

KALADONGER WIND POWER PROJECT IN RAJASTHAN



Document Prepared By EKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity envisages implementation of a 75.6 MW wind power project consisting of 36 Wind Electric Generators (WTGs) of individual capacity 2.1 MW, at Kaladonger village in Rajasthan, India by M/s Bindu Vayu Urja Private Limited (BVUPL).

The electricity generated by the project is exported to the NEWNE electricity grid. The project activity is therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid.

The project activity helps to reduce the supply demand gap in the state and also helps in contributing to the sustainable development by using wind energy as the source of power generation and reduction of GHG Emissions. In the project site, there are other wind projects owned by other customers connected to the same substation. There is an apportioning procedure which is approved by the state nodal agency for apportioning the electricity to each and every customer. The project uses Suzlon's wind energy technology. The project activity implements S95 model 2.1MW WTGs.

The total VCUs generated achieved during this monitoring period is 513,733 tCO₂e.

1.2 Sectoral Scope and Project Type

The project activity falls under

Sectoral Scope: 01 - Energy industries (renewable / nonrenewable sources)

Project Type : I - Renewable Energy Projects

Title : Consolidated baseline methodology for grid-connected electricity generation from renewable sources

Reference : Approved consolidated baseline and monitoring methodology ACM0002, Version 12.3.0²

This project is not a grouped project activity.

1.3 Project Proponent

Organization name	Bindu Vayu Urja Private Limited
Contact person	Ms. Mangal jyoti
Title	Deputy Manager
Address	1 st Floor, 8001, 8th Floor, Q-City, Nanakramguda, Gachibowli Hyderabad 500032, Telangana, INDIA
Telephone	-
Email	-

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the project	Project Consultant
Contact person	Mr. Prakash Kr. Sahu
Title	Project Manager
Address	Office No. 201, EnKing Embassy, Plot No. 48, Scheme No. 78, Part II, Vijay Nagar INDORE – 452010, India.
Telephone	+91 99 31 158 863
Email	prakash@enkingint.org

1.5 Project Start Date

The project start date for this project is said to be 18th February 2012. This is because the first WEG was commissioned as on the said date.

1.6 Project Crediting Period

The project is registered under Clean Development Mechanism (CDM) of UNFCCC with 10 years crediting period (Reference No: 9342) on 31th Dec 2012.¹ Crediting period of the project under CDM starts on 31st December 2012 and ends on 30th December 2022.

The project has begun generating GHG emission reductions from 18th February 2012. Hence, crediting period for VCS begins on 18th February 2012 and ends on 17th February 2022 considering 10 years fixed crediting period.

The project proponent will also not claim GHG emission reductions under two schemes for the same period.

1.7 Project Location

The project activity is located in Kaladonger Site of Jaisalmer District Rajasthan State, India.

The location of WEGs is as given below

S. No.	Loc. No.	LATITUDE			LONGITUDE		
		Deg	Min	Sec	Deg	Min	Sec
1	KD-001	27	5	35.4	70	59	59
2	KD-002	27	5	54.9	70	59	53.5
3	KD-003	27	6	16.8	70	59	54.4
4	KD-004	27	6	27.3	70	59	42.5

¹ <https://cdm.unfccc.int/Projects/DB/RWTUV1356681143.52/view>

5	KD-005	27	6	38.7	70	59	30.8
6	KD-006	27	6	49.8	70	59	18.6
7	KD-007	27	7	1.7	70	59	4.3
8	KD-012	27	7	26.1	70	59	48
9	KD-013	27	7	14.1	70	59	59.1
10	KD-014	27	7	1.8	71	0	9.9
11	KD-024	27	7	9.5	71	2	4.5
12	KD-027	27	7	36.3	71	1	28.8
13	KD-028	27	7	41.5	71	1	13
14	KD-029	27	7	51.5	71	0	54.8
15	KD-030	27	7	54.5	71	0	33.3
16	KD-035	27	8	40.9	71	0	46.3
17	KD-036	27	8	34.2	71	1	3.8
18	KD-037	27	8	27.5	71	1	23.9
19	KD-038	27	8	17.6	71	1	39.8
20	KD-039	27	8	10.4	71	1	56.5
21	KD-040	27	7	59.8	71	2	4.9
22	KD-042	27	7	44.8	71	2	35.6
23	KD-054	27	8	22.4	71	2	59.3
24	KD-055	27	8	30.7	71	2	49.9
25	KD-056	27	8	38.2	71	2	38.8
26	KD-057	27	8	45.1	71	2	26.5
27	KD-058	27	8	52.9	71	2	6.3
28	KD-059	27	9	2.5	71	1	51.7
29	KD-060	27	9	11	71	1	31.3
30	KD-061	27	9	17	71	1	17.4
31	KD-067	27	9	21.4	71	2	54.1
32	KD-068	27	9	14.6	71	3	9.3
33	KD-076	27	8	23.5	71	4	55.5
34	KD-077	27	8	39.3	71	4	47.2
35	KD-078	27	8	48.3	71	4	31.9
36	KD-079	27	9	2.9	71	4	29.8

