# PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

**Title:** Enercon Wind Farm (Hindustan) Ltd in Karnataka

Version 1.1

Date 21/03/2022

First CoU Issuance Period: 3 years, 4 months

Date: 27/10/2018 to 31/01/2022

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

| BASIC INFORMATION | |
|---|---|
| Title of the project activity | Enercon Wind Farm (Hindustan) Ltd in Karnataka |
| Scale of the project activity | Large Scale |
| Completion date of the PCN | 21/03/2022 |
| Project participants | Viviid Emissions Reductions Pvt. Ltd. |
| Host Party | India |
| Applied methodologies and standardized baselines | Consolidated methodology for grid-connected electricity generation from renewable sources, ACM0002, Version 6<br>Standardized baselines: Not applicable |
| Sectoral scopes | SELECT SCOPE<br>Sectoral Scope 1, Energy industries (renewable/ non-renewable sources). |
| Estimated amount of total GHG emission reductions | 119,332 CoUs (119,332 tCO2eq) annually |
| | |

## SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project Enercon Wind Farm (Hindustan) Ltd in Karnataka is located in Chikkanayakanahalli, Gubbi and Hosadurga Village, District Tumkur & Chitradurga, State Karnataka, Country India.

The details of the registered project are as follows:

| S.No. | District | Taluka | Village | No. of WEG's |
|---|---|---|---|---|
| 1 | Tumkur | Chikkanayakanahalli | Dasudi | 20 |
| | | Chikkanayakanahalli | Nelenuru | 5 |
| | | Chikkanayakanahalli | Ganadu | 6 |
| | | Gubbi | Annenhalli | 6 |
| | | Gubbi | Siddapura | 9 |
| 2 | Chitradurga | Hosadurga | Chikkabyaledakere | 16 |
| | | Hosadurga | Kanubehalli | 11 |
| | | Hosadurga | Arasinagundi | 8 |
| | | Hosadurga | Elladakere | 5 |
| | | | **Total** | **86** |

**Purpose of the project activity:**

The purpose of the project activity is to utilize renewable wind energy for generation of electricity. The project activity replaces anthropogenic emissions of greenhouse gases (GHG's) into the atmosphere, which is estimated to be approximately 119,332 CoUs (119,332 tCO2eq) annually, by displacing the equivalent amount of electricity generation through the operation of existing fuel mix in the grid comprising mainly fossil fuel-based power plants and future capacity expansions connected to the grid. In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the Southern regional grid, which are/ will be predominantly based on fossil fuels. Whereas the electricity generation from operation of Wind Energy Convertors (WEC's) is emission free.

## A.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.
- 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 NEWNE regional 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.

## A.3. Location of project activity >>

Country: India
District: Tumkur & Chitradurga
Village: Dasudi, Nelenuru, Ganadu, Annenhalli, Siddapura, Chikkabyaledakere, Kanubehalli, Arasinagundi and Elladakere
Tehsil: Chikkanayakanahalli, Gubbi and Hosadurga
State: Karnataka
Code: 577501

Individual WEG location numbers and coordinates are detailed out in below Table 1: -

