PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 8.8 MW Small Scale Wind Energy Project by Engineered Power Resources India (P) Ltd

Version 1.0

Date of PCN: 26/05/2022
First CoU Issuance Period: 01/01/2014 to31/12/2021
Monitoring Period: 01/01/2014 to 31/12/2021
Crediting Period: 8 years 0 months

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

BASIC INFORMATION	
Title of the project activity	**8.8 MW Small Scale Wind Energy Project by Engineered Power Resources India (P) Ltd**
Scale of the project activity	Small Scale
Completion date of the PCN	26/05/2022
Project participants	**Engineered Power Resources India (P) Ltd** (Project Proponent) **Aajeeth Innovation LLP** (Aggregator)
Host Party	India
Applied methodologies and standardized baselines	Type I (Renewable Energy Projects) UNFCCC Methodology Category AMS I.D.: "Grid connected renewable electricity generation" Ver 18 UCR Protocol Standard Baseline
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated amount of total GHG emission reductions per year	**15,033** CoUs/yr (**15033** tCO_{2eq}/yr)

SECTION A. Description of project activity

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

The project activity titled, **8.8 MW Small Scale Wind Energy Project by Engineered Power Resources India (P) Ltd,** is located in **Villages**: Kasikku Vaithan, Senadamngalam, Kulaiyaneri, **Talukas**: Alangulam, Sankarankovil, Veerakeralampudur, **District**: Tirunelveli, **State**: Tamil Nadu, **Country**: India.

The project activity is a 8.8 MW (2 x 500 KW, 13 x 600 KW) bundle of 15 nos wind electric generators (WEGs), of VESTAS RRB make, installed in phases at various locations within the state of Tamil Nadu. The generated electricity from the WEGs is connected to the state electric utility grid, namely Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and is then distributed to captive users in the same state. The bundled wind power project is an operational activity with continuous reduction of GHGs, currently being applied for voluntary carbon offset units (CoUs) under "Universal Carbon Registry" (UCR).

Purpose of the project activity:

The project activity is promoted by M/S **Engineered Power Resources India (P) Ltd** (herein after called as project proponent 'PP'). The project activity is installation and operation of 15 nos WEGs (2 x 500 KWh, 13 x 600 Kwh) as follows:

Sl. No.	HTSC number	Location	Commissioning Date	Capacity
1	1396	Kasikku Vaithan Village, Nettu Panchayath,Alangulam Taluk, Tirunelveli Distict,Tamil Nadu, Survey number 38/4	21/09/2005	500 KW
2	1464	Kasikku Vaithan Village, Nettu Panchayath,Alangulam Taluk, Tirunelveli Distict , Tamil Nadu, Survey number 38/1	29/09/2005	500 KW
3	2040	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 623/5, 623/6	28/09/2006	600 KW
4	2041	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, Sruvey numbers 623/5, 693/6,699/3A & 699/4	28/09/2006	600 KW
5	2181	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, survey number 721/7 & 721/8	03/08/2008	600 KW
6	2180	Senadamngalam village, Sankarankovil Taluk, Tiunelveli District,Tamil Nadu, Survey numbers 708/4B & 708/5	03/08/2008	600 KW
7	2179	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 622/1,622/4,622/5,624/4,629/16	03/08/2008	600 KW
8	2473	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey numbers 454/13A,13B,14A,14B,15A & 15B,454/9B,9C,8A & 8B,454/3.4.5.6.7	29/09/2007	600 KW
9	2474	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey number 274/1	29/09/2007	600 KW
10	2475	Kulaiyaneri village, Veerakeralampudur Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 422/5 & 422/6	29/09/2007	600 KW
11	2476	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey number 427/8	29/09/2007	600 KW
12	2519	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey numbers 5/5B,5/5C,5/6B,5/7B,5/7C,23/3 & 25/1B	14/03/2008	600 KW
13	2520	Kulaiyaneri village, Veerakeralampudur Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 405/4,420/1A,420/2,420/4A & 420/4B	14/03/2008	600 KW
14	2532	Kulaiyaneri village, Veerakeralampudur Taluk, Tirunelveli District, Tamil Nadu, Survey numbers 41/2A,41/3	26/03/2008	600 KW
15	2533	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey numbers 40/2,40/3A,40/3B & 40/4A	26/03/2008	600 KW

