



Monitoring report form for CDM project activity
(Version 06.0)

MONITORING REPORT

Title of the project activity	Wind Energy Project in Gujarat	
UNFCCC reference number of the project activity	6484	
Version number of the PDD applicable to this monitoring report	6.0	
Version number of this monitoring report	1.1	
Completion date of this monitoring report	02/05/2018	
Monitoring period number	5	
Duration of this monitoring period	01/04/2017 to 31/03/2018 (Both days included)	
Monitoring report number for this monitoring report	N/A	
Project participants	Vish Wind Infrastruktur LLP (India) ACT Financial Solutions B.V. (Netherlands) Statkraft Markets GmbH (Switzerland)	
Host Party	India	
Sectoral scopes	Sectoral Scope 1 - Energy industries (renewable/ non-renewable sources).	
Applied methodologies and standardized baselines	Approved consolidated baseline methodology ACM0002, Version 13.0.0	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	NA	83,574 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	101,234 tCO ₂ e ¹	

¹ Refer ER Sheet for detailed calculations and values used for ERs.

SECTION A. Description of project activity

A.1. General description of project activity

Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks:

Vish Wind Infrastruktüre LLP (VWIL) has developed 50.4 MW wind power project at Kutch and Lalpur sites of Kutch and Jamnagar districts respectively, in the state of Gujarat in India. The purpose of the project activity is to utilize renewable wind energy for generation of electricity. Project activity is the installation of green field energy production using wind as a source of power generation. 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 operation of Wind Energy Convertors (WEGs) is emission free and no emissions occur during the lifetime of the project activity.

Brief description of the installed technology and equipment:

The project consists of 63 machines of Enercon make E-53 type WEGs of 800KW capacity each totaling to the capacity of 50.4 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and further transmitted to WWIL Sub-station (previously known as Enercon Substation). From WWIL substation, electricity is further evacuated to the Gujarat regional electricity grid which is part of the NEWNE (Northern, Eastern, Western and North-Eastern) grid in India. The clean and green electricity supplied by the project will aide in sustainable growth in the region.

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

The first machine under the project activity was commissioned on 2nd October 2011 and last machine under the project activity was commissioned on 31st March 2012. The expected operational lifetime of the project is for 20 years. The total emission reductions achieved during the previous monitoring period '01/10/2012 – 31/03/2013' was 34,757 tCO₂e, during '01/04/2013 – 30/06/2015' was 206,529 tCO₂e, during '01/07/2015 to 31/03/2016' was 62,768 tCO₂e, and during '01/04/2016 – 31/03/2017' was 81,582 tCO₂e.

Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period:

The total emission reductions achieved under this monitoring period (i.e. 01/04/2017 to 31/03/2018) is 83,574 tCO₂e.

A.2. Location of project activity

Host Party (ies): India

Region/State/Province, etc.: Western Region, in the state of Gujarat.

City/Town/Community, etc.: The project activity is located at Kutch and Lalpur site in Kutch & Jamnagar district respectively, in the state of Gujarat, India. The nearest railway station and airport for Kutch site is Rajkot and the nearest railway station and airport for Lalpur site is Jamnagar.

Physical/Geographical location: The project activity is located at Kutch and Lalpur site in Kutch & Jamnagar district respectively, in the state of Gujarat, India. The geo-coordinates of the WEG locations are distributed in between the latitude from 22.06414 N to 23.48258 N and longitude from 69.02001 W to 69.92042 W.

Individual WEG location numbers and coordinates are detailed out in the table below.

Details of Latitude & Longitude for Kutch Site (District Kutch, State- Gujarat):-

Sr. No.	WEG ID NO	Village	Taluka	Latitude (N)	Longitude (E)
1	EIL/800/11-12/2469	KhombhadiNani	Nakhatrana	23.41978	69.13057
2	EIL/800/11-12/2470	KhombhadiNani	Nakhatrana	23.41771	69.13119
3	EIL/800/11-12/2471	KhombhadiNani	Nakhatrana	23.41545	69.13154
4	EIL/800/11-12/2472	KhombhadiNani	Nakhatrana	23.41463	69.13608
5	EIL/800/11-12/2475	KhombhadiNani	Nakhatrana	23.42289	69.13727

