Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: Clean Energy Project in the State of Tamil Nadu

Version 1.2

Date :27/06/2025

First CoU Issuance Period: 02 years,00 Months

Date:01/01/2023 to 31/12/2024

Monitoring Period: 01/01/2023 to 31/12/2024

Monitoring Report (MR)
CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report	
Title of the project activity	Clean Energy Project in the State of Tamil Nadu
UCR Project Registration Number	499
Version	1.2
Completion date of the MR	27/06/2025
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 01 Duration of this monitoring Period: 01/01/2023 to 31/12/2024
Project participants	Vaayu Renewable Energy (Tapti) Private Limited
Host Party	INDIA
Applied methodologies and standardized baselines	ACM0002-Consolidated baseline methodology for grid-connected electricity generation from renewable sources -Version 22.0
Sectoral scopes	01 Energy industries (Renewable/Non-renewable Sources)
Actual amount of GHG emission reductions for this monitoring period in the registered PCN	45,673 COUs
	2023: 25,600CoUs (25,600tCO2eq)
	2024: 20,073 CoUs (20,073 tCO2eq)
Total:	45,673 **CoUs** (45,673 tCO2eq)

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

The "Clean Energy Project in the State of Tamil Nadu" is spread across Tirunelveli district in the state of Tamil Nadu. It aims to generate electricity using renewable wind energy, reducing greenhouse gas (GHG) emissions by approximately 45,673 tCO2e annually. It achieves this by displacing 54,962.599 MWh/yr of electricity from fossil fuel-based power plants with clean power produced by 18 Enercon E-53 wind energy converters (WECs), each with an 800-kW capacity. The project involves the supply, erection, commissioning, and operation of these WECs, which generate 3-phase power at 400V, stepped up to 33 kV, and supply electricity to the Tamil Nadu Generation & Distribution Corporation Ltd. grid. Commissioned between September 2011 and January 2012, the project operates under the Universal Carbon Registry, contributing to continuous GHG emission reductions.

b) Brief description of the installed technology and equipment>>

The project utilizes renewable wind energy to generate electricity, displacing fossil fuel-based power generation and reducing anthropogenic GHG emissions by actual 45,673 tCO2e annually. It produces approximately 54,962.599 MWh/yr of clean electricity, contributing to the Tamil Nadu grid.

The project is fully operational. It consists of 18 wind energy converters (WECs) of Enercon E-53 make, each with a rated capacity of 800 kW. Commissioning Details: Implementation was completed with the commissioning of all 18 WECs. The first machine was commissioned on 29 September 2011, and the last on 31 January 2012, marking the full operationalization of the project.

The project involved the supply, erection, commissioning, and ongoing operation of the WECs. These machines generate 3-phase power at 400V, stepped up to 33 kV, and operate within a frequency range of 47.5–51.5 Hz and a voltage range of 400 V ± 12.5%. The electricity is supplied to Tamil Nadu Generation & Distribution Corporation Ltd. In GHG Emission Reductions.

The project continuously reduces GHG emissions by replacing grid electricity, primarily from fossil fuel-based power plants, with renewable wind energy. The actual emission reduction of 45,673tCO2e aligns with the UCR's standards for monitoring and verifying emission reductions. The project adheres to UCR requirements for registered activities, including documentation of implementation, operation, and emission reduction measures.

It is actively monitored under the UCR framework to ensure ongoing compliance and accurate reporting of GHG reductions.

Main component of the windmill is explained below:

Main Tower:
This is a very tall structure with a door and inside ladder at the bottom. The door is used to enter into the tower for operation and maintenance.

Blades:
The windmills are provided with three blades. The blades are self-supporting in nature made up of Fibre Reinforced Polyester. The blades are mounted on the hub.

Nacelle:
The Nacelle is the one which contains all the major parts of a windmill. The nacelle is made up of thick rugged steel and mounted on a heavy slewing ring. Under normal operating conditions, the nacelle would be facing the upstream wind direction.

Hub:
The Hub is an intermediate assembly between the wing and the main shaft of the wind turbine. Inside the hub, a system to actuate the aerodynamic brake is fitted. The hub is covered with nose cone.

Main Shaft:
The shaft connects the gear box and the hub. Solid high carbon steel bars or cylinders are used as main shaft. The shaft is supported by two bearings.

The E-53 is a medium-capacity wind turbine manufactured by Enercon, with a rated power output of 800 kW. It uses direct-drive (gearless) technology, which increases efficiency and reduces maintenance needs. The cut-in speed is low (3.0 m/s), making it suitable for moderate wind regions, while its cut-out speed is 34 m/s, and it can survive wind speeds up to 59.5 m/s, showing strong design resilience

c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)>>

The project activity consists of 18 WEGs (800 kW) of Enercon make E-53. The first machine under the project activity was commissioned on 29 September 2011 and last machine under the project activity was commissioned on 31 January 2012. The commissioning dates for all the machines include in the project activity are given in the table below.

Ownership of project has been changed from 'Vish Wind Infrastructure LLP.' to 'Vaayu Renewable Energy (Tapti) Pvt. Ltd.'. During the change of ownership, PPA of project activity has also been changed. Post change of ownership electricity generated from project activity will be used for third party sale to SRF Limited instead of sale to state utility. A third-party sale agreement has been signed between the PP 'Vaayu Renewable Energy (Tapti) Pvt. Ltd' & 'SRF Limited'.

Sr No.	HTSC No.	No of WEGs Connected	Date of Commissioning
1	3914	01	29/09/2011
2	3915	01	29/09/2011
3	3916	01	29/09/2011
4	3917	01	29/09/2011
5	3918	01	29/09/2011
6	3919	01	29/09/2011
7	3920	01	29/09/2011
8	3921	01	29/09/2011
9	3947	01	30/09/2011
10	3948	01	30/09/2011
11	3949	01	30/09/2011
12	3954	01	07/10/2011
13	3955	01	07/10/2011
14	3957	01	20/10/2011
15	3959	01	21/10/2011
16	3981	01	28/12/2011
17	3986	01	10/01/2012
18	3999	01	31/01/2012

First Issuance Period: 02 years,00 months – 01/01/2023 to 31/12/2024

UCR Project ID or Date of Authorization: 499
Start Date of Crediting Period: 01/01/2023

