WIND POWER PROJECT AT THENI BY POWERICA LIMITED

Document Prepared by EKI Energy Services Limited

Project Title	**Wind power project at Theni by Powerica Limited**
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Monitoring Period	01-January-2022 to 30-June-2023
Prepared By	EKI Energy Service Limited
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity involves an installation of 6 Wind Turbine Generators (WTG) of total generating capacity of 9.9 MW (6 units of Vestas make V82 WTG). The WTG units are installed in Theni district in the state of Tamil Nadu, India. The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources and to contribute to climate change mitigation efforts. In the absence of the project activity, the electricity thus supplied would have been generated through fossil fuel based thermal power plants. The project activity thus contributes to reduction in specific emissions (emissions of pollutant) including GHG emissions. The project activity is also responsible for sustainable economic growth and conservation of environment through use of wind as a renewable source. The project is located in Tamil Nadu state and each WTG have separate feeder and separate meter.

The project activity is a Greenfield project for generation of electrical energy using wind which is a renewable source of energy. Thus, this project actually displaces the electricity grid which is essentially fossil-fuel based.

The start date of the project activity is 13-September-2010, which is the date of commissioning of the first WTG. The project has been operational since the commissioning and has contributed to reduction in greenhouse gas emissions.

The electricity generation from this project activity contributes to annual GHG reductions estimated at 22,735 tCO_2e (tonnes of carbon dioxide equivalent) by displacing electricity of 23,213.43 MWh from fossil fuel-based electricity grid. The total GHG emissions reductions achieved by this project activity in the monitoring period from 01-January-2022 to 30-June-2023 is 21,864 tCO_2e.

Table no.1 Audit History

Audit Type	Period	Program	VVB Name	Number of years
Validation	13-September-2010 to 12-September-2020.	VCS	Lloyd's Register Quality Assurance Ltd	10 Years
Verification	13-September-2010 to 30-April-2011.	VCS	TÜV SÜD South Asia Pvt. Ltd.	1 Years
Verification	01-May-2011 to 10-September-2011	CDM	Lloyd's Register Quality Assurance Ltd	4 Months, 10 days

Verification	11- September-2011 to 10-December-2012	CDM	Lloyd's Register Quality Assurance Ltd	1 Years, 2 Months
Verification	11-December-2012 to 10-September-2018	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	6 Years
Verification	11-September-2018 to 31-December-2019	VCS	Earthood Service Private Limited	1 Years
Joint Validation + Verification	Validation (13-September-2020 to (12-September-2030) and Verification (01-January-2020 to 31-December-2020)	VCS	KBS Certification Services Pvt. Ltd.	Validation 10 Years Verification 1 Years
Verification	01-January-2021 to 31-December-2021	VCS	RINA Services S.p.A. (RINA)	1 Years
Verification (Ongoing)	01-January-2022 to 30-June-2023	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	1 Years, 6 Months
Total	**Validation - 1** **RCP - 1** **Verification - 7**			**Validation – 10 Years** **RCP – 10 Years** **Verification – 13 Years, 0 Months, 10 Days**

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	Sagar Upadhaya
Title	Project Manager
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India
Telephone	+91-8133981389
Email	sagar.upadhyay@enkingint.org / registry@enkingint.org

1.5 Project Start Date

The project start date is 13-September-2010 which is the date of commissioning of the first phase of the 9.9 MW wind power project.

