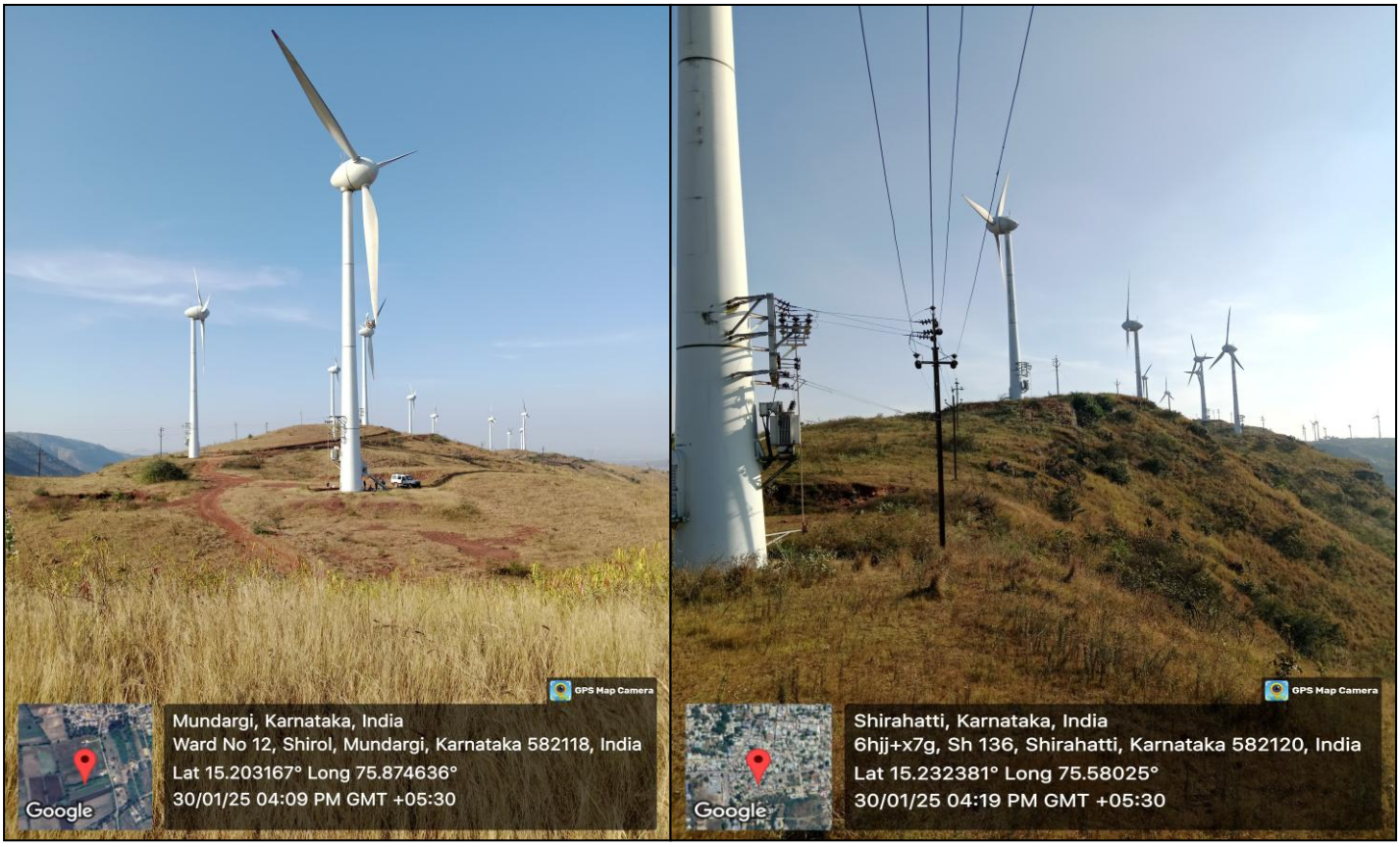
Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT



Title: Enercon Wind Farms in Karnataka Bundled Project

Version 2.0
Date 27/06/2025
First CoU Issuance Period: 04 years 05 months 30 days
Monitoring Period: 01/07/2020 to 31/12/2024

