable development is explained below:

Social well-being:

- Generating Local Employment: The installation of wind power project in rural areas will result in generating local employment opportunities and capacity building of the local employees. The project activity would create both direct and indirect employment throughout the life-cycle of the project activity.
- Encouragement to entrepreneurs: The project will provide encouragement to other entrepreneurs to invest into renewable energy sources.
- New business Opportunity: The project activity would provide business opportunities to the local population contributing to poverty alleviation of the local community.

Economic well-being:

[5] https://cdm.unfccc.int/Projects/DB/RWTUV1411994965.49/view

[6] https://cdm.unfccc.int/Projects/DB/RWTUV1411994965.49/view

- Rural Development: The installation of wind power project will result in rural and infrastructural development in the surrounding rural areas
- Economic Development: The generation of wind power will result in improvising the reliability of the NEWNE Grid and thereby enhance economic development in the region.

Environment well-being:

- Reduction in the consumption of fossil fuels: The installation of power plant generating electricity through renewable resource such as wind power, would lead to reduction in usage of fossil fuels e.g. Coal, oil, natural gas.
- Reduction in GHG emission: The reduction in usage of fossil fuels for electricity generation will result in reduction of the release of associated GHG emissions (CO_2 and CH_4 emissions).
- Improvement of Air Quality: The use of renewable energy for power generation will avoid the emission of air pollutants such as Suspended Particulate Matter (SPM), Sulphur Dioxide (SO_2) and Nitrogen Oxides (NO_x) thereby improvising the surrounding air quality
- Conservation of Natural Resources: Installation of wind power plant will result in conserving fast depleting natural resources such as coal, oil etc.

Technological well-being:

- Advanced Technology: The project activity involves installation and operation of state-of-art wind turbine generators (WTGs) of Vestas make. The implementation of these new technologies will help in increasing reliability of renewable energy generation and encourage development of even better technology in the future.
- Safe and Sound Technology: The project activity deploys the technology, which is environmentally safe and sound, as it does not produce greenhouse gases and any toxic or radioactive waste.

Sustainable Development Contributions

According to the Appendix 2- the document history mentioned in the VCS Standard Version 4[7]. (latest version), it is clearly mentioned that Project Proponent is required to demonstrate contributions to a minimum of three SDGs, effective immediately for all projects registered on or after 20 January 2023. Since this is the 4th Verification of this project and it is registered before 20 January 2023, SDG reporting is not required for the current version and the PP will demonstrate contribution to at least three SDGs by 20 January 2025.

[7] https://verra.org/wp-content/uploads/2022/01/VCS-Summary-of-Effective-Dates-2022-Q1.pdf

2 SAFEGUARDS

2.1 No Net Harm

The project does not involve any potential negative environmental and socio economic impacts and hence this criteria is not applicable to this project activity.

2.2 Local Stakeholder Consultation

Project Proponent had invited different stakeholders to a meeting to explain the proposed project activity and benefits associated with it on 10-January-2014.

The stakeholders identified for the project activity are as follows:

1. Local villagers

2. Local Gram Panchayat Members

3. Local School Staffs

4. State Nodal Agency i.e. Gujarat Energy Development Agency (GEDA),

5. Local contractors involved in the project

6. Employees of Powerica Limited

These stakeholders were invited for the meeting through public notice on local paper dated 04-January-2014 and personal invitation also, a week in advance of the meeting. A record of the people attending the meeting was maintained and all comments from the stakeholders received during the meeting were recorded and compiled in the minutes of meeting.

In the meeting, the stakeholders were briefed about the project activity in the local language and were informed as to how power is generated using wind energy. They were then informed about global warming and its causes and the effects. Subsequently, they were introduced to the concept of CDM and how it is helping the world in mitigating Green House gas emissions. The stakeholders were then invited to provide their comments on how the project activity had affected their lives and about their expectations from the project activity.

Powerica Limited has received all necessary approvals / clearances / permissions from various local bodies which represent the local stakeholders. The stake holder meeting was conducted at the respective project sites and was attended by the office bearers and residents of the nearby village. The stakeholders shared their views on the project activity. Most of them showed positive response. They were hopeful that the proposed project activity will help in the development of the local community, generate more employment and solve the electricity problem without harming their natural surroundings. No adverse comments were received regarding the project

activity and all the queries raised were satisfactorily addressed. The stakeholders were very observant and supportive.