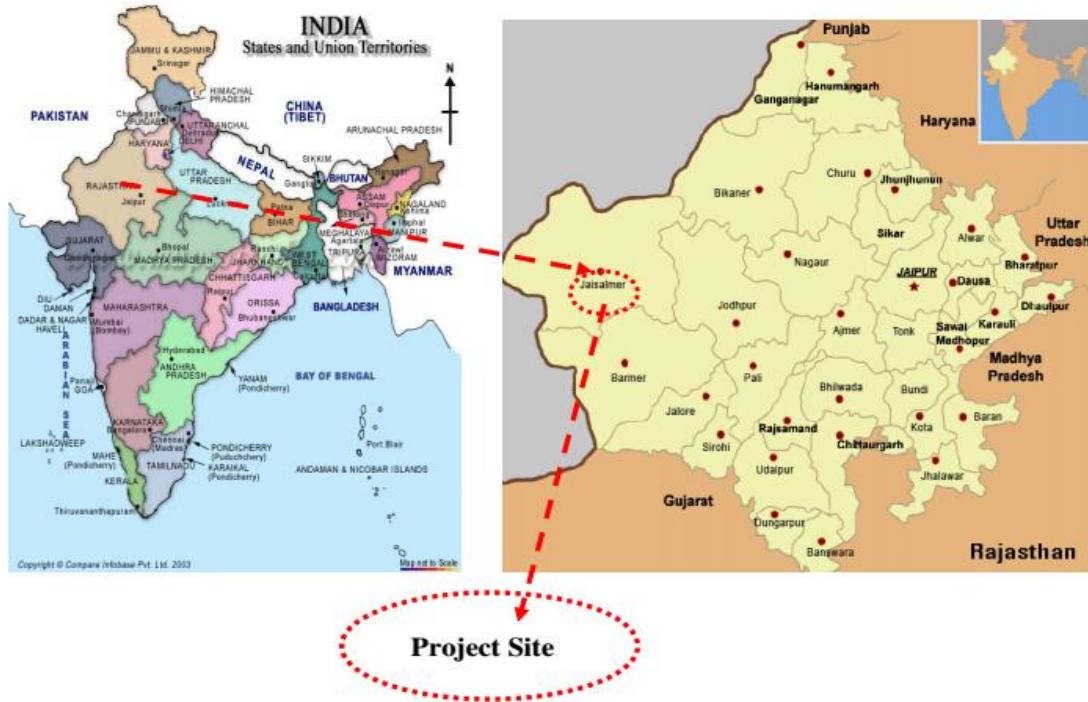


Figure 1. Project Site location

1.8 Title and Reference of Methodology

Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.

Methodology applied is ACM 0002, version 12.3.0²

1.9 Other Programs

Include the following information, as applicable:

- Emission Trading Programs and Other Binding Limits: The PP has not applied this project in any Emission Trading Programs and other Binding Limits.
- Other Forms of Environmental Credit: The PP has not applied this project in any other form of environmental credits.
- Participation under Other GHG Programs: The PP has participated under CDM mechanism of UNFCCC. The UN reference id 9342¹ of program with this project activity. The PP would not consider the credit from any other mechanism for the current monitoring plan. The undertaking is provided to confirm that there is no any double accounting for current monitoring period.

