# PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

**Title: Wind Power Project in Tamil Nadu by Bannari Amman**

Version: 01
Date 10 June 2022

First COU Issuance Period[1]: 8 years 5 months
Date: 01 Jan 2014 to 31 May 2022

[1] Any change in issuance period shall be addressed during the first verification.

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

| BASIC INFORMATION | |
|---|---|
| Title of the project activity | Wind Power Project in Tamil Nadu by Bannari Amman |
| Scale of the project activity | Small Scale |
| Completion date of the PCN | 10 June 2022 |
| Project participants | Green & Clean Sustainability Partners<br>(Authorized Representative of the UCR Project)<br><br>Bannari Amman Spinning Mills Limited<br>(Project Developer) |
| Host Party | India |
| Applied methodologies and standardized baselines | Applied Baseline Methodology:<br>AMS-I. D: "Grid connected renewable electricity generation", version 16<br><br>Standardized Methodology: Not Applicable. |
| Sectoral scopes | 01 Energy industries<br>(Renewable/Non-Renewable Sources) |
| Estimated amount of total GHG emission reductions | To be estimated during verification<br>[An ex-ante estimate is 17,660 CoUs per year] |

## SECTION A. Description of project activity

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

The project activity has been titled[2] under UCR as: **"Wind Power Project in Tamil Nadu by Bannari Amman"** is a renewable power generation project using wind electric converters (WEC's) technology. The project activity involved supply, erection, commissioning and operation of total 14 wind machines of rated capacity 800 kW each. The machines are 'Enercon E-48' make, which is one of the most trusted technologies in the sector. The project is owned by "Bannari Amman Spinning Mills Limited", whereas the project is represented under UCR by its Authorized Representative **"Green & Clean Sustainability Partners"**. The main objective of the project is to produce electricity for the purpose of captive consumption in its industrial unit located at Dindigul District for which Bannari Amman has signed a power purchase agreement (wheeling of power) with the Tamil Nadu Electricity Board (TNEB).

**Purpose of the project activity:**

The project activity is promoted by "Bannari Amman Spinning Mills Limited" (hereinafter also referred to as project proponent or PP), engaged in vertically integrated textile production, especially manufactures cotton yarn, woven and knitted fabrics, finished garments, home textiles. The company was incorporated in the year 1989 and issued shares to the public in the year 2007. With an objective to become a sustainable entity PP has decided to invest on generating green power for its own consumption such that it can replace conventional grid power with renewable electricity. The project activity consists of total 14 Wind Turbine Generators (WTGs) having individual machine capacity of 800 KW; manufactured and supplied by Enercon E-48. The total aggregated installed capacity is **11.2 MW which was commissioned in the Dindigul district in the state of Tamil Nadu, in India.**

Thus, the project activity aims to harness kinetic energy of wind (renewable source) to generate electricity. It is capable of generating around 19,622.40 MWh per year, which is estimated based on an average estimated utilization factor of 20% (this has been calculated for an ex-ante estimate). The net generated electricity from the project activity has been evacuated to regional grid under a long-term power purchase arrangement with the Tamil Nadu Electricity Board for further utilization for captive purpose under a wheeling arrangement. The first machine under the project activity was commissioned on 17 Jan 2006 and last machine under the project activity was commissioned on 08 Mar 2006. The expected operational lifetime of the project is 20 years.

The details along with commissioning period are as follows:

Table 1: Summary:

| Capacity (MW) | Details (Nos., Type & Make) | Commissioning Date |
|---|---|---|
| 11.2 | 14 WTGs @ 800KW,<br>Make: Enercon E-48 | 17 Jan 2006<br>to<br>08 March 2006 |

[2] Title under CDM is "Bannari Amman Spinning Mills Wind Power Project managed by Enercon (India) Ltd".