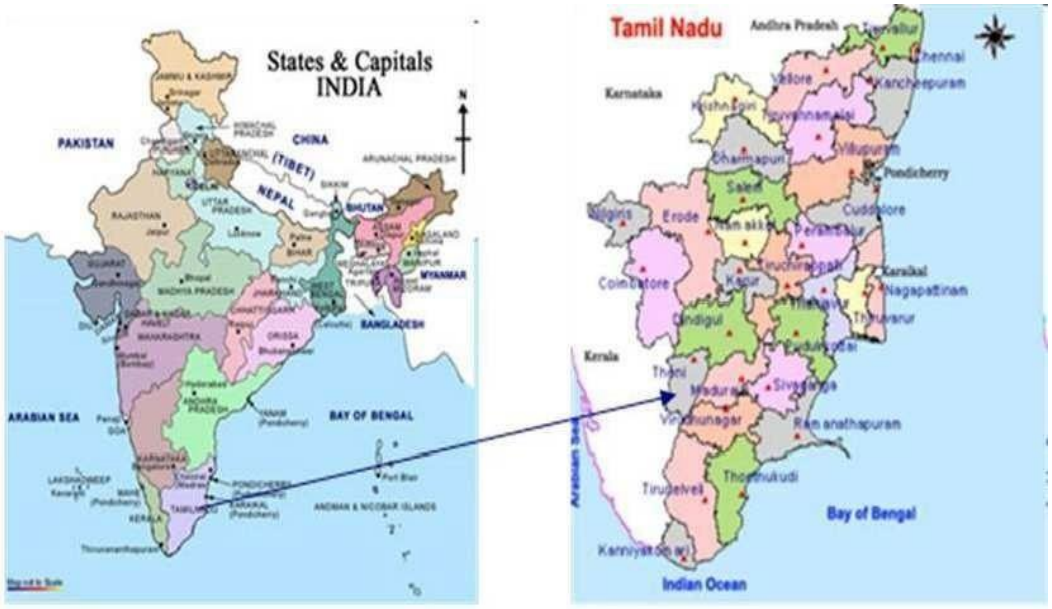
1.6 Project Crediting Period

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

The length of Second crediting period is 13-September-2020 to 12-September-2030.

1.7 Project Location

The project activity located in Taluka: Andipatti, District: Theni, State: Tamil Nadu, the project location is attached in the figure below:



Note: Map not drawn to scale

The unique location information of the WTG is provided in the table below. The WTG numbers indicated in the table below are unique identification number provided by the state utility. Satellite image is also provided[1].

Google map link:

The geo-coordinates of each WTG are as follows:

WTG No.	HTSC No.	Latitude	Longitude	Village
TSSP1255	T-144	9° 59' 40"	77° 34' 11"	Shanmuga-Sundarapuram
TM721	T-141	9° 58' 46"	77° 34'43"	Mottanuthu
TSSP158	T-142	9° 59' 08"	77° 34' 39"	Shanmuga-Sundarapuram

[1] https://www.google.com/maps/d/viewer?mid=1rjN4PB1S2zhAWPzxaMHD7nu3LZcGGYDA&usp=sharing

TM41	T-145	9° 58' 34"	77° 35' 24"	Mottanuthu
TGU28	T-139	9° 57' 03"	77° 33' 33"	Usilampatti
TSSP174	T-143	9° 59' 23"	77° 34' 43"	Shanmuga-Sundarapuram

1.8 Title and Reference of Methodology

Methodology Number: AMS –I.D.

Title: - "Grid connected renewable electricity generation," Version 18[2]

Sectoral scope: 1

The methodology AMS – I.D. also refers to the latest approved versions of the following tools:

- Tool to calculate the emission factor for an electricity system, (Version 07.0, EB 100, Annex 04)[3]
- Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period, (EB 66, version 03.0.1)[4]

Reference: Appendix B of simplified M&P for small scale project activities (UNFCCC, Recent norms)

As the project activity do not cause any project or leakage emissions from fossil fuel combustion, the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" has not been used in the PDD.

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 4572[5].

The project is not rejected by any other GHG Programs.

Details of the credits issued under CDM and VCS mechanism mentioned in below table.

[2] https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

[5] https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1300097036.88/view

Mechanism	Period
13-September-2010 to 30-April-2011	VCS
01-May-2011 to 10-September-2011	CDM
11-September-2011 to 10-December-2012	CDM
11-December-2012 to 10-September-2018	VCS
11-September-2018 to 31-December-2019	VCS
01-January-2020 to 31-December-2020	VCS
01-January-2021 to 31-December-2021	VCS

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

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 4572). 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 Designated National Authority (DNA) for the Government of India (GOI) on the Ministry of Environment and Forestry (MoEFCC)[6], called the National CDM Authority (NCDMA), has stipulated four indicators on sustainable development for Clean Development Mechanism (CDM) projects structured in India. The project participants' view on the contribution of this project activity towards sustainable development follows these four indicators as 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.

