



**Verified Carbon
Standard**

GREEN ENERGY PROJECT AT KUTCH BY POWERICA LIMITED



India's Largest Carbon Credit Developer & Supplier

Document Prepared by EKI Energy Services Limited

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|--------------------------|--|
| Project Title | Green Energy Project at Kutch by Powerica Limited |
| Version | 03 |
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| Monitoring Period | 01-October-2018 to 31-January-2020 (inclusive of both start and end dates) |
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity involves installation and operation of a 21.6 MW wind power generation project at Bhachau, in the Kutch district of Gujarat by Powerica Limited. The total installed capacity of 21.6 MW comprises of 12 WTGs, each with a capacity of 1.80 MW. This is a greenfield project utilizing wind energy for exporting electricity which otherwise would have been generated through alternate fuels (most likely fossil fuel) based power plants, contributing to reduction in specific emissions (emissions of pollutant) including GHG emissions. Electricity produced from the project activity is supplied to erstwhile NEWNE grid (now along with other regional grids forms the INDIAN grid) of India.

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

| Parameters | Value |
|--------------------|---|
| Make | Vestas |
| Model | V-100 |
| Rated Power | 1800 KW |
| Rotor diameter | 100 m |
| Swept area | 7850 m ² |
| Cut in wind speed | 4 m/s |
| Cut out wind speed | 20 m/s |
| No. of Blades | 3 |
| Rotor Speed | 14.4 rpm |
| Hub Height | 80 m |
| Generator Type | Asynchronous with wound rotor, slip rings |

The WTGs involved in the project activity were commissioned in five phases – the earliest date of commissioning is 14-July-2011.

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.

The total emission reductions achieved by this project activity in the monitoring period from 01-October-2018 to 31-January-2020, is 56,223 tCO₂e through displacing 59,275.89 MWh of electricity from fossil-fuel dominated electricity grid with electricity generation using wind energy resources.

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 | 9 th 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 | Mr. Souvik Mitra |
| Title | Project Manager |
| Address | Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India |
| Telephone | +91-9109120945 |
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1.5 Project Start Date

The project start date is 14-July-2011 which is the date of commissioning of the first phase of the 21.6 MW wind power project.

1.6 Project Crediting Period

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

Project crediting period: 14-July-2011 to 13-July-2021.

The project is registered under Clean Development Mechanism (CDM) of UNFCCC with 10 years crediting period (Renewable) (Reference No: 7671¹) on 22-October-2012. The First Crediting period of the project under CDM starts on 22-October-2012 and ends on 21-October-2019 and while the second crediting period starts on 22-October-2019 and ends on 21-October-2026².

1.7 Project Location

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

| Serial No. | WTG ID | Latitude | Longitude | Village |
|------------|---------|------------|-------------|----------|
| 1 | JW 10 | 23°11'56" | 70° 32'48" | Jangi |
| 2 | JW 12 | 23°12' 29" | 70°32' 13" | Jangi |
| 3 | JW 13 | 23°12'12" | 70°32' 16" | Jangi |
| 4 | JW 27 | 23°12' 49" | 70° 33' 35" | Jangi |
| 5 | JW 30 | 23°11' 59" | 70° 31'55" | Jangi |
| 6 | JW 09 | 23°12'3" | 70° 33' 2" | Jangi |
| 7 | NM 82-3 | 23°11'53" | 70° 35'26" | Vandhiya |
| 8 | NM82-4 | 23°12'5" | 70° 35'19" | Vandhiya |
| 9 | NM82-6 | 23°11'59" | 70° 35' 47" | Vandhiya |
| 10 | NM82-7 | 23°11'53" | 70° 35' 58" | Vandhiya |
| 11 | VW 21 | 23° 12'20" | 70° 37'30" | Vandhiya |
| 12 | VW 32 | 23°12'12" | 70° 37'12" | Vandhiya |

¹ <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1349877556.69/view>

² <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1349877556.69/view>

1.8 Title and Reference of Methodology

Methodology: ACM0002 ver. 12.3.0.