Table 2: Machine wise details:

| S.No | HT SC Number | Village/City | Taluk | District | State | Country | GPS Coordinate | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Latitude (N) | Longitude (E) |
| 1 | 1067 | Chinnaputhur | Dharampuram | Erode | Tamil Nadu | India | 10°44'11.96" | 77°25'02.73" |
| 2 | 1068 | Chinnaputhur | | | | | 10°44'19.64" | 77°24'57.79" |
| 3 | 1069 | Chinnaputhur | | | | | 10°44'33.46" | 77°24'54.42" |
| 4 | 1077 | Chinnaputhur | | | | | 10°44'42.34" | 77°25'02.58" |
| 5 | 1106 | Chinnaputhur | | | | | 10°44'42.99" | 77°25'15.38" |
| 6 | 1106 | Chinnaputhur | | | | | 10°44'50.68" | 77°25'10.05" |
| 7 | 1086 | Gathelrev | | | | | 10°45'02.42" | 77°24'53.92" |
| 8 | 1077 | Chinnaputhur | | | | | 10°44'49.72" | 77°24'58.89" |
| 9 | 1070 | Govindapuram | | | | | 10°44'50.65" | 77°24'35.47" |
| 10 | 1070 | Gathelrev | | | | | 10°45'03.08" | 77°24'35.14" |
| 11 | 1071 | Gathelrev | | | | | 10°45'13.14" | 77°24'30.85" |
| 12 | 1073 | Gathelrev | | | | | 10°45'21.51" | 77°24'20.58" |
| 13 | 1072 | Molarpatti | | | | | 10°44'50.84" | 77°24'19.45" |
| 14 | 1072 | Molarpatti | | | | | 10°44'57.94" | 77°24'15.10" |

**Baseline & Project Scenario:**

The project activity was developed as a greenfield activity with no power generation facility existing at the project site in the pre-project scenario that can be attributed to the captive power requirement of PP. In the pre-project scenario equivalent amount of electricity would have been generated and supplied from grid for the purpose of captive consumption, thus the power displaced by the project activity would have been otherwise generated from fossil fuel dominated thermal power plant and fed to the grid which is the current baseline for the project.

Hence, project activity is displacing the estimated annual net electricity generation i.e.,19,622.40 MWh from the southern grid (currently part of Unified Indian National Grid system), which otherwise would have been generated from fossil fuel based thermal power plant and exported to the national grid. The project activity doesn't involve any GHG emission sources. **The estimated annual average $CO_2e$ emission reduction by the project activity is expected to be 17,660 $tCO_2e$**; whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

**Project's Contribution to Sustainable Development:**

The project has identified grid power as the baseline. Indian grid system has been predominantly dependent on power from fossil fuel powered plants. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

Since the project activity will generate electricity through wind energy, as a clean renewable energy source it will not cause any negative impact on the environment. Also due to the nature of the project and baseline scenario, the project contributes to climate change mitigation efforts and also creates a sustainable development in the region, which are highlighted under the section below

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

There was no harm identified form the project and hence no mitigations measures are applicable.

**Rational:** as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), it has been declared that solar project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for Wind Projects.

The project activity has identified grid power as the baseline. Indian grid system has been predominantly dependent on power from fossil fuel powered plants. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

Additionally, the Government of India has stipulated following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways:


- Job creation
- Local infrastructure development
- General awareness on overall technology access and social
- Overall Demographic impacts
- Community engagement via local programs etc.


- Better financial conditions due to job creation
- Better flow of finance into the region due to overall infrastructure and demographic impacts
- Access to businesses opportunities for local vendors, local contractors, etc.


- Deployment of Clean Technology.
- Contribution to Green power into the grid mix
- Contribution to national energy security that involves clean technology as example setting into the sector
- Due to consumption of green power as captive energy it adds value to the PP's business practices leading to sustainability


- Zero impact on air pollution due to no fossil fuel involvement
- Zero discharge on ground due to no water usages, hence no negative impact on soil
- Zero impact on any water bodies due to no release of solid and/or liquid wastes from the project
- Significant contribution to greenhouse gas reduction considering the fossil based grid power as the baseline