² <https://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L>

1.10 Sustainable Development

Contribution to sustainable development:

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

- **Social well-being:** The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.
- **Economic well-being:** The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state. The project activity will generate power using zero emissions Wind based power generation which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.
- **Technological well-being:** The successful operation of project activity would lead to promotion of Wind based power generation and would encourage other entrepreneurs to participate in similar projects
- **Environmental well-being:** The project activity being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the project activity also helps in avoiding significant amount of GHG emissions.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

Power generation using wind is achieved by deploying 36 wind turbine generators (WTGs). Wind power generation is an environmentally safe and sound technology. The WTGs supplied by Suzlon Energy Limited to the project participant. The components were manufactured in India and assembled at the project site. There is no transfer of technology from outside the host country for this project activity.

The project uses Suzlon's wind energy technology and implements 36 number of WTGs of S95 model with a capacity of 2100kW each. The technical details are shown below:

The technical specification of the WTG is as follows:

OPERATING DATA	
Rated power	2100 KW
Rotor speed	12.1 to 17.6 rpm
Power regulation	Active pitch regulated
Cut-in wind speed	3.5 meter/second
Rated wind speed	11 meter/second

Cut-off wind speed	25 meter/second
Restart wind speed	23 meter/second
Wind class	IEC IIA
Estimated service life	20 years
Ambient temperature range-operation	-10°to+ 40°C
A factor	9.59 m/s
ROTOR DATA	
Diameter	95 meter
Rotor cone angle	5°
Rotor speed at rated power	15.83 rpm
Tip speed at rated power	78.7 m/s
Swept area	7085 metre ²
BLADES	
Type	SUZLON SB46
Length	46.3 m
Material	Glass fibre reinforced plastic / Epoxy
Type of aerodynamic brake	
GENERATOR	
Type	Asynchronous 3 phase induction generator with slip rings operated with rotor circuit inverter system.
Rated power	2.1 MW
Number of poles/Synchronous speed	4/1500 rpm
Frequency	50 Hz
Rated generator speed	1568 rpm
TOWER	
Type	Tubular steel tower
Tower Height	80m

No events or situations happened during the reported monitoring period that can alter the applicability of the applied methodology.

The commissioning schedule of the respective WTGs are as follows:

S.No	Make	WEG-HTSC No.	Commissioned on
1	Suzlon	KD01	20/07/2012
2	Suzlon	KD02	20/07/2012
3	Suzlon	KD03	20/07/2012
4	Suzlon	KD04	20/07/2012
5	Suzlon	KD05	20/07/2012
6	Suzlon	KD06	20/07/2012
7	Suzlon	KD07	20/07/2012
8	Suzlon	KD58	30/03/2012
9	Suzlon	KD 27	30/03/2012
10	Suzlon	KD 28	30/03/2012
11	Suzlon	KD12	30/03/2012
12	Suzlon	KD13	30/03/2012
13	Suzlon	KD 14	30/03/2012

14	Suzlon	KD 24	23/03/2012
15	Suzlon	KD 40	23/03/2012
16	Suzlon	KD 78	30/03/2012
17	Suzlon	KD 76	28/03/2012
18	Suzlon	KD 67	28/03/2012
19	Suzlon	KD 29	28/03/2012
20	Suzlon	KD 54	27/03/2012
21	Suzlon	KD 77	27/03/2012
22	Suzlon	KD 68	27/03/2012
23	Suzlon	KD 79	27/03/2012
24	Suzlon	KD 30	27/03/2012
25	Suzlon	KD 35	14/03/2012
26	Suzlon	KD 37	14/03/2012
27	Suzlon	KD 39	14/03/2012
28	Suzlon	KD 59	14/03/2012
29	Suzlon	KD 60	14/03/2012
30	Suzlon	KD 61	14/03/2012
31	Suzlon	KD 57	14/03/2012
32	Suzlon	KD 36	18/02/2012
33	Suzlon	KD 38	25/03/2012
34	Suzlon	KD 55	25/03/2012
35	Suzlon	KD 56	25/03/2012
36	Suzlon	KD 82	10/09/2012

2.2 Deviations

2.2.1 Methodology Deviations

There is no request for deviation applied during this monitoring period

2.2.2 Project Description Deviations

No any project description deviation is applicable for the project activity.