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

Monitoring Report	
Title of the project activity	Enercon Wind Farms in Karnataka Bundled Project
UCR Project Registration Number	511
Version	2.0
Completion date of the MR	27/06/2025
Monitoring period number and duration of this monitoring period	Monitoring Period Number: Second Issuance Duration of this monitoring Period: 01/07/2020 to 31/12/2024
Project participants	WIND WORLD WIND FARMS PVT LTD
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	2020: 20220 CoUs (tCO2eq)
	2021: 33540 CoUs (tCO2eq)
	2022: 32033 CoUs (tCO2eq)
	2023: 31399 CoUs (tCO2eq)
	2024: 27203 CoUs (tCO2eq)
Total:	**144,395** CoUs (tCO2eq)

SECTION A. Description of project activity

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

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The project "Enercon Wind Farms in Karnataka Bundled Project" in Gadag district in the State of Karnataka. The project activity involves WIND WORLD WIND FARMS(KARNATAKA) PVT LTD (3.2MW) & WIND WORLD WIND FARMS(KRISHNA) PVT LTD (15MW) supply, erection, commissioning and operation of total 29 machines, 4 no of rated capacity 800 kW (Karnataka) & 25 no of 600kW (Krishna) each. The machines are Enercon E-40 & E-48 make. The project is owned by Wind World Wind Farms PVT LTD (hereinafter referred to as the Project Proponent or PP).

The details of the registered project are as follows:

Purpose of the project activity:

Wind World Wind Farms PVT LTD has installed 18.2 MW wind farm in the state of Karnataka in India. Wind World (India) Limited ("Wind World") is the equipment supplier and the operations and maintenance contractor for the Project. There are 29 Wind Energy Convertors ("WEC's") of with rated capacity 800 kW & 600kW each. The generated electricity is supplied to Electricity Distribution Company (DISCOM) under a long-term power purchase agreement (PPA). The expected operational lifetime of the project is for 20 years. The project being a renewable energy generation activity, leads to reduction in fossil fuel dominated electricity generation from the Indian grid.

Project activity is connected to Dambal 66/11 kV KPTCL sub-station.

The purpose of the project activity is to generate emission free and environment friendly electricity from the wind energy potential available in the region. The project will generate and supply 166,149 MWh of electricity to the Indian grid. The project thus addresses the demand–supply gap in the state of Karnataka and will assist the sustainable growth, conservation of resources and reduction of greenhouse gas emissions by using renewable energy source like wind energy. The project activity contributes towards reduction of greenhouse gas (GHG) emission from the atmosphere, which has been 144,395**tCO2e**, by displacing an equivalent amount of electricity generation through the operation of existing fuel mix in the grid comprising mainly of fossil fuel-

based power plants. Thus, the project does not only reduce the demand-supply gap of the respective grid, but also helps in reducing other pollutants like SOx, NOx, etc. from the atmosphere. In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the Indian grid, which are/ will be predominantly based on fossil fuels.

This is also the pre-project scenario. The technology employed for the project is well proven and safe.

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

The WECs under the project activity were commissioned between 15/03/2005 and 26/03/2005. The expected operational lifetime of the project is for 20 years.

Sl No	Name of Customer	Individual Capacity (MW)	Site	R.R.NO.	Com. Date
1	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
2	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
3	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
4	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
5	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
6	Wind World Wind Farms (Krishna)Ltd	0.6	Gadag	EWKL H-6	15-03-2005
7	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005

8	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
9	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
10	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
11	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
12	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
13	Wind World Wind	0.6	Gadag	EWKL H-6	15-03-2005
14	Wind World Wind	0.6	Gadag	EWKL H-6	15-03-2005
15	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
16	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
17	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
18	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
19	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
20	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005

21	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
22	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15-03-2005
23	Wind World Wind	0.6	Gadag	EWKL H-6	15-03-2005
24	Wind World Wind	0.6	Gadag	EWKL H-6	15-03-2005
25	Wind World Wind Farms (Krishna)	0.6	Gadag	EWKL H-6	15-03-2005
26	Wind World Wind Farms (Karnataka)	0.8	Gadag	EWKL H-7	26-03-2005
27	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	26-03-2005
28	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	26-03-2005
29	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	26-03-2005

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

This Bundled project activity consists of 29 Wind turbines, 4 no of 800kW & 25 no of 600kW respectively manufactured and supplied by Enercon & Suzlon. This project Generate 18.2 MW power which is consumed by customers delivered by the Grid.

In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind has a considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when passing through the blades of the WEG is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The technology is clean technology since there are no GHG emissions associated with electricity generation.