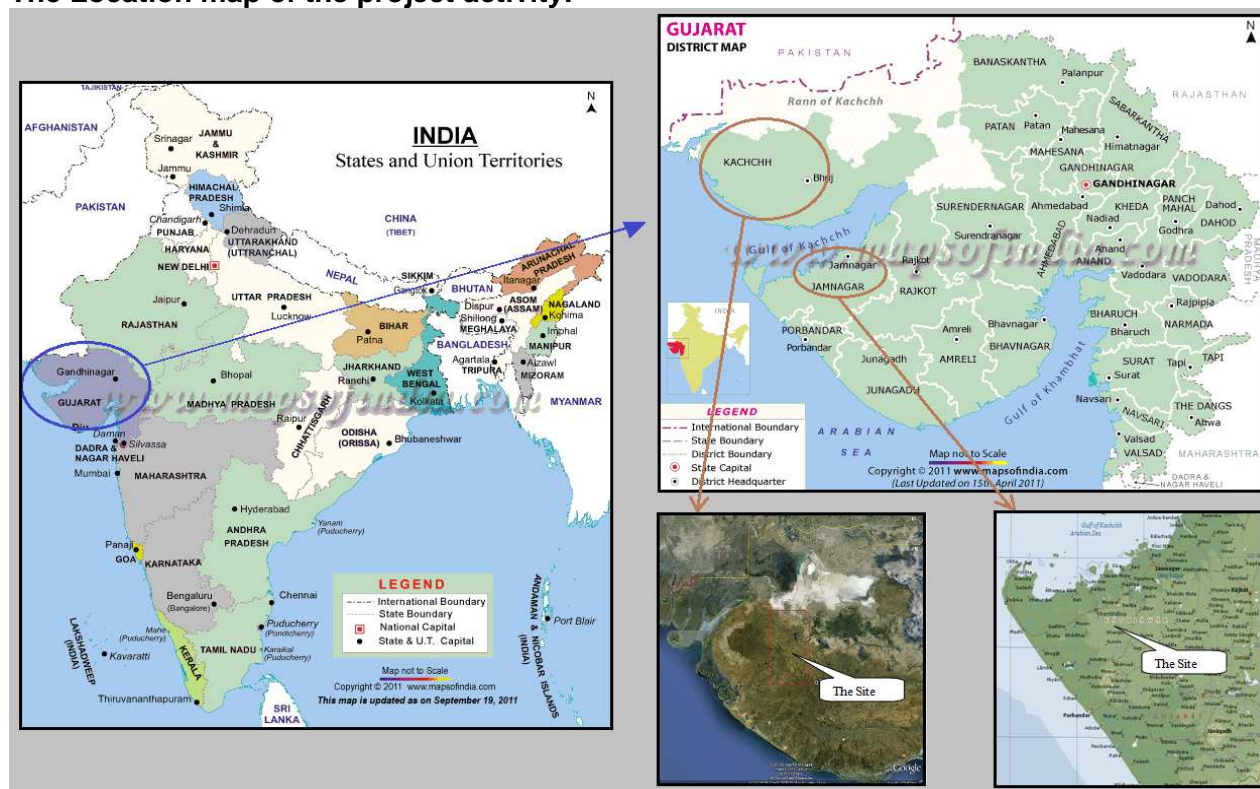
Sr. No.	WEG ID NO	Village	Taluka	Latitude (N)	Longitude (E)
6	EIL/800/11-12/2476	KhombhadiNani	Nakhatrana	23.43353	69.13148
7	EIL/800/11-12/2473	KhombhadiNani	Nakhatrana	23.43568	69.13101
8	EIL/800/11-12/2474	KhombhadiNani	Nakhatrana	23.43891	69.13204
9	EIL/800/11-12/2477	KhombhadiNani	Nakhatrana	23.44566	69.11901
10	EIL/800/11-12/2478	KhombhadiNani	Nakhatrana	23.44863	69.11686
11	EIL/800/11-12/2479	KhombhadiNani	Nakhatrana	23.45061	69.11676
12	EIL/800/11-12/2483	Vigodi	Nakhatrana	23.47575	69.10385
13	EIL/800/11-12/2587	RamparSarva	Nakhatrana	23.46789	69.08344
14	EIL/800/11-12/2494	RamparSarva	Nakhatrana	23.46995	69.08482
15	EIL/800/11-12/2484	Vigodi	Nakhatrana	23.47102	69.08219
16	EIL/800/11-12/2485	Vigodi	Nakhatrana	23.47334	69.08353
17	EIL/800/11-12/2486	Vigodi	Nakhatrana	23.47239	69.08706
18	EIL/800/11-12/2487	Vigodi	Nakhatrana	23.47539	69.08330
19	EIL/800/11-12/2488	Vigodi	Nakhatrana	23.47627	69.08049
20	EIL/800/11-12/2489	Vigodi	Nakhatrana	23.47745	69.08687
21	EIL/800/11-12/2490	Vigodi	Nakhatrana	23.47913	69.08449
22	EIL/800/11-12/2491	Vigodi	Nakhatrana	23.48041	69.07762
23	EIL/800/11-12/2492	Vigodi	Nakhatrana	23.48258	69.06526
24	EIL/800/11-12/2493	Vigodi	Nakhatrana	23.48057	69.06784
25	EIL/800/11-12/2590	Khirsara (Netra)	Nakhatrana	23.47881	69.06922
26	EIL/800/11-12/2591	Khirsara (Netra)	Nakhatrana	23.47680	69.07072
27	EIL/800/11-12/2589	RamparSarva	Nakhatrana	23.44230	69.07665
28	EIL/800/11-12/2495	RamparSarva	Nakhatrana	23.44020	69.07735
29	EIL/800/11-12/2496	RamparSarva	Nakhatrana	23.43439	69.08006
30	EIL/800/11-12/2497	Bandiya	Abdasa	23.41617	69.02001
31	EIL/800/11-12/2480	KhombhadiNani	Nakhatrana	23.43155	69.13112
32	EIL/800/11-12/2481	KhombhadiNani	Nakhatrana	23.42959	69.13235
33	EIL/800/11-12/2482	KhombhadiNani	Nakhatrana	23.44340	69.11945

Details of Latitude & Longitude for Lalpur Site (District Jamnagar, State- Gujarat):-

Sr. No.	WEG ID NO	Village	Taluka	Latitude (N)	Longitude (E)
1	EIL/800/11-12/2161	NaviPipar	Lalpur	22.15478	69.92386
2	EIL/800/11-12/2162	NaviPipar	Lalpur	22.13751	69.91985
3	EIL/800/11-12/2163	NaviPipar	Lalpur	22.13990	69.92042
4	EIL/800/11-12/2164	NaviPipar	Lalpur	22.15693	69.90534
5	EIL/800/11-12/2165	NaviPipar	Lalpur	22.15503	69.90582
6	EIL/800/11-12/2166	Govana	Lalpur	22.13969	69.89579
7	EIL/800/11-12/2167	Govana	Lalpur	22.14332	69.89474
8	EIL/800/11-12/2168	Govana	Lalpur	22.14399	69.89261
9	EIL/800/11-12/2169	Govana	Lalpur	22.14398	69.88783
10	EIL/800/11-12/2170	Govana	Lalpur	22.13915	69.87166
11	EIL/800/11-12/2171	Govana	Lalpur	22.15328	69.87057
12	EIL/800/11-12/2172	Govana	Lalpur	22.15533	69.87030
13	EIL/800/11-12/2173	Govana	Lalpur	22.15732	69.86990

Sr. No.	WEG ID NO	Village	Taluka	Latitude (N)	Longitude (E)
14	EIL/800/11-12/2174	Govana	Lalpur	22.15861	69.86971
15	EIL/800/11-12/2175	Govana	Lalpur	22.16658	69.86708
16	EIL/800/11-12/2176	Govana	Lalpur	22.16880	69.86664
17	EIL/800/11-12/2177	NaniRafudad	Lalpur	22.18928	69.84754
18	EIL/800/11-12/2178	NaniRafudad	Lalpur	22.19097	69.84445
19	EIL/800/11-12/2179	KanVirdi	Lalpur	22.19205	69.84194
20	EIL/800/11-12/2180	KanVirdi	Lalpur	22.19757	69.84555
21	EIL/800/11-12/2181	Babarzar	Lalpur	22.17319	69.82554
22	EIL/800/11-12/2186	Sanosari	Lalpur	22.06414	69.88709
23	EIL/800/11-12/2187	Sanosari	Lalpur	22.06724	69.89168
24	EIL/800/11-12/2188	Sanosari	Lalpur	22.07579	69.89075
25	EIL/800/11-12/2182	Dharampur	Lalpur	22.12138	69.89119
26	EIL/800/11-12/2183	Dharampur	Lalpur	22.12647	69.89537
27	EIL/800/11-12/2185	Bhangor	Bhanvad	22.12911	69.89381
28	EIL/800/11-12/2184	Dharampur	Lalpur	22.13197	69.90297
29	EIL/800/11-12/2189	Sanosari	Lalpur	22.09688	69.90079
30	EIL/800/11-12/2190	Sanosari	Lalpur	22.09475	69.90079

The Location map of the project activity:



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Vish Wind Infrastruktire LLP (Private entity)	No
Netherlands	ACT Financial Solutions B.V.	No
Switzerland	Statkraft Markets GmbH	No

A.4. Reference to applied methodologies and standardized baselines

Title: Consolidated baseline and monitoring methodology for “Grid-connected electricity generation from renewable sources”

Reference: Approved consolidated baseline methodology ACM0002 (Version 13.0.0, EB 67)

UNFCCC web reference of methodology:

<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

ACM0002 draws upon the following tools which have been used in the PDD:

Tool to calculate the emission factor for an electricity system – Version 2.2.1

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf/history_view

Tool for the demonstration and assessment of additionality – Version 06.0.0

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf/history_view

Crediting period type and duration

Type of crediting period: Fixed

Start date of crediting period: 01/10/2012

Length of crediting period: 10 years

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project activity consists of 63 machines (800 kW) of Enercon make E-53. The first machine under the project activity was commissioned on 02 Oct 2011 and last machine under the project activity was commissioned on 31 Mar 2012. The commissioning dates for all the machines included in the project activity are given in the table below:-

Commissioning details for Kutch Site (District Kutch, State- Gujarat):-

Sr. No.	WEG ID NO	Village	Taluka	Date of commissioning
1	EIL/800/11-12/2469	KhombhadiNani	Nakhatrana	31-Mar-2012
2	EIL/800/11-12/2470	KhombhadiNani	Nakhatrana	31-Mar-2012
3	EIL/800/11-12/2471	KhombhadiNani	Nakhatrana	31-Mar-2012
4	EIL/800/11-12/2472	KhombhadiNani	Nakhatrana	31-Mar-2012
5	EIL/800/11-12/2475	KhombhadiNani	Nakhatrana	31-Mar-2012
6	EIL/800/11-12/2476	KhombhadiNani	Nakhatrana	31-Mar-2012
7	EIL/800/11-12/2473	KhombhadiNani	Nakhatrana	31-Mar-2012
8	EIL/800/11-12/2474	KhombhadiNani	Nakhatrana	31-Mar-2012
9	EIL/800/11-12/2477	KhombhadiNani	Nakhatrana	31-Mar-2012
10	EIL/800/11-12/2478	KhombhadiNani	Nakhatrana	31-Mar-2012
11	EIL/800/11-12/2479	KhombhadiNani	Nakhatrana	31-Mar-2012
12	EIL/800/11-12/2483	Vigodi	Nakhatrana	31-Mar-2012
13	EIL/800/11-12/2587	RamparSarva	Nakhatrana	31-Mar-2012
14	EIL/800/11-12/2494	RamparSarva	Nakhatrana	31-Mar-2012
15	EIL/800/11-12/2484	Vigodi	Nakhatrana	31-Mar-2012
16	EIL/800/11-12/2485	Vigodi	Nakhatrana	31-Mar-2012
17	EIL/800/11-12/2486	Vigodi	Nakhatrana	31-Mar-2012
18	EIL/800/11-12/2487	Vigodi	Nakhatrana	31-Mar-2012
19	EIL/800/11-12/2488	Vigodi	Nakhatrana	31-Mar-2012
20	EIL/800/11-12/2489	Vigodi	Nakhatrana	31-Mar-2012
21	EIL/800/11-12/2490	Vigodi	Nakhatrana	31-Mar-2012
22	EIL/800/11-12/2491	Vigodi	Nakhatrana	31-Mar-2012
23	EIL/800/11-12/2492	Vigodi	Nakhatrana	31-Mar-2012
24	EIL/800/11-12/2493	Vigodi	Nakhatrana	31-Mar-2012

Sr. No.	WEG ID NO	Village	Taluka	Date of commissioning
25	EIL/800/11-12/2590	Khirsara (Netra)	Nakhatrana	31-Mar-2012
26	EIL/800/11-12/2591	Khirsara (Netra)	Nakhatrana	31-Mar-2012
27	EIL/800/11-12/2589	RamparSarva	Nakhatrana	31-Mar-2012
28	EIL/800/11-12/2495	RamparSarva	Nakhatrana	31-Mar-2012
29	EIL/800/11-12/2496	RamparSarva	Nakhatrana	31-Mar-2012
30	EIL/800/11-12/2497	Bandiya	Abdasa	31-Mar-2012
31	EIL/800/11-12/2480	KhombhadiNani	Nakhatrana	31-Mar-2012
32	EIL/800/11-12/2481	KhombhadiNani	Nakhatrana	31-Mar-2012
33	EIL/800/11-12/2482	KhombhadiNani	Nakhatrana	31-Mar-2012

Commissioning details for Lalpur Site (District Jamnagar, State- Gujarat):

Sr. No.	WEG ID NO	Village	Taluka	Date of commissioning
1	EIL/800/11-12/2161	NaviPipar	Lalpur	02-Oct-2011
2	EIL/800/11-12/2162	NaviPipar	Lalpur	02-Oct-2011
3	EIL/800/11-12/2163	NaviPipar	Lalpur	02-Oct-2011
4	EIL/800/11-12/2164	NaviPipar	Lalpur	02-Oct-2011
5	EIL/800/11-12/2165	NaviPipar	Lalpur	02-Oct-2011
6	EIL/800/11-12/2166	Govana	Lalpur	02-Oct-2011
7	EIL/800/11-12/2167	Govana	Lalpur	02-Oct-2011
8	EIL/800/11-12/2168	Govana	Lalpur	02-Oct-2011
9	EIL/800/11-12/2169	Govana	Lalpur	02-Oct-2011
10	EIL/800/11-12/2170	Govana	Lalpur	02-Oct-2011
11	EIL/800/11-12/2171	Govana	Lalpur	02-Oct-2011
12	EIL/800/11-12/2172	Govana	Lalpur	02-Oct-2011
13	EIL/800/11-12/2173	Govana	Lalpur	02-Oct-2011
14	EIL/800/11-12/2174	Govana	Lalpur	02-Oct-2011
15	EIL/800/11-12/2175	Govana	Lalpur	02-Oct-2011
16	EIL/800/11-12/2176	Govana	Lalpur	03-Oct-2011
17	EIL/800/11-12/2177	NaniRafudad	Lalpur	03-Oct-2011
18	EIL/800/11-12/2178	NaniRafudad	Lalpur	03-Oct-2011
19	EIL/800/11-12/2179	KanVirdi	Lalpur	03-Oct-2011
20	EIL/800/11-12/2180	KanVirdi	Lalpur	03-Oct-2011
21	EIL/800/11-12/2181	Babarzar	Lalpur	03-Oct-2011
22	EIL/800/11-12/2182	Dharampur	Lalpur	03-Oct-2011
23	EIL/800/11-12/2183	Dharampur	Lalpur	03-Oct-2011
24	EIL/800/11-12/2184	Dharampur	Lalpur	03-Oct-2011
25	EIL/800/11-12/2185	Bhangor	Bhanvad	03-Oct-2011
26	EIL/800/11-12/2186	Sanosari	Lalpur	02-Oct-2011
27	EIL/800/11-12/2187	Sanosari	Lalpur	02-Oct-2011
28	EIL/800/11-12/2188	Sanosari	Lalpur	02-Oct-2011
29	EIL/800/11-12/2189	Sanosari	Lalpur	02-Oct-2011
30	EIL/800/11-12/2190	Sanosari	Lalpur	02-Oct-2011

Wind World (India) Ltd (erstwhile known as Enercon (India) Ltd., herein after also referred as WWIL) conducts operation and maintenance activities, which are ISO 9001:2008 certified. Referring to the available data, it can be inferred that there have not been any major special events for any of the machines that are included in the project activity. As a part of regular maintenance, the machines are

stopped for mechanical and electrical maintenance for 16 to 18 hours annually and for visual inspection for 6 to 7 hours quarterly. Further, the consolidated performance report of project WEGs during the monitoring period including the down time, machine availability, grid availability, etc. has been submitted to DOE. During the monitoring period, there were no events or situations occurred, which may impact the applicability of the methodology.