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

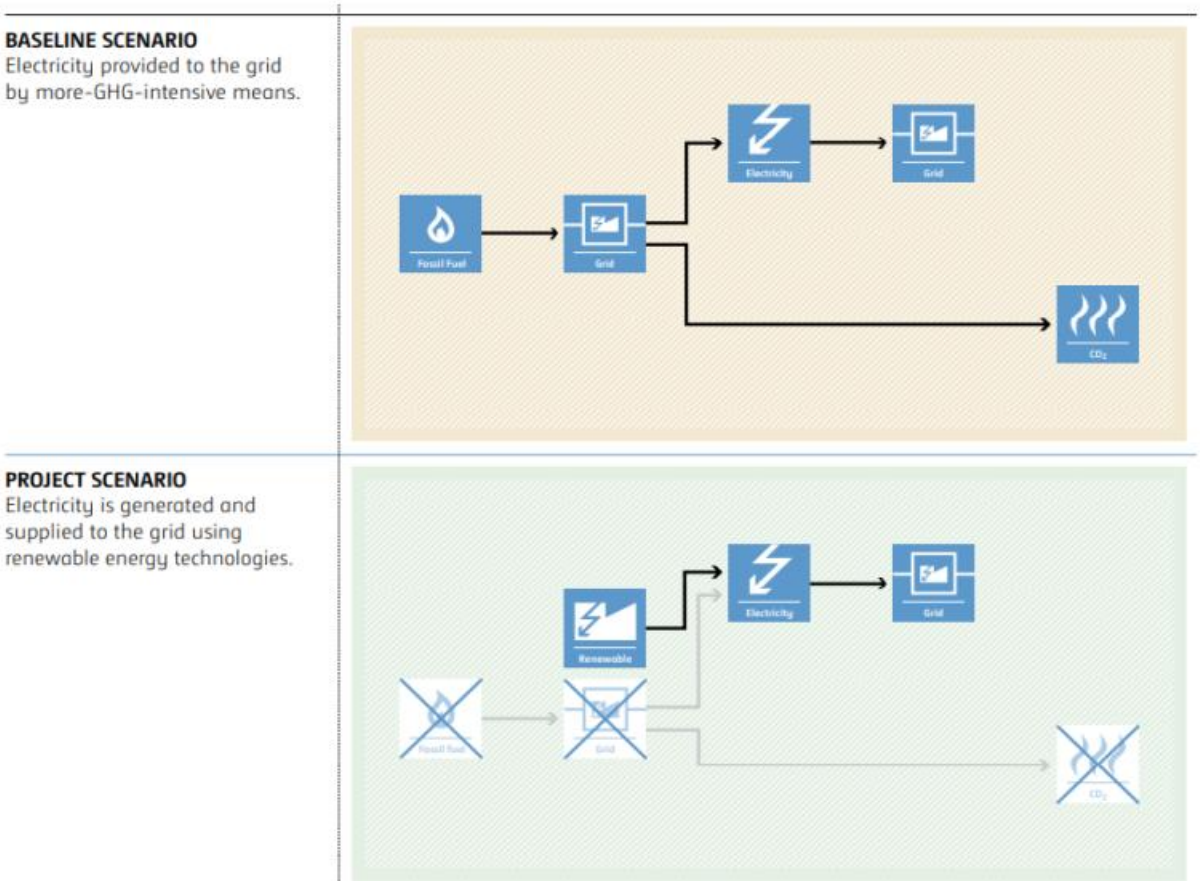
Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/01/2023
Carbon credits claimed up to	31/12/2024
Total ERs generated (tCO_{2eq})	45,673tCO2eq
Leakage	0

e) Baseline Scenario>>

The scenario existing prior to the implementation of the project activity, is electricity delivered to the facility by the project activity that would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources. This is a green field project activity. There was no activity at the site of the project participant prior to the implementation of this project activity. Hence pre-project scenario and baseline scenario are the same.

As per the approved consolidated methodology ACM0002 Version 22, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: “If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources to the grid”.

The Schematic diagram showing the baseline scenario:



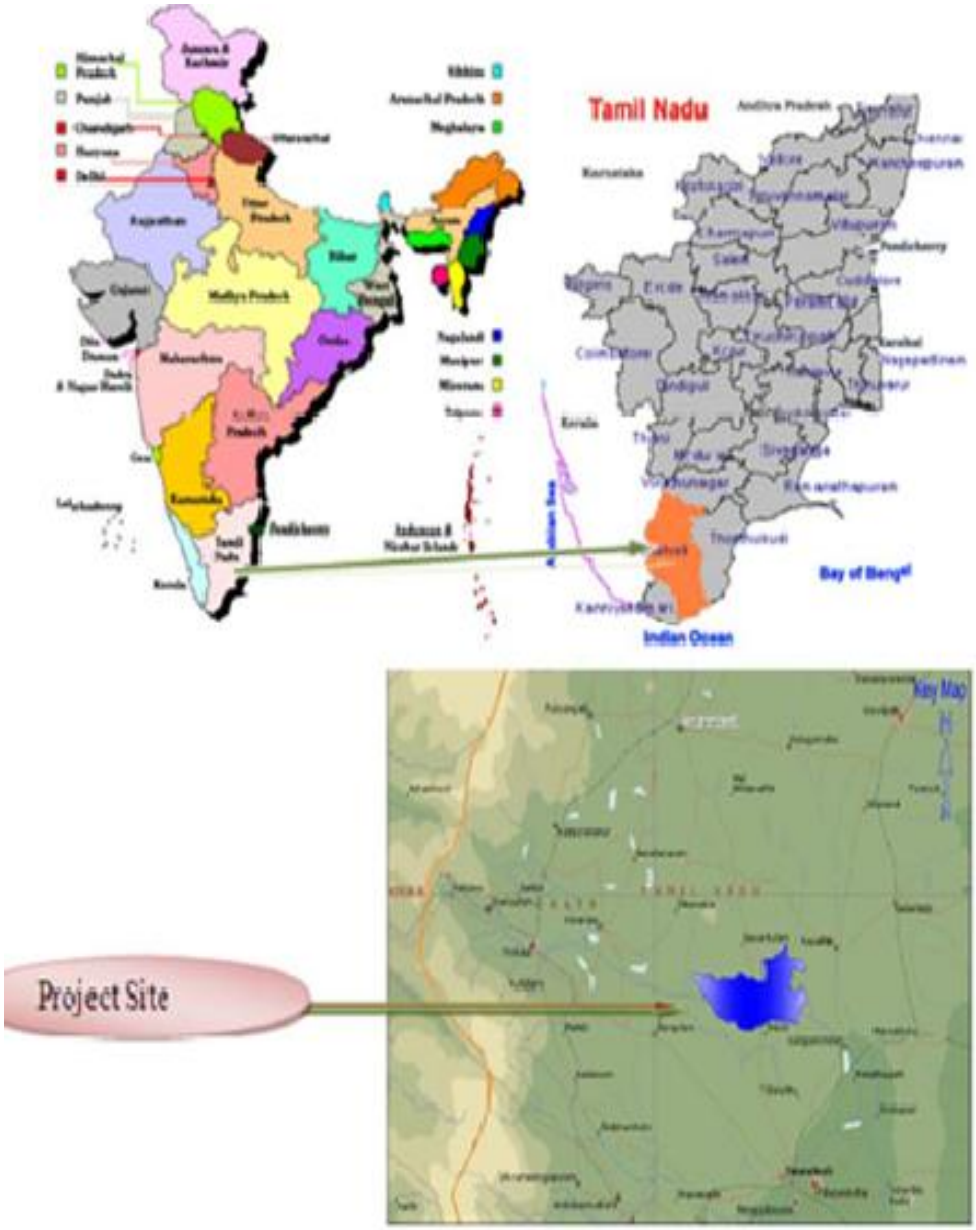
A.2. Location of project activity>>

Country: India
State: Tamilnadu.
District: Tirunelveli
Village: Kanarpatti, Ettankulam, Kalakudi, Kuruchikulam, Ukkirankottai, Vagaikulam, Kattarankulam and Melelanthaikulam .

The project consists of 18 numbers of E-53 WECs of 800 kW each. The latitude and longitude of the project activity are given below:

Vagaikulam Site, Tirunelveli District, Tamil Nadu											
Sl. No	**Loc. No.**					**Latitude (N)**			**Longitude (E)**		
		HTSC No	**Village**	**Taluka**	**District**	**Deg.**	**Minutes**	**Seconds**	**Deg**	**Minutes**	**Seconds**
1	V200	3957	Kanarpatti	Tirunelveli	Tirunelveli	8	52	57.09	77	38	51.01
2	118	3919	Kattaran kulam	Tirunelveli	Tirunelveli	8	55	21	77	40	24.28
3	V177	3947	Ettankul am	Tirunelveli	Tirunelveli	8	52	59.92	77	38	12.89
4	V98	3914	Kalakudi	Tirunelveli	Tirunelveli	8	53	17.24	77	36	21.54

5	V50	3915	Kuruchi kulam	Tirunelveli	Tirunelveli	8	52	49.24	77	35	10.4
6	V52	3916	Kuruchi kulam	Tirunelveli	Tirunelveli	8	52	31.66	77	35	7.49
7	SF 141	3917	Kuruchi kulam	Tirunelveli	Tirunelveli	8	52	53.03	77	34	59.05
8	168	3918	Vagaikul am	Tirunelveli	Tirunelveli	8	54	51.25	77	36	56.19
9	117	3949	Ukkiran kottai	Tirunelveli	Tirunelveli	8	55	13.76	77	36	36.15
10	173	3986	Vagaikulam	Tirunelveli	Tirunelveli	8	55	0	77	37	22.1
11	170	3955	Vagaikulam	Tirunelveli	Tirunelveli	8	54	41.45	77	36	37.58
12	135	3948	Ukkiran kottai	Tirunelveli	Tirunelveli	8	55	4.55	77	36	37.69
13	136	3959	Kanarpatti	Tirunelveli	Tirunelveli	8	53	5.5	77	38	45.7
14	V76	3954	Kuruchikulam	Tirunelveli	Tirunelveli	8	52	38.92	77	35	38.99
15	126	3981	Kattarankulam	Tirunelveli	Tirunelveli	8	55	17	77	41	9.7
16	120	3920	Melelant haikula m	Sankarankoil	Tirunelveli	8	55	36.25	77	40	42.29
17	V213	3921	Kanarpatti	Tirunelveli	Tirunelveli	8	53	21.95	77	39	23.63
18	V202	3999	Kanarpatti	Tirunelveli	Tirunelveli	8	52	33.8	77	38	56.4



PROJECT ACTIVITY

A.3. Parties and project participants >>

Party (Host)	Participants
India (Host)	Vaayu Renewable Energy (Tapti) Pvt. Ltd. (Private) (Private entity)

A.4. References to methodologies and standardized baselines >>

SECTORAL SCOPE - _01 Energy industries (Renewable/Non-renewable sources)

TYPE - Renewable Energy Project

CATERGORY ACM0002., Consolidated baseline methodology for grid-connected electricity generation from renewable sources -Version 22.0

A.5. Crediting period of project activity >>

The project activity is registered under Clean Development Mechanism (CDM) project with registration number 7537[1].The crediting period of this project under CDM is 06/12/2012 to 05/12/2022. PP seeks verification under UCR from 01/01/2023 onwards, i.e., crediting period for UCR starts from 01/01/2023.

A.6. Contact information of responsible persons/entities >>

Name: Lokesh Jain
Contact: 9667647537
Email: lokesh.jain@viviidgreen.com
Address: 1001-B, Sri Krishna Complex, New Link Road, Opp. Laxmi Industrial Estate, Andheri West, Maharashtra 400053 ·

[1] CDM: Clean Energy Project in the State of Tamil Nadu

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

The 14.4 MW wind power project involves 18 Wind Energy Converters (WECs), each with a capacity of 800 KW (E-53 model), installed to generate renewable energy. Below is a simplified summary of the project's implementation status, technology as per the provided details.

(a) Description of Installed Technologies, Technical Processes, and Equipment

Technology - The project uses 18 E-53 Wind Energy Converters (WECs), each with a rated power of 800 KW, manufactured by WWIL at their Daman, India facility. No technology transfer is involved as the equipment is locally produced.

Turbine model	(E- 53)
Rated power	800 KW
Rotor diameter	53 m
Hub height	75 m (Concrete)
Turbine Type	Direct driven, horizontal axis wind turbine with variable rotor speed
Power regulation	Independent pitch system for each blade.
Cut in wind speed	2.5 *m/s*
Rated wind speed	12 *m/s*
Cutout Wind speed	28-34 m/s
Extreme Wind Speed	59.5 *m/s*
Rated rotational speed	29 rpm
Operating	12-29 rpm
Orientation	Upwind
No of Blades	3
Blade Material	Glass Fiber Epoxy reinforced
Gear box type	Gear less
Generator type	Synchronous generator
Braking	Aerodynamic
Output Voltage	400 V
Yaw System	Active yawing with 4 electric yaw drives with brake motor
Tower	74 m (concrete)

Training And Maintenance Requirements:

Training is crucial to keep both people and machines safe when working with Wind Energy Converters (WECs). To get the best performance from these machines, engineers and technicians need to understand them well and keep them in good condition.

Wind World's service staff must be skilled at fixing technical issues at the top of the turbine. This requires them to climb the tower easily and comfortably. The Wind World Training Academy provides tailored training to meet project needs. The training is practical and focused, helping trainees gain knowledge and improve their skills and attitude. This leads to better problem-solving and creativity.