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 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.

Gear Box, Bearing and Housing

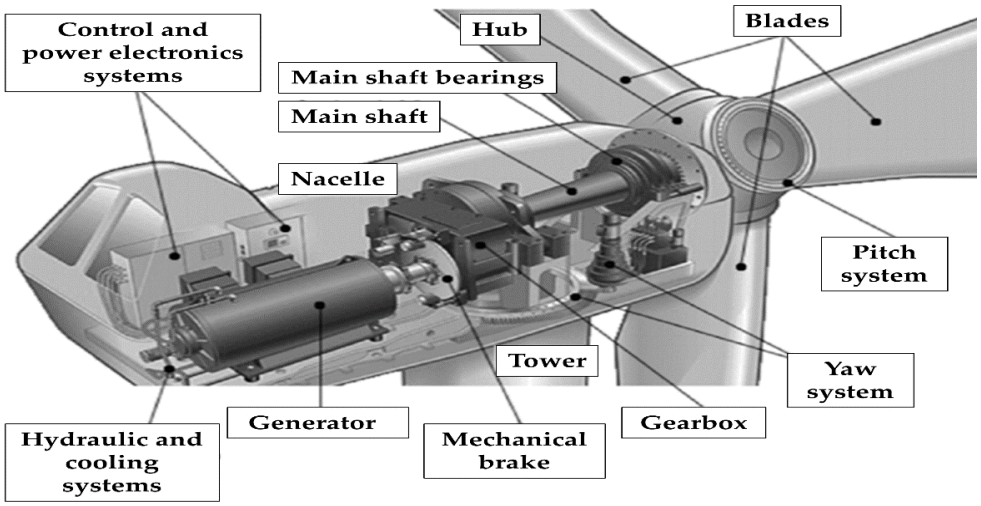
The gearbox is used to increase the speed ratio so that the rotor speed is increased to the rated generator speed. Oil cooling is employed to control the heating of the gearbox. Gearboxes are mounted over dampers to minimize vibration. The main bearings are placed inside the housing.

Brake

Brake is employed in the WEGs to stop the wind turbine mainly for maintenance check. Brakes are also applied during over speed conditions of the wind turbine. The brakes are placed on the high-speed shaft.

Generator

The generator uses an induction type of generator. The generators are provided with monitoring sensors in each phase winding to prevent damage to the generators.



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

Provide the duration of the crediting period corresponding to the monitoring period covered in this monitoring report.

UCR Project ID: **511**
Project Start Date: 01/07/2020
Commissioning Date: 15/03/2005(earliest)

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	01/07/2020
Carbon credits claimed up to	31/12/2024
Total ERs generated (tCO_{2eq})	**144,395**tCO2eq
Leakage	0

e) Baseline Scenario>>

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".

A.2. Location of project activity>>

Country: India

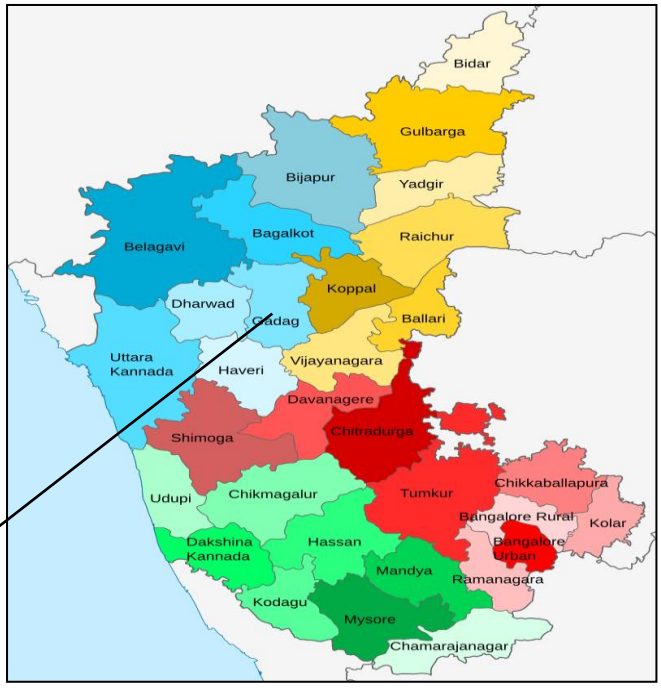
The project activity is located at Gadag District in the state of Karnataka.