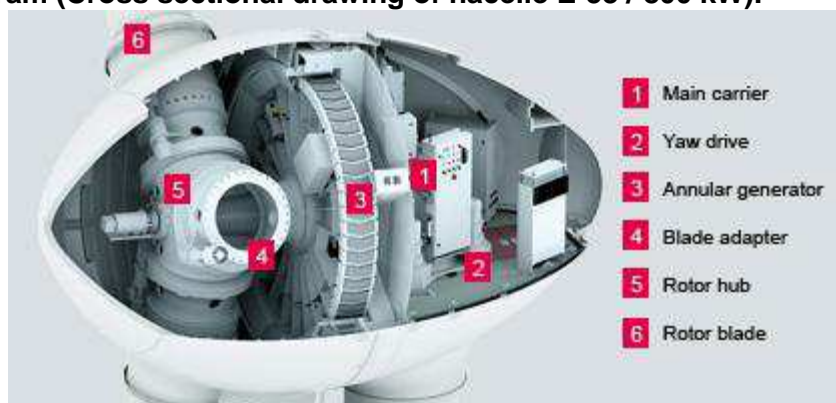
The project activity consists of 63 WEGs of Enercon make E-53 and each machine capacity is of 800 kW (E-53) totaling to the capacity of 50.4 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and connected to 33kV metering points. From 33 kV metering point's electricity transmitted to WWIL Sub-station. At sub-station, electricity is step-up to 132 kV. From WWIL substation, electricity is further evacuated to the state electricity grid at 132kV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V \pm 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 drawl (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.

Figure: E-53 Diagram (Cross sectional drawing of nacelle E-53 / 800 kW).



B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines

Not Applicable.

B.2.2. Corrections

There was a correction regarding the nomenclature used for main (ABT meter) & check meter (GETCO meter) installed at WWIL sub-station and same has been reported under section B.7.1 of revised PDD (version 6, dated 23 July 2013) which has been approved by the board on 25 Oct 2013.

B.2.3. Changes to the start date of the crediting period

Not Applicable.

B.2.4. Inclusion of monitoring plan

Not Applicable.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

PP has made a permanent change in the registered monitoring plan regarding calibration frequency. The change was reported under section B.7.1 of revised PDD (version 6, dated 23 July 2013) which had been approved by UNFCCC on 25 Oct 2013.

B.2.6. Changes to project design

Not Applicable.

SECTION C. Description of monitoring system

WWIL is the O&M contractor for the project activity and is responsible for the maintaining all the monitoring data on behalf of VWIL in respect of the project activity. WWIL has implemented the management structure for managing the monitored data.

The approved monitoring methodology (ACM0002 Version 13.0.0) requires monitoring of the following:

- ✓ Net electricity supplied from the project activity; and
- ✓ Operating margin emission factor and build margin emission factor of the grid.

Since, the ex-ante approach has been followed for the project activity, monitoring of the emission factor value is not required. The sole parameter to be monitored is the amount of net electricity supplied by the project activity to the grid.

Measurement procedures of the net electricity supplied to the grid by the project activity:

The project activity has various clusters and each cluster has exclusively dedicated metering arrangement at project site. These cluster meters are sealed by GEDA (Gujarat Energy Development Agency) and tested once in three years. The Joint meter reading at cluster metering point is taken by the representatives GEDA/GETCO in the presence of WWIL officials in the form of JMR.

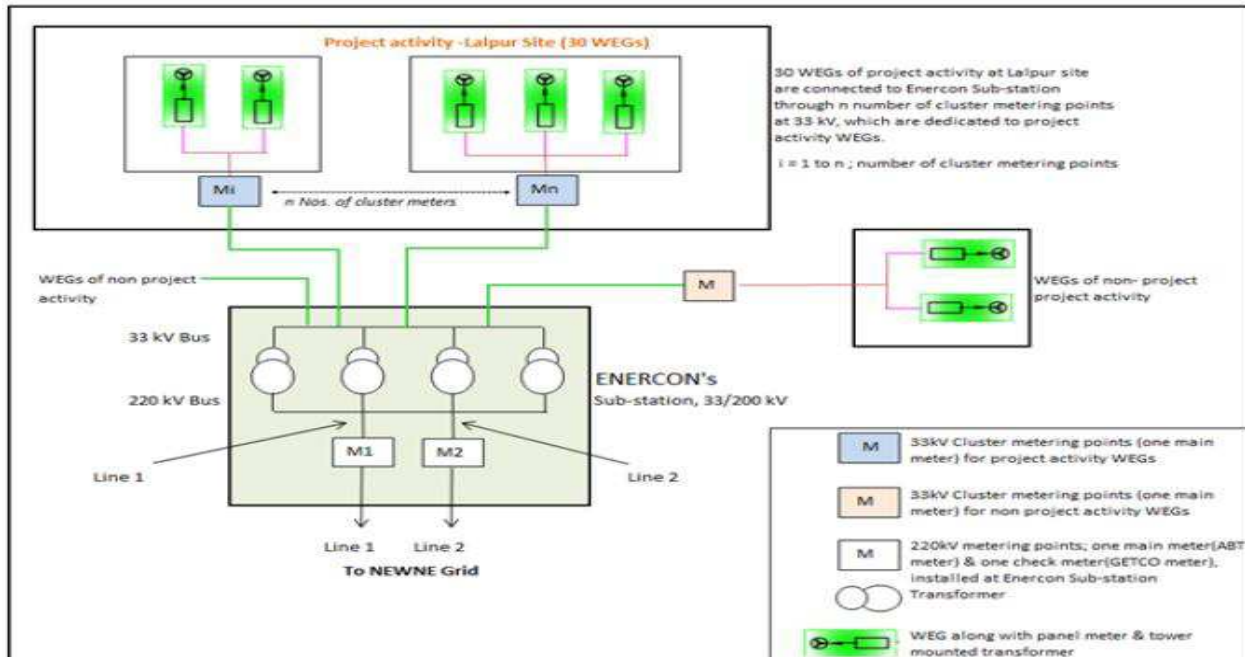
All these cluster meters are connected to the main meter & check meters at the WWIL substation, maintained by WWIL. Main meter is also known as ABT meter while check meter is also known as GETCO meter installed at WWIL sub-station. Both meters (main & check) at sub-station have been installed and are in the custody of GETCO. In further section of the MR, these meters are referred as main and check meter only.