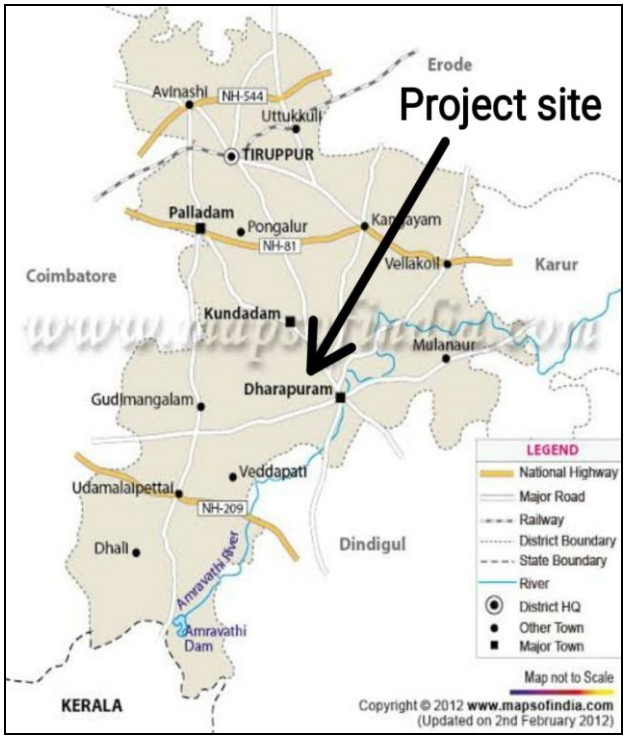
## A.3. Location of project activity >>

The project is located across villages in Chinnaputhur, Govindapuram, Gathelrev, Molarpatti of Dharapuram Taluka, in Erode District of Tamil Nadu state in India.

The nearest railway station is located at Palani which is 30 kms away from the site and nearest airport is located at Coimbatore 80 kms away from the project site.

| Unique Identification Number | HT SC Number | Latitude | Longitude |
|---|---|---|---|
| BASMLDH-01 | 1067 | N 10°44'11.96'' | E77°25'2.73'' |
| BASMLDH-02 | 1068 | N 10°44'19.64'' | E 77°24'57.79'' |
| BASMLDH-03 | 1069 | N 10°44'33.46'' | E 77°24'54.42'' |
| BASMLDH-09 | 1070 | N 10°44'50.65'' | E 77°24'35.47'' |
| BASMLDH-10 | 1070 | N 10°45'3.08'' | E 77°24'35.14'' |
| BASMLDH-11 | 1071 | N 10°45'13.14'' | E 77°24'30.85'' |
| BASMLDH-13 | 1072 | N 10°44'50.84'' | E 77°24'19.45'' |
| BASMLDH-14 | 1072 | N 10°44'57.94'' | E 77°24'15.10'' |
| BASMLDH-12 | 1073 | N 10°45'21.51'' | E 77°24'20.58'' |
| BASMLDH-04 | 1077 | N 10°44'42.34'' | E 77°25'2.58'' |
| BASMLDH-08 | 1077 | N 10°44'49.72'' | E 77°24'58.89'''' |
| BASMLDH-07 | 1086 | N 10°45'2.42'' | E77°24'53.92'' |
| BASMLDH-05 | 1106 | N 10°44'42.99'' | E 77°25'15.38'' |
| BASMLDH-06 | 1106 | N 10°44'50.68'' | E 77°25'10.05'' |

The representative location map is included below:


*(Courtesy: google map and images)*

## A.4. Technologies/measures >>

The project activity employs state-of-art horizontal axis wind turbines. The WTGs comprising the project activity generates clean power which is then exported to the nearest receiving station of Tamil Nadu Electricity Board at Erode. The WTGs are grid connected and houses the metering, switchgear and other protection equipment. Representation of the same is provided below.