The stakeholder meeting was conducted on during registration of the project activity. PP took due care of the comments received during LSC.

The process of local stakeholder consultation is continuous. During the current monitoring period, the project proponent has kept grievance register in plant site office and sought comments/grievances/suggestions from local stakeholders including local community, government agencies and NGOs. However, no comments/grievances/suggestions have been received from the aforementioned stakeholders during the current monitoring period.

2.3 AFOLU-Specific Safeguards

Not applicable to this as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project has been completed and the monitoring equipment's were installed to monitor the parameters as described in the registered Project Description (PD). All the WTGs involved in the project activity are already commissioned and operational. The WTGs are under operation since the date of commissioning and no event has been identified which may impact GHG emission reduction. The commissioning dates of all the WTGs are provided as below.

Sl. No	WTG	Capacity of WTG (MW)	Commissioning Date
1	VWT/2000/14-15/3444	2	12-June-2014
2	VWT/2000/14-15/3447	2	12-June-2014
3	VWT/2000/14-15/3448	2	12-June-2014
4	VWT/2000/14-15/3449	2	12-June-2014
5	VWT/2000/14-15/3450	2	12-June-2014
6	VWT/2000/14-15/3445	2	14-June-2014
7	VWT/2000/14-15/3452	2	14-June-2014
8	VWT/2000/14-15/3451	2	14-June-2014
9	VWT/2000/14-15/3442	2	25-June-2014
10	VWT/2000/14-15/3443	2	25-June-2014
11	VWT/2000/14-15/3446	2	08-July-2014

The technical details of the WTGs involved in the project activity are as below.

Parameters	Value
Make	Vestas
Model	V-100
Rated Power	2000 KW
Rotor diameter	100 m
Swept area	7850 m2
Cut in wind speed	3 m/s
Rated wind speed	12 m/s
Cut out wind speed	20 m/s
No. of Blades	3
Rotor Speed	14.4 rpm
Hub Height	80 m
Generator Type	4-pole (50 Hz) doubly fed generator, slip rings
Gear Box	Type two planetary stages and one helical stage
Tower Type	tubular steel tower

The project aims at providing electricity to the state of Gujarat by effective utilization of renewable resources. The electricity generated from the project activity is supplied to NEWNE regional grid of India. Powerica Limited, the project proponent has developed this project keeping in consideration of the funding available for carbon credits as the project activity feeds clean power to the electricity grid (North-East-West-North East or NEWNE grid, India) thereby helping in significant reduction of GHG emissions. All the WTGs involved in the project activity are already commissioned and operational.

The electricity generated is monitored using electrical meters which provide a measure of the actual electrical energy that would have been sourced from a fossil-fuel based power plants in the absence of the project activity. Hence, the fossil-fuel power based grid is the baseline for the project activity.

Emission reductions are claimed on the net electrical energy that is supplied to grid which is metered using meters located at the electrical yard of the respective WTGs. These electrical energy meters are electronic tri-vector meters of appropriate accuracy class.

During this monitoring period 01-January-2021 to 31-December-2021 (inclusive of both start and end dates) total emission reductions achieved are 41,555 tCO2e by displacing electricity of 42,621.22 MWh from fossil fuel based electricity grid. The project is running smoothly since commissioning, there were no any instances occurred that would alter the GHG reductions, methodology applicability and monitoring procedure. This went for the schedule maintenance at regular intervals.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

3.2.2 Project Description Deviations

The deviation in project activity is provided below:

Deviation 1 was taken during monitoring period 12-June-2014 to 30-September-2018.

Deviation 1. It should be noted that in the registered CDM-PDD two monitoring parameters are listed in Section B.7.1 i.e $EG_{facility,y}$ and $EG_{LCS,y}$, however in the Monitoring Report only one parameter i.e. $EG_{facility,y}$ has been mentioned as only this parameter is used for ER calculations. The meters used for the measurement at the substation monitor the export and import value separately and also display the net reading by subtracting the import reading from the export reading. Since the parameter mentioned in Invoice is the net value of the electricity supplied to the grid, and no separate parameters i.e. export and import of electricity are mentioned in Invoice, the net value mentioned therein has been included in the Monitoring Report and this value has been considered for Emission Reduction calculation. Thus the accuracy of the measurement is not affected.

The other parameter $EG_{LCS,y}$ Summarized quantity of electricity generation recorded at LCS of each WTGs is not used in ER calculations. Thus this parameter is not mentioned in monitoring plan. The exclusion of this parameter does not have any impact on ER calculations.