Methodology Title: “Consolidated baseline methodology for 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 06.0.0, EB 66
- Tool to calculate the emission factor for an electricity system, Version 02.2.1, EB 63
- Guidelines for the reporting and validation of plant load factors”, Version 01, EB 48

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 7671³. The project proponent has provided undertaking that it will not claim any GHG credits for UNFCCC CDM during the current monitoring period.

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 7671⁴). 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

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 results 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.

³ <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1349877556.69/view>

⁴ <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1349877556.69/view>

- Encouragement to entrepreneurs: The project has provided encouragement to other entrepreneurs to invest into renewable energy sources.

Economic well-being:

- Rural Development: The installation of wind power project results in rural and infrastructural development in the surrounding rural areas
- Economic Development: The generation of wind power results 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 results in reduction of the release of associated GHG emissions (CO₂ and CH₄ emissions).
- Improvement of Air Quality: The use of renewable energy for power generation avoids the emission of air pollutants such as Suspended Particulate Matter (SPM), Sulphur Dioxide (SO₂) and Nitrogen Oxides (NO_x) thereby improvising the surrounding air quality
- Conservation of Natural Resources: Installation of wind power plant results 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 helps 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.

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

Local stakeholder consultation of the project was conducted by the Project Proponent during registration of the project through identification of stakeholders, inviting them, holding meeting with the stakeholders and explanation of the project along with resolving comments/grievances/queries from the stakeholders.

Local stakeholder consultation process for this project is a continuous process. During the current monitoring period, the project proponent has kept grievance register in the project site office and has sought comments/grievances/suggestions from local stakeholders including local community/government agencies/NGOs etc. Besides, it has also invite stakeholders to express their comments/grievances/suggestions through mail. However, no major comments/grievances/suggestions have been received in this period and all these comments/grievances/suggestions thus received have been taken care of.

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 equipments 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.

| SI. No | WTG ID | WTG No. | Commissioning Date |
|--------|--------|---------------------|--------------------|
| 1 | VW 21 | VWT/1800/11-12/2133 | 19-July-2011 |
| 2 | VW 32 | VWT/1800/11-12/2134 | 16-July-2011 |
| 3 | NM82-4 | VWT/1800/11-12/2135 | 14-July-2011 |
| 4 | JW 27 | VWT/1800/11-12/2136 | 16-July-2011 |
| 5 | NM82-3 | VWT/1800/11-12/2309 | 29-December-2011 |
| 6 | JW 30 | VWT/1800/11-12/2316 | 31-December-2011 |
| 7 | NM82-7 | VWT/1800/11-12/2311 | 29-December-2011 |
| 8 | JW 09 | VWT/1800/11-12/2312 | 31-December-2011 |
| 9 | JW 10 | VWT/1800/11-12/2313 | 31-December-2011 |
| 10 | JW 12 | VWT/1800/11-12/2314 | 31-December-2011 |
| 11 | JW 13 | VWT/1800/11-12/2315 | 31-December-2011 |

| | | | |
|----|----------|---------------------|------------------|
| 12 | NM 82-06 | VWT/1800/11-12/2310 | 29-December-2011 |
|----|----------|---------------------|------------------|

The project activity WTGs are connected to substation through Vandhya Line 1 and Vandhya Line 2, feeder lines. The energy meters are installed at each WTG site and also at substation feeder line.

During the current monitoring period, the 21.6 MW wind power project plant underwent normal operation and shut-down for maintenance schedule. The details of plant breakdown are included in APPENDIX 2 of this document.