**Technical details:**
The technical layout of the Wind Turbine is shown below:

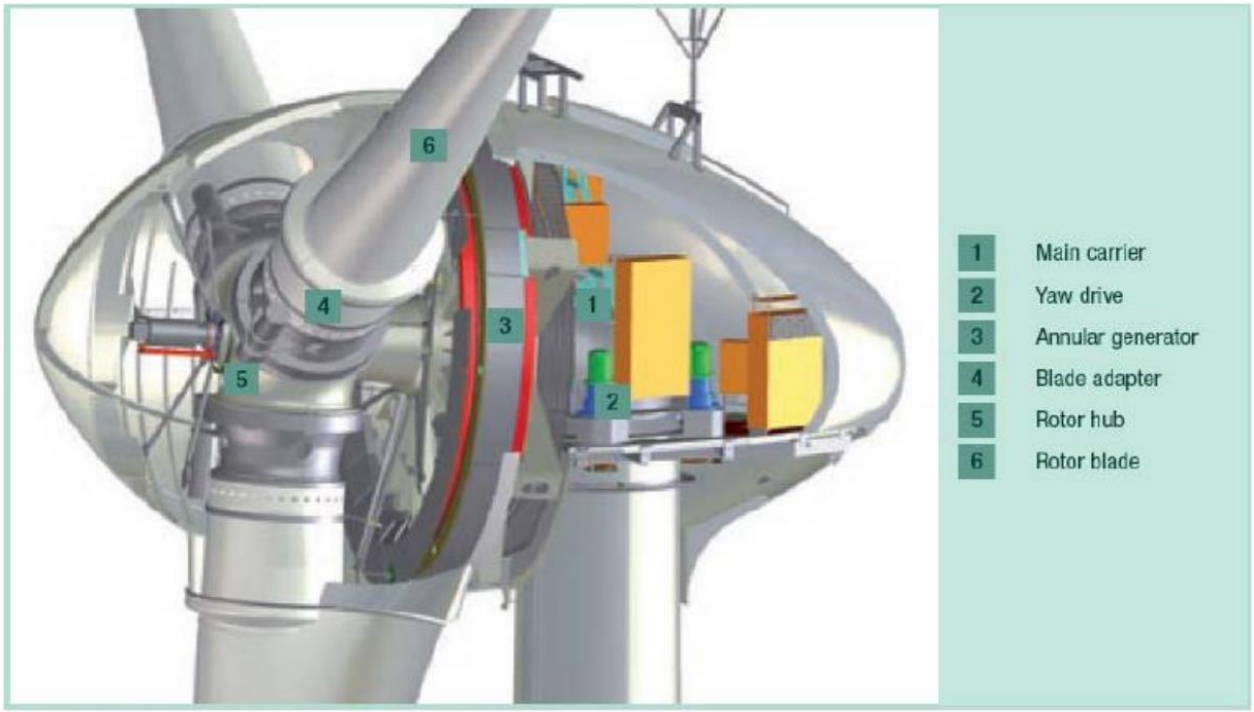



*Figure: Enercon make E-48 Diagram.*

**The Technical details are given below:**

| Specification | Value |
|---|---|
| Rated power | 800 KW |
| Rotor Diameter | 48m |
| Gearbox Type | Gear less |
| Generator Type | Synchronous generator |
| Tower | 74 m concrete |
| Turbine Type | Gearless horizontal axis wind turbine with variable rotor speed |
| Braking | Aerodynamic |
| Blade Material | Glass Fibre reinforced Epoxy |
| Yaw System | Active yawing with 4 electric yaw drives with brake motor and friction bearing |

The more details about the machine are given under the appendix-1.

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

| Party (Host) | Participants |
|---|---|
| India | **1) <u>Project Representative in UCR:</u>**<br><br>**Green & Clean Sustainability Partners (also referred to as GNCS)**<br><br>**Focal Point of Contact:**<br>Rucha Natu<br>Partner<br><br>**Contact details:**<br>gncsustain@gmail.com<br>+91 9713740395<br><br>Address: 267/ Sahjeevan Nagar Near Gopur Square,<br>Indore, Madhya Pradesh – 452 009. India.<br><br>[GNCS has been authorized by the Project Proponent as authorized representative for UCR and to take care of the entire process to be followed under UCR including CoUs issuance and transactions.]<br><br>**2) <u>Project Proponent (PP):</u>**<br><br>**Bannari Amman Spinning Mills Limited.**<br><br>Contact details:<br>S.V. Arumugam<br>www.bannari.com<br><br>Address:<br>252, Mettupalayam Road, Building: Registered Office,<br>Coimbatore – 641 043, Tamil Nādu, India. |