Deviation 2 and deviation 3 was taken during monitoring period 01-January-2020 to 31-December-2020.

Deviation 2. As per registered VCS PD, the calibration frequency is once in a year. The calibration of meters is not in control of PP and same is done by state electricity board. The state electricity board does not follow any fixed calibration frequency, hence deviation is requested for change in calibration frequency as once in five years. This calibration frequency is as per CEA notification *https://cea.nic.in/regulations-category/metering-regulations/?lang=en*

The change in calibration frequency does not have any impact on ER calculations as during monthly reading state electricity board official and PP representative check the meter conditions. Also both parties accepts the reading and PP raise the invoice to state electricity board based on monthly JMR reading. Thus financial obligations are involved which ensures that meters are running accurately.

Deviation 3. Accuracy class of energy meters installed at individual WTG yard is 0.5S & accuracy class of energy meters installed at substation end is 0.2S.

The energy meters installed and maintained (i.e calibration/replacement) by state utility (GETCO), and that is not in PP's control. Also, the accuracy class of energy meters installed are follows the technical requirement as per CEA (installation & operation of meters) (Amendment) regulations, 2019.

(Ref. link: https://cea.nic.in/regulations-category/metering-regulations/?lang=en)

Hence, deviation is requested to accept the accuracy class of the energy meters (0.5S) installed at site against the accuracy class mentioned in registered CDM PDD.

3.3 Grouped Projects

The project is not a grouped project thus this is not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Operating margin CO_2 emission factor for NEWNE (Now Indian grid) grid
Source of data	Central Electricity Authority:CO_2 Emission Database CEA CO_2 Baseline database Version 09
Value applied	0.9776
Justification of choice of data or description of measurement methods and procedures applied	The operating margin emission factor is a 3-year generation-weighted average data, based on the most recent data available on CEA database. Data compiled in CEA CO_2 CDM database is in line with the requirements Version 04.0.0 of "Tool to calculate the emission factor for an electricity system".
Purpose of Data	Calculation of baseline emissions
Comments	This parameter is calculated ex ante and remains fixed for the entire crediting period.

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	Build margin CO_2 emission factor of grid
Source of data	Central Electricity Authority:CO_2 Emission Database CEA CO_2 Baseline database Version 09
Value applied	0.9673
Justification of choice of data or description of	The build margin emission factor is the most recent data available from CEA CO2 Baseline database. Data compiled in CEA CO_2 CDM

measurement methods and procedures applied	database is in line with the requirements Version 04.0.0 of "Tool to calculate the emission factor for an electricity system"
Purpose of Data	Calculation of baseline emissions
Comments	The build Margin is calculated ex ante and fixed for the entire crediting period.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor for grid
Source of data	Central Electricity Authority:CO_2 Emission Database CEA CO2 Baseline database Version 09; January 2014
Value applied	0.9750
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$ The following default values should be used for w_{OM} and w_{BM}: For Wind power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 for the selected crediting period Data compiled in CEA CO_2 CDM database is in line with the requirements Version 04.0.0 of "Tool to calculate the emission factor for an electricity system"
Purpose of Data	Calculation of baseline emissions
Comments	The Combined Margin is calculated ex ante and fixed for the crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh/year
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Monthly Certificate for share of electricity generated by Wind farm issued by GETCO
Description of measurement methods and procedures to be applied	Measured and Calculated Energy exported and imported from the project activity is measured &recorded by the energy meter located at the Wandhya substation. **Measurement methods and procedures:**