| S.No. | WEG Unique Identification Number | Location No. | Latitude (N) | | | Longitude (E) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Degree | Minutes | Seconds | Degree | Minutes | Seconds |
| 1 | EWHPL 01 | 1 | 13 | 43 | 20.9 | 76 | 31 | 3.9 |
| 2 | EWHPL 02 | 2 | 13 | 43 | 25.4 | 76 | 31 | 1.5 |
| 3 | EWHPL 03 | 3 | 13 | 43 | 30.0 | 76 | 30 | 59.0 |
| 4 | EWHPL 04 | 4 | 13 | 43 | 34.6 | 76 | 30 | 57.2 |
| 5 | EWHPL 05 | 5 | 13 | 43 | 39.3 | 76 | 30 | 55.6 |
| 6 | EWHPL 06 | 6 | 13 | 43 | 43.8 | 76 | 30 | 53.1 |
| 7 | EWHPL 07 | 7 | 13 | 43 | 50.0 | 76 | 30 | 50.5 |
| 8 | EWHPL 08 | 8 | 13 | 43 | 54.5 | 76 | 30 | 48.0 |
| 9 | EWHPL 09 | 9 | 13 | 44 | 3.9 | 76 | 30 | 44.9 |
| 10 | EWHPL 10 | 10 | 13 | 45 | 33.0 | 76 | 31 | 5.9 |
| 11 | EWHPL 11 | 11 | 13 | 45 | 28.2 | 76 | 31 | 6.4 |
| 12 | EWHPL 12 | 12 | 13 | 45 | 23.4 | 76 | 31 | 7.0 |
| 13 | EWHPL 13 | 13 | 13 | 45 | 18.9 | 76 | 31 | 7.7 |
| 14 | EWHPL 14 | 14 | 13 | 45 | 14.3 | 76 | 31 | 8.3 |
| 15 | EWHPL 15 | 15 | 13 | 45 | 10.2 | 76 | 31 | 9.5 |
| 16 | EWHPL 16 | 16 | 13 | 44 | 54.0 | 76 | 31 | 12.3 |
| 17 | EWHPL 17 | 17 | 13 | 44 | 49.2 | 76 | 31 | 13.1 |
| 18 | EWHPL 18 | 18 | 13 | 44 | 44.5 | 76 | 31 | 14.7 |
| 19 | EWHPL 19 | 19 | 13 | 44 | 39.8 | 76 | 31 | 16.7 |
| 20 | EWHPL 20 | 20 | 13 | 44 | 35.4 | 76 | 31 | 19.9 |
| 21 | EWHPL 21 | 21 | 13 | 44 | 30.5 | 76 | 31 | 19.8 |
| 22 | EWHPL 22 | 22 | 13 | 44 | 25.6 | 76 | 31 | 20.2 |
| 23 | EWHPL 23 | 23 | 13 | 44 | 21.7 | 76 | 31 | 26.4 |
| 24 | EWHPL 24 | 24 | 13 | 44 | 16.9 | 76 | 31 | 27.7 |
| 25 | EWHPL 25 | 25 | 13 | 44 | 12.0 | 76 | 31 | 28.2 |
| 26 | EWHPL26 | 26 | 13 | 44 | 8.0 | 76 | 31 | 29.8 |
| 27 | EWHPL 27 | 27 | 13 | 43 | 57.6 | 76 | 31 | 53.8 |
| 28 | EWHPL 28 | 28 | 13 | 43 | 54.1 | 76 | 31 | 55.1 |
| 29 | EWHPL 29 | 29 | 13 | 43 | 49.5 | 76 | 31 | 57.1 |
| 30 | EWHPL 30 | 30 | 13 | 43 | 44.8 | 76 | 31 | 58.6 |
| 31 | EWHPL 31 | 31 | 13 | 43 | 40.0 | 76 | 31 | 59.5 |
| 32 | EWHPL 32 | 32 | 13 | 43 | 35.4 | 76 | 32 | 1.9 |
| 33 | EWHPL 33 | 33 | 13 | 43 | 30.6 | 76 | 32 | 4.8 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 34 | EWHPL 34 | 34 | 13 | 43 | 0.6 | 76 | 32 | 22.1 |
| 35 | EWHPL 35 | 35 | 13 | 42 | 54.7 | 76 | 32 | 19.9 |
| 36 | EWHPL 36 | 36 | 13 | 42 | 50.3 | 76 | 32 | 23.0 |
| 37 | EWHPL 37 | 37 | 13 | 42 | 45.6 | 76 | 32 | 24.7 |
| 38 | EWHPL 38 | 38 | 13 | 42 | 40.9 | 76 | 32 | 26.3 |
| 39 | EWHPL 39 | 39 | 13 | 42 | 36.3 | 76 | 32 | 28.5 |
| 40 | EWHPL 40 | 40 | 13 | 42 | 31.1 | 76 | 32 | 31.4 |
| 41 | EWHPL 41 | 41 | 13 | 40 | 57.2 | 76 | 35 | 58.1 |