## A.6. Baseline Emissions>>

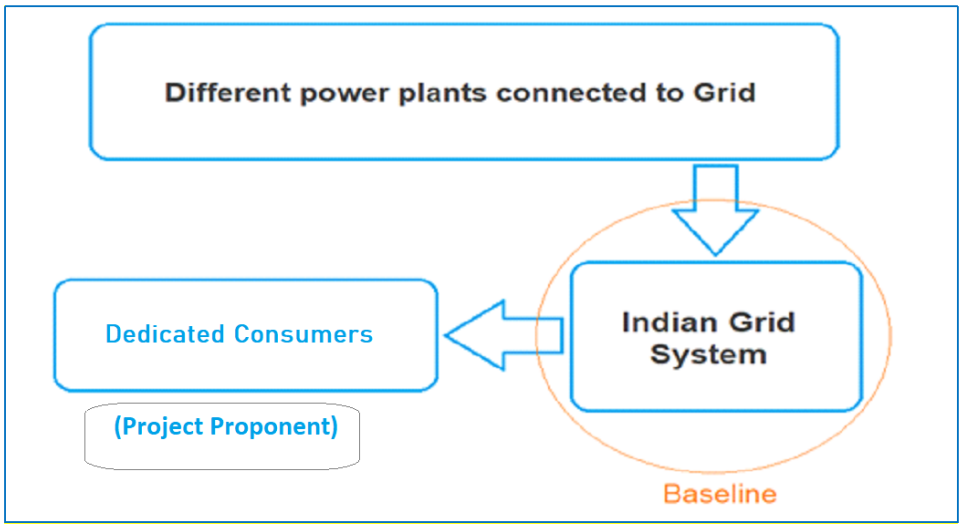
The baseline scenario identified at the PCN stage of the project activity is:

- Grid

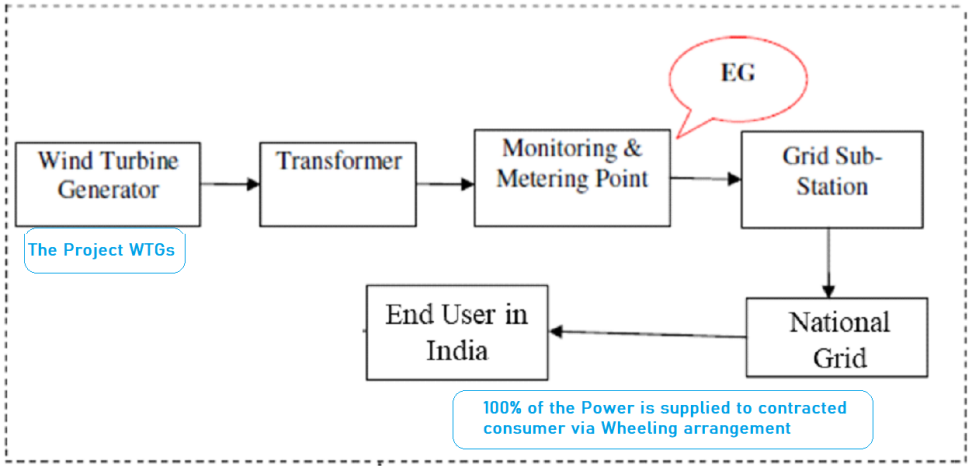
In the absence of the project activity, the equivalent amount of electricity would have been consumed from gird, where power is generated from fossil fuel-based power plants and exported to the southern regional grid (which is connected to the unified Indian Grid system). The national grid is predominantly sourcing from fossil fuel-based power plants; hence the 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 and project scenario:

**Baseline Scenario:**




**Project Scenario:**




## A.7. Debundling>>

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

## 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:**
AMS-I.D (Title: "Grid connected renewable electricity generation", applied version 16)

**Note:** Current applicable version of the methodology is 18; however, as the project is already a registered CDM project (4877) with methodology version 16, hence the same version is applied under UCR PCN as the project baseline and project scenario for the project activity is same since inception without any change in project design.

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

The project activity involves generation of grid connected electricity from the operation of a new wind power project. The project activity has installed capacity of 11.2 MW which will qualify for a small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.D., version 16 and applicability of methodology is discussed below:

| Applicability Criterion | Project Case |
|---|---|
| 1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:<br><br>(a) Supplying electricity to a national or a regional grid; or<br>**(b)** Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling. | The project activity involves setting up of a renewable energy (wind) generation plant that exports electricity Indian electricity grid system for further utilization at a dedicated facility. Thus, the project activity meets this applicability condition (b). |
| 2. Illustration of respective situations under which each of the methodology (i.e., AMS-I. D: Grid connected renewable electricity generation", AMS-I. F: Renewable electricity generation for captive use and mini-grid" and AMS-I. A: Electricity generation by the user) applies is included in Table 2 | According to the point 1 of the Table 2 in the methodology – "Project supplies electricity to a national/ regional grid" is applicable under AMS I.D. As the project activity supplies the electricity to the regional grid which is a regional grid, the methodology AMS-I.D. is applicable. |
| 3. This methodology is applicable to project activities that:<br>(a) Install a Greenfield plant; | The Project activity involves the installation of new power plant at a site where there was no renewable energy |

