Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: Enercon Wind Farm (Hindustan) Ltd in Karnataka

Version 1.1

Date 21/03/2022

First CoU Issuance Period: 3 years, 4 months

Date: 27/10/2018 to 31/01/2022

Monitoring Report (MR)
CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report	
Title of the project activity	Enercon Wind Farm (Hindustan) Ltd in Karnataka
UCR Project Registration Number	106
Version	1.1
Completion date of the MR	21/03/2022
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 1 Duration of this monitoring Period: (first and last days included (27/10/2018 to 31/01/2022)
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	Sectoral Scope 1, Energy industries (renewable/ non-renewable sources).
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2018: 10,806 CoUs (10,806 tCO_{2eq})
	2019: 85,223 CoUs (85,223 tCO_{2eq})
	2020: 74,224 CoUs (74,224 tCO_{2eq})
	2021: 85,014 CoUs (85,014 tCO_{2eq})
	2022: 3,619 CoUs (3,619 tCO_{2eq})
Total:	258,886 CoUs (258,886 tCO_{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

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 258,886 tCO_{2e} for this monitoring period, 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.

b) Brief description of the installed technology and equipment>>

The project activity consists of 86 WEGs of Enercon make E-48 and each machine capacity is of 800 kW (E-48) totalling to the capacity of 68.8 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and connected to 33kV metering points. From 33 kV metering points electricity transmitted to WWIL Sub-station. At sub-station electricity is step-up to 220 kV. From WWIL substation electricity is further evacuated to the state electricity grid at 220kV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%.

c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)>>

The first machine under the project activity was commissioned on 29/09/2006 and last machine under the project activity was commissioned on 28/12/2006. Project activity WEGs were commissioned in three phases between 29/09/2006 & 28/12/2006. 56 WEGs under phase-I were commissioned on 29 Sep 2006, 9 WEGs under phase-II were commissioned on 26/10/2006 & 21 WEGs under phase-III were commissioned on 28/12/2006.

The time frame for this monitoring period is from 27/10/2018 to 31/01/2022.
UCR Project ID or Date of Authorization: 106
Start Date of Crediting Period: 27/10/2022
Project Commissioned: Details given below
Commissioning details

Loc. no.	Unique Identification Number	Date of Commissioning
1	EWHPL 01	26/10/2006
2	EWHPL 02	26/10/2006
3	EWHPL 03	26/10/2006
4	EWHPL 04	28/12/2006
5	EWHPL 05	28/12/2006
6	EWHPL 06	28/12/2006
7	EWHPL 07	28/12/2006
8	EWHPL 08	28/12/2006
9	EWHPL 09	28/12/2006
10	EWHPL 10	29/09/2006

11	EWHPL 11	29/09/2006
12	EWHPL 12	29/09/2006
13	EWHPL 13	29/09/2006
14	EWHPL 14	29/09/2006
15	EWHPL 15	29/09/2006
16	EWHPL 16	29/09/2006
17	EWHPL 17	29/09/2006
18	EWHPL 18	29/09/2006
19	EWHPL 19	29/09/2006
20	EWHPL 20	29/09/2006
21	EWHPL 21	29/09/2006
22	EWHPL 22	29/09/2006
23	EWHPL 23	29/09/2006
24	EWHPL 24	29/09/2006
25	EWHPL 25	29/09/2006
26	EWHPL26	26/10/2006
27	EWHPL 27	29/09/2006
28	EWHPL 28	29/09/2006
29	EWHPL 29	29/09/2006
30	EWHPL 30	29/09/2006
31	EWHPL 31	29/09/2006
32	EWHPL 32	29/09/2006
33	EWHPL 33	29/09/2006
34	EWHPL 34	29/09/2006
35	EWHPL 35	29/09/2006
36	EWHPL 36	29/09/2006
37	EWHPL 37	29/09/2006
38	EWHPL 38	29/09/2006
39	EWHPL 39	29/09/2006
40	EWHPL 40	29/09/2006
41	EWHPL 41	29/09/2006
42	EWHPL 42	29/09/2006
43	EWHPL 43	29/09/2006
44	EWHPL 44	29/09/2006
45	EWHPL 45	29/09/2006
46	EWHPL 46	29/09/2006
47	EWHPL 47	29/09/2006
48	EWHPL 48	29/09/2006
49	EWHPL 49	29/09/2006
50	EWHPL 50	26/10/2006
51	EWHPL 51	26/10/2006
52	EWHPL 52	29/09/2006
53	EWHPL 53	29/09/2006
54	EWHPL 54	29/09/2006
55	EWHPL 55	29/09/2006
56	EWHPL 56	29/09/2006
57	EWHPL 57	29/09/2006
58	EWHPL 58	29/09/2006
59	EWHPL 59	26/10/2006