Economic well-being:

- **Rural Development:** The installation of wind power project will result in rural and infrastructural development in the surrounding rural areas

[6] Since June 2014, the name of DNA changed to Ministry of Environment, Forest and Climate Change (MoEFCC)

- **Economic Development:** The generation of wind power will result in improvising the reliability of the Unified Indian Grid and thereby enhance economic development in the region.

Environmental 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 emissions:** 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 3 - the document history mentioned in the VCS Standard Version 4.5 (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 6th 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.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
Sequential row number	*SDG Target number*	*Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator*	*Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)*	*Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.*	*Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.*
NA	NA	NA	NA	NA	NA

2 SAFEGUARDS

2.1 No Net Harm

Please refer to D 1 and D 2 of PDD (version 5.1 dated 08/11/2019) of the UNFCCC registered CDM project with reference no. 4572.

The web link of the same is given below:

https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1300097036.88/view

2.2 Local Stakeholder Consultation

Please refer to E 1 and E 2 of PDD (version 5.1 dated 08/11/2019) of the UNFCCC registered CDM project with reference no. 4572.

The web link of the same is given below:

https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1300097036.88/view

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 major comments/grievances/suggestions have been received from the afore mentioned stakeholders during the current monitoring period and all such minor suggestions have been take care by the PP, the same approached will be followed during second crediting period of the project activity.

2.3 AFOLU-Specific Safeguards

Not Applicable

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

It is to be noted that the project activity is a greenfield project for generation of electrical energy using wind which is a renewable source of energy. Thus, this project displaces the electricity grid which is essentially fossil-fuel based.

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 emissions due to fossil-fuel based grid has been displaced due to the project activity.

Emission reductions will be claimed on the net electrical energy that is supplied to grid which will be metered using main meter located at the electrical yard of the respective WTGs. These electrical energy meters are essentially electronic tri-vector meters of accuracy class 0.2s. Since these meters are not designed to measure high voltages and currents as generated in the WTG, the WTG output is connected to these meters via transformers (CT/PT) for stepping down the generated voltage and current to ranges which the meters can record. As such, these meters have a multiplying factor which when multiplied to the meter reading provides the actual amount of electricity generated. The technology providers for the project have additionally installed an LCS meter at the WTG controller.

V82_1.65 MW_50Hz:

Lifetime	20 years
Rated Power	1,650 kW
Rotor diameter	82 m
Swept area	5,281 m^2
No. of blades	3
Cut in wind speed	3.5 m/s
Cut out wind Speed	25 m/s
Rotor Speed	14.4 rpm
Regulation	Active-Stall
Hub Height	78 m
Generator Type	Asynchronous
Insulation	Class F

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.

Total GHG emissions reductions achieved during the current monitoring period 01-January-2022 to 31-December-2022 are 16,533 tCO_2e as the result of supplying 17,552.90 MWh electricity that would otherwise have been provided by fossil-fuel dominated grid.

WTG No.	HTSC No.	Location	Date of commissioning
TSSP 1255	T-144	Shanmuga - Sundarapuram	13-September-2010
TM 721	T-141	Mottanuthu	13-September-2010
TSSP 158	T-142	Shanmuga - Sundarapuram	13-September-2010
TM 41	T-145	Mottanuthu	17-September-2010
TGU 28	T-139	Usilampatti	13-September-2010
TSSP 174	T-143	Shanmuga - Sundarapuram	13-September-2010

3.2 Deviations

3.2.1 Methodology Deviations

There is no any methodology deviation applicable for the project activity.