| Applicability Criterion | Project Case |
|---|---|
| (b) Involve a capacity addition in (an) existing plant(s);<br>(c) Involve a retrofit of (an) existing plant(s);<br>(d) Involve a rehabilitation of (an) existing plant(s); or<br>(e) Involve a replacement of (an) existing plant(s). | power plant operating prior to the implementation of the project activity. Thus, Project activity is a Greenfield plant and satisfies this applicability condition (a). |
| 4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:<br>(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or<br>(b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 $W/m^2$.<br>(c) 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/m2 | As the project activity is a wind power plant, these criteria are not applicable. |
| 5. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW. | The rated capacity of the project activity is 11.2 MW with no provision of Co-firing fossil fuel. Hence, not applicable. |
| 6. Combined heat and power (co-generation) systems are not eligible under this category | This is not relevant to the project activity as the project involves only wind power generating units. |
| 7. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units. | There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable. |
| 8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement power plant/unit shall not exceed the limit of 15 MW. | The project activity is a new installation, it does not involve any retrofit measures nor any replacement and hence is not applicable for the project activity. |
| 9. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used | This is not relevant to the project activity as the project involves only wind power generating units. |

| Applicability Criterion | Project Case |
|---|---|
| for electricity generation for supply to a grid, then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS I. C.: Thermal energy production with or without electricity" shall be explored. | |
| 10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply. | This is not relevant to the project activity as the project involves only wind power generating units. |

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

There is no double accounting of emission reductions in the project activity due to the following reasons:

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the generation/feeding point with the grid.
- The project crediting under Clean Development Mechanism (CDM) can be transparently tracked from the UNFCCC website and hence it can be verified whether the double accounting is avoided or not.

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

As per applicable methodology AMS-I.D. Version 16, "*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*."

Thus, the project boundary includes the Wind Turbine Generators (WTGs) and the Indian grid system.

| Source | | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline | Grid connected fossil fuel-based electricity generation | **$CO_2$** | **Yes** | **Main emission source** |
| | | $CH_4$ | No | Minor emission source |
| | | $N_2O$ | No | Minor emission source |
| | | Other | No | No other GHG emissions were emitted from the project |
| Project | Greenfield Wind Power Project Activity | $CO_2$ | No | No $CO_2$ emissions are emitted from the project |
| | | $CH_4$ | No | Project activity does not emit $CH_4$ |
| | | $N_2O$ | No | Project activity does not emit $N_2O$ |
| | | Other | No | No other emissions are emitted from the project |

## B.5. Establishment and description of baseline scenario >>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per para 19 of the approved consolidated methodology AMS-I.D. Version 16, 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 wind power plant to harness the green power from wind energy and to use for sale to national grid through PPA arrangement for captive consumption at a dedicated facility. In the absence of the project activity, the equivalent amount of power would have been generated by the operation of grid-connected fossil fuel-based power plants and by the addition of new fossil fuel-based generation sources into the grid. 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.

A "grid emission factor" refers to a $CO_2$ emission factor ($tCO_2/MWh$) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 $tCO_2/MWh$ for the 2014-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021-22, the combined margin emission factor calculated from CEA database in India results into higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

**Net GHG Emission Reductions and Removals**

Thus, $ER_y = BE_y - PE_y - LE_y$

Where:

$ER_y$ = Emission reductions in year y ($tCO_2/y$)

$BE_y$ = Baseline Emissions in year y ($t\ CO_2/y$)

$PE_y$ = Project emissions in year y ($tCO_2/y$)

$LE_y$ = Leakage emissions in year y ($tCO_2/y$)

## Baseline Emissions

Baseline emissions include only $CO_2$ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated as follows:

$BE_y = EG_{BL,y} \times EF_{grid,y}$

Where:

| | | |
|---|---|---|
| $BE_y$ | = | Baseline emissions in year y (t $CO_2$) |
| $EG_{BL,y}$ | = | Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the UCR project activity in year y (MWh) |
| $EF_{grid,y}$ | = | UCR recommended emission factor of 0.9 $tCO_2$/MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard) |

**Project Emissions**

As per AMS-I.D, version 16, only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of wind should be accounted for the project emission. Since the project activity is a wind power project, project emission for renewable energy plant is nil.

