



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT



Title: 19.5 MW BUNDELED WIND POWER PROJECT IN TAMILNADU

Version 1.0

Date 18/01/2022

First CoU Issuance Period: 07 Years and 00 Months

Date: 01/01/2014 to 31/12/2020



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

BASIC INFORMATION

| | |
|--|--|
| Title of the project activity | 19.5 MW BUNDLED WIND POWER PROJECT IN TAMILNADU |
| Scale of the project activity | Large Scale |
| Completion date of the PCN | 18/01/2022 |
| Project participants | Premier Mills Pvt Ltd |
| Host Party | India |
| Applied methodologies and standardized baselines | ACM0002: Grid-connected electricity generation from renewable sources --- Version 20.0 ¹ |
| Sectoral scopes | 01 Energy industries (Renewable/Non-renewable Sources) |
| Estimated amount of total GHG emission reductions | 2,84,690 CoUs (2,84,690 tCO _{2eq}) |
| | |

¹ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

SECTION A. Description of project activity

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

The project “19.5 MW Bundled Wind Power Project in Tamilnadu” is located in Village Poomalaikundu, Theni, Seepalakotai & Veppampatti, District Theni, State Tamilnadu, Country India.

The details of the registered project are as follows:

Purpose of the project activity:

The main purpose of the project activity is the implementation and operation of 19.5 MW wind farms to generate electricity in high wind speed areas of Tamilnadu. M/s Premier Mills Pvt Ltd is the promoter of these wind farms. The project activity consists of 13 wind electric generators (WEGs) installed in three phases at various locations within Tamilnadu. The generated electricity from WEGs is connected to state electric utility namely Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and transmitted through state electric grid.

The project implementation schedule is placed below:

| Capacity | WTG No | Location | WTG Supplier | Location | Date of Commissioning |
|----------|--------|----------|--------------------------|----------------------|-----------------------|
| 1.5 MW | PML 1 | | ReGen Powertech Pvt Ltd. | Poomalaikundu | 26-03-2011 |
| 1.5 MW | PML 2 | | | Poomalaikundu | 29-03-2011 |
| 1.5 MW | PFL 1 | | | Poomalaikundu | 30-03-2011 |
| 1.5 MW | PFL 2 | | | Poomalaikundu | 30-03-2011 |
| 1.5 MW | LNT | | | Poomalaikundu | 26-03-2011 |
| 1.5 MW | PSW | | | Poomalaikundu, Theni | 29-03-2011 |
| 1.5 MW | CPT | | | Seepalakotai, Theni | 30-03-2011 |
| 1.5 MW | Prima | | | Poomalaikundu, Theni | 29-03-2011 |
| 1.5 MW | PCT 1 | | | Veppampatti | 26-03-2011 |
| 1.5 MW | PCT 2 | | | Veppampatti | 26-03-2011 |
| 1.5 MW | PCT 3 | | | Poomalaikundu | 26-03-2011 |
| 1.5 MW | PCT 4 | | | Poomalaikundu | 27-03-2011 |
| 1.5 MW | PCT 5 | | | Veppampatti | 30-03-2011 |

The project replaces anthropogenic emissions of greenhouse gases (GHGs) estimated to be approximately 40,669 tCO₂e per annum there on displacing 45,189 MWh/ year amount of electricity from the generation mix of power plants connected to the Indian electricity grid, which is mainly dominated by the thermal / fossil fuel-based power plant.

The project activity is the installation of a new grid connected renewable power plant/unit. The scenario existing prior to the implementation of the project activity 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. Baseline scenario and scenario existing prior to the implementation of the project activity are both same.

Contribution of project activity to sustainable development:

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:

Social well being:

- Social well being is assessed by contribution by the project activity towards improvement in living standards of the local community.
- The project activity has resulted in increased job opportunities for the local population on temporary and permanent basis.
- Manpower was required both during erection and operation of the wind farms. This has resulted in poverty alleviation of the local community and development of basic infrastructure leading to improvement in living standards of the local population.