Monitoring Roles & Responsibilities

PP will be monitoring the data sent by the O&M contractor and the data for electricity generated by the project activity will be kept as records for the period of 10+2 years i.e. 2 years beyond the term of crediting period. WWIL is O&M contractor and will be responsible for data recording.

The Project is operated by WWIL (O&M contractor for the project activity) and managed by the PP. The operational and maintenance contract for the project is with Enercon. Enercon is an ISO 9001:2008 certified Quality Management system from Germanischer Lloyd. Enercon follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of theist, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

The accuracy of monitoring parameter is ensured by adhering to the calibration and testing of the metering equipment once in 5 years. Enercon is Operation and Maintenance contractor for the project activity and provides the daily generation report to the Project proponent. The project proponent also maintains the records of daily generation report and joint meter report

The project proponent is Vaayu Renewable Energy (Tapti) Private Limited will be keeping and monitoring the data for electricity generation and calibration reports post project implementation. WWIL being the O&M contractor have the responsibility of activities such as maintaining electricity generation records, calibration records and maintenance of the WECs (Wind Energy Generators).

1. The metering equipment were inspected & calibrated by State Utility. As per the registered monitoring plan all the meters are required to be calibrated once in 5 years by state utility.
2. Main meter with serial number HT1100044 was replaced with meter serial no. 17055050 on 12/12/2023, the meters are shifted to advanced type ABT DLMS. In (2018)
3. Check meter with serial number HT1100045 was replaced with meter serial no. 17055062 on 12/12/2023, the meters are shifted to advanced type ABT DLMS. In (2018)

Procedure for data uncertainty: -

1. In case the main meter at 110kV is not in service due to maintenance, repair, testing, defective display, the same will be either replaced/repaired or calibrated immediately. During this interim period the generation from the Check Meter shall be used during that period.

2. In case the check meter at 110kV is not in service due to maintenance, repair, testing, defective display, the same will be either replaced/repaired or calibrated immediately. However, in that case the recording of the electricity generation will not be affected as it will be taken from the main meter.

3. During the calibration if the main meter at 110kV is found to be outside the permissible limits of the error and if the main meter readings have been used in JMR, the CERs would be calculated by conservative approach by applying an error factor (–ve) as identified during the calibration to the net electricity export value ($EG_{BL,y}$)since the date of last calibration. The main meter would be calibrated or replaced immediately with new calibrated meter.

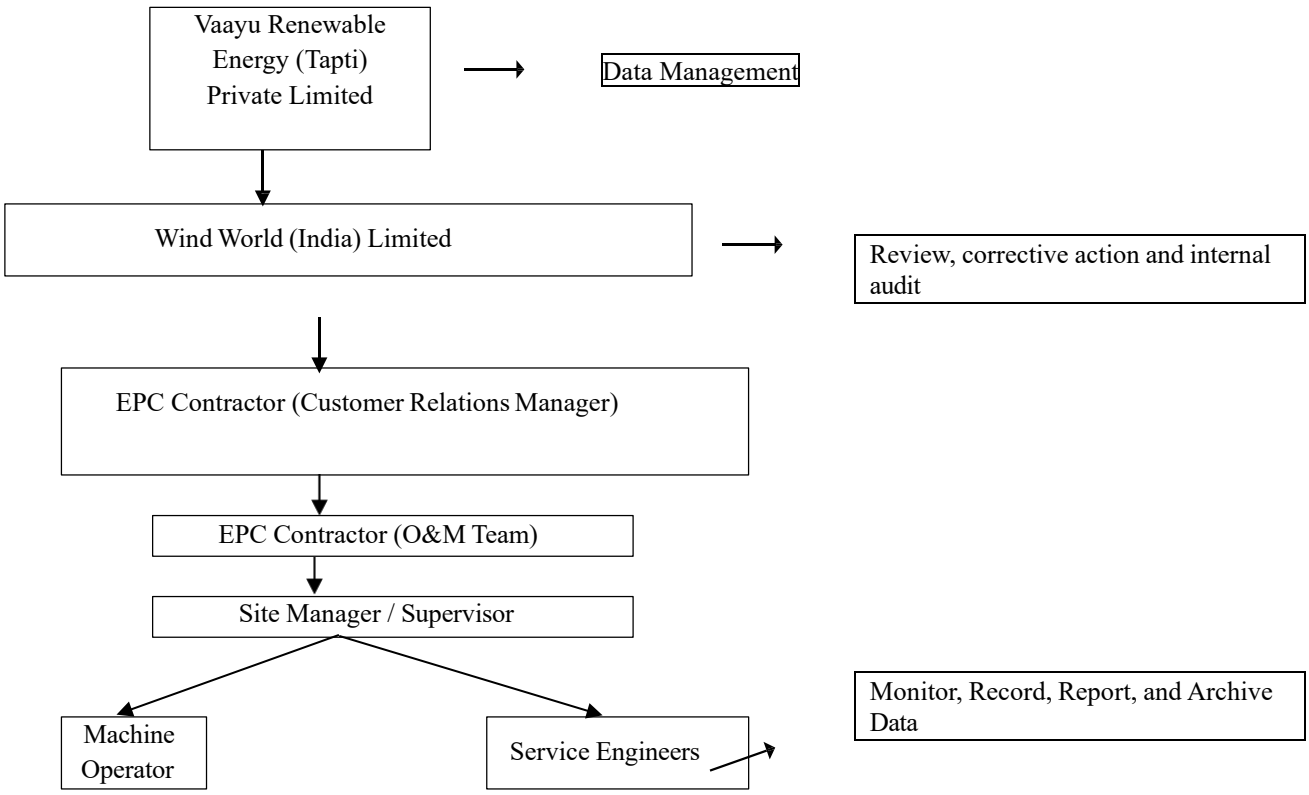
4. During the calibration if the check meter at 110kV is found to be outside the permissible limits of the error and if the check meter readings have been used in JMR, the CERs would be calculated by conservative approach by applying an error factor (–ve) as identified during the calibration to the net electricity export value ($EG_{BL,y}$) since the date of last calibration. The check meter would be calibrated or replaced immediately with new calibrated meter.

5. During the calibration if both main meter and check meters at 110kV is found to be outside the permissible limits of the error, the CERs would be calculated by conservative approach by applying an error factor (–ve) as identified during the calibration to the net electricity export value ($EG_{BL,y}$) since the date of last calibration. The main meter and check meter would be calibrated or replaced immediately with new calibrated meter.