Details of Latitude & Longitude of Individual machines have been Given below: -

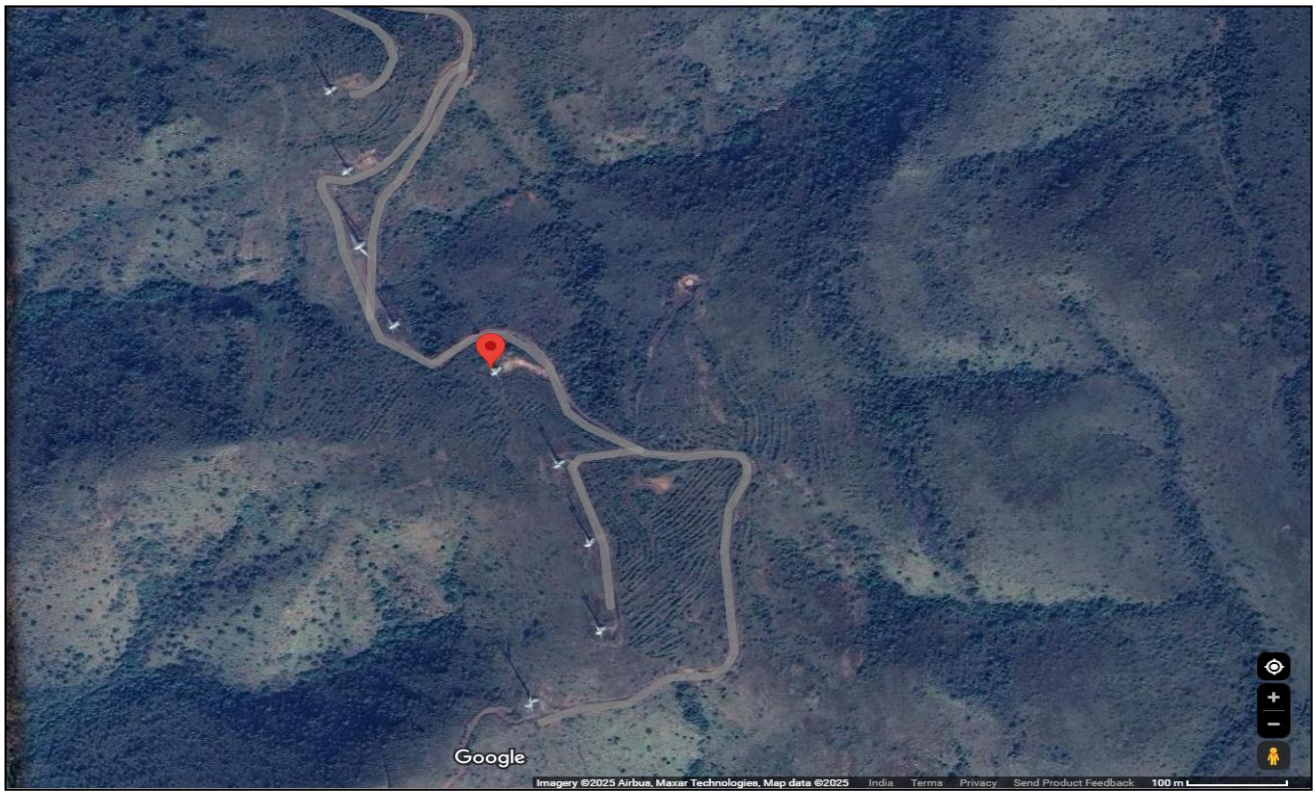
Sl no	Name of Customer	Individual Capacity (MW)	Site	R.R.NO.	Location No	Latitude (Decimal)	Longitude (Decimal)
1	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	1	15.1967	75.7375
2	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	2	15.1956	75.7382
3	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	3	15.1948	75.7385
4	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	4	15.1938	75.7386
5	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	5	15.1931	75.7379
6	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	6	15.2135	75.7255
7	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	7	15.2116	75.7307
8	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	8	15.2108	75.7312

9	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	9	15.2098	75.7321
10	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	10	15.2214	75.7398
11	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	11	15.2083	75.734
12	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	12	15.197	75.7363
13	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	13	15.1973	75.7366
14	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	14	15.2206	75.7399
15	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	15	15.2193	75.7398
16	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	16	15.2184	75.7394
17	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	17	15.2177	75.7389
18	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	18	15.2167	75.7388
19	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	19	15.2141	75.7384
20	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	20	15.2145	75.7387
21	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	21	15.2136	75.7383