60	EWHPL 60	26/10/2006
61	EWHPL 61	26/10/2006
62	EWHPL 62	29/09/2006
63	EWHPL 63	29/09/2006
64	EWHPL 64	29/09/2006
65	EWHPL 65	29/09/2006
66	EWHPL 66	29/09/2006
67	EWHPL 67	29/09/2006
68	EWHPL 68	29/09/2006
69	EWHPL 69	29/09/2006
70	EWHPL 70	29/09/2006
71	EWHPL 71	29/09/2006
72	EWHPL 72	28/12/2006
73	EWHPL 73	28/12/2006
74	EWHPL 74	28/12/2006
75	EWHPL 75	28/12/2006
76	EWHPL 76	28/12/2006
77	EWHPL 77	28/12/2006
78	EWHPL 78	28/12/2006
79	EWHPL 79	28/12/2006
80	EWHPL 80	28/12/2006
81	EWHPL 81	28/12/2006
82	EWHPL 82	28/12/2006
83	EWHPL 83	28/12/2006
84	EWHPL 84	28/12/2006
85	EWHPL 85	28/12/2006
86	EWHPL 86	28/12/2006

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	27/10/2018
Carbon credits claimed up to	31/01/2022
Total ERs generated (tCO_{2eq})	258,886 tCO_{2eq}
Leakage	0

e) Baseline Scenario>>

Project activity installs the wind farm at a barren land. Project activity is the installations of green field energy production with the installation of 86 WEGs of WWIL make E 48 of 800 KW each totalling 68.8MW 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 Southern 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.

A.2. Location of project activity>>

Country: India
District: Tumkur & Chitradurga
Village: Dasudi, Nelenuru, Ganadu, Annenhalli, Siddapura, Chikkabyaledakere, Kanubehalli, Arasinagundi and Elladakere
Tehsil: Chikkanayakanahalli, Gubbi and Hosadurga
State: Karnataka
Code: 577501

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

S.No.	WEG Unique Identification Number	Location No.	Latitude (N)			Longitude (E)		
			Degree	Minutes	Seconds	Degree	Minutes	Seconds
1	EWHPL 01	1	13	43	20.9	76	31	3.9
2	EWHPL 02	2	13	43	25.4	76	31	1.5
3	EWHPL 03	3	13	43	30.0	76	30	59.0
4	EWHPL 04	4	13	43	34.6	76	30	57.2
5	EWHPL 05	5	13	43	39.3	76	30	55.6
6	EWHPL 06	6	13	43	43.8	76	30	53.1
7	EWHPL 07	7	13	43	50.0	76	30	50.5
8	EWHPL 08	8	13	43	54.5	76	30	48.0
9	EWHPL 09	9	13	44	3.9	76	30	44.9
10	EWHPL 10	10	13	45	33.0	76	31	5.9
11	EWHPL 11	11	13	45	28.2	76	31	6.4
12	EWHPL 12	12	13	45	23.4	76	31	7.0
13	EWHPL 13	13	13	45	18.9	76	31	7.7
14	EWHPL 14	14	13	45	14.3	76	31	8.3
15	EWHPL 15	15	13	45	10.2	76	31	9.5
16	EWHPL 16	16	13	44	54.0	76	31	12.3
17	EWHPL 17	17	13	44	49.2	76	31	13.1
18	EWHPL 18	18	13	44	44.5	76	31	14.7
19	EWHPL 19	19	13	44	39.8	76	31	16.7