The first WEG in the bundled project activity was commissioned for commercial operation as on **21/09/2005.**

The net generated electricity from the project activity is sold to captive users through the state electricity board i.e., TANGEDCO under the Power Purchase Agreement (PPA) signed between the PP and the utility. In pre-project scenario, electricity would have been delivered to the grid by the operation of fossil fuel-based grid-connected power plants and by the addition of new fossil fuel-based generation sources in the grid. As the nature of the wind project, no fossil fuel is involved for power generation in the project activity. The electricity produced by the project is directly contributing to climate change mitigation by reducing the anthropogenic emissions of greenhouse gases (GHGs, i.e. CO_2) into the atmosphere by displacing an equivalent amount of power at grid.

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

The project activity is displacing an estimated annual net electricity generation i.e., **16,703 MWh** from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plant. The estimated annual average CO2e emission reductions by the project activity is expected to be **15,033 tCO2e**, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

Since the project activity will generate electricity through wind energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

Project's Contribution to Sustainable Development

Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment.

Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources. This project is a greenfield activity where grid power is the baseline. 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.

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 well being 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:
    o improved power quality
    o Reactive power control
    o Mitigation of transmission and distribution congestion

With regards to ESG credentials:

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:

The following environmental benefits are derived from the project activity:
- Produces renewable electricity without any GHG emissions.
- Wind power plants have little impact on the surrounding ecology.

For the PP, energy sale pattern is now based on renewable energy due to the project and it also contributes to GHG emission reduction and conservation of depleting energy sources associated with the project baseline. Hence, project contributes to ESG credentials.

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

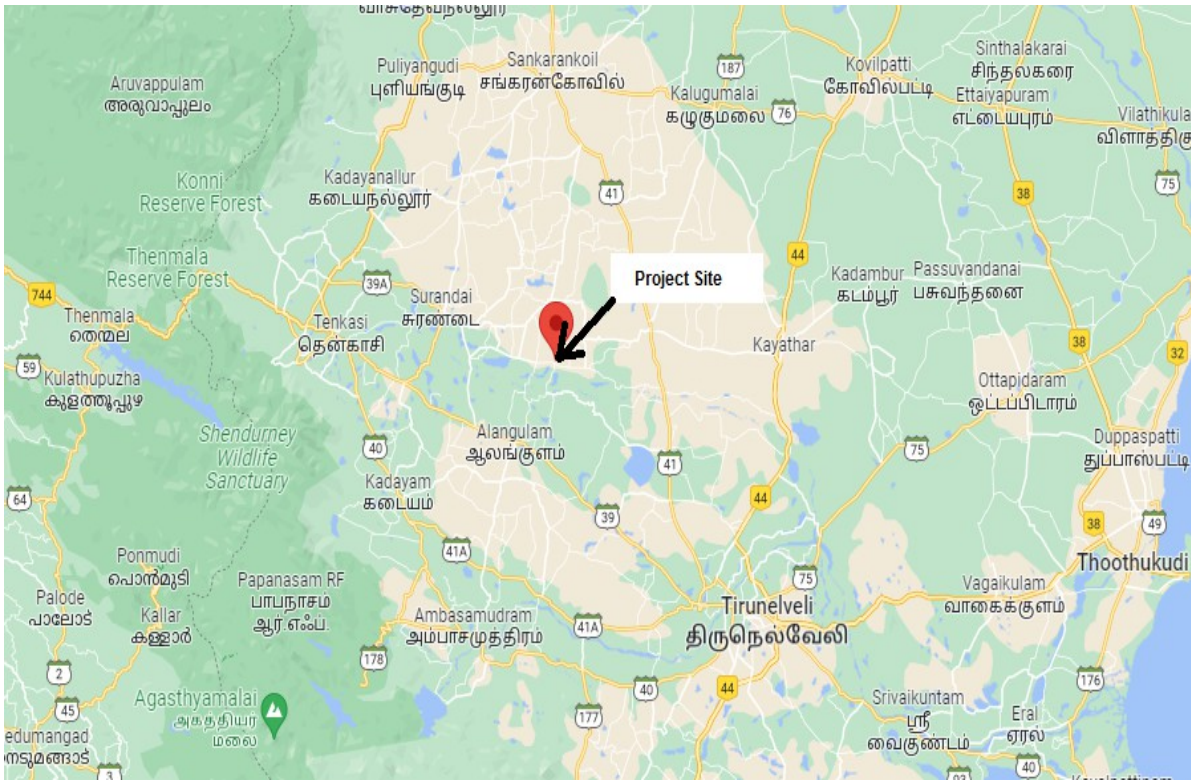
There are social, environmental, economic and technological benefits which contribute to sustainable development. Rational: As per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), 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.