22	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	22	15.2126	75.7389
23	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	23	15.2117	75.739
24	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	24	15.2076	75.7346
25	Wind World Wind Farms (Krishna) Ltd	0.6	Gadag	EWKL H-6	25	15.2067	75.7343
26	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	26	15.7058	75.7341
27	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	27	15.2047	75.7328
28	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	28	15.2037	75.733
29	Wind World Wind Farms (Karnataka) Ltd	0.8	Gadag	EWKL H-7	29	15.2029	75.7338



Project Activity



Satellite view of project activity

A.3. Parties and project participants >>

Party (Host)	Participants
India	WIND WORLD WIND FARMS PVT LTD

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

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

TYPE I- **Renewable Energy Projects**

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

A.5. Crediting period of project activity >>

Type I - Renewable Energy Projects
Start date- 01/07/2020
Length of the crediting period corresponding to this monitoring period: 04 years 05 months 30 days -01/07/2020 to 31/12/2024

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

Contact Person- Lokesh Jain
Email- lokesh.jain@viviidgreen.com
Phone no- 91 89208 56146
Address- Sri Krishna Complex, New Link Road, Opp. Laxmi Industrial Estate, Andheri (West), Mumbai - 400053

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 main Purpose of the project activity is the implementation and operation of 18.2 MW wind farms to generate electricity in high wind speed areas of Karnataka. WIND WORLD WIND FARMS(KARNATAKA) PVT LTD (3.2MW) & WIND WORLD WIND FARMS(KRISHNA) PVT LTD (15MW) is the Project Proponent of these wind farm. The project was commissioned on several dates by the respective authority of government of Karnataka. The applied technology is one of the most environment friendly technologies available as the operation of the wind power plant does not emit any GHGs or any other harmful gases unlike the operation of conventional power plant. The project activity has used the reliable and proven technology to ensure that an environmentally safe and sound technology has been implemented.

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

All the machines are Enercon **E-40 & E-48** make and have been developed by (ENERCON). The Enercon wind turbine harnesses wind energy for electricity generation through a simple yet efficient process. Wind passing over the three large blades creates lift, causing the rotor to spin. This rotation is directly transmitted to a powerful ring-shaped generator within the nacelle (housing atop the tower). Unlike conventional turbines with gearboxes, Enercon utilizes a gearless design, reducing complexity and maintenance needs. The generator converts the rotational energy into electricity.

Leveraging the principles of kinetic energy conversion, wind energy generation harnesses the power of moving air masses. Wind turbines act as sophisticated windmills, their aerodynamically designed blades capturing the kinetic energy of wind. This captured energy is then converted into mechanical energy as the blades rotate. A connected generator utilizes this rotational motion to induce electrical current, resulting in the production of clean electricity without greenhouse gas emissions.

Some of the salient features of the project equipment can be found in the below mentioned table.

The project activity involves 29 numbers of wind energy converters (WECs) of Enercon make (800 kW, [1]E48) & (600kW, E-40) with internal electrical lines connecting the Project with local evacuation facility. The WECs generates 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%. The other salient features of the state -of-art-technology are:

Specification	ENERCON E-48	ENERCON E-40
Rated Power (kW)	800	600
Rotor Diameter (m)	48	43.7
Swept Area (m^2)	1810	1521
Hub Height (m)	50–76	50–78
Rotor Speed (rpm)	16–31.5	34
Cut-in Wind Speed (m/s)	2–3	2.5
Rated Wind Speed (m/s)	14	12
Cut-out Wind Speed (m/s)	25	28
Drive Type	Gearless DD, Annular Generator	Gearless DD
Blade Type	GRP, Pitch-controlled	Pitch-controlled

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.

Social benefits:

- The project activity will lead to the development of supporting infrastructure such as road network etc., in the wind park location, the access to which is also provided to the local population.

[1] **E-48-** https://www.thewindpower.net/turbine_en_3_enercon_e48-800.php

E-40- https://en.wind-turbine-models.com/turbines/68-enercon-e-40-6.44

- The project activity will lead to alleviation of poverty by establishing direct and indirect benefits through employment generation and improved economic activities by strengthening of local grid of the state electricity utility.
- Use of a renewable source of energy reduces the dependence on imported fossil fuels and associated price variation thereby leading to increased energy security.