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

20	EWHPL 20	20	13	44	35.4	76	31	19.9
21	EWHPL 21	21	13	44	30.5	76	31	19.8
22	EWHPL 22	22	13	44	25.6	76	31	20.2
23	EWHPL 23	23	13	44	21.7	76	31	26.4
24	EWHPL 24	24	13	44	16.9	76	31	27.7
25	EWHPL 25	25	13	44	12.0	76	31	28.2
26	EWHPL26	26	13	44	8.0	76	31	29.8
27	EWHPL 27	27	13	43	57.6	76	31	53.8
28	EWHPL 28	28	13	43	54.1	76	31	55.1
29	EWHPL 29	29	13	43	49.5	76	31	57.1
30	EWHPL 30	30	13	43	44.8	76	31	58.6
31	EWHPL 31	31	13	43	40.0	76	31	59.5
32	EWHPL 32	32	13	43	35.4	76	32	1.9
33	EWHPL 33	33	13	43	30.6	76	32	4.8
34	EWHPL 34	34	13	43	0.6	76	32	22.1
35	EWHPL 35	35	13	42	54.7	76	32	19.9
36	EWHPL 36	36	13	42	50.3	76	32	23.0
37	EWHPL 37	37	13	42	45.6	76	32	24.7
38	EWHPL 38	38	13	42	40.9	76	32	26.3
39	EWHPL 39	39	13	42	36.3	76	32	28.5
40	EWHPL 40	40	13	42	31.1	76	32	31.4
41	EWHPL 41	41	13	40	57.2	76	35	58.1
42	EWHPL 42	42	13	40	52.4	76	35	59.4
43	EWHPL 43	43	13	40	47.7	76	36	0.9
44	EWHPL 44	44	13	40	43.1	76	36	2.6
45	EWHPL 45	45	13	40	38.4	76	36	4.2
46	EWHPL 46	46	13	40	33.7	76	36	5.8
47	EWHPL 47	47	13	40	13.7	76	36	10.7
48	EWHPL 48	48	13	40	9.1	76	36	12.6
49	EWHPL 49	49	13	40	4.7	76	36	15.7
50	EWHPL 50	50	13	39	2.8	76	36	34.8
51	EWHPL 51	51	13	38	58.7	76	36	36.8
52	EWHPL 52	52	13	38	54.1	76	36	38.9
53	EWHPL 53	53	13	38	49.5	76	36	41.3
54	EWHPL 54	54	13	38	44.9	76	36	43.1
55	EWHPL 55	55	13	38	40.2	76	36	44.9
56	EWHPL 56	56	13	38	35.6	76	36	46.9
57	EWHPL 57	57	13	38	30.9	76	36	48.7
58	EWHPL 58	58	13	38	26.4	76	36	50.9
59	EWHPL 59	59	13	38	22.3	76	36	56.3
60	EWHPL 60	60	13	38	17.8	76	36	58.8
61	EWHPL 61	61	13	38	11.8	76	37	2.5
62	EWHPL 62	62	13	38	7.2	76	37	4.6
63	EWHPL 63	63	13	38	2.6	76	37	6.8
64	EWHPL 64	64	13	37	58.0	76	37	9.2
65	EWHPL 65	65	13	37	53.5	76	37	11.5
66	EWHPL 66	66	13	37	48.9	76	37	13.7
67	EWHPL 67	67	13	37	44.3	76	37	16.0
68	EWHPL 68	68	13	37	39.8	76	37	18.4