A.3. Location of project activity >>

Country : India
Villages: Kasikku Vaithan, Senadamngalam and Kulaiyaneri
Talukas: Alangulam, Sankarankovil and Veerakeralampudur
District: Tirunelveli
State: Tamil Nadu

HTSC number	Location	Lat - long
1396	Kasikku Vaithan Village, Nettu Panchayath,Alangulam Taluk, Tirunelveli Distict,Tamil Nadu, Survey number 38/4	8˚56'02"N 77˚32'17"E
1464	Kasikku Vaithan Village, Nettu Panchayath,Alangulam Taluk, Tirunelveli Distict , Tamil Nadu, Survey number 38/1	8˚56'09"N 77˚32'16"E
2040	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 623/5, 623/6	9˚03'22"N 77˚24'57"E
2041	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, Sruvey numbers 623/5, 693/6,699/3A & 699/4	9˚03'20"N 77˚24'44"E
2181	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, survey number 721/7 & 721/8	9˚03'33"N 77˚25'00"E
2180	Senadamngalam village, Sankarankovil Taluk, Tiunelveli District,Tamil Nadu, Survey numbers 708/4B & 708/5	9˚03'06"N 77˚24'56"E
2179	Senadamngalam village, Sankarankovil Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 622/1,622/4,622/5,624/4,629/16	9˚03'21"N 77˚25'37"E
2473	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey numbers 454/13A,13B,14A,14B,15A & 15B,454/9B,9C,8A & 8B,454/3.4.5.6.7	8˚59'41"N 77˚25'08"E
2474	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey number 274/1	9˚00'00"N 77˚25'21"E
2475	Kulaiyaneri village, Veerakeralampudur Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 422/5 & 422/6	8˚59'51"N 77˚25'09"E
2476	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey number 427/8	8˚59'56"N 77˚24'48"E
2519	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey numbers 5/5B,5/5C,5/6B,5/7B,5/7C,23/3 & 25/1B	9˚01'07"N 77˚25'12"E
2520	Kulaiyaneri village, Veerakeralampudur Taluk, Tirunelveli District,Tamil Nadu, Survey numbers 405/4,420/1A,420/2,420/4A & 420/4B	9˚00'05"N 77˚25'08"E
2532	Kulaiyaneri village, Veerakeralampudur Taluk, Tirunelveli District, Tamil Nadu, Survey numbers 41/2A,41/3	9˚01"12"N 77˚25'27"E
2533	Kulaiyaneri village, Veerakeralampudur Taluk,Tirunelveli District,Tamil Nadu, Survey numbers 40/2,40/3A,40/3B & 40/4A	9˚01'22"N 77˚25'28"E



A.4. Technologies/measures >>

All the machines are Vestas RRB make and have been developed using state of the art technology. 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 ladder at the bottom. The ladder is used 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.

