PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 29.7 MW Wind Power project in Karnataka, India.

Version 02

Date 05/05/2022

First CoU Issuance Period: 3 Years, 2 Months

Date: 20/11/2018 to 31/12/2021

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

BASIC INFORMATION	
Title of the project activity	29.7 MW Wind Power project in Karnataka, India.
Scale of the project activity	Large Scale
Completion date of the PCN	01/05/2022
Project participants	Accion Wind Energy Pvt. Ltd. (AWEPL)
Host Party	INDIA
Applied methodologies and standardized baselines	ACM0002 ver. 20 - Consolidated methodology for grid-connected electricity generation from renewable sources
Sectoral scopes	01: Energy industries (renewable - / non-renewable sources)
Estimated amount of total GHG emission reductions	85393 CoUs (85,393 tCO_{2eq})/

SECTION A. Description of project activity

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

The project activity is the installation wind power projects at two sites Arasinagundi and Anabaru in close proximity in district Davangere in the Indian State of Karnataka. The total capacity of the project is 29.7 MW comprises of 18 No's of 1.65 MW WTGs. Acciona Wind Energy Pvt. Ltd. (AWEPL) is the project developer which is the 100% subsidiary of the Spanish Acciona group of companies, i.e. Acciona Energia Internacional, S.A. and Acciona, S.A

The entire capacity of the project is connected to the Indian national grid and supplying generated renewable power to the Karnataka State electricity grid i.e. Bangalore Electricity Supply Company (BESCOM).

All the WTGs involved in the project activity were commissioned in two phases. Commissioning details of all the WTGs are given below:

Sl. No	**Site Name**	**WTG ID**	**Commissioning Date**
01	Arasinagundi site	30166, 30167, 30168, 30169, 30170, 30171, 30172, 30173	06/06/2008
02	Anaburu Site	30436, 30437, 30438, 30439, 30440, 30441, 30442, 30443, 30444, 30445	29/09/2008

The project activity is a Greenfield project for generation of electrical energy using wind which is a renewable source of energy. In wind energy generation, kinetic energy of the wind is converted into mechanical energy and subsequently into electrical energy. Since electricity is generated from wind energy, no emissions are attributed to the project emissions and due to that equivalent amount of fossil-fuel dominated grid can be displaced due to the project activity.

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

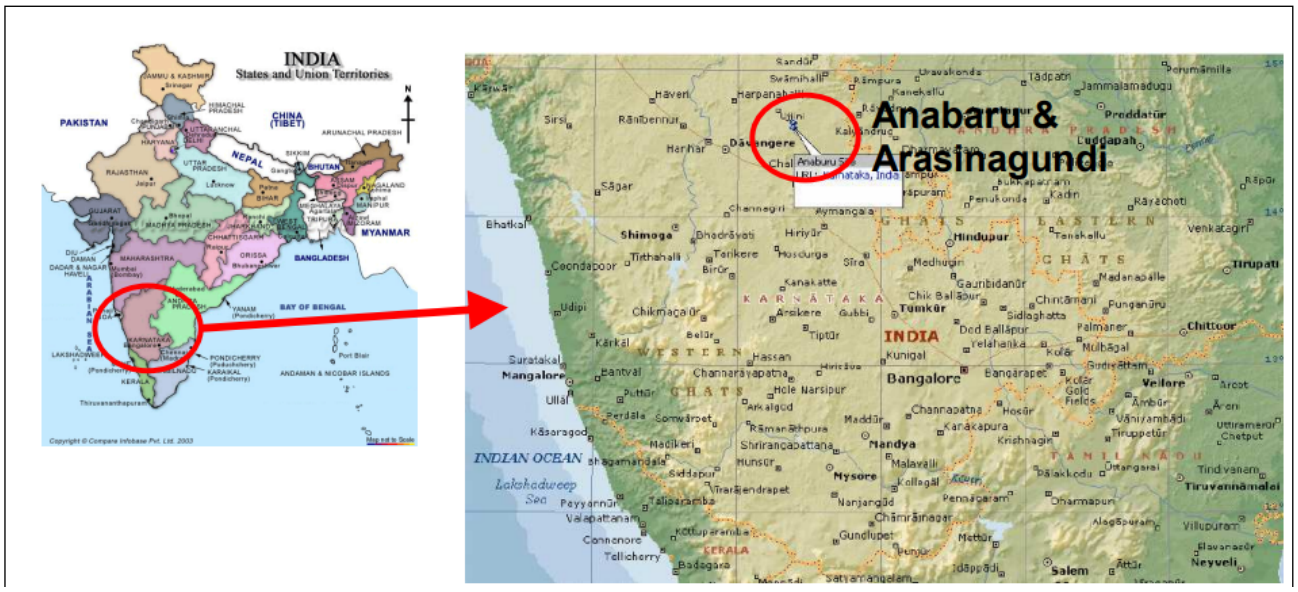
- **Social benefits:**
- Social well-being is assessed by contribution by the project activity towards improvement in living standards of the local community.
- The project activity has resulted in increased job opportunities for the local population on temporary and permanent basis.
- Manpower was required 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