| 42 | EWHPL 42 | 42 | 13 | 40 | 52.4 | 76 | 35 | 59.4 |
| 43 | EWHPL 43 | 43 | 13 | 40 | 47.7 | 76 | 36 | 0.9 |
| 44 | EWHPL 44 | 44 | 13 | 40 | 43.1 | 76 | 36 | 2.6 |
| 45 | EWHPL 45 | 45 | 13 | 40 | 38.4 | 76 | 36 | 4.2 |
| 46 | EWHPL 46 | 46 | 13 | 40 | 33.7 | 76 | 36 | 5.8 |
| 47 | EWHPL 47 | 47 | 13 | 40 | 13.7 | 76 | 36 | 10.7 |
| 48 | EWHPL 48 | 48 | 13 | 40 | 9.1 | 76 | 36 | 12.6 |
| 49 | EWHPL 49 | 49 | 13 | 40 | 4.7 | 76 | 36 | 15.7 |
| 50 | EWHPL 50 | 50 | 13 | 39 | 2.8 | 76 | 36 | 34.8 |
| 51 | EWHPL 51 | 51 | 13 | 38 | 58.7 | 76 | 36 | 36.8 |
| 52 | EWHPL 52 | 52 | 13 | 38 | 54.1 | 76 | 36 | 38.9 |
| 53 | EWHPL 53 | 53 | 13 | 38 | 49.5 | 76 | 36 | 41.3 |
| 54 | EWHPL 54 | 54 | 13 | 38 | 44.9 | 76 | 36 | 43.1 |
| 55 | EWHPL 55 | 55 | 13 | 38 | 40.2 | 76 | 36 | 44.9 |
| 56 | EWHPL 56 | 56 | 13 | 38 | 35.6 | 76 | 36 | 46.9 |
| 57 | EWHPL 57 | 57 | 13 | 38 | 30.9 | 76 | 36 | 48.7 |
| 58 | EWHPL 58 | 58 | 13 | 38 | 26.4 | 76 | 36 | 50.9 |
| 59 | EWHPL 59 | 59 | 13 | 38 | 22.3 | 76 | 36 | 56.3 |
| 60 | EWHPL 60 | 60 | 13 | 38 | 17.8 | 76 | 36 | 58.8 |
| 61 | EWHPL 61 | 61 | 13 | 38 | 11.8 | 76 | 37 | 2.5 |
| 62 | EWHPL 62 | 62 | 13 | 38 | 7.2 | 76 | 37 | 4.6 |
| 63 | EWHPL 63 | 63 | 13 | 38 | 2.6 | 76 | 37 | 6.8 |
| 64 | EWHPL 64 | 64 | 13 | 37 | 58.0 | 76 | 37 | 9.2 |
| 65 | EWHPL 65 | 65 | 13 | 37 | 53.5 | 76 | 37 | 11.5 |
| 66 | EWHPL 66 | 66 | 13 | 37 | 48.9 | 76 | 37 | 13.7 |
| 67 | EWHPL 67 | 67 | 13 | 37 | 44.3 | 76 | 37 | 16.0 |
| 68 | EWHPL 68 | 68 | 13 | 37 | 39.8 | 76 | 37 | 18.4 |
| 69 | EWHPL 69 | 69 | 13 | 37 | 35.1 | 76 | 37 | 20.3 |
| 70 | EWHPL 70 | 70 | 13 | 37 | 30.5 | 76 | 37 | 22.3 |
| 71 | EWHPL 71 | 71 | 13 | 37 | 25.9 | 76 | 37 | 24.7 |
| 72 | EWHPL 72 | 72 | 13 | 32 | 25.1 | 76 | 43 | 45.2 |
| 73 | EWHPL 73 | 73 | 13 | 32 | 30.0 | 76 | 43 | 44.4 |
| 74 | EWHPL 74 | 74 | 13 | 32 | 34.8 | 76 | 43 | 44.7 |
| 75 | EWHPL 75 | 75 | 13 | 32 | 39.7 | 76 | 43 | 44.5 |
| 76 | EWHPL 76 | 76 | 13 | 32 | 44.6 | 76 | 43 | 43.9 |
| 77 | EWHPL 77 | 77 | 13 | 32 | 49.5 | 76 | 43 | 42.5 |
| 78 | EWHPL 78 | 78 | 13 | 32 | 54.4 | 76 | 43 | 42.1 |
| 79 | EWHPL 79 | 79 | 13 | 33 | 6.1 | 76 | 43 | 33.2 |
| 80 | EWHPL 80 | 80 | 13 | 33 | 11.0 | 76 | 43 | 34.1 |
| 81 | EWHPL 81 | 81 | 13 | 33 | 15.9 | 76 | 43 | 34.6 |
| 82 | EWHPL 82 | 82 | 13 | 33 | 20.8 | 76 | 43 | 34.5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 83 | EWHPL 83 | 83 | 13 | 34 | 19.9 | 76 | 44 | 0.8 |
| 84 | EWHPL 84 | 84 | 13 | 34 | 27.5 | 76 | 44 | 2.3 |
| 85 | EWHPL 85 | 85 | 13 | 34 | 50.5 | 76 | 44 | 14.8 |
| 86 | EWHPL 86 | 86 | 13 | 34 | 54.9 | 76 | 44 | 14.8 |