69	EWHPL 69	69	13	37	35.1	76	37	20.3
70	EWHPL 70	70	13	37	30.5	76	37	22.3
71	EWHPL 71	71	13	37	25.9	76	37	24.7
72	EWHPL 72	72	13	32	25.1	76	43	45.2
73	EWHPL 73	73	13	32	30.0	76	43	44.4
74	EWHPL 74	74	13	32	34.8	76	43	44.7
75	EWHPL 75	75	13	32	39.7	76	43	44.5
76	EWHPL 76	76	13	32	44.6	76	43	43.9
77	EWHPL 77	77	13	32	49.5	76	43	42.5
78	EWHPL 78	78	13	32	54.4	76	43	42.1
79	EWHPL 79	79	13	33	6.1	76	43	33.2
80	EWHPL 80	80	13	33	11.0	76	43	34.1
81	EWHPL 81	81	13	33	15.9	76	43	34.6
82	EWHPL 82	82	13	33	20.8	76	43	34.5
83	EWHPL 83	83	13	34	19.9	76	44	0.8
84	EWHPL 84	84	13	34	27.5	76	44	2.3
85	EWHPL 85	85	13	34	50.5	76	44	14.8
86	EWHPL 86	86	13	34	54.9	76	44	14.8

A.3. Parties and project participants >>

Party (Host)	Participants
Government of India (Host)	VIVIID Emissions Reductions Universal Pvt Ltd

A.4. 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

The project activity is wind based renewable energy source, zero emission power project connected to the Rajasthan state grid, which forms part of the Southern 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 Indian grid.

A.5. Crediting period of project activity >>

Start Date : 27/10/2018
Length of the crediting period corresponding to this monitoring period: 3 years, 4 months – 27/10/2018 to 31/01/2022

A.6. Contact information of responsible persons/entities >>

Name : Puneet Katyal
Email : puneet.katyal@viviidrenewables.com
Phone : +91 98671 65214

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

The Project involves 86-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%.
The first WEC under the project activity was commissioned on 29 September 2006 and the last WEC under the project activity was commissioned on 28 December 2006. The expected operational lifetime of the project is for 20 years.
There are two main and check meters dedicated to project activity at 33 kV metering point for the project activity. The one set of main and check meter is connected to 56.8 MW and other set of the main and check meter is connected to 12 MW of the project activity. In addition to this there is one set of main and check meter (bulk meter) at 220 kV metering point at the WWIL substation is connected to the machines of the project activity and the machines commissioned by the other project developers. Therefore, in order to determine the net electricity supplied to the grid by the project at 220 kV at the WWIL substation, the state utility applies the transmission loss to the meter reading recorded at the 33 kV metering point.

At 220kV sub-station only the WEGs of project activity are connected and there is no WEGs of other customers while at the time of validation WEGs of other project activity were also connected to same 220kV sub-station that's why the generic procedure of apportion is mentioned below. Further it may be noted in future WEGs of other project activity might be connected to 220kV same sub-station depending on the requirements. Monitoring system and apportioning procedure mentioned below is given to provide the generic scenario and method of calculation to arrive the net electricity export of individual customers in case there is other project WEGs are also connected to same 220kV sub-station. This procedure of apportioning is applied by state utility only.

The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of WWIL and the state utility. The transmission loss applied to the project activity by the state utility is reflected in the joint meter readings (Form B) recorded at 33kV metering point. Net electricity supplied to the grid is calculated by applying transmission loss to the meter readings taken at 33 kV metering location of the project activity.

The procedure for calculation of transmission loss as given in the PPA is set-out below:-

$$Z = \frac{(X1 + X2 + X3 + X4 + ... + Xn) - Y}{(X1 + X2 + X3 + X4 + ... + Xn)} \times 100$$

Where,

Z = Percentage transmission loss for export incurred in transmission line between the meters located at 33 kV metering point (including the machines of the project activity and other project developers) and the meters located at 220kV metering point (bulk meter: main and check) at high voltage side of receiving sub-station.