Economic well being

- The project activity has created direct and indirect job opportunities to the local community during installation and operation of the WEGs.
- The investment for the project activity has increased the economic activity of the local area.
- The project activity also contributes in economic wellbeing of the nation's economy by reducing import of fossil fuel for electricity generation in hard currency.

Environmental well being

- The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate fuel (most likely - fossil fuel) based power plants, contributing to reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions.
- As wind power projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power.
- 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.

Technological well being

- There is continuous research and development on the geometry of the wind blades, height of towers, diameters of towers, etc., which augurs well for the technological well being in the development of wind energy to produce clean electricity.
- The generated electricity from the project activity is connected to the grid. The project activity improves the supply of electricity with clean, renewable wind power while contributing to the regional/local economic development.
- Wind energy plants provide local distributed generation, and provide site-specific reliability and transmission and distribution benefits including:
 - improved power quality
 - Reactive power control
 - Mitigation of transmission and distribution congestion

All the above are the contributions of the project activity to sustainable development

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.

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)², it has been declared that wind 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.

There are social, environmental, economic and technological benefits which contribute to sustainable development. The key details have been discussed in the previous section.

A.3. Location of project activity >>

Country: India

District: Theni

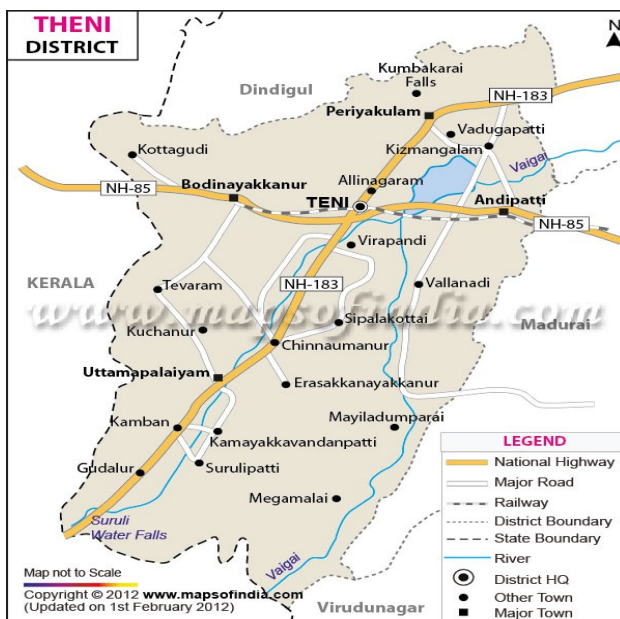
Village: Poomalaikundu, Theni, Seepalakotai & Veppampatti

Tehsil: Dharampuri,

State: Tamilnadu

Code: Theni -625531

² http://moef.gov.in/wp-content/uploads/2017/07/Latest_118_Final_Directions.pdf



The unique location of individual wind turbines are:

| WM No. | HTSC NO. OLD | HTSC NO. NEW | Location | Survey No. | Latitude | Longitude |
|--------|--------------|--------------|---------------|-----------------|----------|-----------|
| PML 1 | RE 2 - T12 | 059224760133 | Poomalaikundu | 76/2, 4(P) | 9.909222 | 77.433369 |
| PML 2 | RE2 - T20 | 059224760141 | Poomalaikundu | 355/5,6,7,12(P) | 9.908307 | 77.444683 |