Environmental benefits:

- The project activity employs renewable energy source for electricity generation instead of fossil fuel- based electricity generation which would have emitted gaseous, liquid and/or solid effluents/wastes.
- Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus, the project causes no negative impact on the surrounding environment and contributes to environmental well-being.

Economic benefits:

- The project activity requires temporary and permanent, skilled and semi-skilled manpower at the wind park; this will create additional employment opportunities in the region.
- The generated electricity will be fed into the Indian grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub- urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development.

Technical benefits:

- Increased interest in wind energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future.

United Nations Sustainable Development Goals:

The project activity generates electrical power using wind energy, which is generated from windmills, thereby displacing non-renewable fossil resources resulting to sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations. Thus, the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions.

SDG Goals	Description
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 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
Goal 13 	This 18.2 MW Wind power project meets the SDG 13 goal by saving fossil fuel and producing clean energy. This project is expected to reduce to **144,395tCO_2** annually. 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.

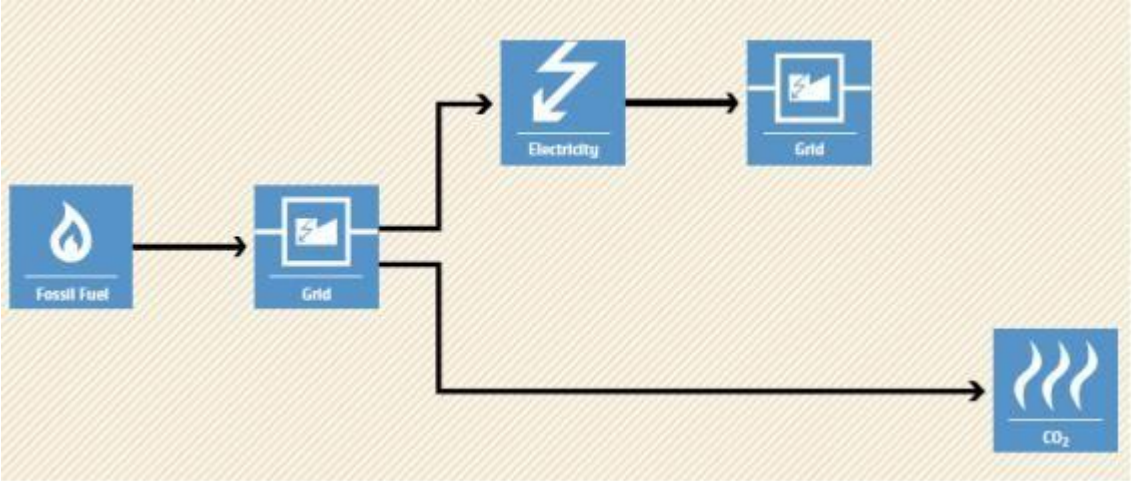
B.3. Baseline Emissions>>

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

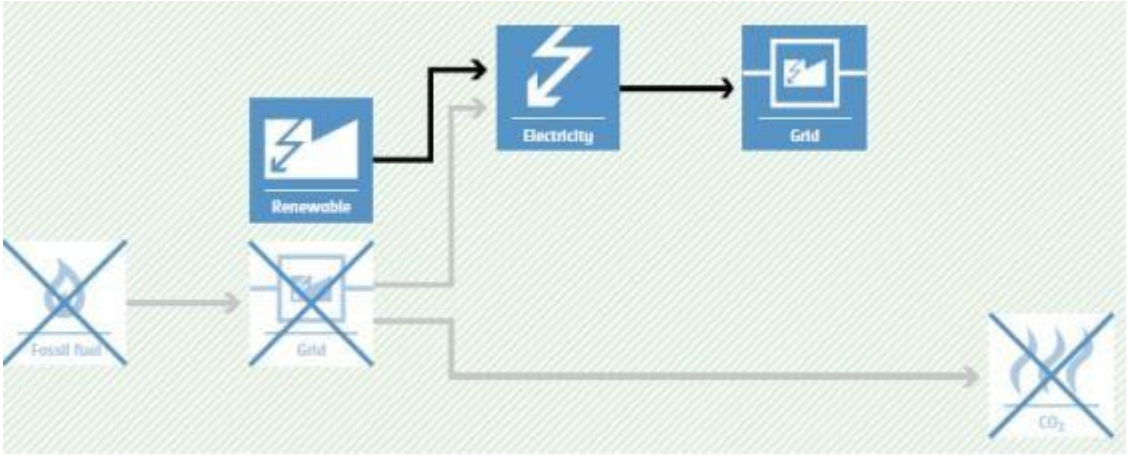
In the absence of the project activity, the equivalent amount of electricity would have been generated from fossil fuel-based power plants and exported to the regional grid (which is connected to the unified Indian Grid system) as national grid is predominantly sourcing from fossil fuel-based power plants. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.