- **Environmental benefits:**
- 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.

- **Economic benefits:**
- 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

A.3. Location of project activity >>

Country: India
District: Davangere
Village: Anabaru and Arasinagundi
Tehsil: Jagalur
State: Karnataka
Code: 577002



A.4. Technologies/measures >>

The project activity will employ state-of-art Horizontal axis wind turbines. The Wind Turbine Generators (WTGs) comprising the project activity will generate clean green power which will be exported to the grid through the receiving station of KPTCL (110/66 KV substation at Nayakanhatti). The pooling 33kV/66kV sub-station erected and commissioned in the leased land provided by KPTCL located within the premises of Hiremallahole Substation of KPTCL will be used as a common facility to evacuate the power generated at the Anabaru and Arasinagundi wind farms to Nayakanhatti. The project will house the metering, switchgear and other protection equipment along with underground cabling within the wind farms.

Traditionally in India, in any wind farm internal wind farm connections are usually done using overhead transmission lines with open transformers. However, in the above project going with Acciona's global philosophy of environmental consciousness and safety precautions, for the first time in India Accion has gone ahead with underground cabling inside the wind farm, with unit substation sheltering transformers and switchgear. This underground cabling will be first of its kind for wind farms in India and will require special care and extra cost of approximately Rs.2 million per MW in terms of installation, besides repair and maintenance as against the overhead transmission lines. The unit substation sheltering transformers and switchgear will cost another approximately Rs.2 million per MW. Implementation of this concept in India will be developed and encouraged on the successful experience of AWEPL's unique initiative. Pits and earth removed will be restored post construction to bring back the site appearance as close to original as possible. Also, this is the first time an Indian entity has implemented a very sophisticated wind farm SCADA system with remote monitoring facility to have better control and bring in better efficiency in the

wind farm monitoring and operation.

PPAs are intended to be signed with the Distribution Company (DISCOM) for a term of 10 years, extendable by another term of 10 years if the KERC determined tariff from the eleventh year onwards is acceptable to the DISCOM. The technology provider will provide operational training for the plant personnel, along with operation and maintenance service at least for the first two years of the project activity. WTGs are manufactured as per stringent European quality standards in accordance with Indian climatic conditions. All the WTGs are three bladed active stalls regulated.

Salient features of WTG to be used in the project activity are:

- ISO 9001 Certificate for Design and Manufacture; ISO 9001:2000 for Installation & Commissioning and for Operation & Maintenance.
- Approved by Ministry for new and renewable energy (MNRE)
- Type certified by Det Norske Veritas, Denmark – World's most prestigious organization for Wind Turbine Certification.
- Suitable for India's harsh climatic conditions prevailing at remote locations.
- Improved Power factor
- Improved power curve for operation under low wind conditions
- Carefully devised electrical system to withstand erratic grid connections.
- Integrated Power transmission mechanism.
- High Performance Rotor blades.
- Dual speed asynchronous generator.
- Microprocessor based fully automatic control system with user friendly operation and central monitoring system.
- Quality, Safety and Health plan for construction, installation, commissioning and Operation & Maintenance.
- Microprocessor controlled high efficiency soft start.
- Active Yaw gear drives incorporating hydraulic yaw brakes.