## A.4. Technologies/measures >>

The project activity consists of 86 WEGs of Enercon make E-48 and each machine capacity is of 800 kW (E-48) totalling to the capacity of 68.8 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and connected to 33kV metering points. From 33 kV metering points electricity transmitted to WWIL Sub-station. At sub-station electricity is step-up to 220 kV. From WWIL substation electricity is further evacuated to the state electricity grid at 220kV. 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:-

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawal (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEG with voltage fluctuation of -20 to +20%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking System.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts generation of power at wind speed of 3 m/s

WWIL has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured. Diagram of main component of Enercon make E-48 is shown in below picture:-

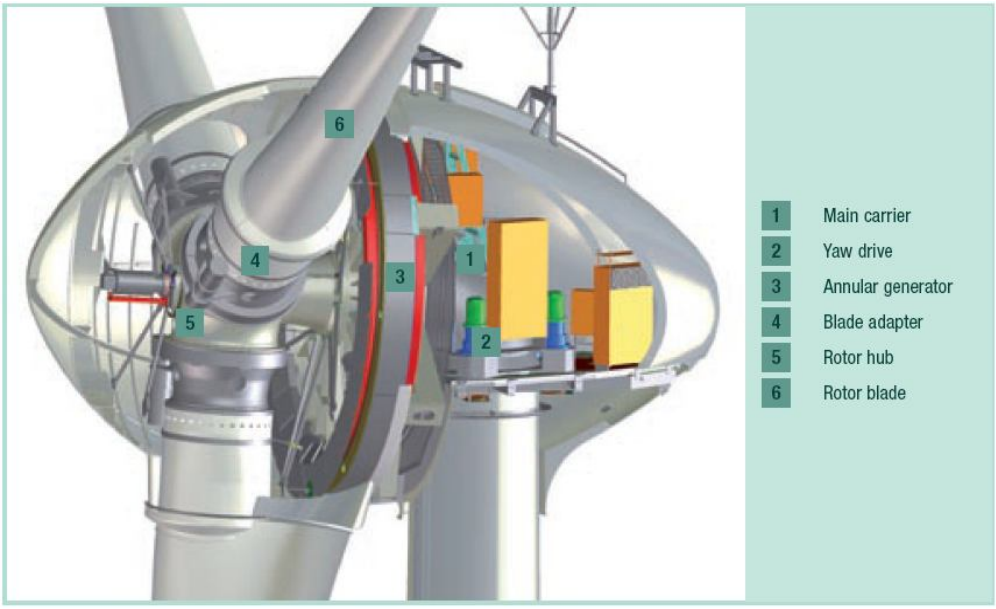



*Figure: Enercon make E-48 Diagram.*

| Specification | Value |
|---|---|
| Turbine model | Enercon E – 53 |
| Rated Power | 800 kW |
| Rated diameter | 53 m |
| Hub height | 75 m |
| Turbine type | Gearless horizontal axis wind turbine with variable rotor speed |
| Power regulation | Independent electromechanical pitch system for each blade |
| Cut in wind speed | 2.5 m/s |
| Rated wind speed | 12 m/s |
| Cut out wind speed | 28 - 34 m/s |
| Extreme wind speed | 59.5 m/s |
| Rated rotational speed | 32 rpm |
| Operating range rot. Speed | 12 - 29 rpm |
| Orientation | Upwind |
| No. of blades | 3 |
| Blade material | Fibre glass Epoxy reinforced with integral lightning protection |
| Gear box type | Gearless |
| Generator type | Synchronous generator |
| Braking | Aerodynamic |
| Output voltage | 400 V |
| Yaw system | Active yawing with 4 electric yaw drives with brake motor and friction bearing |
| Tower | 74 m Concrete |

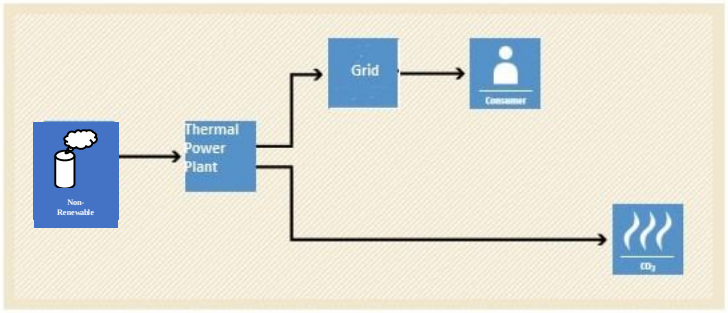
## A.5. Parties and project participants >>

| Party (Host) | Participants |
|---|---|
| Government of India (Host) | Viviid Emissions Reductions Pvt. Ltd. |

## A.6. Baseline Emissions>>

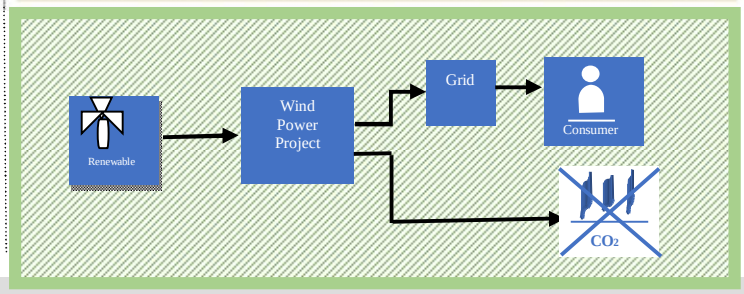
