PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: Enercon Wind Farm (Hindustan) Ltd in Rajasthan

Version 1.1

Date 21/03/2022

First CoU Issuance Period: 1 years, 11 months

Date: 15/03/2020 to 31/01/2022

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

BASIC INFORMATION	
Title of the project activity	Enercon Wind Farm (Hindustan) Ltd in Rajasthan
Scale of the project activity	Large Scale
Completion date of the PCN	21/03/2022
Project participants	Viviid Emissions Reductions Universal Pvt. Ltd.
Host Party	India
Applied methodologies and standardized baselines	Consolidated methodology for grid-connected electricity generation from renewable sources, ACM0002, Version 6 Standardized baselines: Not applicable
Sectoral scopes	SELECT SCOPE Sectoral Scope 1, Energy industries (renewable/ non-renewable sources).
Estimated amount of total GHG emission reductions	104,068 CoUs (104,068 tCO2eq) annually

SECTION A. Description of project activity

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

The project Enercon Wind Farm (Hindustan) Ltd in Rajasthan is located in Kita and Pithodai Ki Dhani Village, District Jaisalmer, State Rajasthan, Country India.

The details of the registered project are as follows:

Purpose of the project activity:

The purpose of the project activity is to utilize renewable wind energy for generation of electricity. The project activity replaces anthropogenic emissions of greenhouse gases (GHG's) into the atmosphere, which is estimated to be approximately 104,068 tCO_{2e} annually, by displacing the equivalent amount of electricity generation through the operation of existing fuel mix in the grid comprising mainly fossil fuel-based power plants and future capacity expansions connected to the grid. In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the NEWNE grid, which are/ will be predominantly based on fossil fuels. Whereas the electricity generation from operation of Wind Energy Convertors (WEC's) is emission free.

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

There are social, environmental, economic and technological benefits which contribute to sustainable development.

- **Social benefits:**
- The project activity will lead to the development of supporting infrastructure such as road network etc., in the wind park location, the access to which is also provided to the local population.
- The project activity will lead to alleviation of poverty by establishing direct and indirect benefits through employment generation and improved economic activities by strengthening of local grid of the state electricity utility.
- Use of a renewable source of energy reduces the dependence on imported fossil fuels and associated price variation thereby leading to increased energy security.

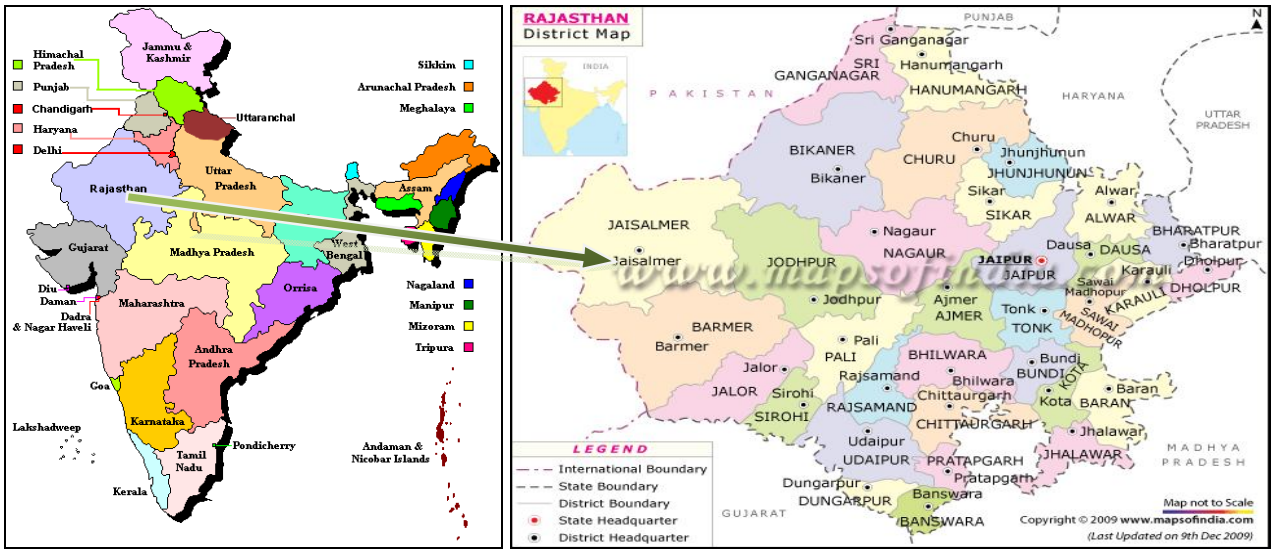
- **Environmental benefits:**
- The project activity employs renewable energy source for electricity generation instead of fossil fuel-based electricity generation which would have emitted gaseous, liquid and/or solid effluents/wastes.
- Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus, the project causes no negative impact on the surrounding environment and contributes to environmental well-being.