2.3 Grouped Project

This project activity is not a grouped project activity.

2.4 Safeguards

2.4.1 No Net Harm

The project does not involve any potential negative environmental and socio economic impacts and hence this criteria is not applicable to this project activity.

2.4.2 Local Stakeholder Consultation

The stakeholders identified for the project were: the usual occupants of the villages around and the local communities, NGOs, governmental agencies, BVUPL employees, contractors. Local

population is considered to be a major stakeholder with respect to the project activity. Comments were received from the village people.

Representative of the project proponent explained the purpose of the meeting and detailed each questions in the questionnaire. He further explained about the advantages of the wind energy generation and explained how the project would help in reducing demand supply gap in environment friendly manner.

The villagers wished to know the impact of WTGs on the environment in the region. Further to the discussion, Representative of Suzlon Energy Limited, explained it's an eco-friendly technology which will have no harmful effect on the environment. Finally the comments were received from the stakeholder.

According to the feedback received from the stakeholders, due to the erection of wind farms the socioeconomic situation in the area and the village people's living standard has been improved. It has not only provided employment but also significantly contributed to the infrastructure development likes roads.

Local Stakeholder consultation had been carried out during CDM registration of this project activity. There were no comments that required follow up action from PP. The PP also placed a grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid,OMsimple,y}
Data unit	tCO ₂ /MWh
Description	Operating margin CO ₂ emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 07 ³
Value applied	0.9841
Justification of choice of data or description of measurement methods and procedures applied	The operating margin emission factor data has been deduced from CO ₂ database. CEA CO ₂ Baseline database Version 07
Purpose of the data	Calculation of baseline emissions
Comments	The operating margin emission factor is a 3-year generation-weighted average (2008-11). Data calculated to be 0.9841. The operating Margin is calculated ex ante and fixed during the crediting period.

Data / Parameter	EF _{grid,BM,y}
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³ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 07
Value applied	0.8587
Justification of choice of data or description of measurement methods and procedures applied	The build margin emission factor data has been deduced from CO ₂ database. CEA CO ₂ Baseline database Version 07
Purpose of the data	Calculation of baseline emissions
Comments	The build Margin would be calculated ex-ante and fixed during the crediting period. For ex-ante calculation the most recent data available has been used and the build margin thus calculated is 0.8587

Data / Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 07
Value applied	0.9527
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per the procedures in "Tool to calculate the emission factor for an electricity system" based on CEA data.
Purpose of the data	Calculation of baseline emissions
Comments	The combined margin would be calculated ex-ante and fixed for the entire crediting period and the combined margin thus calculated is 0.9527.

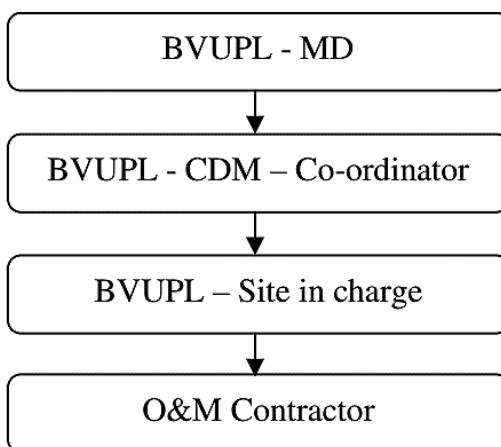
3.2 Data and Parameters Monitored

Data / Parameter	EG _{PJ,y}
Data unit	MWh
Description	Quantity of net electricity exported to the grid during the year y.
Source of data	Certificate for share of electricity generated by Wind Farm.
Description of measurement methods and procedures to be applied	Net electricity supplied will be calculated based on the difference between calculated values of "export" and calculated value "import" on the JVVNL energy meter at the common evacuation point and the percentage transmission loss as

	prescribed in the PPA for metering at 220 kV. All the data items monitored under the monitoring plan will be archived for entire crediting period or till the last issuance of VER/CERs for this project activity whichever occurs later. Calibration Frequency: All Energy meters will be tested for accuracy at least once in a year. The accuracy class of the energy meter is 0.2s
Frequency of monitoring/recording	Measuring frequency: Continuous Reading frequency: Daily Recording frequency: Monthly.
Value monitored	539,239.922 MWh (with application error factor due to delay in calibration)
Monitoring equipment	Energy meters of 0.2s accuracy class
QA/QC procedures to be applied	Net electricity supplied to the grid by the project activity will be cross checked with invoices submitted to JVVNL.
Purpose of the data	Calculation of baseline emissions
Calculation method	Net electricity supplied to the grid by the project activity will be cross checked with invoices submitted to JVVNL.
Comments	The data will be archived for two years after the end of the last crediting period or till the last issuance of CERs for the project activity, whichever is later.