Project activity installs the wind farm at a barren land. Project activity is the installations of green field energy production with the installation of 86 WEGs of WWIL make E-48 of 800 KW each totalling 68.8MW project capacity.
In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the NEWNE grid, which are/ will be predominantly based on fossil fuels[1], hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario. Since the project activity involves power generation from wind, it does not emit any emissions in the atmosphere.
Project activity will harness wind as a source of energy production which is environmentally safe and sound technology. There is no GHG emission through project activity. The WEGs confirms to the relevant code of safety and standards mandatory for setting up wind projects. The standard includes Wind Turbine Safety and Design, Noise level and Mechanical Load. Therefore, the technology implemented can be depicted as environmentally safe and sound one.

**BASELINE SCENARIO**
Thermal energy would be produced by more-GHG-intensive means based on the use of non-renewable sources




**PROJECT SCENERIO**

Project activity will harness wind as a source of energy production which is environmentally safe and sound technology. There is no GHG emission through project activity.




## A.7. Debundling>>

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

[1] http://www.cea.nic.in/installed_capacity.html

## SECTION B. Application of methodologies and standardized baselines

### B.1. References to methodologies and standardized baselines >>

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

TYPE I - Renewable Energy Projects

CATEGORY- ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources", Version 6

### B.2. Applicability of methodologies and standardized baselines >>

The project activity is wind based renewable energy source, zero emission power project connected to the Rajasthan state grid, which forms part of the NEWNE grid. The project activity will displace fossil fuel-based electricity generation that would have otherwise been provided by the operation and expansion of the fossil fuel-based power plants in NEWNE grid.