**Thus, $PE_y$ =0.**

**Leakage**

As per paragraph 22 of AMS-I.D. version-16, 'If the energy generating equipment is transferred from another activity, leakage is to be considered.' In the project activity, there is no transfer of energy generating equipment and therefore the leakage from the project activity is considered as zero.

**Hence, $LE_y$ = 0**

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions ($BE_y$)
= 19,662.40 MWh/year ✕ 0.9 $tCO_2$/MWh
= 17,660 $tCO_2$/year (i.e., 17,660 CoUs/year)

## B.6. Prior History>>

The project is registered under Clean Development Mechanism (CDM) of UNFCCC with 10 years of crediting period (Reference No: 4877). Crediting period of the project under CDM starts on 01 Aug 2011 and ends on 31 July 2021. The project has already claimed carbon credits under CDM till 30 June 2012.

In continuation with the same, the project can claim credits from 01 July 2012. However, as per UCR guidelines, the earliest crediting can be considered from 01 Jan 2014; hence the first monitoring period considered under UCR is from 01 Jan 2014.

**Further details related to project history:**

The board of Bannari Amman approved this project on the basis of carbon revenues, to ensure financial sustainability of the project. Carbon related activity for the project was a serious consideration in the initial board meeting dated 25th July 2005 (as can be verified in the registered CDM-PDD). Initially project was intended to generate power and sale to grid; but it was also decided in that board meeting that the arrangement for the project would be changed from 'sale to EB' to 'captive consumption' in due course of time, which was later confirmed in one of the subsequent Board meetings dated 4th January 2007. Thus, the project was implemented and commissioned for captive consumption via wheeling arrangement based on a long term PPA.

Since the date of commissioning, the project has been operational without any change in design and monitoring aspects, hence project activity as registered under the CDM mechanism is valid for the UCR mechanism.

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

Not applicable (i.e. there is no change in the start date of crediting period), as the project is submitted under UCR as a fresh project.

The crediting period under UCR has been considered from 01 Jan 2014.
This is because currently no GHG emission reduction has been claimed under the project since 01 July 2012 and as per UCR guidelines the earliest date of crediting is considered as 01 Jan 2014.

**Note:**
However, the project is currently webhosted under CDM for the monitoring period "01 Jul 2012 - 31 Aug 2018", but the same monitoring period has not been pursued further for verification under CDM. Therefore, no double accounting is envisaged.

However, PP keeps the provision to change the crediting period of the project under UCR, which can be addressed during the first verification.

## B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

Not applicable.

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

Number : First Monitoring Period[3]
Duration : 8 years, 5 months
01 Jan 2014 to 31 May 2022 (inclusive of both dates)

[3] As prescribed under the section B.7, PP keeps the provision to change the crediting period of the project under UCR, which can be addressed during the first verification.

## B.8. Monitoring plan>>

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

| | |
|---|---|
| Data / Parameter | UCR recommended emission factor |
| Data unit | $tCO_2$ /MWh |
| Description | A "grid emission factor" refers to a $CO_2$ emission factor ($tCO_2$/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 $tCO_2$/MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach. |
| Source of data | https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardNov2021updatedVer2_301121081557551620.pdf |
| Value applied | 0.9 |
| Measurement methods and procedures | - |
| Monitoring frequency | Ex-ante fixed parameter |
| Purpose of Data | For the calculation of Emission Factor of the grid |
| Additional Comment | The combined margin emission factor as per CEA database (current version 17, Year 2022) results into higher emission factor. Hence for 2021-22 vintage UCR default emission factor remains conservative. |

**Data and Parameters to be monitored (ex-post monitoring values):**

| | |
|---|---|
| Data / Parameter | $EG_{BL, y}$ |
| Data unit | MWh / year |
| Description | Net electricity supplied to the grid by the project activity |
| Source of data | Tamil Nadu Electricity Board records |
| Measurement procedures (if any): | For the purpose of a simplified and reliable measurement method, PP has proposed the following procedure for the parameter (based on current practice and any probable futuristic provision of measuring):<br><br>(i) If the JMR/Credit notes etc. generated for the project WTGs provide net export quantity, the same will be directly considered for calculation.<br><br>(ii) However, if the monthly statement does not directly provide "net electricity" units, then quantity of net electricity supplied to the grid shall be calculated using the parameters reflected in the monthly document, such as Export units and Import units. |