The joint meter reading at main & check meter at sub-stations is taken by the representatives GEDA/GETCO in the presence of WWIL officials in the form of JMR. Cluster meters & substation meters (main & check meter) are tested once in three years. All the JMR are available exclusively with the GEDA/GETCO officials and PP doesn't have a copy of same and based on the JMR readings at cluster meter & main meter, GETCO issues the share certificates to PP. Thus, these share certificates are the source documents for emission reduction calculation.

The 63 WEGs of project activity are located at two different sites. 30 WEGs of project activity are installed at Lalpur site, district Jamnagar while 33 WEGs of the project activity are installed at Kutch

site, district Kutch of Gujarat state. Metering arrangement of project activity at both the site (Lalpur & Kutch) is shown below:-

1) Layout of Metering arrangement for project activity installed at Lalpur site is as follows:

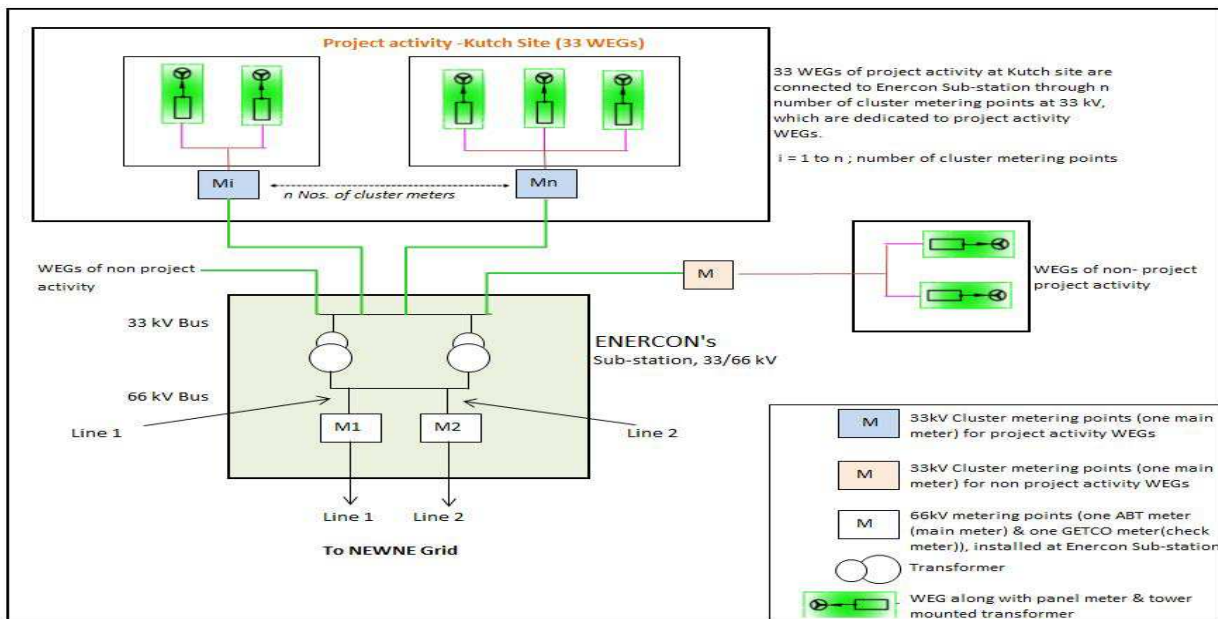


From the above layout it is clear that project activity WEGs (30 Nos.) installed at Lalpur site are connected to various clusters and each cluster have exclusive dedicated metering arrangement at 33kV at project site. These cluster meters are sealed by GEDA. The monthly meter readings at each cluster are taken jointly by WWIL and officials of GEDA.

All these cluster meters for the project activity and non-project activity (non-project activity WEGs also have dedicated clusters) are connected at 220kV WWIL sub-station through 33kV bus. At the sub-station electricity is stepped up from 33 kV to 220kV. Output of 220kV at sub-station is connected to line 1 & line 2². At each line, there is a set of one main & one check meter at the substation. The main & check meter reading is taken by the representatives of GEDA/GETCO in the presence of WWIL officials in the form of JMR. Main & check meter is tested once in three years.

2) Layout of Metering arrangement for project activity installed at Kutch site is as follows:-

² Configuration of line can be changed in future depending on load on sub-station, which is out of PP's control



From the above layout, it is clear that project activity WEGs (33 Nos) installed at Kutch site are connected to various clusters and each cluster have exclusive dedicated metering arrangement at 33kV at project site. These cluster meters are sealed by GEDA. The monthly meter readings at each cluster are taken jointly by WWIL and officials of GEDA.

All these cluster meters for the project activity and non-project activity (non-project activity WEGs also have dedicated clusters) are connected at 66 kV Wind World sub-station through 33kV bus. At Wind World sub-station electricity is stepped from 33kV to 66 kV. Output of 66 kV at sub-station is connected to line 1 & line 2. At each line there is a set of one main & one check meter at WWIL substation. The main meter reading is taken by the representatives GEDA/GETCO in the presence of WWIL officials in the form of JMR. Main & check meter is tested once in three years.

GEDA then apportions the net electricity supplied to the grid at the individual WWIL substations by all the project owners after adjusting transmission loss to the meter readings taken at dedicated cluster meters of different project owners. The electricity from WWIL substation is finally supplied to the utility's substation. The net electricity generated by the project owner is taken directly from the share certificate as provided by GETCO (after apportionment) to the project proponent and is used for calculation of emission reduction.

The apportionment for the project activity is done as follows:

$EG_{ABT, Export}$ = Electricity exported, as recorded by the main meter at WWIL substation

$EG_{ABT, Import}$ = Electricity imported, as recorded by the main meter at WWIL substation

$EG_{Cluster, Export}$ = Electricity exported by the project activity, as measured at Cluster Meter

$EG_{Cluster, Import}$ = Electricity imported by the project activity, as measured at Cluster Meter

$EG_{Cluster, WF, Export}$ = Electricity exported by all the project owners connected to WWIL substation, as measured at Cluster Meter

$EG_{Cluster, WF, Import}$ = Electricity imported by all the project owners connected to WWIL substation, as measured at Cluster Meter

$EG_{facility, Export, y}$ = Electricity exported by the project activity to the grid, calculated

$EG_{facility, Import, y}$ = Electricity imported from the project activity to the grid, calculated

$EG_{facility, y}$ = Quantity of net electricity generation supplied by the project activity to the grid., calculated

Electricity Exported to the Grid by the project activity

$EG_{facility, Export, y} = EG_{ABT, Export} \times EG_{Cluster, Export} / EG_{Cluster, WF, Export}$

Electricity Imported from the Grid by the project activity

$EG_{facility, Import} = EG_{ABT, Import} \times EG_{Cluster, Import} / EG_{Cluster, WF, Import}$

Net Electricity Exported to the grid by the project activity

$EG_{facility, y} = EG_{facility, Export, y} - EG_{facility, Import}$

The apportionment procedure for the project activity is done by GEDA (Gujarat Energy Development Agency) based on the meter readings of the various cluster meters of various project owners connected to WWIL substation and main meter reading recorded at WWIL substation, connecting all the machines of the project activity and other project developers. The meter readings at cluster meters and at Wind World substation are directly monitored and hence, the apportioning of the electricity is done based on the meter reading that are directly measured.