Specifications	**Values**
Tower / Rotor Height	78 m
Rotor Diameter	82 m
Installed electrical output	1650 kW
Annual generation of individual WTGs as per the guaranteed generation	There is no guaranteed generation – it is expected generation only. There is a 'power curve guarantee'. Expected generation to be in line with Financial Model
Cut-in wind speed	3.5 m/s
Cut-out wind speed	7.5 m/s
Rotor swept area	20 m/s (10 min average)
Rotational speed	5281 sq meters
Rotor material Blades material	Carbon fibre/epoxy/wood/glass
Regulation	Active Stall
Generator	1-speed, water cooled.
Rated output	1,650 kW
Rotational speed at rated power	1012 rpm
Operating voltage	3 * 690 V
Frequency	50Hz

Insulation class	F/B
Cooling system	Oil cooler/Radiator: Cooling capacity 37.5 kW Water cooler/Radiator: Cooling capacity 46.2 kW
Gear box	1. Step planet, 2. Step helical
Manufacturer	Vestas
Gear ratio	1:70,2
Nominal loan gearbox mechanical power	1,800 kW
Yaw drive system	Planetary gear motor.
Yaw bearing	Ball bearing, internal gearing.
Aerodynamic brake	Hydraulic disc brake
Mechanical brake	Hydraulic disc brake
Control unit	SCADA

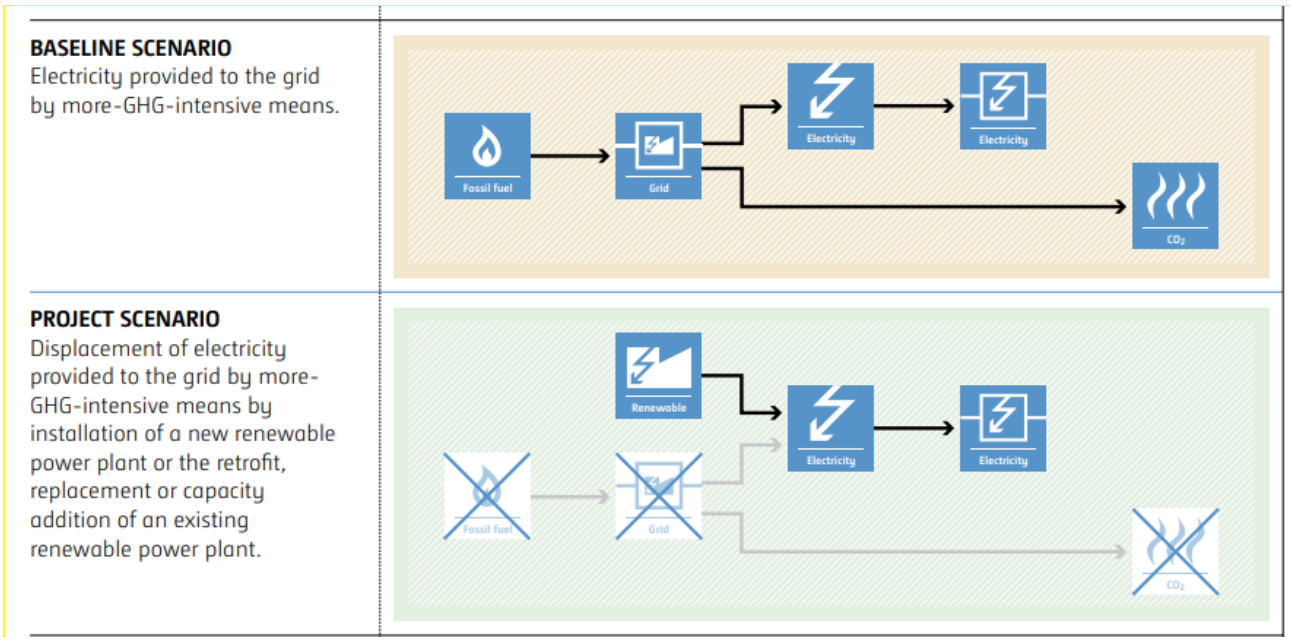
A.5. Parties and project participants >>

Party (Host)	Participants
India (Host Country)	Accion Wind Energy Pvt. Ltd. (Project Promoter) – Private Entity

A.6. Baseline Emissions>>

According to the methodology ACM0002, version 20, baseline scenario has been identified as "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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The project activity involved setting up of wind Power generation Plant to harness the power of wind to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied to the electricity grid by the operation of grid-connected power plants (mainly by fossil fuel fired plants) and by the addition of new generation sources, as reflected in the combined margin (CM) calculations. As per the UCR requirement, the combined margined emission factor of 0.9 tCO2/MWh is considered conservatively.



A.7. Debundling>>

The project is a large scale project. Hence not applicable.