<table>
<tr><td></td><td>Data Typed: Measured and Calculated (Export - Import)
Monitoring: Energy Meter is used for monitoring
Meter Calibration Frequency: Once in five years
Archiving Policy: Paper & / Electronic</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuous measurement and at least monthly recording</td></tr>
<tr><td>Value monitored</td><td>42621.22</td></tr>
<tr><td>Monitoring equipment</td><td>Monitoring Equipment:
Monitored through the main meter and check meter readings. Both the energy meters are bi-directional tri-vector meters.
Monitoring:
a) At WTG yard: Electrical Energy Meters which are electronic tri-vector meters of Secure make with accuracy class 0.5s.
b) At substation: Electrical Energy Meters which are bidirectional electronic tri-vector ABT meter of L & T make with accuracy class 0.2s.
<table>
<tr><td>The meters are calibrated once in five year as per CEA notification and deviation requested. Please refer section 3.2.2 of MR for deviation.
WTG Unique ID</td><td>Meter Serial Number</td></tr>
<tr><td>JW04</td><td>GJU65932</td></tr>
<tr><td>JW11</td><td>GJU65931</td></tr>
<tr><td>VW33</td><td>GJU65934</td></tr>
<tr><td>VW41</td><td>GJU65678</td></tr>
<tr><td>VW50</td><td>GJU65933</td></tr>
<tr><td>VW52</td><td>GJU65935</td></tr>
<tr><td>VW53</td><td>GJU65930</td></tr>
<tr><td>VW60</td><td>GJU65936</td></tr>
<tr><td>VW68</td><td>GJU65937</td></tr>
<tr><td>VW69</td><td>GJU65684</td></tr>
<tr><td>VW72</td><td>GJU65685</td></tr>
</table>
Bulk meters are located at the substation yard (Vandhiya 220 KV – Line 1 & 2), the details of these meters have been given below:

Meter Sr. No. GJ-2311A GJ-2363 A</td></tr>
</table>

	Type Tri-vector Meter Tri-vector Meter Make L & T L & T Accuracy Class 0.2 S 0.2 S Calibration details mentioned in Appendix 1
QA/QC procedures to be applied	The Quantity of net electricity generation from the certificates for share of electricity are cross-checked with the invoices for the sale of power by Powerica Limited. The Energy Meters are calibrated once in five years.
Purpose of the data	Calculation of baseline emissions
Calculation method	--
Comments	The Monitored Data to be kept for a minimum of two years after the end of the crediting period or the last issuance whichever is later.

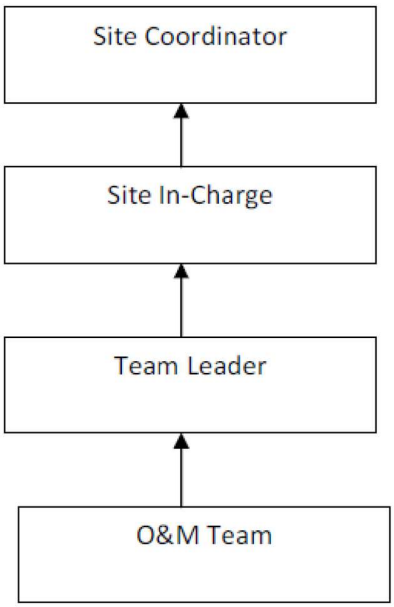
4.3 Monitoring Plan

The project activity is in accordance with approved large scale methodology ACM 0002, Version 15.0, and therefore, can use the monitoring methodology for the same.

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of metering the electricity supplied to the grid by the renewable technology. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline emission factor is based on an ex-ante determination, monitoring of this parameter is not required. The sole parameter for monitoring is the electricity exported to the grid. The Project is operated and managed by Vestas Wind Technology India Private Limited (Vestas).

Vestas has a designated Site-In-Charge (O&M) on site who is responsible for monitoring the electricity exported from the project activity. The organizational structure of the O&M team by Vestas is as follows:



The roles and responsibilities of the O&M team may be elaborated as follows:

O&M Team: The team comprises of site engineers who are directly responsible for carrying out the O & M activity of WTG. They execute the preventive maintenance and attend to break downs as per O&M Manual & Procedures. They respond to breakdown calls and resolve customer complaints. They record all the readings and prepare documentations for Reports, Logs and Daily Generation Reports.