- **Economic benefits:**
- The project activity requires temporary and permanent, skilled and semi-skilled manpower at the wind park; this will create additional employment opportunities in the region.
- The generated electricity will be fed into the NEWNE regional grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development.

- **Technical benefits:**
- Increased interest in wind energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future.

A.3. Location of project activity >>

Country: India
District: Jaislamer
Village: Kita & Pithodai Ki Dhani
Tehsil: Fatehgarh
State: Rajasthan
Code: 345001



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

S. No	EWHPL UNIQUE ID	Loc No	Latitude			Longitude		
			Deg.	Minute	Second	Deg.	Minute	Second
1	EWHPL 01	322	26	40	47.5	70	58	58.2
2	EWHPL 02	323	26	40	55.3	70	58	54.6
3	EWHPL 03	145	26	41	2.5	70	58	49.5
4	EWHPL 04	146	26	41	7.7	70	58	43.9
5	EWHPL 05	147	26	41	12.8	70	58	38.4
6	EWHPL 06	148	26	41	18	70	58	32.8
7	EWHPL 07	150	26	41	27	70	58	48.3
8	EWHPL 08	151	26	41	32.1	70	58	42.7
9	EWHPL 09	152	26	41	37.3	70	58	37.2
10	EWHPL 10	153	26	41	38.5	70	59	8.6
11	EWHPL 11	154	26	41	43.6	70	59	3.1
12	EWHPL 12	155	26	41	48	70	58	57.5
13	EWHPL 13	156	26	41	54.1	70	58	52.1
14	EWHPL 14	157	26	41	56.6	70	58	41.5
15	EWHPL 15	307	26	42	12	70	58	24.8
16	EWHPL16	306	26	42	17.2	70	58	19.3
17	EWHPL 17	300	26	42	47.4	70	58	24.4

18	EWHPL 18	301	26	42	43.9	70	58	30.7
19	EWHPL 19	304	26	42	26.8	70	58	46.6
20	EWHPL 20	305	26	42	21.7	70	58	52.2
21	EWHPL 21	161	26	42	16.5	70	58	57.7
22	EWHPL 22	160	26	42	9	70	59	2.2
23	EWHPL 23	159	26	42	1.3	70	59	6.7
24	EWHPL 24	324	26	42	5.7	70	59	23.9
25	EWHPL 25	167	26	42	38.3	70	59	0.2
26	EWHPL 26	168	26	42	42.9	70	58	56.3
27	EWHPL 27	169	26	42	49.6	70	58	54.4
28	EWHPL 28	170	26	42	56.5	70	58	52.7
29	EWHPL 29	326	26	43	22.4	70	58	50.2
30	EWHPL 30	177	26	42	54.5	70	59	29.3
31	EWHPL 31	178	26	42	49.4	70	59	34.9
32	EWHPL 32	179	26	42	44.2	70	59	40.5
33	EWHPL 33	181	26	42	32.2	70	59	50.9
34	EWHPL 34	183	26	42	59	70	59	50.6
35	EWHPL 35	184	26	43	5.8	70	59	45.8
36	EWHPL 36	186	26	43	17.8	70	59	35.4
37	EWHPL 37	190	26	43	25.1	70	59	50.1
38	EWHPL 38	191	26	43	18.3	70	59	54.9
39	EWHPL 39	192	26	43	13.2	71	0	0.5
40	EWHPL 40	193	26	43	8	71	0	6.1
41	EWHPL 41	194	26	43	2.9	71	0	11.6
42	EWHPL 43	218	26	45	31.3	71	0	32
43	EWHPL 42	219	26	45	17.2	71	0	23.1
44	EWHPL 44	220	26	44	52.6	71	0	38.2
45	EWHPL 45	221	26	44	52.5	71	0	47.2
46	EWHPL 46	222	26	44	45.9	71	0	55.9
47	EWHPL 47	223	26	44	56.1	71	1	5.4
48	EWHPL 48	224	26	45	1.9	71	1	16.3
49	EWHPL 49	225	26	44	43.9	71	1	23
50	EWHPL 50	226	26	44	38.8	71	1	35.9
51	EWHPL 51	230	26	44	24.9	71	1	55.5
52	EWHPL 52	232	26	44	19.9	71	2	1.7
53	EWHPL 53	233	26	44	14.1	71	2	7.3
54	EWHPL 54	329	26	44	30.1	71	2	16
55	EWHPL 55	234	26	44	20.5	71	2	27.9
56	EWHPL 56	236	26	43	57.4	71	2	22.2
57	EWHPL 57	237	26	43	55.8	71	2	30.9
58	EWHPL 58	238	26	43	56.9	71	2	39.7
59	EWHPL 59	328	26	44	8.9	71	2	56.5