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:

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 http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

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

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 | Weighted average of 3 years (2007-80, 2008-09 and 2009-10) CO ₂ Operating Margin emission factor of the grid |
| Source of data | Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 06, March 2011 |
| Value applied | 0.9941 |
| Justification of choice of data or description of measurement methods and procedures applied | Obtained from the CEA database on CO ₂ Baseline for Indian Power Sector, Version 06 as the weighted average of Operating Margin (incl. imports) for years 2007-08, 2008-09, 2009-10 |
| Purpose of Data | Calculation of baseline emissions |
| Comments | The value is fixed and it is same 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 06; March 2011 |
| Value applied | 0.8123 |
| Justification of choice of data or description of measurement methods and procedures applied | Obtained from the CEA database on CO ₂ Baseline for Indian Power Sector, Version 06, March 2011 |
| Purpose of Data | Calculation of baseline emissions |
| Comments | The value is fixed and it is same 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 CO ₂ Baseline database Version 06; March 2011 |
| Value applied | 0.9486 |
| Justification of choice of data or description of | 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 |

| | |
|--|--|
| measurement methods and procedures applied | 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 02.2.1 of “Tool to calculate the emission factor for an electricity system” |
| Purpose of Data | Calculation of baseline emissions |
| Comments | The value is fixed and it is same for the entire crediting period |

4.2 Data and Parameters Monitored

| Data / Parameter | EG _{facility, y} | | | | | | | | | | | |
|---|--|--|------|---------------------------------------|------|---------|------|----------|------|---------|-------|----------|
| Data unit | MWh | | | | | | | | | | | |
| Description | Quantity of net electricity generation supplied by the project plant/unit to the grid in year y | | | | | | | | | | | |
| Source of data | Certificate for share of electricity generated by Wind farm issued by GETCO | | | | | | | | | | | |
| Description of measurement methods and procedures to be applied | <p>Measured and Calculated</p> <p>Energy exported and imported from the project activity is measured & recorded by the energy meter located at the Vandhya and Shikarpur substations.</p> <p>Measurement methods and procedures:</p> <p>Data Typed: Measured</p> <p>Monitoring: Energy Meter is used for monitoring</p> <p>Meter Calibration Frequency: Once in three years</p> <p>Archiving Policy: Paper & / Electronic</p> | | | | | | | | | | | |
| Frequency of monitoring/recording | Continuous monitoring and monthly recording | | | | | | | | | | | |
| Value monitored | <table border="1"> <thead> <tr> <th>Year</th> <th>Net Electricity Supplied to grid(MWh)</th> </tr> </thead> <tbody> <tr> <td>2018</td> <td>4989.44</td> </tr> <tr> <td>2019</td> <td>51324.12</td> </tr> <tr> <td>2020</td> <td>2962.34</td> </tr> <tr> <td>Total</td> <td>59275.89</td> </tr> </tbody> </table> | | Year | Net Electricity Supplied to grid(MWh) | 2018 | 4989.44 | 2019 | 51324.12 | 2020 | 2962.34 | Total | 59275.89 |
| Year | Net Electricity Supplied to grid(MWh) | | | | | | | | | | | |
| 2018 | 4989.44 | | | | | | | | | | | |
| 2019 | 51324.12 | | | | | | | | | | | |
| 2020 | 2962.34 | | | | | | | | | | | |
| Total | 59275.89 | | | | | | | | | | | |