Summation of meter readings at 33 kV metering points for all the project developers connected to receiving substation (including the machines of the project activity and other project developers)

= (X1 + X2+ X3+ X4+....+ Xn)

Xi = Energy Export Reading (Xi) noted at energy meter installed at 33kV metering point where i vary from 1 to n which represents the meters connected to project activity and other project developers. X1, X2, X3,…Xn are the meters that are installed at 33kV metering point (including the machines of the project activity and other project developers) and further connected to the receiving substation at 220 kV by internally connected lines.

Y = Energy Export Reading at bulk meter installed at high voltage side of transformer of the receiving sub-station at 220 kV connecting machines of the project activity and other project developers.

Energy Export by the project activity at 33 kV metering point is as follows:

EG_{export} = X1 +X2

Where, X1 & X2 is the export reading recording at 33kV metering points for project activity.

Transmission Loss in Export **(T_E)** = Transmission Loss (Z) * Energy Export at 33kV metering point (EG_{Export})

Empirical Formula for Energy Export after adjustment of transmission loss (Equation 1)

Net Energy Export after adjustment of transmission loss = **EG_{export} – Transmission Loss (T_E)**

The transmission loss in export is generally less than 5%. However, in case of Energy Import, the state utility conservatively applies adjustment of 15% to the import values noted at 33 kV metering point.

Transmission Loss in Import **(T_I)** = 15% * Energy Import at 33kV metering point (EG_{import})

Empirical Formula for Energy Import after adjustment of transmission loss (Equation 2)

Net Energy Import after adjustment of transmission loss = **EG_{import} +15%*EG_{import}**
= **115%* EG_{import}**

Therefore Energy Supplied to Grid after adjustment of transmission loss is difference of equation 1 and 2 as given in the joint meter readings (Form B) signed jointly by WWIL and the state utility.

$EG_y = EG_{export} – 115\%*EG_{import} – Transmission\ Loss\ (T_E)$

The Joint meter reading noted at 33 kV metering location contains the following data:-

1. Electricity Export (EG_{export})
2. Electricity Import (EG_{import})
3. Transmission Loss (T_E) between 33 kV metering point and 220 kV metering point at WWIL substation

4. Net Electricity supplied to the Grid [EGexport-115%*EG_{import}-T_E]

Joint meter reading (Form B) is signed by the representatives of WWIL and the state utility. The meter readings (both export and import), transmission loss and net electricity supplied to the grid are recorded in the joint meter readings (Form B) (33 kV metering point). Hence all these values will be reproduced from the joint meter readings (Form B) for calculation of emission reductions.

In addition to the joint meter readings (Form B) at 33kV metering location for the project activity, the following documents have been provided to the DoE for verification:

1. Joint Meter Readings (Form B) at 220kV metering point (bulk meters: main and check) at WWIL substation
2. Transmission loss calculation endorsed / confirmed jointly by the representatives of WWIL and the state utility.

Parameter	Meter	Meter Serial No.	Meter Test Checking Frequency		Calibration				
				2018	2019		2020		2021
				Date	Error Factor (%)	Date	Error Factor (%)	Date	Date
KBCWP-01(68.8 MW)	Main Meter	13191156/ 18092881	Annual	28-11-18		06-03-19	0.18%	06-08-20	21-06-21
					0.04%	24-05-19			
	Check Meter	14194655			0.09%	06-03-19	0.11%	06-08-20	21-06-21
					0.09%	24-05-19			
KBCWP-02(56.8 MW)	Main Meter	5389967/ 18093162		23-03-18	0.06%	21-05-19	NA	06-08-20	21-06-21
					0.05%	29-08-19			
	Check Meter	5389970 /18069106			0.08%	21-05-19	NA	06-08-20	21-06-21
					0.10%	29-08-19			
KBCWP-03(12 MW)	Main Meter	5463844		23-03-18	0.12%	21-05-19	NA	NA	NA
	Check Meter	5463845			0.14%		NA	NA	NA

b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>

The project activity consists of 86 WEGs of Enercon make E-48 and each machine capacity is of 800 kW (E-48) totalling to the capacity of 68.8 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and connected to 33kV metering points. From 33 kV metering points electricity transmitted to WWIL Sub-station. At sub-station electricity is step-up to 220 kV. From WWIL substation electricity is further evacuated to the state electricity grid at 220kV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%.