60	EWHPL 60	241	26	43	58.7	71	2	59.9
61	EWHPL 61	242	26	43	51.8	71	3	5.1
62	EWHPL 62	245	26	44	30.5	71	3	32.5
63	EWHPL 63	246	26	44	32.5	71	3	22.5
64	EWHPL 64	249	26	45	9.4	71	3	14.1
65	EWHP 65	302	26	44	51.4	71	2	56.1
66	EWHPL 66	250	26	44	58.1	71	2	52.3
67	EWHPL 67	251	26	45	0.4	71	2	44.6
68	EWHPL 68	252	26	45	0.8	71	2	32.4
69	EWHPL 69	253	26	45	4.3	71	2	25.6
70	EWHPL 70	254	26	45	14.2	71	2	15.9
71	EWHPL 71	256	26	45	23.8	71	2	25.8
72	EWHPL 72	257	26	45	39.3	71	2	47.5
73	EWHPL 73	258	26	45	42.8	71	2	37.2
74	EWHPL 74	259	26	45	46.6	71	2	26.5
75	EWHPL 75	260	26	45	48.3	71	2	18.7

A.4. Technologies/measures >>

The Project involves 75-wind energy converters (WECs) of 800 kW E-48 with internal electrical lines connecting the Project with local evacuation facility. The WECs generates 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%.

Wind World (India) Limited has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH and has established a manufacturing plant at Daman in India where, along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured. The other salient features of the state-of-art-technology are as follows:

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.

- Near Unity Power Factor at all times.
- Minimum drawl (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEC with voltage fluctuation of -20 to +20%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator, which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking System.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s

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

A.5. Parties and project participants >>

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

A.6. Baseline Emissions>>

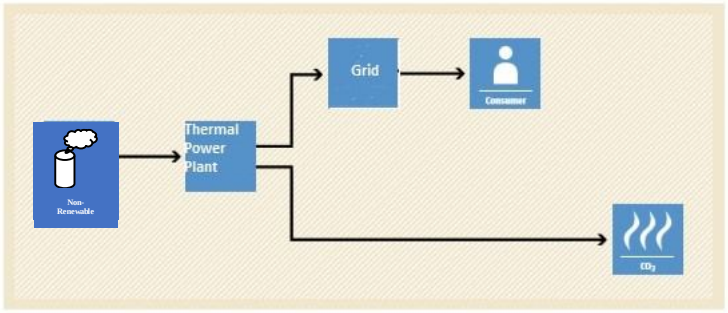
Project activity installs the wind farm at a barren land. Project activity is the installations of green field energy production with the installation of 75 WEGs of WWIL make E 53 of 800 KW each totalling 60MW project capacity.

In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the NEWNE grid, which are/ will be predominantly based on fossil fuels[1], hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario. Since the project activity involves power generation from wind, it does not emit any emissions in the atmosphere.

Project activity will harness wind as a source of energy production which is environmentally safe and sound technology. There is no GHG emission through project activity. The WEGs confirms to the relevant code of safety and standards mandatory for setting up wind projects. The standard includes Wind Turbine Safety and Design, Noise level and Mechanical Load. Therefore, the technology implemented can be depicted as environmentally safe and sound one.

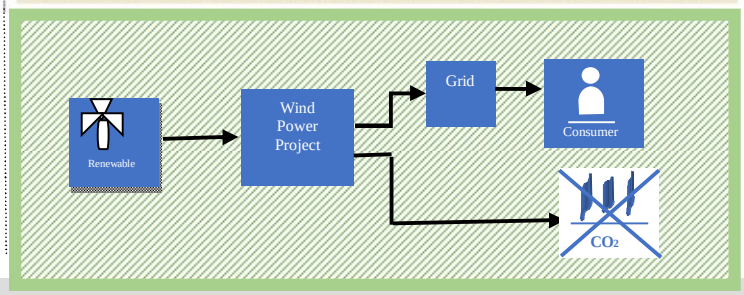
BASELINE SCENARIO

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



PROJECT SCENERIO

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



A.7. Debundling>>

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

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

SECTION B. Application of methodologies and standardized baselines

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

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

TYPE I - Renewable Energy Projects

CATEGORY- ACM0002 Grid-connected electricity generation from renewable sources, Version 06

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

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

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

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

	• 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. • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.	
4.	The methodology is not applicable to the following: • 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; • Biomass fired power plants; • Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m^2.	The project activity does not involve any of the given criteria hence methodology is applicable for the project activity.
5.	In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The project activity is a new wind power plant. No replacement, modification or retrofit measures are implemented here. Hence, this criterion is also not relevant to the project activity.