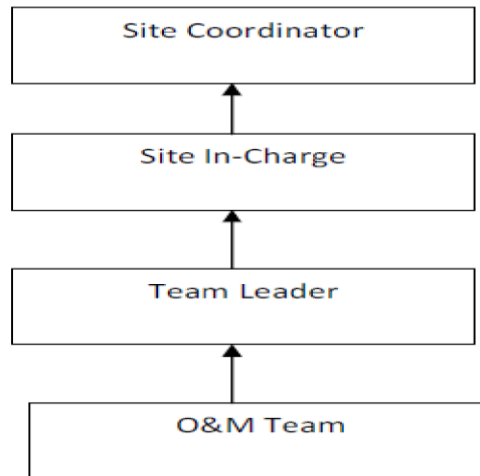
| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|---|-------|----------|----------|----------|-------|----------|-------|----------|---------|----------|----------|----------|----------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|
| Monitoring equipment | <p>Monitoring Equipment: Monitored through the main meter and check meter readings. Both the energy meters are bi-directional tri-vector meters.</p> <p>Meter accuracy: 0.2s of the meter at respective substations that are used for the exported electricity metering. 0.5s of the meter at respective WTG yards that would be used for the electricity metering. 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.</p> <p>Details of energy meters are given below:</p> <p>Make: Secure</p> <p>Accuracy Class: 0.2s</p> <table border="1"> <tr><td>JW 27</td><td>GJU61847</td></tr> <tr><td>NM 82-04</td><td>GJU64200</td></tr> <tr><td>VW 21</td><td>GJU61844</td></tr> <tr><td>VW 32</td><td>GJU61845</td></tr> <tr><td>NM82-03</td><td>GJU65938</td></tr> <tr><td>NM 82-06</td><td>GJU74496</td></tr> <tr><td>NM 82-07</td><td>GJU74498</td></tr> <tr><td>JW 09</td><td>GJU64145</td></tr> <tr><td>JW 10</td><td>GJU64174</td></tr> <tr><td>JW 12</td><td>GJU64152</td></tr> <tr><td>JW 13</td><td>GJU64146</td></tr> <tr><td>JM 30</td><td>GJU64165</td></tr> </table> | JW 27 | GJU61847 | NM 82-04 | GJU64200 | VW 21 | GJU61844 | VW 32 | GJU61845 | NM82-03 | GJU65938 | NM 82-06 | GJU74496 | NM 82-07 | GJU74498 | JW 09 | GJU64145 | JW 10 | GJU64174 | JW 12 | GJU64152 | JW 13 | GJU64146 | JM 30 | GJU64165 |
| JW 27 | GJU61847 | | | | | | | | | | | | | | | | | | | | | | | | |
| NM 82-04 | GJU64200 | | | | | | | | | | | | | | | | | | | | | | | | |
| VW 21 | GJU61844 | | | | | | | | | | | | | | | | | | | | | | | | |
| VW 32 | GJU61845 | | | | | | | | | | | | | | | | | | | | | | | | |
| NM82-03 | GJU65938 | | | | | | | | | | | | | | | | | | | | | | | | |
| NM 82-06 | GJU74496 | | | | | | | | | | | | | | | | | | | | | | | | |
| NM 82-07 | GJU74498 | | | | | | | | | | | | | | | | | | | | | | | | |
| JW 09 | GJU64145 | | | | | | | | | | | | | | | | | | | | | | | | |
| JW 10 | GJU64174 | | | | | | | | | | | | | | | | | | | | | | | | |
| JW 12 | GJU64152 | | | | | | | | | | | | | | | | | | | | | | | | |
| JW 13 | GJU64146 | | | | | | | | | | | | | | | | | | | | | | | | |
| JM 30 | GJU64165 | | | | | | | | | | | | | | | | | | | | | | | | |
| 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. | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 12, and therefore, can use the monitoring methodology for the same.

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.



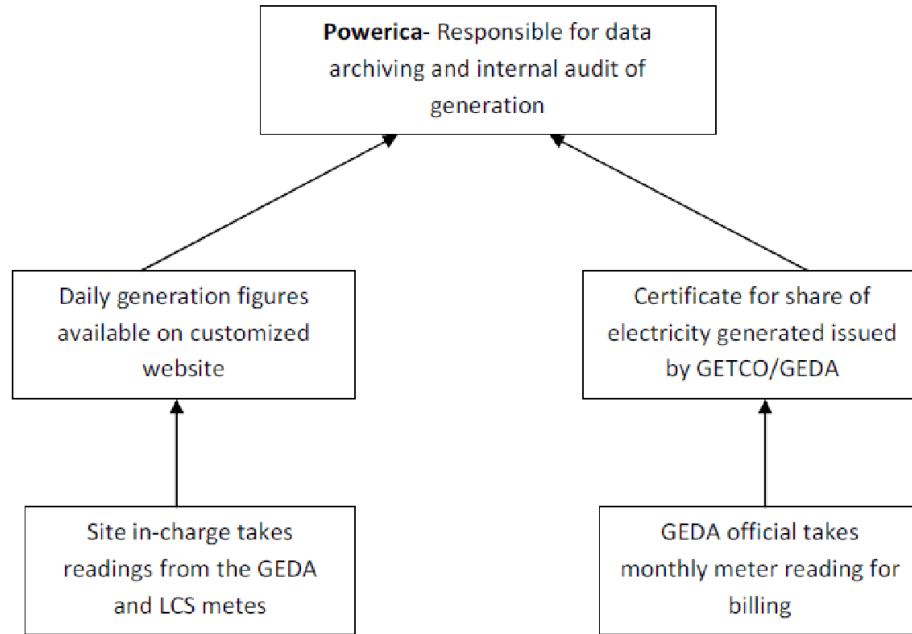
The roles and responsibilities of the O&M team may be elaborated as follows:

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-In-charge: 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.