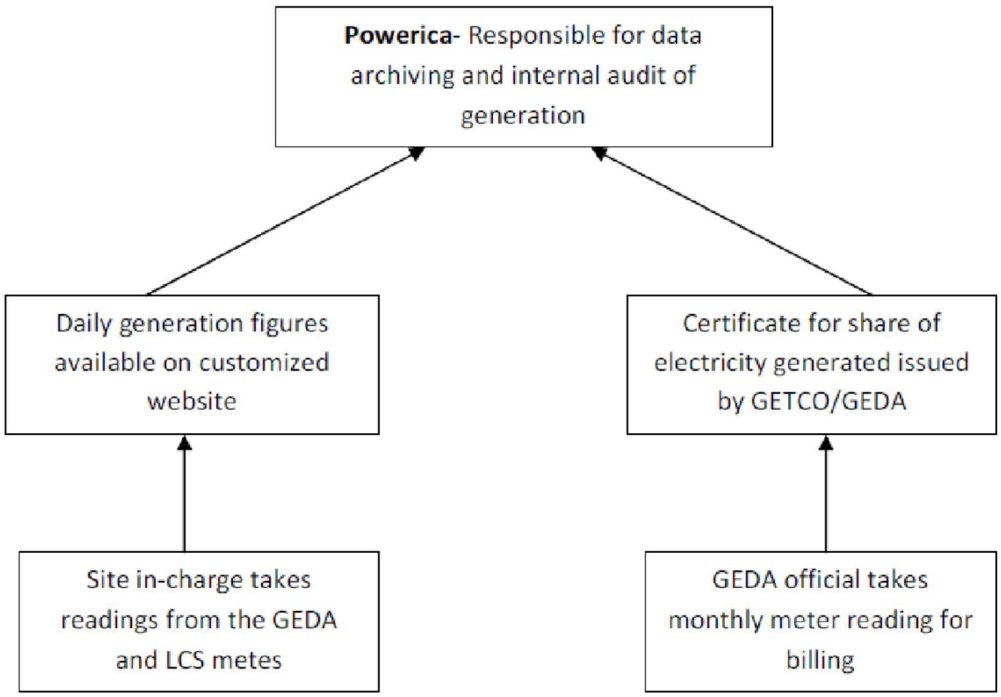
Team Leader: He leads the O&M team and is responsible for attending to the unscheduled breakdown of WTGs and for ensuring that WTG should be restored at earliest. He ensures the proper reading, recording and monitoring of the Generation.

Site-Incharge: He is responsible for the entire site. He has to take timely corrective measures/action to ensure that overall performance of site is met and delivered. He is responsible for the individual site. He executes the preventive maintenance and attends to break downs as per O&M Manual & Procedures. He also checks the daily Generation reports for all the WTGs.

Site Co-ordinator: He is in-charge of overall O&M activities of site. The responsibilities include ensuring complete documentation of the Generation of the site, on-time service delivery, timely response to breakdowns and efficient manpower management for the site.
Further, all new technicians on site are trained by Vestas. Also, the O&M personnel are trained regularly in order to improve their technical skills.

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

The overall flow of information has been depicted using the following hierarchical structure



Monitoring Process at Gujarat

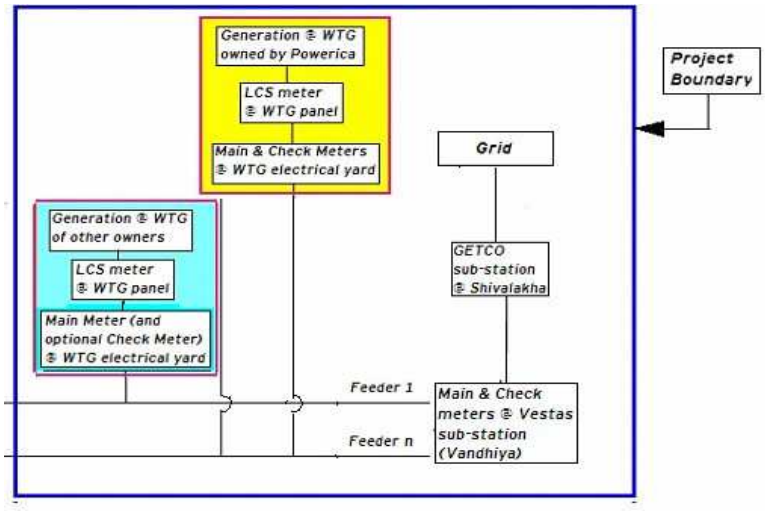
Metering of wind power is done as under:

- Joint meter reading is taken at substation meter by representative of GETCO (Gujarat Electricity Transmission Company) and O&M service provider (on behalf of individual wind farm owners). Let the total generation recorded for particular month is 'X' units in sub-station meter.
- Joint meter reading is taken at Local Meter-(transformer yard meter of each WTG) by representative of GETCO (Gujarat Electricity Transmission Company) and O&M service provider (on behalf of individual wind farm owners). Let us assume total generation of Powerica recorded for particular month is 'Y1' units.
- Similarly joint meter reading for other wind farm owners is also taken. Let the generation of individual owner recorded for particular month are 'Y2, Y3,...,Yn' units.
- GETCO distributes 'X' to individual wind farm owners using following formula and issues monthly certificates.
- For Powerica, net units calculated for billing = X * Y1 / ΣYn
- It must be noted here that the meter readings as mentioned above are 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 are 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 mentioned in monthly wind energy certificates shall be directly 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.