3.3 Monitoring Plan

The organisational structure of this CDM project activity is as follows:



The project proponent has entered into agreement with the WTG- Supplier - Suzlon Energy Limited for the operation and maintenance of WTGs. The WTG supplier has dedicated and

technically well equipped O&M team⁴ for day-to-day Operation and maintenance of each WTG. O&M contractor provides a monthly report, which includes generation data, major breakdown events and machine availability. Site in-charge is responsible for recording of monthly Meter Readings of export and import. Monthly power export and import data is sent regularly to CDM coordinator of BVUPL. The detailed monitoring plan has been described in Annex 4 of the registered PDD.

Measurement of Energy and Metering:

- Since there are power producers other than the project proponent injecting electricity produced by them using the common evacuation / injection system and through the common metering equipment, Suzlon Energy Limited has been identified 'as the common agency responsible for joint metering.
- The joint meter reading taken at the common evacuation / injection system is supported by controller readings of individual power producers using the common evacuation / injection system.
- WTG controller meter does not require calibration due to the following reason: "The Controller is a micro processor based intelligent device which has been specially designed for the control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current /voltage are converted to digital signal internally using AD convertors at very high sampling rates. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed/stored. Woodward relay does not have a display and needs special protocol to view energy readings as this relay communicates digital signal through special communication protocol hence; it is not possible to calibrate. Moreover, turbine cannot run without this relay hence it cannot be removed for calibration during operation"
- Based on this breakup, limited to the total energy injection, net electricity exported by the project proponent is calculated below.

$$E_{PJ,y} = (\text{Export} - \text{Import}) \times (1 + \% \text{ transmission loss})$$

⁴ Suzlon Energy limited is an ISO certified company with all training needs identified and document as per the ISO requirement. O&M is one of their service offering for which they have trained staff.

Where,

$$Export = \left(\frac{E_{Exp,feeder,i}}{E_{Gen,feeder,i}} \times E_{WTG,i} \right) - \left(\left(\sum E_{Exp,feeder,i} \right) - E_{Exp,sub-station} \right) \div \sum E_{Gen,feeder,i} \times E_{WTG,i}$$

$$Import = \left(\frac{E_{Imp,feeder,i}}{E_{Gen,feeder,i}} \times E_{WTG,i} \right) - \left(\left(\sum E_{Imp,feeder,i} \right) - E_{Imp,sub-station} \right) \div \sum E_{Gen,feeder,i} \times E_{WTG,i}$$

A schematic diagram indicating the metering system is provided below:

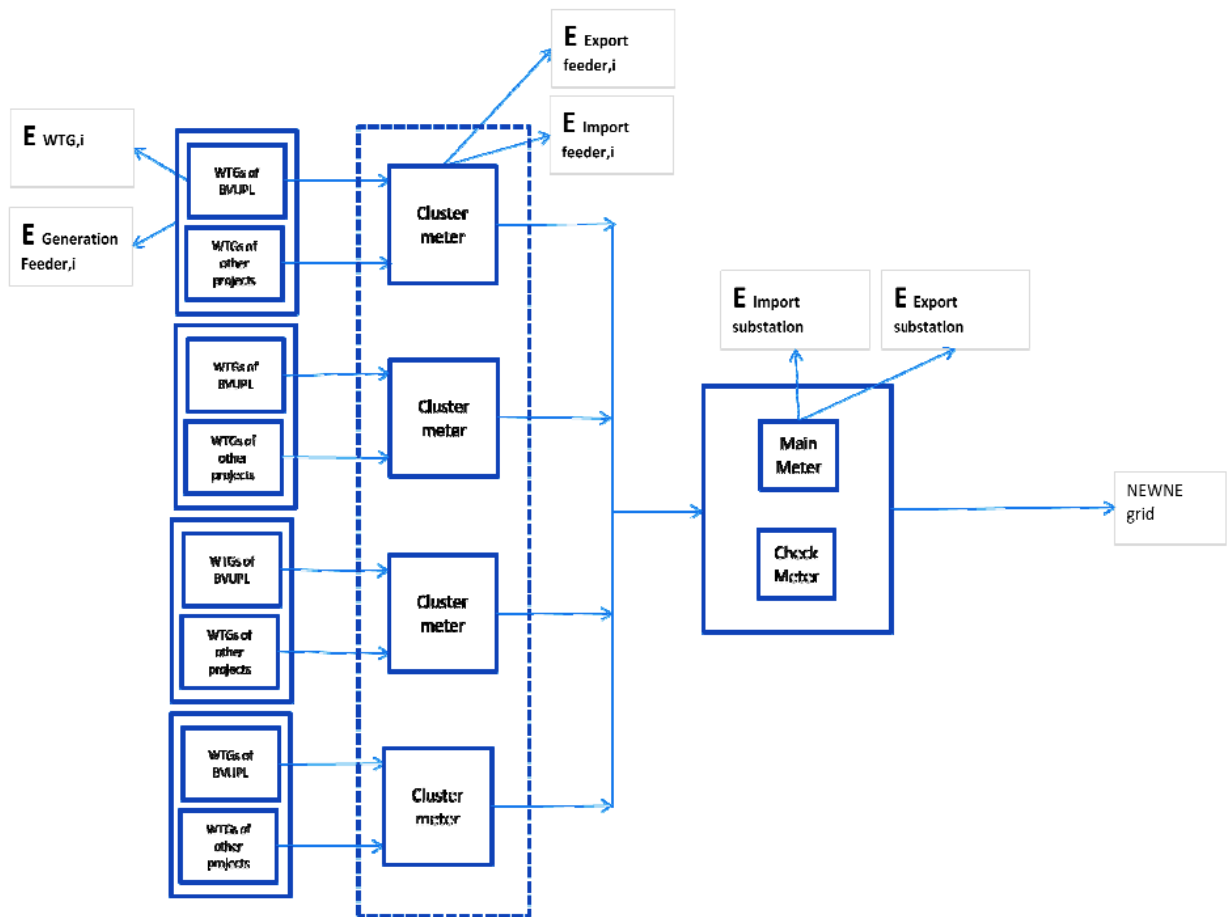


Figure 2.A schematic diagram indicating the metering system

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors.

$$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$$

Where:

BE_y : Baseline Emissions in year y; t CO₂

$EG_{BL,y}$: Energy baseline in year y; kWh

EF_{CO2} : Emission Factor in year y; t CO₂e/kWh

As per registered CDM PDD, combined margin emission factor is 0.9527 tCO₂ /MWh. Hence the baseline emissions for the project activity for the current monitoring period are as follows.

$$BE_y = EG_{BL,y} * EF_{CO2} = 539,239.922 * 0.9527 = 513,733 \text{ tCO}_2\text{e (round down values)}$$

4.2 Project Emissions

The project activity involves in harnessing wind power. So the emissions from the project are zero.

4.3 Leakage

The project activity is a Greenfield wind power project and there is no technology transfer with respect to this project activity. Hence the Leakage emissions for the project are zero.

4.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2014	129060	0	0	129060
2015	106887	0	0	106887
2016	127672	0	0	127672
2017	114157	0	0	114157
2018	35957	0	0	35957
Total	513,733	0	0	513,733

The actual VER is -7.93% lower than the estimated VER. This variation is majorly due to the variations in wind flow pattern, grid availability and other parameters which are not in the control of PP. This is also affected due the application of error factor. The above variations is conservative.