6. During the calibration if the TNEB meter at 33kV is found to be outside the permissible limits of the error the CERs would be calculated by conservative approach by applying an error factor (–ve) as identified during the calibration to the net electricity export value ($EG_{BL,y}$) since the date of last calibration. The TNEB meter would be calibrated or replaced immediately with new calibrated meter.

7. In case the TNEB meter at 33kV is not in service due to maintenance, repair, testing, defective display or operate outside the permissible limit of error, the same will be either replaced/repaired or calibrated immediately and then the net electricity export will be calculated by state utility pursuant to provision of PPA.

SINGLE LINE DIAGRAM



(b) Implementation and Actual Operation of the Project Activity

Project Overview - The project is a new 14.4 MW wind power initiative with 18 WECs installed at a single site. There are no multiple sites or phased implementation mentioned.

Implementation Status - The project involves the installation of 18 WECs, each fully operational and connected to the local grid. The manufacturing of WECs including synchronous generators, occurs at WWIL's Daman facility in India.

Current Status - The project is fully operational, with all 18 WECs generating renewable energy as designed.

Additional - Baseline Scenario - Without this project, the equivalent electricity would be supplied by the Indian grid, which relies heavily on fossil fuel-based power plants.
Environmental Impact - The project contributes to reducing greenhouse gas emissions by providing clean, renewable energy.

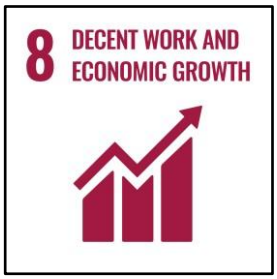
b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>

The 14.4 MW wind power project involves 18 E-53 Wind Energy Converters (WECs), each with an

800-kW capacity, set up by WWIL in India. These wind turbines convert wind energy into electricity using synchronous generators, which are manufactured at WWIL's Daman plant using advanced vacuum impregnation technology for better insulation and durability. The turbines have rotor blades, a nacelle with the generator and control systems, a tower, and a concrete foundation. The electricity generated is fed into the Indian grid through transformers. Without this project, the same amount of electricity would come from fossil fuel-based power plants, which is the baseline scenario. This renewable energy project reduces emissions and supports local manufacturing through technology transfer.

B.2 Do no harm or Impact test of the project activity>>

There are social, environmental, economic and technological benefits which contribute to sustainable development.

Goal 7 	➢ The project activity will generate clean energy, which with increased share will increase the affordability at a cheaper rate to end user. The project activity will utilize wind energy (renewal resource) to generate power. The project activity will increase the share of renewable resource-based electricity to global mix of energy consumption
Goal 8 	➢ Decent work and economic growth. This project generates additional employment for skilled and unskilled people, also the project situated in remote area will provide employment opportunities to unskilled people from villages. The training on various aspects including safety, operational issues and developing a skill set will also be provided to employees ➢ This project will achieve full and productive employment and decent work.
Goal 13 	➢ This 14.4 MW wind power project meets the SDG 13 goal by saving fossil fuel and producing clean energy. This project is reduced to 45,673 **tCO_2.** ➢ In a Greenfield project, electricity delivered to the grid by the project would have otherwise been generated by the operation of grid connected power plants. Thereby the project activity reduces the dependence on fossil fuel-based generation units and as there are no emissions associated with this project it contributes to the reduction of greenhouse gases (GHG) emissions.

There are social, environmental, economic and technological benefits which contribute to sustainable development.

- **Social benefits:**

- The project activity will contribute to socio-economic development through improving the infrastructure for road network and other mode of communications in the remote part of the state during both the construction and operational period.
- The project activity will utilize renewable energy source for electricity generation instead of fossil fuel-based electricity generation which would have emitted gaseous, liquid and/or solid effluents/wastes. Thus, the project causes no negative impact on the surrounding environment and contributes to environmental well-being.
- The project activity will contribute towards reduction of the GHG emissions as well as emission of pollutants like SOx, Suspended Particulate Matters (SPMs) etc. by avoiding equivalent amount of power generation from fossil fuel-based power plants.

- **Environmental benefits:**

- Utilizing wind energy instead of burning fossil fuels for electricity generation significantly decreases the emission of harmful pollutants, fostering cleaner air, water, and soil.
- Leveraging wind energy aids in preserving natural resources and minimizing detrimental impacts on the environment, contributing to overall ecological well-being.
- Moreover, harnessing wind energy offers a sustainable alternative to burning fossil fuels, which not only mitigates pollution but also conserves natural habitats and biodiversity, supporting healthier ecosystems and enhancing environmental resilience.

- **Economic benefits:**
- The project will generate electricity utilizing renewable source like wind, thus will increase the contribution of renewable based power generation in the region and will also help in reducing the demand - supply gap of the respective grid.
- The project activity involves substantial amount of investment, thus will contribute towards generation of direct and indirect employment opportunities as per the requirement of the skilled and semi-skilled manpower.
- Use of a renewable source of energy reduces the dependence on imported fossil fuels and associated price variation, thereby leading to increased energy security.

