MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 2 and Date 25/04/2012
Title: Vaayu India Wind Power Project in Gujarat
Project Reference No: 4700
Monitoring Period I - From 01/06/2011 to 29/02/2012 (including first and last day)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

>>
The project activity includes development, design, engineering, procurement, finance, construction, operation and maintenance of Vaayu 51.2 MW wind power project ("Project") in the Indian state of Gujarat to provide reliable, renewable power to the Gujarat state electricity grid which is part of the NEWNE regional electricity grid. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from grid connected fossil fuel based electricity generation plants.

The Project involves 64 wind energy converters (WECs) of Enercon make (800 kW E-53) with internal electrical lines connecting the Project with local evacuation facility. The specifications of E-53 machine are given in section A.4 of the monitoring report.

The machines under the project activity were commissioned on 25th June 2010, 12th July 2010, 14th February 2011, 18th February 2011, 5th March 2011, 18th March 2011, 4th May 2011, 6th May 2011, 24th May 2011, 10th June 2011, 27th June 2011 & 4th July 2011.. The expected operational lifetime of the project is for 20 years. The total emission reductions achieved under this monitoring period (1st June 2011 to 29th February 2012) is 61,182 tCO_2.

A.2. Project Participants

>>
Vaayu (India) Power Corporation Private Limited

A.3. Location of the project activity:

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The project area extends between latitude 21° 55' and 22° 08' North and longitude 70° 05' and 70° 19' East.

The Project is connected to Sadodar substation at Jamnagar District in Gujarat. The Project is spread across villages Chattar, Narmana, Seth Wadala, Jam Ambardi, Mevasa, Dhun Dhoraji, Sadodar, Bodi, Padavala and Machharda in Jamnagar and Rajkot Districts of Gujarat state in India The information in regard of the Wind Energy Generators i.e. WTG-ID No., location number & latitude & longitude are defined in the table as follows:

Sr. No.	Location No	WTG-ID No.	Village	Latitude	Longitude
1	3020	EIL/800/10-11/1826	Machharda	N22 O 06' 19.0"	E70 O 18' 45.7"
2	3021	EIL/800/10-11/1827	Machharda	N22 O 06' 23.5"	E70 O 18' 43.7"
3	3022	EIL/800/10-11/1828	Machharda	N22 O 06' 29.7"	E70 O 18' 44.6"
4	3072	EIL/800/09-10/1738	Padavala	N21 O 57' 19.6"	E70 O 15' 05.0"
5	3073	EIL/800/09-10/1739	Padavala	N21 O 57' 14.9"	E70 O 15' 11.7"

Sr. No.	Location No	WTG-ID No.	Village	Latitude	Longitude
6	3075	EIL/800/09-10/1740	Padavala	N21 ^{O} 56’43.1”	E70 ^{O} 15’ 20.6”
7	3076	EIL/800/09-10/1741	Padavala	N21 ^{O} 55’ 59.2”	E70 ^{O} 15’ 33.7”
8	3088	EIL/800/09-10/1742	Padavala	N21 ^{O} 56’ 19.3”	E70 ^{O} 14’ 38.0”
9	62	EIL/800/09-10/1766	Chattar	N22 ^{O} 07’ 40.2”	E70 ^{O} 15’ 10.7”
10	63	EIL/800/09-10/1767	Chattar	N22 ^{O} 07’ 46.6”	E70 ^{O} 15’00.6”
11	64	EIL/800/09-10/1768	Chattar	N22 ^{O} 07’ 53.3”	E70 ^{O} 14’ 57.1”
12	539	EIL/800/09-10/1789	Seth Wadala	N22 ^{O} 04’ 46.7”	E70 ^{O} 05’ 34.3”
13	540	EIL/800/09-10/1790	Seth Wadala	N22 ^{O} 04’ 33.3”	E70 ^{O} 05’ 43.1”
14	541	EIL/800/09-10/1791	Seth Wadala	N22 ^{O} 04’ 27.4”	E70 ^{O} 05’ 47.6”
15	543	EIL/800/09-10/1792	Seth Wadala	N22 ^{O} 04’ 17.3”	E70 ^{O} 05’ 53.7”
16	544	EIL/800/09-10/1793	Seth Wadala	N22 ^{O} 04’ 13.5”	E70 ^{O} 06’ 00.7”
17	545	EIL/800/09-10/1794	Seth Wadala	N22 ^{O} 03’ 31.5”	E70 ^{O} 05’ 32.6”
18	546	EIL/800/09-10/1795	Jam Ambardi	N22 ^{O} 03’ 40.2”	E70 ^{O} 05’ 31.0”
19	547	EIL/800/09-10/1796	Jam Ambardi	N22 ^{O} 03’ 45.3”	E70 ^{O} 05’ 31.9”
20	548	EIL/800/09-10/1797	Jam Ambardi	N22 ^{O} 03’ 50.7”	E70 ^{O} 05’ 34.2”
21	903	EIL/800/09-10/1747	Mevasa/Haripar	N22 ^{O} 01’ 23.0”	E70 ^{O} 15’ 35.2”
22	904	EIL/800/09-10/1748	Mevasa/Haripar	N22 ^{O} 01’ 30.2”	E70 ^{O} 15’ 41.0”
23	905	EIL/800/09-10/1749	Mevasa/Haripar	N22 ^{O} 01’ 36.6”	E70 ^{O} 15’ 27.2”
24	906	EIL/800/09-10/1750	Mevasa/Haripar	N22 ^{O} 01’ 30.7”	E70 ^{O} 14’ 55.0”
25	907	EIL/800/09-10/1751	Mevasa/ Haripar	N22 ^{O} 01’ 37.9”	E70 ^{O} 14’ 56.8”
26	908	EIL/800/09-10/1752	Mevasa/ Haripar	N22 ^{O} 01’ 44.8”	E70 ^{O} 14’ 54.1”
27	909	EIL/800/09-10/1753	Mevasa/ Haripar	N22 ^{O} 01’ 51.2”	E70 ^{O} 14’ 51.2”
28	910	EIL/800/09-10/1754	Mevasa/ Haripar	N22 ^{O} 01’ 57.7”	E70 ^{O} 14’ 55.7”
29	912	EIL/800/09-10/1746	Dhun Dhoraji	N22 ^{O} 02’ 09.1”	E70 ^{O} 15’ 04.4”
30	926	EIL/800/09-10/1769	Chattar	N22 ^{O} 06’ 57.6”	E70 ^{O} 16’ 33.0”