| | |
|---|---|
| | Thus, the difference between the measured quantities of the grid export and the import will be considered as net export:<br>$EG_{BL,y} = EG_{Export} - EG_{Import}$<br><br>(iii) In case the monthly accounting procedure (as may be reflected in the monthly statement (e.g., B-form, JMR, share certificate, invoice etc. whichever is relevant during the crediting period) includes any transmission losses or other parameters to discount the units and month billing is done on such discounted net value, then PP may decide to consider this value for ER calculation, which is conservative.<br><br>Thus, $EG_{BL,\ y}$ is the net export which will be either directly sourced from the monthly generation statements (such as JMR) or to be calculated from export and import values reported and/or the losses parameters (if included). |
| Measurement Frequency: | Monthly |
| Value applied: | 19,662.40<br>(This is an annualized average value considered here for an ex-ante estimation only, whereas this is an ex-post parameter hence actual value shall be applied during monitoring and verification) |
| QA/QC procedures applied: | Calibration of the Tamil Nadu Electricity Board Main meters will be carried out once in five years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement.<br><br>The energy meter details are attached in Appendix-2 for further reference. Any change/replacement in energy meters shall be addressed during periodic verifications.<br><br>The net amount of electricity considered for ER estimate which will be anyhow based on monthly statements to be issued by Tamil Nadu Electricity Board, which can be further cross verified by the monthly bills. |
| Purpose of data: | The Data/Parameter is required to calculate the baseline emission. |
| Any comment: | All the data will be archived till a period of two years from the end of the crediting period. |

# Appendix 1:

Technical specification of the wind machine:

| | | |
|---|---|---|
| **Power** | | |
| Rated power: | | 800.0 kW |
| Flexible power ratings: | | - |
| Cut-in wind speed: | | 3.0 m/s |
| Rated wind speed: | | 12.0 m/s |
| Cut-out wind speed: | | 34.0 m/s |
| Survival wind speed: | | 59.5 m/s |
| Wind zone (DIBt): | | III |
| Wind class (IEC): | | IIa |
| **Rotor** | | |
| Diameter: | | 48.0 m |
| Swept area: | | 1,809.6 m² |
| Number of blades: | | 3 |
| Rotor speed, max: | | 31.0 U/min |
| Tip speed: | | 78 m/s |
| Type: | | AERO E-48 |
| Material: | | GFK |
| Manufacturer: | | Enercon |
| Power density 1: | | 442.1 W/m² |
| Power density 2: | | 2.3 m²/kW |
| **Gear box** | | |
| Type: | | Without. Direct drive |
| **Generator** | | |
| Type: | | Synchronous |
| Number: | | 1.0 |
| Speed, max: | | 31.0 U/min |
| Voltage: | | 690.0 V |
| Grid connection: | | IGBT |
| Grid frequency: | | 50.0 Hz |
| Manufacturer: | | Enercon |
| **Tower** | | |
| Hub height: | | 50/55/60/65/76 m |
| Type: | | Steel tube/ Hybrid |
| Shape: | | conical |
| Corrosion protection: | | painted |
| Manufacturer: | | Enercon |
| | | |

# Appendix 2:

List of energy meters and their basic details:

| SL. NO. | HTSC NO. | METER SL. NO. | MAKE | ACCURACY CLASS |
|---|---|---|---|---|
| 1 | 1067 | HT2160906 | EDMI | 0.2s |
| 2 | 1068 | HT2160763 | EDMI | 0.2s |
| 3 | 1069 | HT2160764 | EDMI | 0.2s |
| 4 | 1070 | HT2160675 | EDMI | 0.2s |
| 5 | 1071 | HT2160676 | EDMI | 0.2s |
| 6 | 1072 | HT2160677 | EDMI | 0.2s |
| 7 | 1073 | 17067951 | L&T | 0.2s |
| 8 | 1077 | 17067952 | L&T | 0.2s |
| 9 | 1086 | 17067949 | L&T | 0.2s |
| 10 | 1106 | 17068074 | L&T | 0.2s |

The main meter is tested and calibrated by the TNEB at the time of commissioning of WTG. This is a sealed meter and is controlled by TNEB. Every month, reading of the main meter of each WTG HTSC connection taken by TNEB personnel in presence of O&M personnel (representative of PP).