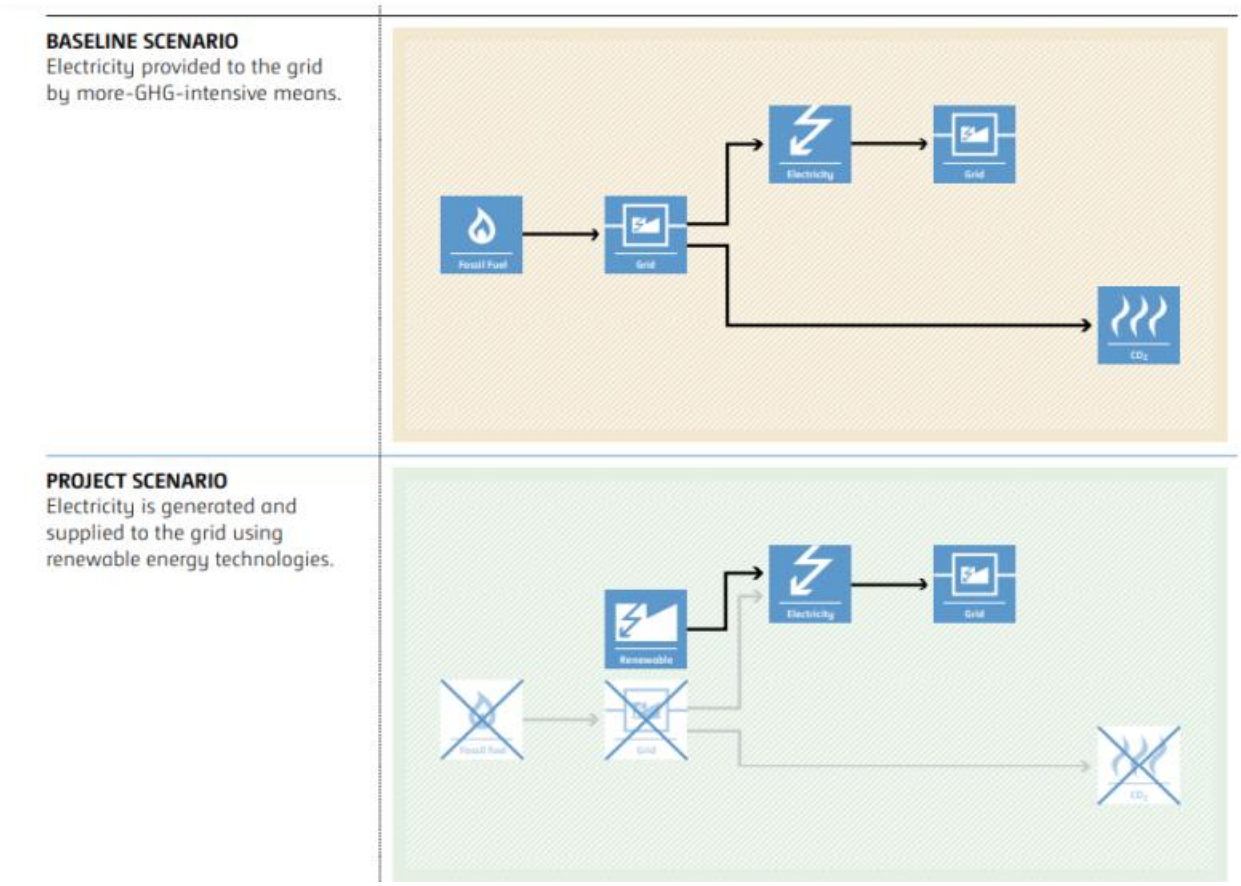
B.3. Baseline Emissions>>

The baseline scenario identified at the PCN stage of the project activity is:

The scenario existing prior to the implementation of the project activity, is electricity delivered to the facility by the project activity that would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources. This is a green field project activity. There was no activity at the site of the project participant prior to the implementation of this project activity. Hence pre-project scenario and baseline scenario are the same.

As per the approved consolidated methodology ACM0002 Version 22, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: “If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources to the grid”.

The Schematic diagram showing the baseline scenario:



B.4. Debundling>>

This Project is not a debundled component of a larger project activity.

SECTION C. Application of methodologies and standardized baselines

C.1. References to methodologies and standardized baselines >>

SECTORAL SCOPE – 01 Energy industries (Renewable/Non-renewable sources)

TYPE - Renewable Energy Projects

CATEGORY - ACM0002., Consolidated baseline methodology for grid-connected electricity generation from renewable sources -Version 22.0

C.2. Applicability of methodologies and standardized baselines >>

Applicability Criteria.	**Applicability status**
1)This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plant(s)/unit(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s), or (e) Involve a replacement of (an) existing plant(s)/unit(s). (f) Install a Greenfield power plant together with a grid-connected Greenfield pumped storage power plant. The greenfield power plant may be directly connected to the PSP or connected to the PSP through the grid.	The proposed project involves establishing a new grid-connected renewable wind power plant, confirming to the specified criteria.
2) In case the project activity involves the integration of a BESS, the methodology is applicable to grid-connected renewable energy power generation project activities that: (a)Integrate BESS with a Greenfield power plant; (b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic1 or wind power plant(s)/unit(s); (c) Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s); (d) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s). (e) Integrate a BESS together with a Greenfield power plant that is operating in coordination with a PSP. The BESS is located at site of the greenfield renewable power plant.	The project entails installing a new grid-connected renewable wind power project without the integration of a Battery Energy Storage System (BESS). Therefore, this condition does not apply to the project activity.
3)The methodology is applicable under the following conditions: (a) Hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations	The proposed project involves installing new wind power plants without integrating a Battery Energy Storage System (BESS). Thus, the mentioned criterion does not apply

or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; (c) In case of Greenfield project activities applicable under paragraph 7(a) above, the project participants shall demonstrate that the BESS was an integral part of the design of the renewable energy project activity (e.g., by referring to feasibility studies or investment decision documents); (d) The BESS should be charged with electricity generated from the associated renewable energy power plant(s). Only during exigencies2 may the BESS be charged with electricity from the grid or a fossil fuel electricity generator. In such cases, the corresponding GHG emissions shall be accounted for as project emissions following the requirements under section 5.4.4 below. The charging using the grid or using fossil fuel electricity generator should not amount to more than 2 per cent of the electricity generated by the project renewable energy plant during a monitoring period. During the time periods (e.g., week(s), months(s)) when the BESS consumes more than 2 per cent of the electricity for charging, the project participant shall not be entitled to issuance of the certified emission reductions for the concerned periods of the monitoring period. (e) In case the project activity involves PSP, the PSP shall utilize the electricity generated from the renewable energy power plant(s) that is operating in coordination with the PSP during pumping mode	
4)In case of hydro power plants, one of the following conditions shall apply: a)The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs; or b)The project activity is implemented in an existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (7) is greater than 4 W/m2; or c)The project activity results in new single or multiple reservoirs and the power density calculate equation (7), is greater than 4 W/m2. d)The project activity is an integrated hydro power project involving multiple reservoirs, where the power density of any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m2, all of the following conditions shall apply.	The proposed project involves the installation of wind power plants/units. Hence, the mentioned criterion is not applicable.

(i)The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity. (iii)Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 are: a) Lower than or equal to 15 MW; and b) Less than 10 per cent of the total installed capacity of integrated hydro power project.	
5)In the case of integrated hydro power projects, project proponent shall: a)Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or b)Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability indifferent seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	The proposed project activity involves the installation of wind power plants/units. Therefore, the mentioned criteria are not applicable.
6) In the case of PSP, the project participants shall demonstrate in the PDD that the project is not using water which would have been used to generate electricity in the baseline.	The proposed project activity involves installing wind power plants/units. Therefore, the specified criteria are not applicable.
7)The methodology is not applicable to: a)Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; b) Biomass-fired power plants;	The proposed project activity involves installing wind power plants/units. Therefore, the specified criteria are not applicable.
8)In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance	The proposed project activity involves installing wind power plants/units. Therefore, the specified criteria are not applicable.