| | | | | | | |
|----------|--------------|--------------|-------------------------|---------------------------------|----------|-----------|
| PFL 1 | RE2 - T23 | 059224760144 | Poomalaikundu | 633/7(P) | 9.897876 | 77.450116 |
| PFL 2 | RE2 - T24 | 059224760145 | Poomalaikundu | 250/3(P),5(P) | 9.888758 | 77.447043 |
| LNT | RE2 - T10 | 059224760131 | Poomalaikundu | 156/1A(P) | 9.887428 | 77.424151 |
| PSW | RE2 - T18 | 059224760139 | Poomalaikundu, Theni | 184/2B1, 2B2,2C,6 | 9.881306 | 77.430917 |
| CPT | RE2 - T26 | 059224760147 | Seepalakotai, Theni | 147/1A, 1B, 1C,1D,1E,2 | 9.878545 | 77.412525 |
| Prima | RE2- T19 | 059224760140 | Poomalaikundu, Theni | 311/1(P), 2(P) | 9.900629 | 77.43963 |
| PCT 1 | RE2 - T06 | 059224760127 | Veppampatti | 3/1(P) | 9.883652 | 77.417038 |
| PCT 2 | RE2 - T07 | 059224760128 | Veppampatti | 28/3(P) | 9.879464 | 77.42406 |
| PCT 3 | RE2 - T08 | 059224760129 | Poomalaikundu | 167/2B2(P),3F(P) | 9.884677 | 77.426941 |
| PCT 4 | RE2 - T16 | 059224760137 | Poomalaikundu | 524/7A(P), 7B(P) | 9.907914 | 77.469099 |
| PCT 5 | RE2 - T25 | 059224760146 | Veppampatti | 19/1C(P), 13/2B3(P), 2C3B(P) | 9.879447 | 77.417932 |

A.4. Technologies/measures >>

All the machines are Vensys 82 make and have been developed by ReGEN Powerech PVT Ltd in association with its collaborators using state of the art technology. The primary driver for the development of the turbines was ReGEN commitment to make wind energy more accessible - in terms of technology, yield and cost.

In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when passes 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 a clean technology since there are no GHG emissions associated with the electricity generation.

The important parts of a windmill are:

Main Tower

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

Blades

The WEGs are provided with three blades. The blades are self-supporting in nature made up of Fiber Reinforced Polyester. The blades are mounted on the hub.

Nacelle

The Nacelle is the one which contains all the major parts of a WEG. 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 is to connect 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 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 induction type of generator. The generators are provided with monitoring sensors in each phase winding to prevent damage to the generators.

Technical Details of 1.5 MW (Vensys-82) WTG

| Specification | Value |
|-----------------------------------|---|
| Power | |
| Rated power | 1500 KW |
| Cut-in wind speed (10 min. mean) | 3 m/s |
| Rated Wind Speed (10 min. mean) | Approx. 12.5 m/s |
| Cut-out wind speed (10 min. mean) | 22 m/s |
| Survival wind speed | 52.5 m/s |
| Generator | Variable Speed, Multi-pole Synchronous with Permanent Magnet Excitation |
| | |
| Rotor | |
| Diameter | 82 |
| Swept area | 5325 sq. meter |
| Speed range (variable) | 9 to 17.3 rpm |
| | |

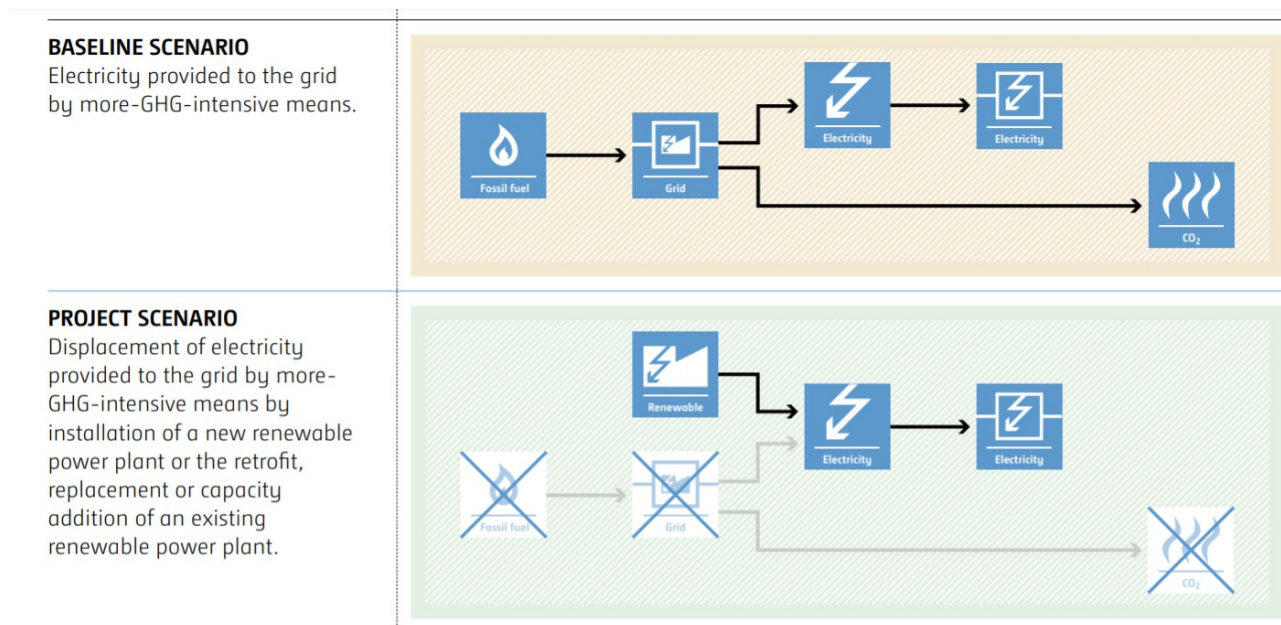
| | |
|---------------------------------|---|
| Tower And Foundation | |
| Hub height | 85 m |
| Design | Tubular, Four sections |
| Foundation type | Floating foundation |
| | |
| Control And Safety Systems | Pitch Regulation |
| Control of output | Variable, Micro-controller based |
| Speed control | 3 seconds |
| Low Voltage Ride Through (LVRT) | Aerodynamic Brake, Single Pitch Control/triple redundant |
| Primary brake system | Electromechanical, Maintenance Free Toothed Belt Drive (Patented) |
| Pitch System | VPN, Visualization via web-browser |
| Remote Monitoring | Pitch Regulation |
| | |
| Type Classes | |
| Wind Turbines type classes | GL III A |