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: Renewable Energy Projects

Methodology: ACM0002 Consolidated methodology for grid-connected electricity generation from renewable sources Version 6

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

Among the methodologies approved by UNFCCC for grid-connected electricity generation from renewable sources based UCR project activities, ACM0002 has been chosen as the most suitable for this project activity.

This baseline methodology shall be used in conjunction with the approved monitoring methodology ACM0002 ("Consolidated monitoring methodology for grid-connected electricity generation from renewable sources")

The project activity meets the applicability conditions of ACM0002, as demonstrated below –

Applicability Criteria	Applicability status
This methodology is applicable to grid-connected renewable power generation project activities that: (a) install Greenfield power plant; (b) involve a capacity addition to (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s)/unit(s); (d) involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) involve a replacement of (an) existing plant(s)/unit(s)	The proposed project activity is a Green field, Indian grid connected renewable power plant. Therefore, it confirms to the said criteria
The methodology is applicable under the following conditions: The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	The project activity is the installation of a new grid connected renewable wind power project. Thus, it meets the first applicability condition
In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	The proposed project activity is the installation of a new wind power plants/units. Therefore, the said criteria is not applicable
In case of hydro power plants, one of the following	The proposed project activity is the

conditions shall apply: (a) The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs; or (b) The project activity is implemented in an existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3) is greater than 4 W/m2; or (c) The project activity results in new single or multiple reservoirs and the power density calculate equation (3), is greater than 4 W/m2. (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density of any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m2, all of the following conditions shall apply. (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4) is greater than 4W/m2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2shall be: (a) Lower than or equal to 15 MW; and (b) Less than 10% of the total installed capacity of integrated hydro power project	installation of wind power plants/units. Therefore, the said criteria is not applicable
In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability indifferent seasons to optimize the water flow at	The proposed project activity is the installation of wind power plants/units. Therefore, the said criteria is not applicable

the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	
The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants;	The proposed project activity is the installation of wind power plants/units. Therefore, the said criteria is not applicable
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The proposed project activity is the installation of wind power plants/units. Therefore, the said criteria is not applicable

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

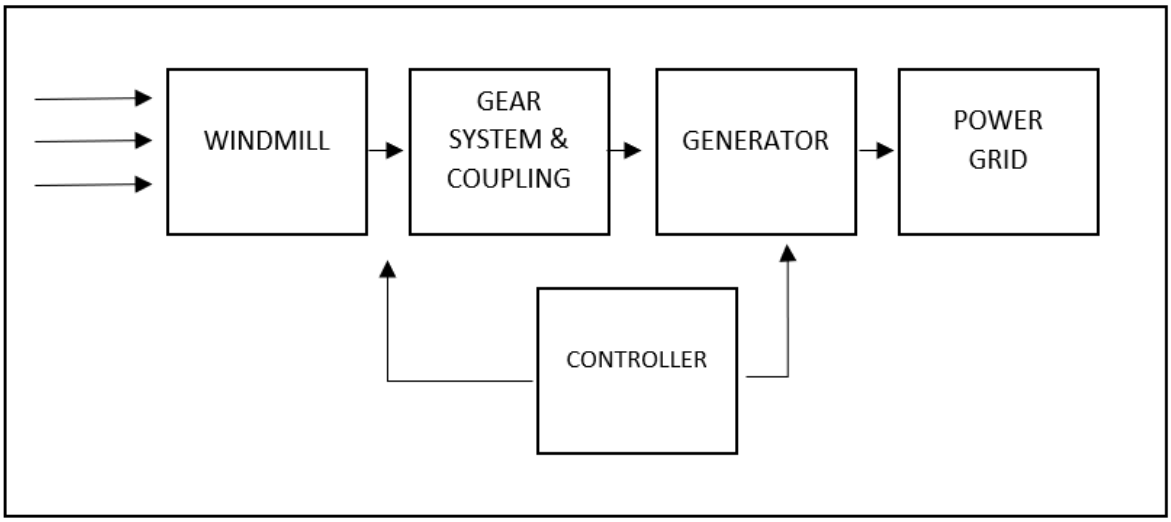
The project is registered under CDM (Reference number 1949) and the crediting period under CDM is 20/11/2008 – 19/11/2018 (Fixed). PP will request for issuance of carbon offsets in UCR for the post completion of the crediting period under CDM (ie, 20/11/2018 – 31/11/2021) i.e., crediting period will start from 20/11/2018. Hence, there will be no double counting with CDM.