The other salient features of the state-of-art-technology are:-

- 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 drawal (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEG 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

WWIL has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured. Diagram of main component of Enercon make E-48 is shown in below picture:-

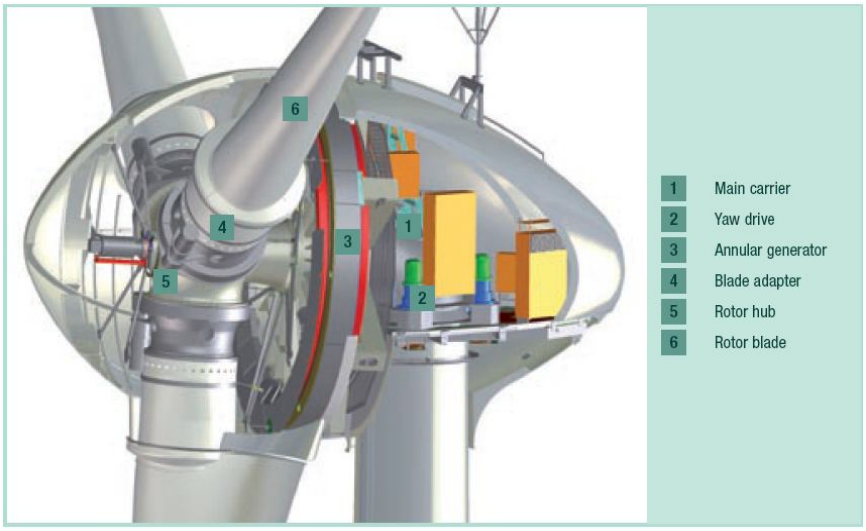


Figure: Enercon make E-48 Diagram.

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

B.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.

B.3. Baseline Emissions>>

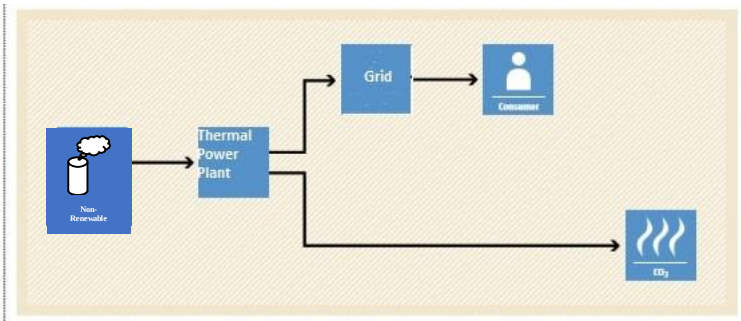
Project activity installs the wind farm at a barren land. Project activity is the installations of green field energy production with the installation of 86 WEGs of WWIL make E-48 of 800 KW each totalling 68.8MW project capacity.

In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the Indian grid, which are/ will be predominantly based on fossil fuels[2], 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.

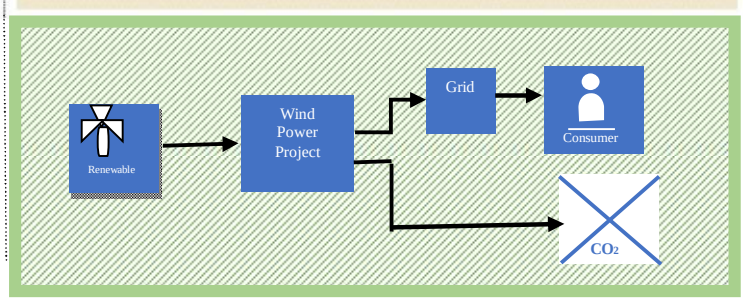
BASELINE SCENARIO

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.