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 = $X * Y1 / \sum Yn$ 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

Internal audits & Performance review

The records are regularly audited and checked by the senior officials from project proponent basis. The officials monitor readings at site are adequately trained. There are no any discrepancy/inconsistency observed in the values of net electricity supplied to grid value.

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.

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

Where,

BE_y = Baseline Emissions (tCO₂/year)

EG_{facility,y} = Net Electricity exported to grid (MWh)

EF_{grid, CM, y} = Baseline Emission Factor (Combined margin CO₂ emission factor for grid)

The calculation of yearly baseline emissions is provided in the table below:

| Period | Net Electricity Export | Baseline Emission Factor | Baseline Emissions |
|-------------------------------------|------------------------|--------------------------|--------------------|
| 01-October-2018 to 31-December-2018 | 4989.44 | 0.9486 | 4732 |
| 01-January-2019 to 31-December-2019 | 51324.12 | 0.9486 | 48681 |
| 01-January-2020 to 31-January-2020 | 2962.34 | 0.9486 | 2810 |
| Total | 59275.89 | | 56223 |

Hence the baseline emission calculated for the reported monitoring period is 56,223 tCO₂e
i.e. BE_y = 56,223 tCO₂e

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.

$$PE_y = 0 \text{ tCO}_2\text{e}$$

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.

$$LE_y = 0 \text{ tCO}_2\text{e}$$

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 tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

LE_y = Leakage Emissions in tCO₂/year

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

$$BE_y = 56,223 \text{ tCO}_2$$

$$PE_y = 0 \text{ tCO}_2$$

$$LE_y = 0 \text{ tCO}_2.$$

| Year | Baseline emissions or removals (tCO ₂ e) | Project emissions or removals (tCO ₂ e) | Leakage emissions (tCO ₂ e) | Net GHG emission reductions or removals (tCO ₂ e) |
|-------------------------------------|---|--|--|--|
| 01-October-2018 to 31-December-2018 | 4,732 | 0 | 0 | 4,732 |

| | | | | |
|-------------------------------------|--------|---|---|--------|
| 01-January-2019 to 31-December-2019 | 48,681 | 0 | 0 | 48,681 |
| 01-January-2020 to 31-January-2020 | 2,810 | 0 | 0 | 2,810 |
| Total | 56,223 | 0 | 0 | 56,223 |

The actual VER is about 20.8 % lower than the estimated VER. This variation is majorly due to the variations in wind flow pattern, grid availability and other parameters which are not in the control of PP. This is also affected due the application of error factor. The above variations is conservative.

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. | Year 2018 | Due date of calibration |
|---------------|-------------------------|------------------|--------------------------------|
| JW27 | GJU61847 | 09-March-2018 | 08-Mrarch-2023 |
| NM04 | GJU64200 | 07-March-2018 | 06-March-2023 |
| VW21 | GJU61844 | 14-March-2018 | 13-March-2023 |
| VW32 | GJU61845 | 14-March-2018 | 13-March-2023 |
| NM03 | GJU65938 | 07-March-2018 | 06-March-2023 |
| NM06 | GJU74496 | 07-March-2018 | 06-March-2023 |
| INM07 | GJU74498 | 07-March-2018 | 06-March-2023 |
| JW09 | GJU64145 | 09-March-2018 | 08-March-2023 |
| JW10 | GJU64174 | 09-March-2018 | 08-March-2023 |
| JW12 | GJU64152 | 09-March-2018 | 08-March-2023 |
| JW13 | GJU64146 | 09-March-2018 | 08-March-2023 |
| JW30 | GJU64165 | 09-March-2018 | 08-March-2023 |

All meters are of Secure Make and 0.2s accuracy class. Considering five years calibration frequency as per CEA notification and as per deviation request, there is no any delay in calibration applicable for the project activity.