3.2.2 Project Description Deviations

1. This project deviation was approved during renewal of crediting period (Monitoring period from 01-January-2020 to 31-December-2020).

As per registered CDM PDD, the calibration frequency is once in every two years. 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.

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 accept 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.

The deviation is in accordance with the existing national regulation for testing of meters (monitoring equipment) in the host country and the monitoring parameter thus measured is cross-checked by invoices issued by state electricity transmission utility. Hence the deviation does not have any impact of value of monitored parameter and thus on the value of GHG emission reductions. Thus, the deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario of the project activity.

2. The project participant requesting for deviation during crediting period 13-September-2020 to 12-September-2030 and Monitoring period from 01-January-2022 to 30-June-2023 are as follows.

As per the registered and RCP PDD During the previous verification the accuracy class of energy meters were 0.5s, but as per the actual practice of site the accuracy class found 0.2s which is more precise then 0.5s and towards more conservative approach, and same has been verified by VVB during the site visit. Hence PP is seeking the deviation to change the accuracy class from 0.5s to 0.2s for the all energy meters during the current monitoring period of this project activities.

3.3 Grouped Projects

This is not a grouped project activity.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EFgrid,OM,y
Data unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[7]
Value applied	0.9622
Justification of choice of data or description of measurement methods and procedures applied	Calculated as the last 3year (2016-17, 2017-18, 2018-19) generation-weighted average, sourced from Baseline CO2 Emission Database, Version 15.0, Dec 2019 published by Central Electricity Authority (CEA), Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	EFgrid,BM,y
Data unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[8]

[7] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver15.pdf

[8] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver15.pdf

Value applied	0.8811
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as per the latest data available for the most recent year 2018-19. The data is obtained from "CO2 Baseline Database for Indian Power Sector" version 15, published by the Central Electricity Authority, Ministry of Power, and Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[9]
Value applied	0.9419
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year y (tCO_2/MWh) $EF_{grid,OM,y}$= Operating margin CO_2 emission factor in year y (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	EG y
Data unit	MWh/year
Description	Quantity of net electricity supplied to the grid in year y
Source of data	TNEB Statement
Description of measurement methods	Monitoring: Electrical Energy Meters which are electronic tri-vector meters

[9] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver15.pdf

<table>
<tr><td>and procedures to be applied</td><td>Data type :Measured & Calculated Archiving: Paper & Electronic Recording Frequency: Monthly

Responsibility: The O&M site-in-charge shall be responsible for the regular recording of data.

Calibration Frequency: The meters shall be calibrated once every five years. as per CEA (installation and operation of meters) (Amendment) Regulations, 2019

Web-link https://cea.nic.in/regulations-category/metering-regulations/?lang=en</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuous monitoring and monthly recording</td></tr>
<tr><td>Value monitored</td><td>23,213.43</td></tr>
<tr><td>Monitoring equipment</td><td>Monitoring Equipment: Electrical Energy Meters which are electronic tri- vector meters.

Accuracy: 0.2s Make: HPL

Details of energy meters are given below:
<table><tr><td>WTG No.</td><td>Meter Serial No.</td></tr><tr><td>TGU 28 SS(T-139)</td><td>627560</td></tr><tr><td>TM 41 SS(T-145)</td><td>624763</td></tr><tr><td>TSSP 158 SS(T-142)</td><td>624852</td></tr><tr><td>TSSP 174 SS(T-143)</td><td>627558</td></tr><tr><td>TM 721 SS(T-141)</td><td>627555</td></tr><tr><td>TSSP 1225 SS(T-144)</td><td>627553</td></tr></table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The amount of electricity exported to grid is cross-checked with the invoices for sale of power.