Schematic diagram showing the baseline scenario:

Baseline Scenario:



Project Scenario:



B.4. Debundling>>

This project is not a debundled component of a larger registered carbon offset 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 I- **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 >>

The project activity involves generation of grid connected electricity from the construction and operation of a new wind power-based power project for selling it to grid. The project activity has an installed capacity of 18.2 MW which will qualify for a large-scale project activity. The project status corresponds to the methodology ACM0002 version 22, and applicability of methodology is discussed below.

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	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.

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.	
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 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	The proposed project involves installing new wind power plants without integrating a Battery Energy Storage System (BESS). Thus, the mentioned criterion does not apply
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	The proposed project involves the installation of wind power plants/units. Hence, the mentioned criterion is not applicable.

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. (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,	The proposed project activity involves installing wind power plants/units. Therefore, the specified

since in this case the baseline may be the continued use of fossil fuels at the site; b) Biomass-fired power plants;	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.

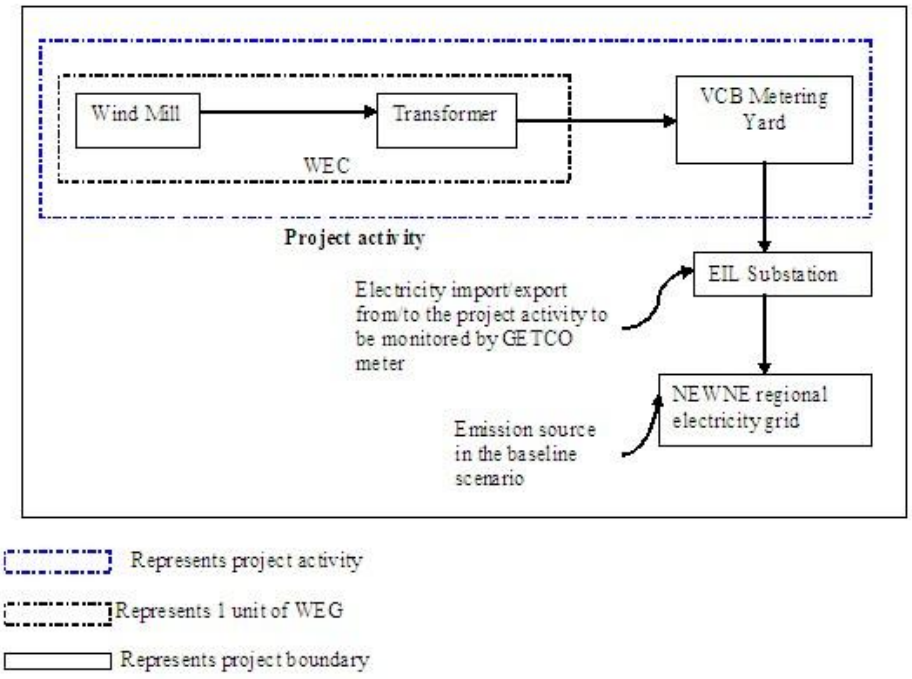
C.3 Applicability of double counting emission reductions >>

The project activity is registered under Clean Development Mechanism (CDM)[2] project with registration number 1286. The crediting period of this project under CDM was 01/07/2010 – 30/06/2020. PP seeks verification under UCR from 01/07/2020 onwards, i.e., crediting period for UCR starts from 01/07/2020 to 31/12/2024. Hence, there is no double counting for the said project.

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

As per applicable methodology, 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. Hence, the project boundary includes the project site where the power plant has been installed, associated power evacuation infrastructure, energy metering points, switch yards and other civil constructs and connected to the Indian Grid.