APPENDIX 2: BREAKDOWN DETAILS

| Date from | Date to | Duration | Turbine name | Event Allocation | Category | Reason | PAMC Remark |
|------------|------------|----------|--------------|------------------|---------------|--------|---|
| 07/12/2018 | 12/12/2018 | 122.20 | NM04 | Utility | Force Majeure | -- | 220/33kV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged. |
| 07/12/2018 | 12/12/2018 | 122.20 | JW 27 | Utility | Force Majeure | --- | 220/33kV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged. |
| 07/12/2018 | 12/12/2018 | 122.20 | NM 03 | Utility | Force Majeure | --- | 220/33kV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged. |
| 07/12/2018 | 12/12/2018 | 122.20 | VW 21 | Utility | Force Majeure | --- | 220/33kV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged. |
| 07/12/2018 | 12/12/2018 | 122.20 | VW 32 | Utility | Force Majeure | --- | 220/33 KV Jangi SS all Feeder |

| | | | | | | | |
|------------|------------|--------|-------|---------|---------------|-----|---|
| | | | | | | | tripped due to electrical accident. Vestas Investigation work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | NM 07 | Utility | Force Majeure | --- | 220/33 KV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | NM 06 | Utility | Force Majeure | -- | 220/33 KV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | JW 09 | Utility | Force Majeure | -- | 220/33 KV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | JW 10 | Utility | Force Majeure | -- | 220/33 KV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation |

| | | | | | | | |
|------------|------------|--------|-------|--------------|---------------|------------------------|--|
| | | | | | | | work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | JW 12 | Utility | Force Majeure | -- | 220/33 KV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | JW 13 | Utility | Force Majeure | -- | 220/33 KV Jangi SS all Feeder tripped due to electrical accident. Vestas Investigation work completed and then Line charged |
| 07/12/2018 | 12/12/2018 | 122.20 | JM 30 | Utility | Force Majeure | -- | WTG Stopped for Oil Leakage in HUB Inspection work |
| 28/07/2019 | 23/08/2019 | 626.37 | NM 03 | Manufacturer | WTG Breakdown | -- | Thermoerr. oil pump F____/____i½C (During Trouble shooting, found Metal particles in gearoil pump unit, So as per TOS instruction, Endoscopy done, Finalize the Gearbox failure; So it was replaced by Renovated Gearbox by Vestas |
| 09/08/2019 | 12/08/2019 | 66.32 | JW 09 | Utility | Internal Grid | Earth Fault & Overcurr | 220/33kV SS Feeder-12 trip due to O/C and |

| | | | | | Failure | ent | E/F |
|------------|------------|-------|-------|--------------|-----------------------|----------------------------|---|
| 09/08/2019 | 12/08/2019 | 69.29 | JW 10 | Utility | Internal Grid Failure | Earth Fall and Overcurrent | 220/33kV SS Feeder-12 trip due to O/C and E/F |
| 09/08/2019 | 12/08/2019 | 69.29 | JW 12 | Utility | Internal Grid Failure | Earth Fall and Overcurrent | 220/33kV SS Feeder-12 trip due to O/C and E/F |
| 09/08/2019 | 12/08/2019 | 67.04 | JW 13 | Utility | Internal Grid Failure | Earth Fall and Overcurrent | 220/33kV SS Feeder-12 trip due to O/C and E/F |
| 09/08/2019 | 12/08/2019 | 71.10 | JW 30 | Utility | Internal Grid Failure | Earth Fall and Overcurrent | 220/33kV SS Feeder-12 trip due to O/C and E/F |
| 10/08/2019 | 12/08/2019 | 63.38 | JW 27 | Manufacturer | WTG Breakdown | --- | Yaw Signals Invalid |