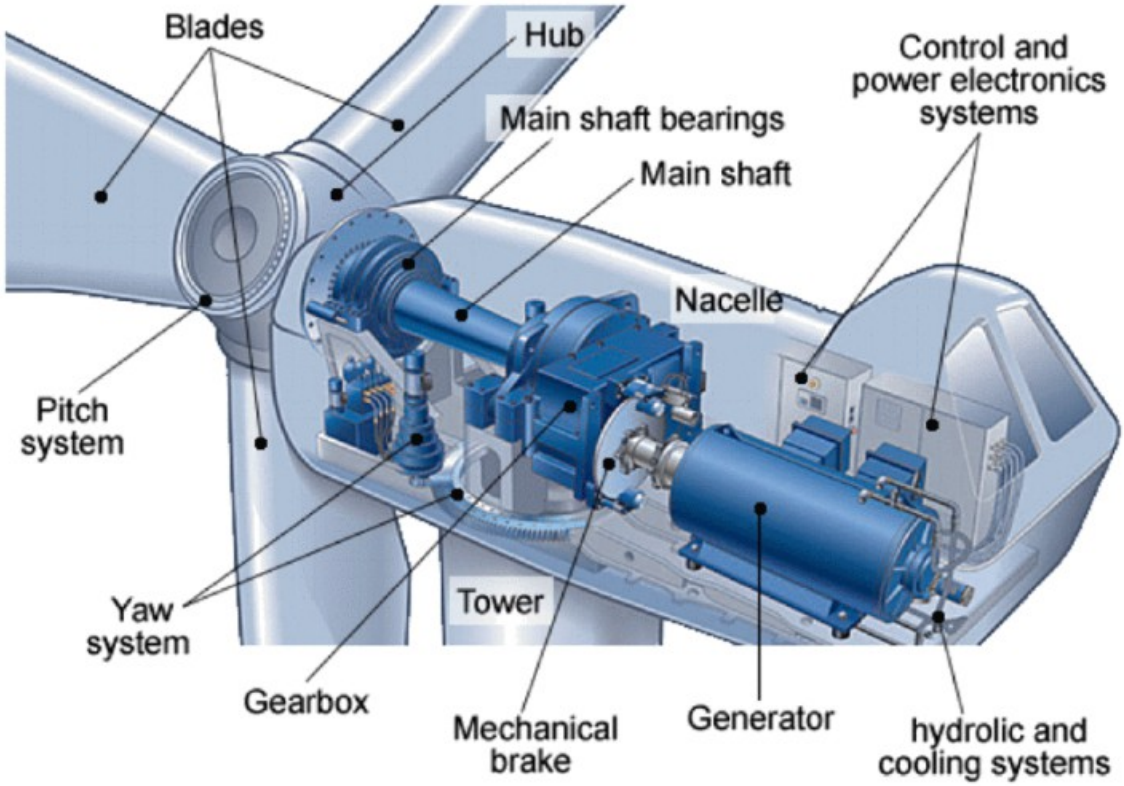
Main Shaft The shaft is to connect the gear box and the hub. Solid high carbon steel bars or cylinders are used as main shaft. The shaft is supported by two bearings.

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 highspeed 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.