The apportioning procedure is performed by GEDA personnel based on the meter reading taken at cluster meter at project site & meter installed at Wind World sub-station.

In addition to above there is a possibility for the PP to record the values of $EG_{\text{Cluster, Export}}$ and $EG_{\text{Cluster, Import}}$. However, it would be impossible for the PP to collect information of $EG_{\text{Cluster, WF, Export}}$ and $EG_{\text{Cluster, WF, Import}}$. Thus even if $EG_{\text{Cluster, Export}}$ and $EG_{\text{Cluster, Import}}$ is monitored it has no value if the values $EG_{\text{Cluster, WF, Export}}$ and $EG_{\text{Cluster, WF, Import}}$ are not monitored. Hence only quantity of net electricity generation supplied by the project activity to the grid ($EG_{\text{facility,y}}$) by the project activity could be monitored by the PP and this value is sourced from "Certificate for Share of Electricity Generated by Wind farm" prepared & issued by SLDC/GETCO.

QA/ QC procedures:

If during meter testing, the main meter at the WWIL substation is found beyond the permissible limit of error, the meter reading is taken from the check meter. In case both the main & check meters are found beyond the permissible limit of error then meter reading is taken from the main meter located at the utility substation after addition of average historical transmission losses and the meters (main & check) will be calibrated by the state utility.

If during meter testing, the cluster meters are found beyond the permissible limit of error, the sum of panel meter (LCS meter) readings located at each wind turbine of the project activity is provided to GEDA for purpose of apportioning of the net electricity supplied to the grid. WWIL provided the LCS data (sourced from online SCADA system) to GETCO for the period during which cluster meters are found beyond the permissible limit of error.

During the current monitoring period none of the meters were found faulty or beyond the permissible limit of error.

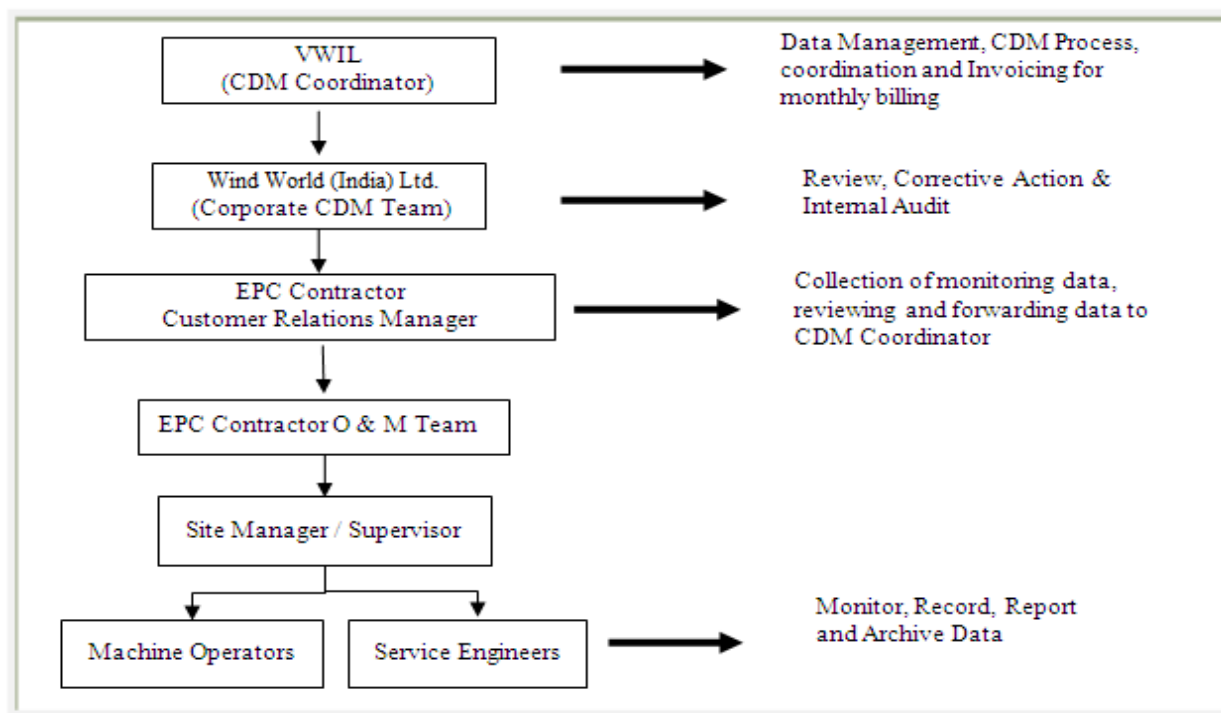
The LCS meters do not require calibration as the energy readings of the electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed at the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the values recorded by the inverting system, the machine will stop working and generate error report.

Procedure to deal with data uncertainty:

During the meter testing, if the meter is found to be outside the permissible limits of the error and if that meter readings have been used in JMR, the (–ve) error value would be applied to net electricity supplied value is applied to all the JMR values since the date of last calibration. The meter would be replaced immediately with new calibrated meter. During the current monitoring period none of meter was found faulty or beyond the permissible limit of error and no error factor was applied on JMR values.

Monitoring roles and responsibilities

The following management structure has been formed for implementation of the monitoring plan and management of the monitored data (Please note that the information flow is from the O&M team to the Managing Director):



Meter Test Checking Details:

The metering equipment were inspected & tested by State Utility once every three years. Meter details & testing details for main meter & check meter installed at WWIL sub-stations are as follows:-

Site	WWIL Sub-station	Line No.	Meter Type	Meter S. No.	Accuracy class	previous dates of testing	Validity
Lalpur	220kV Tebhdha (Dharampur)	Line 1	Main	GJ0947-A	0.2	12/01/2017	11-01-2020
			Check	GJU62417	0.2	12/01/2017	11-01-2020
		Line 2	Main	GJ0950-A	0.2	12/01/2017	11-01-2020
			Check	GJU62418	0.2	12/01/2017	11-01-2020
Kutch	33/66 kV Rasaliya (Kotda Jadoar)	Line 1	Main	GJ0978-A	0.2	31/01/2017	30-01-2020
			Check	GJU63159	0.2	31/01/2017	30-01-2020
		Line 2	Main	GJ0979-A	0.2	31/01/2017	30-01-2020
			Check	GJU63158	0.2	31/01/2017	30-01-2020

The main and check meters are tested for accuracy once in three years by state utility and in case of error; meters are calibrated by state utility. However, during the current monitoring period all the tested meters were functioning and all meters were found under the permissible limit of error and accordingly none of the meter was replaced during the current monitoring period.