A.5. Parties and project participants >>

| Party (Host) | Participants |
|--------------|-----------------------|
| India | Premier Mills Pvt Ltd |

A.6. Baseline Emissions>>

In the absence of the project activity, the equivalent amount of electricity would have been imported from the regional grid (which is connected to the unified Indian Grid system (NEWNE Grid)), which is carbon intensive due to predominantly sourced 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.



A.7. Debundling>>

This “19.5 MW Bundled Wind Power Project in Tamilnadu” project 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- ACM0002 Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources Version 20.0³

B.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 supply to grid. The project activity has installed capacity of 19.5 MW which qualifies for a large-scale project activity. The project status is corresponding to the methodology ACM0002 version 20.0 and applicability of methodology is discussed below:

³ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

| Applicability Criterion | Project Case |
|---|---|
| 4. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s). | The project activity is a Renewable Energy Project i.e., Wind Power Project which falls under applicability criteria option 1 (a) i.e., “Install a Greenfield power plant”. Hence the project activity meets the given applicability criterion. |
| 5. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; ACM0002 Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources Version 20.0 Sectoral scope(s): 01. 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 ; (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/m ² . | The project is installation of new wind-based electricity generation plants (not a hydro power plant). Hence this criterion is not applicable. |
| 6. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 19.5 MW for a Large-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 19.5 MW. | The project is wind power project and thus the criterion is not applicable to this project activity. |
| 7. Combined heat and power (co-generation) systems are not eligible under this category | The project is wind power project and thus the criterion is not applicable to this project activity. |
| 8. 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 19.5 MW and should be physically distinct ¹ from the existing units | The project is a greenfield wind power project and does not involve in capacity addition and thus the criterion is not applicable to this project activity. |
| 9. In the case of retrofit, rehabilitation or replacement, to qualify as a Large-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 19.5 MW. | The project activity is Greenfield and there is no switching of fossil fuel to renewable energy. Hence the criteria is not applicable to the project activity |
| 10. 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 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. | This project is a wind power project and hence the criteria is not applicable. |
| 11. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply. | The project is not a biomass fired power plant. Hence the criteria is not applicable to the project activity. |