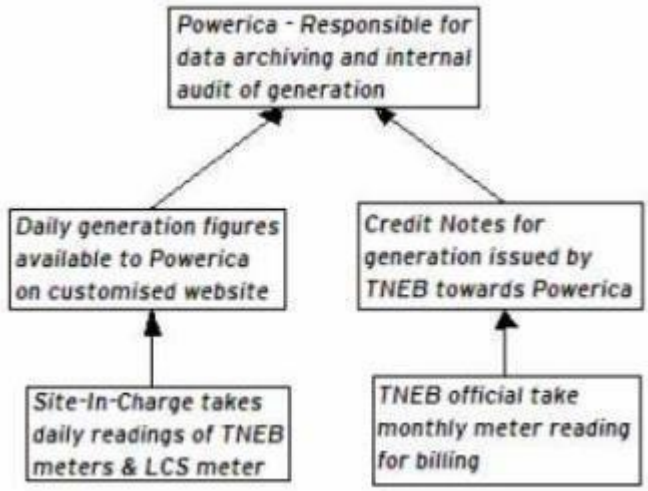
Meter calibration shall be conducted once in every five years and internal audit system is in place.

(Meter calibration details are available in Appendix -1)</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Calculation method</td><td>--</td></tr>
<tr><td>Comments</td><td>The Monitored Data to be kept for a minimum of two years after theend of the crediting period or the last issuance whichever is later.</td></tr>
</table>

4.3 Monitoring Plan

The monitoring methodology specified in the methodology requires that the project- monitoring plan to consist of metering the electricity generated 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 emission to the project activity.'

Since the baseline methodology is based on ex-ante determination of the baseline emission factor, the monitoring of baseline emission factor 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 will have a designated Site-In-Charge (O&M) on site who will be responsible for monitoring the electricity exported from the project activity. The overall flow of information has been depicted using the following hierarchical structure:



There are two points of monitoring:

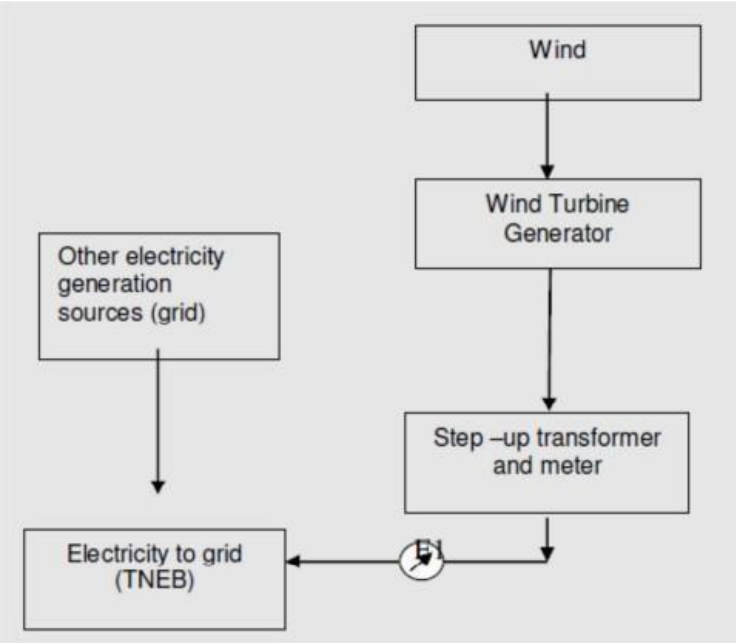
1. At the WTG panel by LCS meter provided by O&M service provider

2. At the WTG electrical yard substation using a TNEB owned electronic tri-vector meters

The net electricity exported to grid is calculated as the product of difference of current and previous TNEB meter readings multiplied with the multiplying factor of the meter. Additionally, all the WTGs at the site are connected to a central monitoring system located at that site only. This system captures daily generation figures which are later made available to Powerica on the customized website of Vestas.

Emergency Preparedness

In the context of the project activity, the meters will be kept in sealed by TNEB and all maintenance will be taken up by TNEB only. In case of failure of the main meter, generation value of controller meter would be considered. The previous month's transmission loss between the main meter and controller meter would be taken into account to determine net electricity supplied to grid. There was no any such instance occurred where main meter is failed during current monitoring period. The state electricity board has removed check meters, hence only main meters are part of project activity. The monitoring process is under control of state electricity board and PP do not have any control on it. The schematic line diagram of metering point are as below where project activity uses only main meter for determination of net electricity supplied to grid.