5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The emission factor value has been fixed Ex-ante and the same shall be used for the monitoring period. Net Electricity Generated is obtained by deducting total import (from grid) from total export (to grid). These values are taken from the "Certificate for Share of Electricity Generated by Wind Farm" issued by state electricity board. This statement is issued on a monthly basis.

Baseline emissions are calculated by multiplying the Net electricity exported to the grid with net baseline emission factor, as given in the registered VCS PD.

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$

Where:

BE_y = Emission reductions in year y (t CO_2e/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 CO_2 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", version 04.0.0 (tCO_2/MWh)

The project activity is the installation of a new, grid connected renewable power plant (Greenfield project) with no renewable power plant operating prior to the implementation of the project activity, hence, EG PJ, y has been calculated as:

$EG_{PJ,y} = EG_{facility,y}$

Where:

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)

EG facility, y = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

Therefore,

$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$

Where,

BE_y	= Baseline Emissions (tCO_2/year)
$EG_{facility,y}$	= Net Electricity exported to grid (MWh)
$EF_{grid,CM,y}$	= Baseline Emission Factor (Combined margin CO_2 emission factor for grid)

The calculation of yearly baseline emissions is provided below:

42,621.22 (MWh) * 0.9750 (tCO_2/ MWh)

= 41,555 tCO_2 (the value is rounded down)

Hence the baseline emission calculated for the reported monitoring period is 41,555 tCO_2 i.e. BE_y = 41,555 tCO_2

5.2 Project Emissions

No project emissions are applicable to this wind electric power project, since the electricity generation is based on wind resources, which does not involve in combustion or generation of emissions from fossil fuels. Hence, these emission sources are neglected.

$PE_y = 0$

5.3 Leakage

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

$LE_y = 0$

5.4 Net GHG Emission Reductions and Removals

The Formula used to calculate the net emission reduction for the project activity is

$ER_y = BE_y - PE_y - LE_y$

Where,

ER_y = Emission Reduction in tCO_2/year

BE_y = Baseline emission in tCO_2/year

PE_y = Project emissions in tCO_2/year

LE_y = Leakage Emissions in tCO_2/year

For the project activity during the current monitoring period, as per section 5.1

BE_y = 41,555 tCO_2

PE_y = 0 tCO_2

LE_y = 0 tCO_2.

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01-January-2021 to 31-December-2021	41,555	0	0	41,555
Total	41,555	0	0	41,555

During the current monitoring period, actual emission reductions achieved are 41,555 tCO_2e whereas estimated emission reductions was 50,207 tCO_2e. The project witnessed a decrease of 17.23% in emission reductions as compared to ex-ante emissions

APPENDIX 1: ENERGY METER CALIBRATION DETAILS

The calibration details for meters involved in the project activity and available with PP are as below. The calibration is under control of state electricity board and PP do not have any control on it.

WTG No	Meter Serial No.	Calibration date	Due Date of Calibration
JW04	GJU65932	23-March-2019	22-March-2024
JW11	GJU65931	23-March-2019	22-March-2024
VW33	GJU65934	23-March-2019	22-March-2024
VW41	GJU65678	23-March-2019	22-March-2024
VW50	GJU65933	23-March-2019	22-March-2024
VW52	GJU65935	23-March-2019	22-March-2024
VW53	GJU65930	23-March-2019	22-March-2024
VW60	GJU65936	23-March-2019	22-March-2024
VW68	GJU65937	23-March-2019	22-March-2024
VW69	GJU65684	23-March-2019	22-March-2024
VW72	GJU65685	23-March-2019	22-March-2024

The bulk meters located at the substation

Meter Sr. No. Make: Accuracy class:	GJ-2311- A L & T 0.2S	GJ-2363 – A L & T 0.2S
Meter Location (Vandhiya 220 KV Substation)	Line - 1	Line -2
Date of Calibration	15-Oct.-2018	15-Oct.-2018
Next due date	14-Oct.-2023	14-Oct.-2023

All meters at the WTG yards are of Secure Make and 0.5s accuracy class while those at substation yards are of L&T make and 0.2s accuracy class. Considering five years calibration frequency as per CEA notification and as per deviation request, there is no delay in calibration applicable for the project activity during current monitoring period.