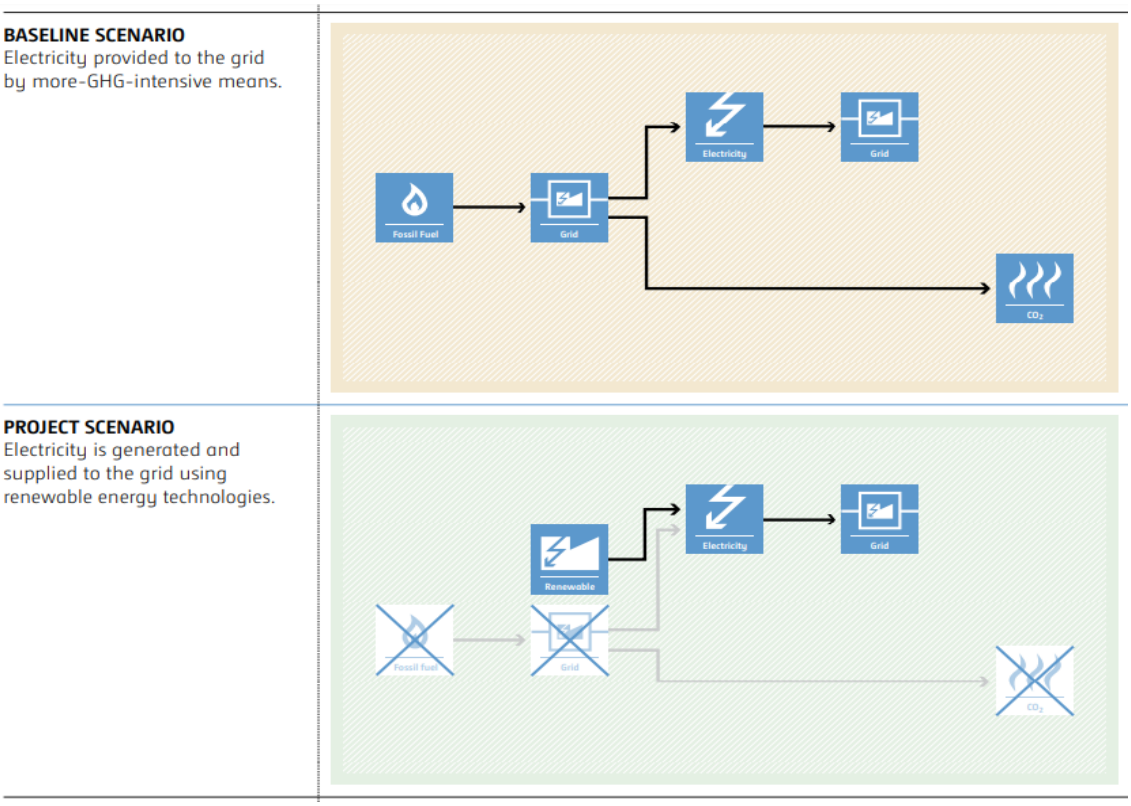
In the absence of the project activity the equivalent amount of electricity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and fed into unified India grid system, hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario as discussed in the previous section.



A.5. Parties and project participants >>

Party (Host)	Participants
India	**Project Proponent**: Engineered Power Resources India (Pvt) Limited **Aggregator**: Aajeeth Innovation LLP UCR ID# 356526225 Email: aajeeth@freezingsun.in

A.6. Baseline Emissions>>



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

- the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of fossil fuel-based grid-connected power plant and fed into the Southern grid, which is carbon intensive due to use of fossil fuels.

A.7. Debundling>>

This project activity is not a debundled component of a larger carbon or GHG registered 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. - "Grid connected renewable electricity generation", Version 18.0
This methodology comprises of activities that include the construction and operation of a power plant that uses renewable energy sources and supplies electricity to the grid (Greenfield power plant).

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

This project is included within the UCR Standard Positive List of technologies and is within the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of: (a) The grid-connected renewable electricity generation technologies of installed capacity up to 15 MW
Project activity involves power generation with capacity 8.8 MW which is less than 15MW.
The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion of the UNFCCC CDM Methodology.
The project activity is wind energy power project and not a hydro power project activity.
The project activity does not involve any retrofit measures nor any replacement to existing WEGs.
The project activity is not a combined heat and power (co-generation) system.
No biomass is involved, the project is only a wind energy power project.
The project activity is a voluntary coordinated action. The project activity is a greenfield 8.8 MW Wind Electric Project, i.e., no capacity addition was done to any existing power plant.
The project activity is not a landfill gas, waste gas, wastewater treatment and agro-industries project, and does not recover methane emissions and is not eligible under any relevant Type III category.
The project activity comprises of renewable power/energy generation through wind energy and displaces fossil fuel powered electricity from the regional grid by supplying renewable power to the grid itself. Hence this UNFCCC CDM Methodology is applicable and fulfilled.
The project activity involves the installation of new power plants at listed sites where there was no renewable energy power plant operating prior to implementation of project.

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 consumption point for project developer

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

The project boundary encompasses the physical, geographical site of the wind energy power plant, the energy metering equipment and the connected regional electricity grid.