In addition to main & check meter at WWIL sub-stations, details of cluster meters connecting to WEGs of Lalpur & Kutch site are as follows:

Cluster meter details for Kutch site:-

S. No.	Loc. No	Meter S. No.	Accuracy Class & Make	Previous Dates of Testing	Validity till date	GEDA ID No.	WEG UID
1	43	GJU64407	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2469	VISHWKC-01
2	44					EIL/800/11-12-2470	VISHWKC-02
3	45					EIL/800/11-12-2471	VISHWKC-03
4	46					EIL/800/11-12-2472	VISHWKC-04
5	51					EIL/800/11-12-2475	VISHWKC-05
6	56					EIL/800/11-12-2476	VISHWKC-06
7	57					EIL/800/11-12-2473	VISHWKC-07
8	58					EIL/800/11-12-2474	VISHWKC-08
9	1003					EIL/800/11-12-2480	VISHWKC-39
10	1004					EIL/800/11-12-2481	VISHWKC-40
11	61	GJU64650	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2477	VISHWKC-09
12	62					EIL/800/11-12-2478	VISHWKC-10
13	63					EIL/800/11-12-2479	VISHWKC-11
14	1006					EIL/800/11-12-2482	VISHWKC-41
15	106	GJU900077	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2483	VISHWKC-12
16	111	GJU64652	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2487	VISHWKC-13
17	112					EIL/800/11-12-2494	VISHWKC-14
18	115					EIL/800/11-12-2486	VISHWKC-17
19	113	GJU64406	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2484	VISHWKC-15
20	114					EIL/800/11-12-2485	VISHWKC-16
21	116					EIL/800/11-12-2487	VISHWKC-18
22	117					EIL/800/11-12-2488	VISHWKC-19
23	118					EIL/800/11-12-2489	VISHWKC-20
24	119					EIL/800/11-12-2490	VISHWKC-21
25	120					EIL/800/11-12-2491	VISHWKC-22
26	123					EIL/800/11-12-2492	VISHWKC-23
27	124					EIL/800/11-12-2493	VISHWKC-24
28	125					EIL/800/11-12-2490	VISHWKC-25
29	126					EIL/800/11-12-2491	VISHWKC-26
30	136	GJU65845	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2489	VISHWKC-36
31	137					EIL/800/11-12-2495	VISHWKC-37
32	140					EIL/800/11-12-2496	VISHWKC-38
33	226	GJU65846	0.2 Secure	18-Aug-17	17-Aug-20	EIL/800/11-12-2497	VISHWKC-47

Cluster meter details for Lalpur site:-

Sl. No	Loc. No	Meter Serial No.	Accuracy Class& make	Previous Dates of Testing	Validity till date	GEDA ID No.	WEG UID
1	60	GJU62414	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2161	VISHWLP-12
2	66	GJU62406	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2162	VISHWLP-13
3	67					EIL/800/11-12/2163	VISHWLP-14
4	72	GJU61312	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2164	VISHWLP-15
5	73					EIL/800/11-12/2165	VISHWLP-16
6	75	GJU61318	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2166	VISHWLP-17
7	76					EIL/800/11-12/2167	VISHWLP-18
8	77					EIL/800/11-12/2168	VISHWLP-19
9	78					EIL/800/11-12/2169	VISHWLP-20
10	79					EIL/800/11-12/2170	VISHWLP-21
11	85	GJU61319	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2171	VISHWLP-22
12	86					EIL/800/11-12/2172	VISHWLP-23

13	87	GJU61308	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2173	VISHWLP-24
14	88					EIL/800/11-12/2174	VISHWLP-25
15	90					EIL/800/11-12/2175	VISHWLP-26
16	91					EIL/800/11-12/2176	VISHWLP-27
17	102	GJU62457	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2177	VISHWLP-28
18	104					EIL/800/11-12/2178	VISHWLP-29
19	105					EIL/800/11-12/2179	VISHWLP-30
20	108					EIL/800/11-12/2180	VISHWLP-31
21	133	GJU62405	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2181	VISHWLP-32
22	353	GJU62463	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2186	VISHWLP-37
23	354	GJU62416	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2187	VISHWLP-38
24	355					EIL/800/11-12/2188	VISHWLP-39
25	372	GJU62411	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2182	VISHWLP-33
26	373	GJU60957	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2183	VISHWLP-34
27	374					EIL/800/11-12/2185	VISHWLP-35
28	378	GJU62415	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2184	VISHWLP-36
29	386	GJU62413	0.2 Secure	13-Sep-17	12-Sep-20	EIL/800/11-12/2189	VISHWLP-40
30	387					EIL/800/11-12/2190	VISHWLP-41

As observed from the above tables, there is no delay in testing for cluster meters installed at both the sites at Jamnagar and Kutch respectively. The current monitoring period falls under the validity period of meter testing, which is within the prescribed three years period from the date of last testing.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	EF _{grid,OM,y}
Unit	tCO ₂ e/MWh
Description	Operating Margin Emission Factor of NEWNE Electricity Grid
Source of data	"CO ₂ Baseline Database for Indian Power Sector", version 6.0 published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO ₂ Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) applied	0.99431
Choice of data or measurement methods and procedures	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.
Purpose of data/parameter	To calculate Baseline Emission.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data/Parameter	EF _{grid,BM,y}
Unit	tCO ₂ e/MWh
Description	Build Margin Emission Factor of NEWNE Electricity Grid
Source of data	"CO ₂ Baseline Database for Indian Power Sector", version 6.0 published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO ₂ Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) applied	0.81231

Choice of data or measurement methods and procedures	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002.
Purpose of data/parameter	To calculate Baseline Emission.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data/Parameter	EF_y or $EF_{grid,CM,y}$
Unit	tCO ₂ e/MWh
Description	Combined Margin Emission Factor of NEWNE Electricity Grid
Source of data	"CO ₂ Baseline Database for Indian Power Sector", version 6.0 published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO ₂ Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) applied	In case of wind power projects default weights of 0.75 for $EF_{grid,OM,y}$ and 0.25 for $EF_{grid,BM,y}$ are applicable as per ACM0002 Version 12.1.0. Combined Margin Emission Factor ($EF_{grid,CM,y}$) = 0.94881
Choice of data or measurement methods and procedures	Combined Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodologies: ACM0002, and Tool to Calculate the emission Factor for an Electricity System.
Purpose of data/parameter	To calculate Baseline Emission.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

D.2. Data and parameters monitored

Data/Parameter	$EG_{facility,y}$
Unit	MWh (Mega-watt hour)
Description	Quantity of net electricity generation supplied by the project activity to the grid in year y.
Measured/calculated/default	Calculated However, the values used for arriving this parameter are continuously measured from the energy meters which are under the direct purview of GETCO.
Source of data	'Certificate for Share of Electricity Generated by Wind farm' prepared & issued by SLDC/GETCO (Gujarat Energy Transmission Corporation Limited) based on the meter reading recorded at cluster meters (installed at project site) & main meter (ABT meter) installed at WWIL sub-station.
Value(s) of monitored parameter	Electricity supplied to the grid during the monitoring period = 88,083.296 ³ MWh
Monitoring equipment	The value is calculated, which is derived from the continuously measured values of energy meters. The details of energy meters are provided under the section C above.
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	The procedures for calculation of net electricity supplied to grid has been followed as per the provisions of the power purchase agreement and details of calculation method has been explained in monitoring plan under section C of monitoring report.