B.4. Debundling>>

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

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

SECTION C. Application of methodologies and standardized baselines

C.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

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

The project activity is wind based renewable energy source, zero emission power project connected to the Karnataka state grid, which forms part of the Southern 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 Southern 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. • The project activity is implemented	This condition is not relevant, as the project activity is not the installation of a hydro power plant.

	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.

C.3 Applicability of double counting emission reductions >>

The project activity is registered under Clean Development Mechanism (CDM) project with registration number 1259, as well as Gold Standard (GS) with reference number 3664. The crediting period of this project under CDM & GS is 27/10/2008 to 26/10/2018. PP seeks verification under UCR from 27/10/2018 onwards, i.e., crediting period for UCR starts from 27/10/2018. Hence, there is no double counting for said projects. The details of CERs issued and GS CERs labelled is given below:

CDM 1259

Weblink: https://cdm.unfccc.int/Projects/DB/DNV-CUK1185356859.49/view

Monitoring Period	Issued CERs
27/10/2008 - 30/11/2009	114,191
01/12/2009 - 31/08/2011	173,795
01/09/2011 - 30/06/2012	77,277
01/07/2012 - 30/09/2012	45,359
01/10/2012 - 31/10/2013	115,627
01/11/2013 - 31/12/2014	114,101
01/01/2015 - 31/05/2016	120,230
01/06/2016 - 30/06/2017	105,751
01/07/2017 - 26/10/2018	Awaiting Issuance Request

GS
Weblink: platform.sustain-cert.com/public-project/685

Monitoring Period	Issued GS CERs
01/11/2013 to 31/12/2014	114,101
01/01/2015 - 31/05/2016	120,230
01/06/2016 - 30/06/2017	105,751
01/07/2017 - 26/10/2018	Awaiting Issuance Request

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

Project boundary has ascertained using ACM0002 Version 06- "The spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to".

Hence the project boundary includes the WTGs, sub-station, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Indian grid.

	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	

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

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

Current Monitoring Period baseline emissions
= 0.9 tCO2e/MWh x 287653.906 MWh
= 258,886 tCO2e

Total baseline emission reductions (BEy) = 258,886 CoUs)

C.6. Prior History>>
The project activity is registered as CDM project with reference number 1259 and as GS project with reference number 3664 for generation or issuance of carbon credits with fixed crediting period from 27/10/2008 to 26/10/2018.

[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.

C.7. Monitoring period number and duration>>

First Issuance Period: 3 years, 4 months – 27/10/2018 to 31/01/2022

C.8. Changes to start date of crediting period >>

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

C.9. 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.

C.10. Monitoring plan>>

Data/Parameter	**EG_y**
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 two joint meter readings (Form B) taken at 33 kV metering point. 287653.906 MWh
Measurement methods and procedures	The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM.
Monitoring frequency	Monthly
Purpose of data	Baseline Emissions calculations

Data / Parameter:	**EG_{export}**
Data unit:	MWh (Mega-Watt hour)
Description:	Summation of electricity Export recorded at meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two joint meter readings (Form B) issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point
Source of data Value(s) applied	Electricity export to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. 290456.204 MWh
Measurement procedures (if any):	The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV

	metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM.
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:	**EG_{import}**
Data unit:	MWh (Mega-Watt hour)
Description:	Summation of electricity Import recorded at the meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two joint meter readings (Form B) issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point.
Source of data Value(s) applied	Electricity export to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. 211.428 MWh
Measurement procedures (if any):	The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM.
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:	**T_E**
Data unit:	MWh (Mega-Watt hour)
Description:	Transmission loss for export between the metering location at 33 kV point and the metering location at 220 kV at the WWIL substation.
Source of data Value(s) applied	Transmission Loss for export has been sourced from the joint meter reading (Form B) taken at 33kV metering point for the project activity.

	2559.134 MWh
Measurement procedures (if any):	The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kVmetering point) & KBCWP03 (33kV metering point) are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM.
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