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid-connected electricity	CO_2	**Included**	Major source of emission
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
Project Activity	Greenfield power project	CO_2	Excluded	Excluded for simplification. This is conservative
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative

Net GHG Emission Reductions and Removals

Thus, ERy = BEy – PEy – LEy Where:

ERy = Emission reductions in year y (tCO2/y)

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

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

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

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

Baseline emissions include only CO2 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.

Total Capacity: 8.8 MW

Estimated Annual Emission Reductions: $BE_y = EG_{BL,yl} \times EF_{,CO2,GRID,y}$

BE_y = Emission reductions in a year y.

where:

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the UCR project activity in year y (MWh)

$EF_{Grid,CO2,y}$ = CO_2 emission factor of the grid in year y (t CO_2/MWh) as determined by the UCR Standard.

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 2015-2020 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 same emission factors as that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

Estimated annual Emission Reductions (ER_y) = 15033 CoUs/yr (15033 tCO_{2eq}/yr)

B.6. Prior History>>

The project activity has not been registered or applied for voluntary carbon benefits under any other GHG program and hence there is no double counting issue of CoUs.

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

There is no change in the start date of crediting period. The start date of crediting under UCR is considered as 01/01/2014 and no GHG emission reduction has been claimed so far under any other voluntary GHG program.

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 CoU Issuance Period: 01/01/2014 to 31/12/2021
Monitoring Period: 01/01/2014 to 31/12/2021
Crediting Period: 8 years 0 months

B.8. Monitoring plan>>

Key Data Monitored: • Quantity of net electricity supplied to the grid

1. Monitoring Plan Objective and Organization

PP is the project implementer and monitors the electricity delivered to the electricity grid by the project activity. The data is already archived electronically and is stored since **21/09/2005**.

To ensure that the data is reliable and transparent, the PP has established Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents. The data is monitored on a daily basis and is submitted to PP on a daily basis.

PP has implemented QA&QC measures to calibrate and ensure the accuracy of metering and safety aspects of the project operation. The metering devices are calibrated and inspected properly and periodically, according to state electricity board's specifications and requirements to ensure accuracy in the readings.

Data / Parameter:	***EGy***
Data unit:	MWh
Description:	Quantity of net electricity supplied by the Project Activity to the grid in year y
Source of data:	JMR. Statement of net export of power to the grid issued Monthly by State Electricity Board or any other competent authority as applicable.
Measurement procedures (if any):	To be specified by State Electricity Board
Monitoring frequency:	The net energy exported to the grid is measured every month using calibrated energy meter by the State Electricity Board authorities in the presence of the project implementer or its representatives. The meter/s shall be jointly inspected, and sealed by authorised representatives of the company and the state utility. Measuring procedure: Will be measured by an export-import energy meter. The net electricity exported by the project plant would either be directly sourced as a measured parameter or be calculated by deducting the amount of imported electricity from the total amount of exported electricity. Accuracy class of energy meter:As per Power Purchase Agreement (PPA) or relevant National standards amended/modified from time to time. Calibration Frequency: As per the Central Electricity Authority the testing and calibration frequency should be minimum once in five years. However, the calibration will be done following the relevant applicable National Guidelines updated from time to time during the operation of the project activity. Entity responsible: Aggregator
QA/QC procedures:	Monitoring frequency: Continuous Measurement frequency: Hourly Recording frequency: Monthly

	The electricity meter/s record both export and import of electricity from the solar Power plant and the readings with regard to net electricity generated will be used for calculation of emission reductions. The net electricity supplied to the grid will be cross checked with the monthly invoices. The meter/s would be checked for accuracy and the meters will be calibrated as per the procedures of State Electricity Board as per the national or international standards. Measurement results shall be cross checked with records for sold electricity (i.e. invoice).
Purpose of Data	-Calculation of baseline emissions

Data/Parameter	$EF_{, CO2, GRID, y}$
Data unit	tCO2 /MWh
Description	Fixed Ex-Ante
of data Value(s) applied	UCR Standard Protocol As per Standard
Measurement methods and procedures	Fixed
Monitoring frequency	NA
Purpose of data	To estimate baseline emissions