[2] https://cdm.unfccc.int/Projects/DB/SGS-UKL1186566570.26/view



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. The project activity generates

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, 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)

BEBEy = 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 17 in year y can be calculated as follows:

BE y = EG PJ, y * EF grid, CM, 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 CDM 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 :

EGPJ,y = EGfacility,y

Where:

$EG_{PJ,y}$	= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
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[3] from 2013 to 2023 and Emission Factor of 0.757 tCO2/MWh for 2024.

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
Hence (LEy = 0).

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

Annual or Total baseline emission reductions (BEy)= 144,395 CoUs /year (144,395 tCO_{2eq}/year)

Year	Net Quantity of net electricity generation supplied by the project activity to the grid in year y	Emission Factor	Baseline Emissions	Project emissions or actual net GHG removals by sink	Leakage	Emission reductions or net anthropogenic GHG removals by sinks
	[MWh]	(tCO2e /MWh)	(tCO2e)	(tCO2e)	(tCO2e)	(tCO2e)
		[EFy]	[Bey]= [EGfacility, y]* [EFy]	[PEy]	[LEy]	[ERy]=[Bey]-[Pey] [Ley]
Year 1	22466	0.9	20220	0	0	20220
Year 2	37267	0.9	33540	0	0	33540
Year 3	35592	0.9	32033	0	0	32033
Year 4	34887	0.9	31399	0	0	31399
Year 5	35936	0.757	27203	0	0	27203
Total	**166149**					**144395**

C.6. Prior History>>

The project activity is registered under Clean Development Mechanism (CDM)[4] project with registration number 1286. The crediting period of this project under CDM was 01/07/2010 – 30/06/2020.

C.7. Monitoring period number and duration>>

First Issuance Period in UCR: 04 years 05 months 30 days
Monitoring Period: 01/07/2020 to 31/12/2024

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

There is no change in the start date of the crediting period.

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

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

[4] https://cdm.unfccc.int/Projects/DB/SGS-UKL1186566570.26/view

C.10. Monitoring plan>>

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

Data / Parameter:	*EF*Grid,y
Data unit:	tCO2 /MWh
Description:	A "grid emission factor" refers to a CO2 emission factor (tCO2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO2/MWh for the for the 2013 - 2023years and 0.757 tCO2/MWh for year 2024.
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:	

Data and Parameters to be monitored

Data/Parameter	$EG_{pj,y}$ net
Data unit	MWh
Description	"Form B" -Electricity Generated by Wind farm' prepared & issued by SLDC
Measurement methods and procedures	- All the cluster meters and sub-station meters (main & check meters) are electronic and two-way (bi-directional) meters that measure both export and import of electricity and provide net electricity exported to the grid. -All the cluster meters and sub-station meters (main & check meters) measure the electricity (export & Import) on continuous basis and are recorded by state utility on monthly basis. Cross-sectional Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Archiving Policy: Electronic Calibration frequency: Once in 5 years [5](considered as per provision of CEA India). The net electricity generated by the project activity will be calculated

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

	Meter
Value Applied	**166,149**MWh
Monitoring frequency	Monthly 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.
QA/QC procedures	Continuous monitoring, hourly measurement monthly recording. Tri-vector (TVM)/ABT energy meters with accuracy class 0.2s.
Purpose of data	For baseline emission calculations

Appendix-1>Meter Change Details & Calibration Details

15 MW
Main Meter &
Check Meter

3.2 MW
Main Meter &
Check Meter

Site (Feeder Level)	Main Meter	Check Meter
15 MW	23016861	23016862
3.2 MW	23016865	23016866

Appendix-Calibration Details

Company Name	Plant Capacity (MW)	Location	Commissioning Date	Calibration date	Calibration validity	Calibration delay
Enercon Wind Farms in Karnataka Bundled Project	**18.2 MW**	Krishna (15MW)	15-03-2005	23-09-2024	22-09-2029	01-07-2020 to 22-08-2024
		Karnataka (3.2MW)	26-03-2005	23-09-2024	22-09-2029	01-07-2020 to 22-08-2024

There was a calibration delay during the **(01-07-2020 to 22-08-2024)** for 15MW & **(01-07-2020 to 22-08-2024)** for 3.2 MW in this monitoring period. To address this, an error factor has been applied to the net export values for the delay period since the meters were not calibrated as per the required frequency. According to VVS guidelines, an error factor of "±0.2%" should be applied separately to both export and import values. A conservative approach has been adopted. To account for potential errors in both export and import, a cumulative error factor of "-0.4%" has been applied to the net electricity generation for the delay period.