APPENDIX 1: CALIBRATION DETAILS

S. No	Meter Number	Meter Make	Accuracy Class	Calibration Date	Calibration Date	Calibration Date	Due Date
1	UPP31771 (Main Sub-station Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
2	UPP31772 (Backup Sub-station Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
3	UPP31774 (Main Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
4	UPP31776 (Backup Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
5	UPP31769 (Main Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
6	UPP31770 (Backup Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
7	UPP31766 (Main Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
8	UPP31783 (Backup Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
9	RJB78190 (Main Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018
10	RJB78191 (Backup Cluster Meter)	Secure Meters Limited	0.2 s	11/12/2013	29/04/2016	16/05/2017	16/05/2018

APPENDIX 2: BREAKDOWN DETAILS

01-Mar-14	KD-077	20:27:36	CBM anomalies
15-Mar-14	KD-005	22:21:12	Pitch thyristor 2 fault
17-Mar-14	KD-006	19:24:16	WTG restoration after grid resume
23-Mar-14	KD-013	22:31:28	WTG restoration after grid resume
25-Mar-14	KD-014	21:43:04	Line CCU collective faults
31-Mar-14	KD-028	22:22:32	WTG restoration after grid resume
02-Apr-14	KD-029	19:56:24	Line CCU collective faults
10-Apr-14	KD-037	22:10:08	Line CCU collective faults
20-May-14	KD-002	19:26:40	Communication fault pitch controller Axis 1
22-May-14	KD-003	19:05:04	Battery charging voltage not OK
26-May-14	KD-005	21:46:20	Line CCU collective faults
01-Jun-14	KD-012	22:19:20	DTA Maintenance Work

03-Jun-14	KD-013	21:27:04	DTA Maintenance Work
05-Jun-14	KD-014	22:05:12	Shutdown taken by Customer WTG Restoration after grid failure
07-Jun-14	KD-024	21:03:20	Pitch thyristor 2 fault (
11-Jun-14	KD-028	22:28:40	Shutdown taken by Customer WTG Restoration after grid failure
13-Jun-14	KD-029	23:10:32	Shutdown taken by Customer WTG Restoration after grid failure
15-Jun-14	KD-030	23:15:04	Shutdown taken by Customer WTG Restoration after grid failure
19-Jun-14	KD-036	21:54:24	WTG inspection work
21-Jun-14	KD-037	23:02:48	Line ccu collective fault
27-Jun-14	KD-040	23:12:16	VCB tripped WTG restoration after grid failure
29-Jun-14	KD-042	19:58:08	CBM Anomalies
01-Jul-14	KD-054	22:53:44	DTA Maintenance Work
03-Jul-14	KD-055	22:04:48	DTA Maintenance Work
19-Sep-14	KD-058	19:16:24	WTG restoration after grid resume
21-Sep-14	KD-059	19:43:52	WTG restoration after grid resume
03-Oct-14	KD-077	19:04:48	WTG restoration after grid resume
25-Oct-14	KD-013	19:02:40	Line CCU Collective fault
08-Nov-14	KD-035	22:49:52	Line ccu collective fault
16-Nov-14	KD-039	23:01:04	Line ccu collective fault
04-Dec-14	KD-060	19:37:44	Line CCU collective faults
14-Dec-14	KD-077	21:35:32	WTG Restoration time after grid Shutdown
16-Dec-14	KD-078	19:34:04	WTG Restoration time after grid Shutdown
18-Dec-14	KD-079	19:06:24	WTG Restoration time after grid Shutdown
20-Dec-14	KD-001	21:54:24	WTG Restoration time after grid
22-Dec-14	KD-002	21:43:28	WTG Restoration time after grid Shutdown
26-Dec-14	KD-004	19:07:12	WTG Restoration time after grid Shutdown Internal Shutdown taken by customer WTG restoration time after grid shutdown
28-Dec-14	KD-005	22:03:44	WTG Restoration time after grid Shutdown
05-Jan-15	KD-013	20:00:32	WTG Restoration time after grid Shutdown Internal Shutdown taken by customer WTG restoration time after grid shutdown
07-Jan-15	KD-014	20:23:48	WTG Restoration time after grid Shutdown Internal Shutdown taken by customer WTG restoration time after grid shutdown
09-Jan-15	KD-024	22:53:12	WTG Restoration time after grid Shutdown
13-Jan-15	KD-028	22:18:24	WTG Restoration after grid resume
15-Jan-15	KD-029	21:10:12	WTG Restoration after grid resume
17-Jan-15	KD-030	20:37:04	WTG Restoration after grid resume
19-Jan-15	KD-035	22:13:36	WTG Restoration after grid resume
21-Jan-15	KD-036	22:16:16	WTG Restoration after grid resume
23-Jan-15	KD-037	20:01:12	WTG Restoration after grid resume