The approved consolidated baseline and monitoring methodology ACM0002 Version 06 is the choice of the baseline and monitoring methodology and it is applicable because:

| Para No. | Applicability Conditions as per ACM 0002 | Applicability to this Project Activity |
|---|---|---|
| 1. | The project activity is the installation capacity addition, retrofit or replacement of a power plant/unit of one of the following types:<br>• Hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir)<br>• Wind power plant/unit,<br>• Geothermal power plant/unit,<br>• Solar power plant/unit,<br>• Wave power plant/unit<br>• Tidal power plant/unit. | The project activity is the installation of new grid connected renewable power generation from wind. |
| 2. | In the case of capacity additions, retrofits or replacements: the existing plant 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 or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; | This condition is not relevant, as the project activity does not involve capacity additions, retrofits or replacements. |
| 3. | In case of hydro power plants:<br>• The project activity is implemented in an existing reservoir, with no | This condition is not relevant, as the project activity is not the installation of a hydro power plant. |

| | | |
|---|---|---|
| | change in the volume of reservoir.<br>• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 $W/m^2$.<br>• The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 $W/m^2$. | |
| 4. | The methodology is not applicable to the following:<br>• 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;<br>• Biomass fired power plants;<br>• Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 $W/m^2$. | The project activity does not involve any of the given criteria hence methodology is applicable for the project activity. |
| 5. | In the case of retrofits, 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, i.e. 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 project activity is a new wind power plant. No replacement, modification or retrofit measures are implemented here. Hence, this criterion is also not relevant to the project activity. |

**B.3. Applicability of double counting emission reductions >>**

The project activity is registered under Clean Development Mechanism (CDM) project with registration number 1259, as well as Gold Standard (GS) with reference number 3664. The crediting period of this project under CDM & GS is 27/10/2008 to 26/10/2018. PP seeks verification under UCR from 27/10/2018 onwards, i.e., crediting period for UCR starts from 27/10/2018. Hence, there is no double counting for said projects.

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

According to ACM0002, for the baseline emission factor, the spatial extent of the project boundary

includes the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

The Indian electricity system is divided into five regional grids, viz. Northern, Eastern, Western, Southern, and North-Eastern. Each grid covers several states. As the regional grids are interconnected, there is inter-state and inter-regional exchange. A small power exchange also takes place with neighbouring countries like Bhutan and Nepal.

The project boundary encompasses the physical extent of the northern regional electricity grid, which includes the project site and all power plants connected physically to the electricity system.

Power generation and supply within the regional grid is managed by Regional Load Dispatch Centre (RLDC). The Regional Power Committees (RPCs) provide a common platform for discussion and solution to the regional problems relating to the grid. Each state in a regional grid meets its demand with its own generation facilities and also with allocation from power plants owned by the Central Sector such as NTPC and NHPC etc. Specific quotas are allocated to each state from the Central Sector power plants. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. The regional grid thus represents the largest electricity grid where power plants can be dispatched without significant constraints and thus, represents the "project electricity system" for the Project. As the Project is connected to the Northern regional electricity grid, the Northern grid is the "project electricity system".

| | Source | Gas | Included? | Justification/ Explanation |
|---|---|---|---|---|
| **Baseline** | Electricity generation from power plants connected to the Northern Grid | $CO_2$ | Included | Main emission source |
| | | $CH_4$ | Excluded | This source is not required to be estimated for wind energy projects under ACM0002 |
| | | $N_2O$ | Excluded | This source is not required to be estimated for wind energy projects under ACM0002 |
| **Project Activity** | Electricity generation from the Project | $CO_2$ | Excluded | Wind energy generation does not have any direct GHG emissions. |
| | | $CH_4$ | Excluded | |
| | | $N_2O$ | Excluded | |

## B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

According to ACM0002, for project activities that do not modify or retrofit an existing electricity generation facility, the baseline scenario is the following:

*Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described below.*

As the Project does not modify or retrofit an existing generation facility, the baseline scenario is the emissions generated by the operation of grid-connected power plants and by the addition of new generation sources. This is estimated using calculation of Combined Margin multiplied by electricity delivered to the grid by the Project.
According to the approved baseline methodology ACM0002, the emission reductions ***ERy*** by the

project activity during a given year "*y*[1]" is

***ERy = BEy – PEy – Ly…….(1)***

where *BEy* is the baseline emissions
*PEy* is project activity emissions and;
*Ly* is the amount of emissions leakage resulting from the project activity.