³Detailed calculation and month-wise values have been provided in the ER sheet. Please refer the ER sheet.

QA/QC procedures	All the meters are tested once in three year as per the metering code prevalent in the state of Gujarat & GETCO notification (dated 21.02.2011 & 04.01.2012). The detailed QA/QC procedures have been mentioned in Section C above. The Net Quantity of Electricity exported to the grid are reflected in the Share Certificate issued by GETCO and the same can be cross verified by the sale invoices.
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	The data will be archived for crediting period + 2 years.

D.3. Implementation of sampling plan

Not applicable.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

The Baseline emission for the project activity has been calculated as below:

$$BE_y = EG_{PJ,y} * EF_{grid, CM, y}$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{grid, CM, y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y ; calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh)

Baseline emission factor (Combined Margin) ($EF_{grid, CM, y}$) = 0.94881 tCO₂e/MWh

Since the project activity is the installation of a new grid connected renewable power plant,

$$EG_{PJ,y} = EG_{facility,y}$$

Where $EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

Therefore, annual Baseline Emissions (BE_y) = $EG_{PJ,y} * EF_{grid, CM, y}$
 $= EG_{facility,y} * EF_{grid, CM, y}$

Baseline Emission Reductions calculation for project activity:-

Duration	Quantity of net electricity generation supplied by the project activity to the grid in year y [MWh]	Baseline Emission Factor (tCO ₂ e/MWh)	Baseline Emissions (tCO ₂ e)
	[$EG_{facility,y}$]	[EF_y]	[BE_y] = [$EG_{facility,y}$] * [EF_y]
01 April 2017 to 31 Mar 2018	88,083.296	0.94881	83,574 ⁴

In the emission reduction excel spreadsheet, the baseline emissions for the current monitoring period have been calculated as the sum of the monthly baseline emissions. To be conservative, the final value (i.e. the sum of monthly values of baseline emissions) has been rounded down, hence the final value arrived is conservative. Please refer the spreadsheet for the calculations of baseline emission and emission reductions for the current monitoring period.

⁴ Refer ER Sheet for detailed calculations and values used for ERs.

E.2. Calculation of project emissions or actual net removals

Since the project activity is a renewable energy project which generates electricity using wind power and hence does not result in project emissions.

E.3. Calculation of leakage emissions

No leakage is considered from the project activity as per approved methodology ACM0002.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	83,574	0	0	NA	83,574	83,574

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante (t CO ₂ e)
83,574	101,234 ⁵

E.6. Remarks on increase in achieved emission reductions

The CERs for the current monitoring period is 17.44% lower than the estimated value in the PDD. This is primarily due to seasonal nature of wind power projects where actual achieved PLF of the project was lower than the projection.

As shown in the ER estimation sheet, the PLF of project activity for the current monitoring period (i.e. 1 April 2017 to 31 Mar 2018) comes out to be 19.95%. The PLF projection as per the revised approved PDD was 23.8% for Lalpur site & 24.5% for Kutch site.

⁵ The annual (i.e. 365 days) estimated volume of CERs as per registered PDD = 101,234 tCO₂e. The total nos. of days included in this mentoring period = 365. Thus, to calculate the ex-ante estimated value corresponds to this monitoring period, the annual projected value of the registered PDD has been considered.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	<input type="checkbox"/> Project participant <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	Vish Wind Infrastrukture LLP
Street/P.O. Box	A-9, Veera Industrial Estate, Veera Desai Road, Andheri (W)
Building	Wind World Tower
City	Mumbai
State/region	Maharashtra
Postcode	400 053
Country	India
Telephone	+91-22 - 6692 4848
Fax	+91-22 – 67040473
E-mail	yogeshh.mehra@windworldindia.com
Website	
Contact person	
Title	Designated Partner
Salutation	Mr.
Last name	Mehra
Middle name	
First name	Yogeshh
Department	Corporate
Mobile	
Direct fax	+91-22-6692 4848
Direct tel.	+91-22-67040473
Personal e-mail	yogeshh.mehra@windworldindia.com

Appendix 2. Baseline Information

The Operating Margin data for the most recent three years and the Build Margin data for the NEWNE Grid as published in the “Baseline Carbon dioxide Emission Database”⁴, Version 6.0, 1st March, 2011, published by Central Electricity Authority (CEA), Government of India, have been used for the estimation of the Baseline Emission. The Operating Margin data for the most recent three years and the Build Margin data for the NEWNE are as follows:

Simple Operating Margin		
	NEWNE Grid (tCO ₂ e/MWh)	Net Generation Total (MWh)
Simple Operating Margin – 2007-08	0.99990	496.119
Simple Operating Margin – 2008-09	1.00655	510.693
Simple Operating Margin – 2009-10	0.97774	544.915
Weighted Average Operating Margin *		0.99431

**Calculated as per Option A, i.e. generation weighted average CO₂ emissions per unit electricity generation has been used*

Build Margin	
	NEWNE Grid (tCO ₂ e/MWh)
Build Margin- 2009-10	0.81231

Combined Margin Calculations		
	Weights	NEWNE Grid (tCO ₂ e/MWh)
Weighted Average Operating Margin	0.75	0.99431
Build Margin	0.25	0.81231
Combined Margin		0.94881

⁴ http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver6.pdf

Appendix 3. Monitoring Information

Detailed metering information has been provided in the section C.

Meter Reading

- The net electricity supplied to the grid is taken directly from the share certificate for net electricity generated provided by GETCO.
 - The meter reading is taken jointly at WWIL sub-station & cluster metering points by representatives of Wind World and GEDA/GETCO located at WWIL substation. The main & check meters are connected to the wind turbines of the project activity and the wind turbines of the other project owners. Therefore GETCO provides the share certificate that apportions the net electricity generated by the project owners.
 - The Cluster meters are provided exclusively to all the project owners having installed wind turbines at the wind farm

Testing

- Both Main meter (accuracy class 0.2) & Check meter (accuracy class 0.2) at both WWIL Substations (220kV & 66kV) is tested and calibrated once in three years.
- All cluster meters (accuracy class 0.2) connected to the WEGs of project activity are tested once every three years as per the provisions fixed with utility. However, in this current monitoring period there was delay in meter calibration for Lalpur site, hence correction factor has been applied across the delay period. The information and correction factor application are included in the ER sheet (version 2).

Data recording

- The meter recording at the sub-station meters (main & check meter) at WWIL substation and the cluster meters of the project activity is continuously monitored and recorded on monthly basis.
- The sub-station meters (main & check) & all the cluster meters are electronic and two-way (bi- directional) meters that measure both export and import of electricity and provide net electricity exported to the grid.

All the monitored data will be recorded and filed electronically and in hard format, for 2 years beyond the crediting period (i.e. 10+2 years).