The project is also registered with VCS (Reference number VCS 051) and the Crediting Period under VCS is 06/06/2008 - 05/06/2018. As PP will request for issuance for the carbon credits under URC only from 20/11/2018, there is no double counting with VCS.

The project is not registered under any other mechanism.

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 UCR project power plants are connected. Thus, the project boundary includes the Wind Turbine Generators (WTGs) and the Indian grid system.



Scenario	Source	GHG	Included?	Justification/Explanation
Baseline	Electricity generation in fossil fuel fired power that is dispatched due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Not identified in the baseline methodology
		N_2O	No	Not identified in the baseline methodology
Project Activity	Electricity generation in the project activity	CO_2	No	Zero-emissions grid connected electricity generation from renewable energy
		CH_4	No	Zero-emissions grid connected electricity generation from renewable energy
		N_2O	No	Zero-emissions grid connected electricity generation from renewable energy

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

Emission Reductions

The proposed project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The emission reduction ER_y by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

$$\mathbf{ER_y = BE_y - PE_y - L_y}$$

For geothermal project activities and for new Hydro-electric power projects with reservoirs, there

are different choices to account emissions from the own project.

For wind energy projects $PE_y = 0$ and there is not leakage to this project so $L_y = 0$. Then $ER_y = BE_y$ The emission reductions are the baseline emissions.

The baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2 /MWh) times the electricity supplied by the project activity to the grid (EG_y in MWh).

$BE_y = EF_y * EG = 94882 * 0.9 = 85,393$

Project activity emissions

According to the chosen baseline methodology ACM0002, for wind energy based renewable energy project activities,

$PE_y = 0.$

Leakage

According to ACM0002, the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction, fuel handling (extraction, processing, and transport), and land inundation (for hydroelectric projects). Project participants do not need to consider these emission sources as leakage in applying this methodology. Project activities using ACM0002 shall not claim any credit for the project on account of reducing these emissions below the level of the baseline scenario. Thus, the leakage emissions are nil.

Therefore,

$ER_y = BE_y = 85393$

Estimated Annual or Total baseline emission reductions (BEy) = 85,393 CoUs /year (85,393 $mtCO_2eq/yr$)

B.6. Prior History>>

The project is registered with VCS (Ref ID: 51 & Crediting Period 06/06/2008 - 05/06/2018) and CDM (Ref ID: 1949 & Crediting Period 20/11/2008 to 20/11/2018). As the Crediting period for both the standards have already expired, the criteria for double counting are not applicable for the project.

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 >>

Not applicable

B.9. Monitoring period number and duration>>

First Issuance Period: 3 years, 2 months – 20/11/2018 to 31/12/2021

B.8. Monitoring plan>>

As per the law applicable and implemented in practice, the delivered energy shall be metered by AWEPL and KPTCL at the high voltage side of the step-up transformers installed at the receiving station. The energy metering equipment shall be electronic trisector meters, which is required for the project. The energy metering equipment shall be maintained in accordance with electricity standards and have the capability of recording half hourly and monthly readings, which in turn are produced to KPTCL. The energy meters installed would be capable of recording and storing the parameters for a minimum period of 35 days with digital output. The energy meter readings at the project sites and the receiving station will be taken simultaneously and jointly by both the parties. The recorded metering data shall be downloaded through meter recording instrument.

Apart from the joint (KPTCL/DISCOM and AWEPL) main meter reading undertaken as per the law applicable and implemented in practice to the wind farm in the State of Karnataka, which is duly signed by the KPTCL/DISCOM representative together with a AWEPL representative, AWEPL will follow the provisions under the law applicable and implemented in practice to the wind farm in the State of Karnataka and PPA in case the primary measuring fails.

Data/Parameter	EG_y
Data unit	MWh
Description	Net electricity supplied to DISCOM facility using KPTCL network.
Source of data Value(s) applied	Joint energy meter reading available at project grid integration point and invoice to DISCOM.
Measurement methods and procedures	The provisions for metering will be as per the law applicable and implemented in practice to the wind farm in the state of Karnataka and the provisions of the power purchase agreement (PPA). Plant records and maintains the records of all the electricity supplied to the grid. Actually, this is based on the joint energy meter readings signed by plant and DISCOM representatives which is normally termed as a Generation Note based on which the AWEPL will invoice. Data is archived electronically. Generation details will be kept two years beyond the crediting period
Monitoring frequency	Regular Intervals as per applicable law of Karnataka State
Purpose of data	