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

The project activity is registered under Clean Development Mechanism (CDM) project with registration number 1168, as well as Gold Standard (GS) with reference number 2483. The crediting period of this project under CDM & GS is 15/03/2010 to 14/03/2020. PP seeks verification under UCR from 15/03/2020 onwards, i.e., crediting period for UCR starts from 15/03/2020. Hence, there is no double counting for said projects.

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

According to ACM0002, for the baseline emission factor, the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the

CDM project power plant is connected to.

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

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

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

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

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

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

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

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

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

ERy = BEy – PEy – Ly…….(1)

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

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

BEy = EGy * EFy …….(2)

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

Project Emissions:

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

PEy = 0

Leakage:

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

Ly = 0

Annual electricity supplied to the grid by the Project
= 60 MW (Capacity) x 22% (PLF) x 8760 (hours)
= 115632 MWh

Annual baseline emissions
= 0.9 tCO2e/MWh x 115632 GWh
= 104,068 tCO2e

Estimated Annual or Total baseline emission reductions (BEy) = 104068 CoUs /year (104068 tCO2eq/yr)

B.6. Prior History>>

The project activity is registered as CDM project with reference number 1168 and as GS project with reference number 2483 for generation or issuance of carbon credits with fixed crediting period from 15/03/2010 to 14/03/2020.

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

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

The crediting period under UCR will start from 15/03/2020 onwards.

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

There are no permanent changes from registered PCN monitoring plan and applied methodology.

B.9. Monitoring period number and duration>>

First Issuance Period: 1 years, 11 months – 15/03/2020 to 31/01/2022

B.8. Monitoring plan>>

Data/Parameter	**EGy**
Data unit	MWh (Mega-Watt hour)
Description	Net electricity supplied to the grid by the Project
Source of data Value(s) applied	Electricity supplied to the grid as per monthly breakup sheet prepared by Wind World (India) Limited and the same will cross verified by the tariff invoices raised on RRVPNL/Ajmer & Jaipur DISCOM (State Utility).
Measurement methods and procedures	The WECs of the project activity and WECs of other power producers are connected to Bhu Substation which is further connected to Akal substation. In addition to the project activity, the WECs located at Kita, Jodha, Pithoda ki Dhani are also connected to Bhu substation which are further connected to the Akal substation. Net Electricity supplied by all these WECs is metered at a common metering/delivery point. The common metering/delivery point comprises one main meter and one backup meter that are installed at 220 kV/400 kV metering/delivery point at the Akal substation. Consequently, the main meter reading reflects the aggregate electricity supplied by all these WECs, including the project activity. The net electricity supplied by individual WEC is determined by a process of allocating the total electricity recorded at the main meter to the individual WEC in proportion to the electricity generation recorded by the LCS meters at the individual WEC. It can be sourced from breakup sheet issued by O & M contractor and cross checked by invoices raised by project owner to EB.
Monitoring frequency	Monthly
Purpose of data	Baseline Emissions calculations

Data / Parameter:	$\sum_{Project} E_{WEC.Export,j}$
Data unit:	MWh (Mega-Watt hour)
Description:	Summation of gross electricity exported (at substation

	point) by all the WECs of the project activity. Where j is any WEC between 1 to 75 of the project activity connected to main meter & backup meter at Akal substation and secondary backup meter at Bhu substation.
Source of data:	Electricity supplied to the grid as per monthly breakup sheet prepared by Wind World (India) Limited and the same will cross verified by the tariff invoices raised on RRVPNL/Ajmer & Jaipur DISCOM (State Utility).
Measurement procedures (if any):	Calculation prepared by Wind World (India) Limited
Monitoring frequency:	Monthly
QA/QC procedures:	The value is calculated and can be cross checked from the invoices raised on the state utility.
Any comment:	Not Applicable

Data / Parameter:	$\sum_{Project} E_{WEC.Import,j}$
Data unit:	MWh (Mega-Watt hour)
Description:	Summation of gross electricity imported (at substation point) by all the WECs of the project activity. Where j is any WEC between 1 to 75 of the project activity connected to main meter & backup meter at Akal substation and secondary backup meter at Bhu substation.
Source of data:	Electricity sourced from the grid as per monthly breakup sheet prepared by Wind World (India) Limited and the same will cross verified by the tariff invoices raised on RRVPNL/Ajmer & Jaipur DISCOM (State Utility).
Measurement procedures (if any):	Calculation prepared by Wind World (India) Limited
Monitoring frequency:	Monthly
QA/QC procedures:	The value is calculated and can be cross checked from the invoices raised on the state utility.
Any comment:	Not Applicable