Baseline Emissions for the amount of electricity supplied by project activity, *BEy* is calculated as

***BEy = EGy * EFy …….(2)***

where *EGy* is the electricity supplied to the grid, *EFy* is the $CO_2$ emission factor of the grid, 0.9 as per UCR Standard

**Project Emissions:**

The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as nil.

*PEy = 0*

**Leakage:**

Emissions Leakage on account of the project activity is ignored in accordance with ACM0002.

*Ly = 0*

Annual electricity supplied to the grid by the Project
= 68.8 MW (Capacity) x 22% (PLF) x 8760 (hours)
= 132591.36 MWh

Annual baseline emissions
= 0.9 tCO2e/MWh x 115632 GWh
= 119,332 tCO2e

**Estimated Annual or Total baseline emission reductions (BEy) =** 119,332 CoUs /year (119,332 tCO2eq/yr)

**B.6. Prior History>>**

The project activity is registered as CDM project with reference number 1259 and as GS project with reference number 3664 for generation or issuance of carbon credits with fixed crediting period from 27/10/2008 to 26/10/2018.

[1] Throughout the document, the suffix *y* denotes that such parameter is a function of the year y, thus to be monitored at least annually.

**B.7. Changes to start date of crediting period >>**

The crediting period under UCR will start from 27/10/2018 onwards.

**B.8. 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.

**B.9. Monitoring period number and duration>>**

First Issuance Period: 3 years, 4 months – 27/10/2018 to 31/01/2022

**B.8. Monitoring plan>>**

| Data/Parameter | $EG_y$ |
|---|---|
| Data unit | MWh (Mega-Watt hour) |
| Description | Net electricity supplied to the grid by the Project |
| Source of data<br>Value(s) applied | Electricity supplied to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. |
| Measurement methods and procedures | The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM. |
| Monitoring frequency | Monthly |
| Purpose of data | Baseline Emissions calculations |

| Data / Parameter: | $EG_{export}$ |
|---|---|
| Data unit: | MWh (Mega-Watt hour) |
| Description: | Summation of electricity Export recorded at meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two joint meter readings (Form B) issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point |
| Source of data: | Electricity export to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. |
| Measurement procedures (if any): | The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points |

| | |
|---|---|
| | with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM. |
| Monitoring frequency: | Monthly |
| QA/QC procedures: | The value is calculated and can be cross checked from the invoices raised on the state utility. |
| Any comment: | Not Applicable |

| Data / Parameter: | $EG_{import}$ |
|---|---|
| Data unit: | MWh (Mega-Watt hour) |
| Description: | Summation of electricity Import recorded at the meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two joint meter readings (Form B) issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point. |
| Source of data: | Electricity export to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. |
| Measurement procedures (if any): | The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM. |
| Monitoring frequency: | Monthly |
| QA/QC procedures: | The value is calculated and can be cross checked from the invoices raised on the state utility. |
| Any comment: | Not Applicable |

| Data / Parameter: | $T_E$ |
|---|---|
| Data unit: | MWh (Mega-Watt hour) |
| Description: | Transmission loss for export between the metering location at 33 kV point and the metering location at 220 kV at the WWIL substation. |
| Source of data: | Transmission Loss for export has been sourced from the joint meter reading (Form B) taken at 33kV metering point for the project activity |
| Measurement procedures (if any): | The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values |

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| | mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM. |
| Monitoring frequency: | Monthly |
| QA/QC procedures: | The value is calculated and can be cross checked from the invoices raised on the state utility. |
| Any comment: | Not Applicable |