25-Jan-15	KD-038	21:43:04	WTG Restoration after grid resume
27-Jan-15	KD-039	22:09:12	Line CCU collective fault
31-Jan-15	KD-042	21:52:44	WTG Restoration after grid resume
02-Feb-15	KD-054	22:30:12	WTG Restoration after grid resume
04-Feb-15	KD-055	22:36:08	WTG Restoration after grid resume
06-Feb-15	KD-056	22:43:12	WTG Restoration after grid resume
06-Mar-15	KD-003	19:11:36	Gearbox oil over temperature
10-Mar-15	KD-005	19:53:44	Converter rotor voltage fault
14-Mar-15	KD-007	22:38:04	Gearbox oil over temperature
18-Mar-15	KD-013	22:54:16	Line side CCU voltage fault
03-Apr-15	KD-036	23:48:04	WTG Restoration After grid failure
05-Apr-15	KD-037	23:09:36	WTG Restoration After grid failure
07-Apr-15	KD-038	22:47:44	WTG Restoration After grid failure
09-Apr-15	KD-039	22:44:32	WTG Restoration After grid failure
11-Apr-15	KD-040	22:39:04	WTG Restoration After grid failure
13-Apr-15	KD-042	23:18:08	WTG Restoration After grid failure
15-Apr-15	KD-054	22:20:16	WTG Restoration After grid failure
17-Apr-15	KD-055	23:37:44	WTG Restoration After grid failure
19-Apr-15	KD-056	23:49:28	WTG Restoration After grid failure
23-Apr-15	KD-058	23:49:12	WTG Restoration After grid failure
27-Apr-15	KD-060	23:49:04	WTG Restoration After grid failure
01-May-15	KD-067	19:21:08	Tower torqueing
03-May-15	KD-068	23:24:56	Gearbox oil pressure too low
05-May-15	KD-076	22:44:08	Internal grid failure WTG restoration after grid resume
06-Jul-15	KD-059	19:42:56	Pitch Thyristor 2 fault
21-Mar-17	KD-035	19:13:32	Internal Grid Shutdown & WTG restoration after grid shutdown
25-Mar-17	KD-037	20:20:48	Internal Grid Shutdown & WTG restoration after grid shutdown
02-Apr-17	KD-042	20:40:48	Line CCU collective faults
06-Apr-17	KD-055	21:46:16	Grid shutdown WTG Restoration after grid resume
21-Jul-17	KD-005	19:08:32	Tower torqueing
23-Jul-17	KD-006	20:51:52	IO Card 28V power supply failed
25-Jul-17	KD-007	21:57:36	Tower torqueing
27-Jul-17	KD-012	23:25:44	WTG restoration time after grid resume
29-Jul-17	KD-013	19:18:16	Pitch Thyristor 2 fault
31-Jul-17	KD-014	23:25:44	WTG restoration time after grid resume
02-Aug-17	KD-024	23:24:56	WTG restoration time after grid resume
04-Aug-17	KD-027	23:19:52	WTG restoration time after grid resume
06-Aug-17	KD-028	23:18:56	WTG restoration time after grid resume
08-Aug-17	KD-029	23:24:24	WTG restoration time after grid resume
10-Aug-17	KD-030	23:24:00	WTG restoration time after grid resume

12-Aug-17	KD-035	23:24:00	WTG restoration time after grid resume
14-Aug-17	KD-036	19:56:00	Safety Chain
16-Aug-17	KD-037	23:22:00	Converter rotor voltage fault
18-Aug-17	KD-038	20:18:12	Tower torqueing
20-Aug-17	KD-039	19:06:40	Tower torqueing
26-Aug-17	KD-054	20:30:32	Shutdown taken by customer and WTG Restoration time after grid resume
30-Aug-17	KD-056	19:18:08	Internal Shutdown taken by Customer WTG Restoration time after grid resume
03-Sep-17	KD-058	23:18:40	IO Card 28V power supply failed
11-Sep-17	KD-067	21:40:28	Shutdown taken by customer