C.3 Applicability of double counting emission reductions >>

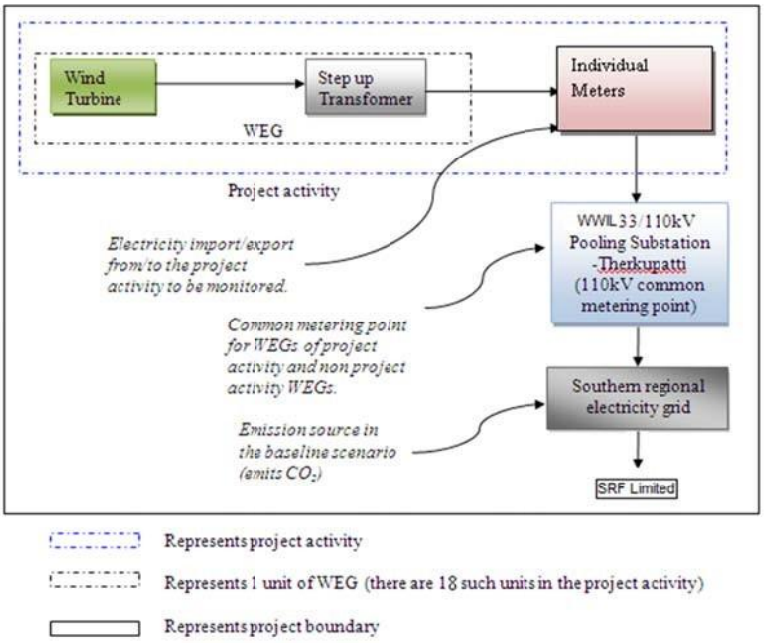
Hence, there is no double counting for this project.

C.4. Project boundary, sources and greenhouse gases (GHGs)>>

According to the methodology ACM0002, version 22 .0. the spatial extent of the project boundary includes the project power plant, and all power plants connected physically to the electricity system that the project power plant is connected to.

The project boundary includes the WECs of the project activity, transformer, individual meters, WWIL substation & Indian which is final consumer of generated electricity.

A schematic of project boundary diagram is shown below.



Project boundary:

The baseline study of the Indian grid shows that the main sources of GHG emissions under the baseline scenario are CO_2 emissions from the conventional power generating systems. Other emissions are that of CH_4 and N_2O but both emissions have been excluded for simplification.

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Grid connected electricity generation	CO_2	Yes	In the baseline scenario, the electricity would have been sourced from the Indian grid which in turn would be connected to fossil fuel fired power plants which emit CO_2.

		CH_4	No	No methane is expected to be emitted.
		N_2O	No	No nitrous oxide is expected to be emitted.
Project Scenario	Greenfield wind energy conversion system	CO_2	No	The project activity does not emit any emissions.
		CH_4	No	No methane is expected to be emitted.
		N_2O	No	No nitrous oxide is expected to be emitted.

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

As per the approved consolidated methodology ACM0002. version – 22.0, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

"The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise, been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid"

The project activity involves setting up of a new grid connected wind power plant to harness the green power from wind energy. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants. The power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

As per approved consolidated methodology ACM0002, version 22.0, emission reduction is estimated as difference between the baseline emission and project emission after factoring into leakage

Emission reductions are calculated as per methodology ACM0002, Version 22.0 Equation 17:

$$ER_y = BE_y - PE_y \quad \textbf{(Eq. 1)}$$

Where,

ER_y = Emissions reductions in year y (t CO2)
BE_y = Baseline emissions in year y (t CO2)
PE_y = Project emissions in year y (t CO2)

Baseline Emissions

The baseline emissions as per methodology ACM0002, Version 22.0, para 57 ; encompass solely the CO2 emissions stemming from electricity generation in power plants displaced by the project activity. The methodology operates on the assumption that any electricity generation exceeding baseline levels would have originated from established grid-connected power plants and the integration of new grid-connected power plants.

The Baseline emissions as per methodology ACM0002, Version 22.0 Equation 11 in year y can be calculated as follows:

$BE_y = EG_{PJ,y} * EF_{grid,,y}$

Where:

BE_y = Baseline emissions in year *y* (tCO_2/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 project activity in year *y* (MWh/yr)

$EF_{grid,y}$ = Grid Emission factor in year y (tCO_2/MWh)

Since the project activity is the installation of a new grid connected renewable power plant (green field project), 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 project activity in year *y* (MWh/yr)
EGfacility,y	= Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

A "grid emission factor" denotes the CO2 emission factor (measured in tCO2/MWh) associated with each unit of electricity supplied by an electricity system. The UCR suggests employing an emission factor of 0.9[2] from 2013 to 2023 and Emission Factor of 0.757 tCO2/MWh for 2024 as a cautious estimate for Indian projects. The same emission factor is utilized for computing emission reductions for the Project Activity.

Project Emission:

Regarding project emissions, ACM0002 version 22.0 specifies that only emissions related to fossil fuel combustion, emissions from the operation of geothermal power plants due to the release of non-condensable gases, and emissions from water reservoirs of hydroelectric plants should be taken into account. Since the project involves a wind power project, emissions from renewable energy plants are negligible
Hence (PEy = 0).

Leakage Emission:

Leakage, as outlined in ACM0002 version 22.0, para 5.6, is considered to be zero as there is no transfer of energy-generating equipment in the project activity

[2]As per UCR CoU Standard Update: 2024 Vintage UCR Indian Grid Emission Factor Announced | by Universal Carbon Registry | Jan, 2025 | Medium

Hence (LEy = 0).

Total baseline emission reductions (BEy) = 45,673 CoUs (45,673 tCO2eq)

Sr. No.	Year	Capacity	Total EGy ,Net Generation	Total EGy ,Net Generation	Emission Factor	Baseline Emissions (BE)	Project Emissions (PE)	Emission Reductions
		MW	kWh	MWh	tCO2/ mWh	tCO2e	tCO2e	tCO2e
1	01-01-2023 to 31-12-2023	14.4	28445044.87	28445.04487	0.9	25600	0	25600
2	01-01-2024 to 31-12-2024		26517554	26517.554	0.757	20073	0	20073
	Total		**54962599**	**54962.599**		**45,673**		**45,673**

C.6. Prior History>>

The project activity is registered under Clean Development Mechanism (CDM) project with registration number 7537.The crediting period of this project under CDM is 06/12/2012 to 05/12/2022. PP seeks verification under UCR from 01/01/2023 onwards, i.e., crediting period for UCR starts from 01/01/2023.

C.7. Monitoring period number and duration>>

First Issuance Period: 02 years,00 months – 01/01/2023 to 31/12/2024

C.8. Changes to start date of crediting period >>

The start date of the crediting period under UCR is considered from 01/01/2023.

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no permanent changes from registered PCN monitoring plan and applied methodology.