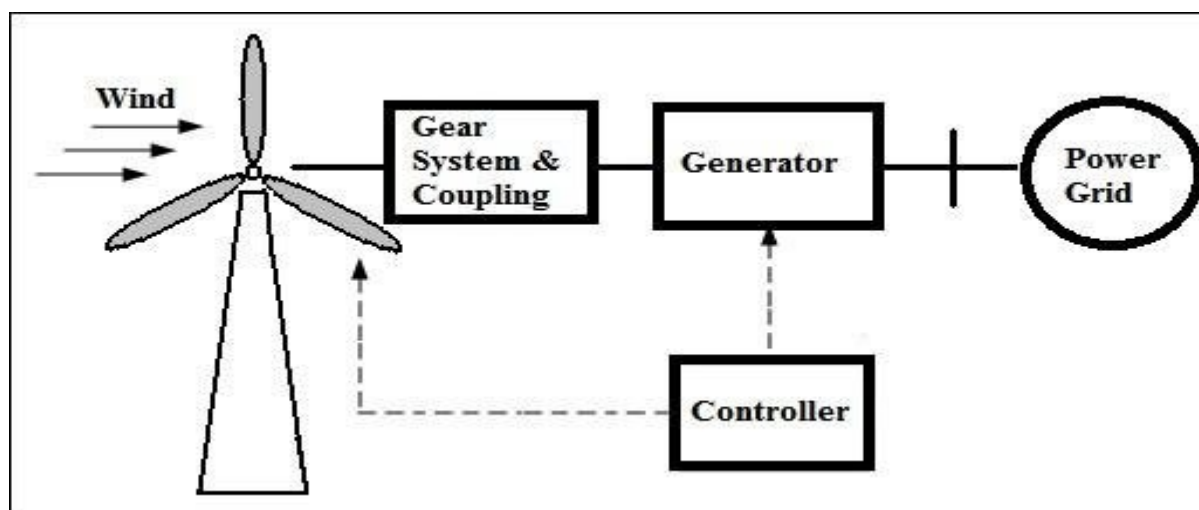
B.3. Applicability of double counting emission reductions >>

PP will request for issuance of carbon offsets in UCR for the post completion of the fixed crediting period (01/01/2014 – 31/12/2020) i.e., crediting period will start from 01/01/2014. The project is not registered with any other voluntary market (National or International). Hence, the criteria for double counting are not applicable for the project.

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

As per applicable methodology ACM0002 version 20.0, “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected”. Thus, the project boundary includes the Wind Turbine Generators (WTGs) and the Indian grid system.

The project boundary includes the physical, geographical site(s) of:



| | Source | GHG | Included? | Justification/Explanation |
|--|--|-----|-----------|---|
| | Grid connected electricity generation | CO2 | Yes | Main source of emission |
| | | CH4 | Excluded | Minor source of emission |
| | | N2O | Excluded | Minor emission source |
| | Greenfield Wind Power Project Activity | CO2 | Excluded | No CO2 emission are emitted from the project |
| | | CH4 | Excluded | CH4 |
| | | N2O | Excluded | No other emissions are emitted from the project |

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

As per the approved methodology ACM0002 version 20.0, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, 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 (tCO₂/y)

BE_y = Baseline Emissions in year y (t CO₂/y)

PE_y = Project emissions in year y (tCO₂/y)

LE_y = Leakage emissions in year y (tCO₂/y)

Baseline emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired 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:

$$BE_y = E_{grid} \times EF_{grid}$$

Where:

E_{grid} = Baseline emissions in year y (t CO₂/yr)

$Q_{y,y}$ = 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)

$EF_{y,y}$, , = Combined margin CO₂ emission factor for grid connected power generation in year y

calculated using the latest version of “TOOL07: Tool to calculate the emission factor for an electricity system” (t CO₂/MWh)

Project Emissions

As per ACM0002 version 20.0, 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 Hydro 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 ACM0002 version 20.0, ‘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 crediting 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) = 45,188.46 MWh/year * 0.9 tCO₂/MWh = 40,669.614 tCO₂e/year (i.e. 40,670 CoUs /year)

B.6. Prior History>>

The project activity is not having prior history of any registration with any other mechanism.

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

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

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: 07 years, 00 months – 01/01/2014 to 31/12/2020

B.8. Monitoring plan>>

The joint measurement is carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties sign the recorded reading.