The project promoters have contracted the technology supplier for providing O&M services for the power project. The service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WTGs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WTG controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider would also be responsible for supply of necessary main components of the WTG such as main gearboxes, blades, generators, towers, hubs, main shafts & bearings, ground and top controller and hydraulic systems. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities. Additionally, spare meters would also be kept available at the site for replacement in case of failure of any of the monitoring equipment.

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.

$BE_y = (EG_y - EC_y) * EF_{grid,CM,y}$

Where,

BE_y = Baseline Emissions (tCO_2/year)

EGy = Electricity exported to grid in year y (MWh)

ECy = Electricity Imported from grid in year y (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:

BE_y = 23,213.43 MWh * 0.9419 tCO_2/year

BE_y = 21,864 tCO_2e (the value is rounded down)

Hence the baseline emission calculated for the reported monitoring period is 21,864 tCO_2

i.e. BE_y = **21,864 tCO_2e**

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.

PEy = 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.

LEy = 0

5.4 Net GHG Emission Reductions and Removals

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

ERy = BEy – PEy – LEy

Where,

ERy = Emission Reduction in tCO_2/year

BEy = Baseline emission in tCO_2/year

PEy = Project emissions in tCO_2/year

LEy = Leakage Emissions in tCO_2/year

For the project activity during the current monitoring period,

BEy = **21,864** tCO_2e, PEy = 0 tCO_2e, LEy = 0 tCO_2e.

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)
Year 1 (01-January-2022-- 31-December-2022)	16,570	0	0	16,570
Year 2 (01-January-2023-- 30-June-2023)	5,294	0	0	5,294
Total	**21,864**	**0**	**0**	**21,864**

Ex-ante emissions reductions /removals	Achieved emissions reductions /removals	Percent difference	Justification for the difference
22,735 tCO_2 (Year 2022)	16,570 tCO_2	-27.12 %	During the Year 2022, the project witnessed a decrease of -27.12% in emission reductions as compared to ex-ante emissions, which is due to variation is majorly due to the variations in wind flow pattern, grid availability and other parameters which are not in the control of PP.
11,274 tCO_2 (Year 2023)	5,294 tCO_2	-53.04 %	And during the Year 2023, the project witnessed a decrease of -53.04 % in emission reductions as compared to ex-ante emissions, which is due to variation is majorly due to the variations in wind flow pattern, grid availability and other parameters which are not in the control of PP.

APPENDIX 1: METER CALIBRATION DETAILS

WTG No.	Meter Serial No.	Make	Accuracy Class	Last Calibration up to	Latest date Of Calibration	Delay In Calibration
TGU 28 SS(T-139)	627560	HPL	0.2s	16-May-2022	08-November-2022	17-May-2022 to 07-November-2022
TM 41 SS(T-145)	624763	HPL	0.2s	16-May-2022	08-November-2022	17-May-2022 to 07-November-2022
TSSP 158 SS(T-142)	624852	HPL	0.2s	16-May-2022	08-November-2022	17-May-2022 to 07-November-2022
TSSP 174 SS(T-143)	627558	HPL	0.2s	16-May-2022	08-November-2022	17-May-2022 to 07-November-2022
TM 721 SS(T-141)	627555	HPL	0.2s	16-May-2022	08-November-2022	17-May-2022 to 07-November-2022
TSSP 1225 SS(T-144)	627553	HPL	0.2s	16-May-2022	08-November-2022	17-May-2022 to 07-November-2022

APPENDIX 2: MAJOR BREAKDOWN DETAILS

Sr. NO	WTG's	Short Description	From	To	Total Stoppage Hrs
1	TGU 28 SS(T-139)	Micon04 Feeder restored after Overcurrent Earth Fault Relay replaced by new one.	21-July-2022 18:08:00	22-July-2022 22:09:00	28:01 Hrs _ 1.2 Days