C.10. Monitoring plan>>

Data and Parameters available ex-post verification

Data/Parameter	EG,p,j,y
Data unit	MWh
Description	Net electricity supplied to the grid by the Project activity.
Measurement methods and procedures	Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Calibration frequency: once in five years (as per CEA Indian provision) Cross checking: Quantity of net electricity supplied to or consumed at PP's facility will be cross checked from the monthly bills or invoices raised. The Net electricity supplied to the grid will be calculated by the values of electricity export to the grid.The Net electricity is recorded as following: Thus, $EG_{PJ,y} = EG_{Net,Export}$
Value Applied	54962.599 MWh
Monitoring frequency	The net energy exported to the grid is measured every month using calibrated energy meter by the State Electricity Board authorities in the presence of the project implementer or its representatives. The meter/s shall be jointly inspected and sealed by authorised representatives of the company and the state utility. Measuring procedure: Will be measured by an export-import energy meter. The net electricity exported by the project plant would either be directly sourced as a measured parameter or be calculated by deducting the amount of imported electricity from the total amount of exported electricity. Accuracy class of energy meter: 0.2s Calibration Frequency: As per the Central Electricity Authority the testing and calibration frequency should be once in five years[3].
Purpose of data	For baseline emission calculations

Data and Parameters available at validation (ex-ante values):

Data / Parameter:	EFGrid,y
Data unit:	tCO2 /MWh
Description:	A "grid emission factor" refers to a CO2 emission factor (tCO2/MWh) which will be associated with

[3] https://cea.nic.in/wp-content/uploads/2020/02/meter_reg.pdf

	each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO2/MWh for the period 2013 - 2023 and 0.757 tCO2/MWh from 2024 as a fairly conservative estimate for Indian projects. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data:	UCR CoU Standard Update: 2024 Vintage UCR Indian Grid Emission Factor Announced | by Universal Carbon Registry | Jan, 2025 | Medium
Measurement procedures (if any):	-
Monitoring frequency:	Ex-ante fixed parameter
QA/QC procedures:	For the calculation of Emission Factor of the grid
Any comment:	-

Appendix 1: - Bulk Meter Details

SR.NO	Meter Type	Meter Sr. No.	Sub-station	Accuracy class	Make	Calibration Details	Calibration Validity
1	Main Meter	17055050	WWIL	0.2	L & T	12-12-2023	12-12-2027
2	Check Meter	17055062	WWIL	0.2	L & T	12-12-2023	12-12-2027

APPENDIX
CALIBRATION DATA

Sr.no	Meter Type	Meter Sr. No.	Sub-station	Accuracy class	Make	Calibration Details	Calibration Validity
3914	Main Meter	HT2170224	WWIL	0.2	EDMI	26-04-2023	25-04-2027
3915	Main Meter	HT2170393	WWIL	0.2	EDMI	26-04-2023	25-04-2027
3916	Main Meter	22009402	WWIL	0.2	Schneider Electric India Pvt ltd	18-11-2022	17-11-2026
3917	Main Meter	23003927	WWIL	0.2	Schneider Electric India Pvt ltd	04-10-2023	04-09-2027
3918	Main Meter	HT2170381	WWIL	0.2	EDMI	05-11-2023	05-10-2027
3919	Main Meter	22009403	WWIL	0.2	Schneider Electric India Pvt ltd	05-10-2023	05-09-2027
3920	Main Meter	TNW03916	WWIL	0.2	secure meters limited	04-04-2022	04-03-2026
3921	Main Meter	HT2180371	WWIL	0.2	EDMI	05-05-2023	04-04-2027
3947	Main Meter	23004573	WWIL	0.2	Schneider Electric India Pvt ltd	06-04-2023	06-03-2027
3948	Main Meter	TNW06258	WWIL	0.2	secure meters limited	27-06-2023	26-05-2027
3949	Main Meter	HT2170380	WWIL	0.2	EDMI	27-06-2023	26-05-2027
3954	Main Meter	HT2170390	WWIL	0.2	EDMI	27-06-2023	04-04-2027
3955	Main Meter	TNW03889	WWIL	0.2	secure meters limited	26-04-2023	25-04-2027
3957	Main Meter	TNW03915	WWIL	0.2	E3MO24	04-04-2022	04-04-2026

3959	Main Meter	23014331	WWIL	0.2	Electronic Trivetor Meter	05-05-2023	05-04-2027
3981	Main Meter	23014335	WWIL	0.2	Electronic Trivetor Meter	05-10-2023	05-09-2027
3986	Main Meter	HT2170644	WWIL	0.2	Edmi	05-05-2023	05-04-2027
3999	Main Meter	TNW03914	WWIL	0.2	secure meters limited	06-04-2023	06-04-2027

There is calibration delay for the current monitoring period from 01/01/2023 to 31/12/2023. The error factor has been applied in net export values for the delayed period as meters were not calibrated as per the calibration frequency which is once in five years. As per the Appendix calibration of the VVS Standard v3.0, Para 366(a): error factor of "±0.2%" should be applicable for both export & import i.e. the measured values. However, net electricity generation is considered as per the registered monitoring plan, the separate export and import values are not available. Hence being conservative and to account for the error for both export & import, a cumulative error of "-0.4%" on net electricity generation has been applied for delay period.

METER CHANGE DETAILS					
Sr.no	**Old Sr no**	**NEW Meter Sr. No.**	**Sub-station**	**Accuracy class**	**Meter replaces date**
3914	HT2170224	HT2170224	WWIL	0.2	23.06.2023
3915	HT2170393	HT2170393	WWIL	0.2	23.06.2023
3916	HT2170397	22009402	WWIL	0.2	23.06.2023
3917	HT2170458	23003927	WWIL	0.2	23.06.2023
3918	HT2170381	HT2170381	WWIL	0.2	23.06.2023
3919	HT2170645	22009403	WWIL	0.2	23.06.2023
3920	HT2170473	TNW03916	WWIL	0.2	23.06.2023
3921	HT2170481	HT2180371	WWIL	0.2	23.06.2023
3947	HT2170450	23004573	WWIL	0.2	23.06.2023
3948	HT2170383	TNW06258	WWIL	0.2	23.06.2023
3949	HT2170380	HT2170380	WWIL	0.2	23.06.2023
3954	HT2170390	HT2170390	WWIL	0.2	23.06.2023
3955	HT2170384	TNW03889	WWIL	0.2	23.06.2023
3957	HT2170483	TNW03915	WWIL	0.2	23.06.2023
3959	HT2170476	23014331	WWIL	0.2	23.06.2023
3981	HT2170388	23014335	WWIL	0.2	23.06.2023
3986	HT2170644	HT2170644	WWIL	0.2	23.06.2023
3999	HT2170474	TNW03914	WWIL	0.2	23.06.2023