Sr. No.	Location No	WTG-ID No.	Village	Latitude	Longitude
31	927	EIL/800/09-10/1770	Chattar	N22 ^{O} 06’ 59.3”	E70 ^{O} 16’ 23.3”
32	928	EIL/800/09-10/1771	Chattar	N22 ^{O} 07’ 10.0”	E70 ^{O} 16’ 16.5”
33	929	EIL/800/09-10/1772	Chattar	N22 ^{O} 07’ 15.9”	E70 ^{O} 16’ 11.3”
34	931	EIL/800/10-11/1870	Chattar	N22 ^{O} 07’ 12.7”	E70 ^{O}15’ 23.5”
35	932	EIL/800/09-10/1773	Chattar	N22 ^{O} 07’ 05.5”	E70 ^{O} 15’ 27.2”
36	933	EIL/800/09-10/1774	Chattar	N22 ^{O} 06’ 59.3”	E70 ^{O} 15’ 31.5”
37	934	EIL/800/09-10/1775	Chattar	N22 ^{O} 06’ 53.9”	E70 ^{O} 15’ 27.9”
38	935	EIL/800/09-10/1776	Chattar	N22 ^{O} 06’ 46.0”	E70 ^{O} 15’ 22.7”
39	936	EIL/800/09-10/1777	Chattar	N22 ^{O} 06’ 40.3”	E70 ^{O} 15’ 25.7”
40	937	EIL/800/09-10/1778	Chattar	N22 ^{O} 07’ 27.2”	E70 ^{O} 15’ 26.6”
41	938	EIL/800/09-10/1779	Chattar	N22 ^{O} 06’ 25.7”	E70 ^{O} 15’ 22.1”
42	939	EIL/800/09-10/1760	Jamvadi	N22 ^{O} 08’ 07.2”	E70 ^{O} 18’ 57.8”
43	941	EIL/800/09-10/1761	Jamvadi	N22 ^{O} 08’ 19.5”	E70 ^{O} 19’ 02.3”
44	942	EIL/800/09-10/1762	Jamvadi	N22 ^{O} 08’ 08.6”	E70 ^{O} 19’ 30.2”
45	943	EIL/800/09-10/1763	Jamvadi	N22 ^{O} 08’ 00.9”	E70 ^{O} 19’ 25.4”
46	944	EIL/800/09-10/1764	Jamvadi	N22 ^{O} 07’ 53.9”	E70 ^{O} 19’ 26.0”
47	945	EIL/800/09-10/1765	Jamvadi	N22 ^{O} 07’49.5”	E70 ^{O} 19’ 31.4”
48	947	EIL/800/09-10/1755	Moti Vavdi	N22 ^{O} 06’ 04.0”	E70 ^{O} 18’ 16.9”
49	948	EIL/800/09-10/1756	Moti Vavdi	N22 ^{O} 05’ 57.0”	E70 ^{O} 18’ 17.8”
50	950	EIL/800/09-10/1757	Moti Vavdi	N22 ^{O} 05’ 45.7”	E70 ^{O} 18’ 21.5”
51	951	EIL/800/09-10/1758	Moti Vavdi	N22 ^{O} 05’ 38.3”	E70 ^{O} 18’ 18.4”
52	952	EIL/800/09-10/1759	Moti Vavdi	N22 ^{O} 05’ 31.6”	E70 ^{O} 18’ 16.9”
53	958	EIL/800/09-10/1743	Dhun Dhoraji	N22 ^{O} 02’ 32.4”	E70 ^{O} 16’ 42.8”
54	959	EIL/800/09-10/1744	Dhun Dhoraji	N22 ^{O} 02’ 26.2”	E70 ^{O} 16’ 44.6”
55	960	EIL/800/09-10/1745	Dhun Dhoraji	N22 ^{O} 02’ 19.0”	E70 ^{O} 16’ 44.4”
56	992	EIL/800/09-10/1782	Sadodar	N22 ^{O} 03’ 13.6”	E70 ^{O} 10’ 37.3”
57	993	EIL/800/09-	Sadodar	N22 ^{O} 03’ 09.5”	E70 ^{O} 10’ 40.0”

Sr. No.	Location No	WTG-ID No.	Village	Latitude	Longitude
		10/1783			
58	994	EIL/800/09-10/1784	Sadodar	N22 ^{O} 02' 59.6"	E70 ^{O} 10' 36.4"
59	995	EIL/800/09-10/1785	Sadodar	N22 ^{O} 02' 54.2"	E70 ^{O} 10' 33.5"
60	996	EIL/800/09-10/1786	Sadodar	N22 ^{O} 02' 47.4"	E70 ^{O} 10' 22.2"
61	997	EIL/800/09-10/1787	Sadodar	N22 ^{O} 02' 41.3"	E70 ^{O} 10' 32.4"
62	1028	EIL/800/09-10/1788	Seth Wadala	N22 ^{O} 03' 06.0"	E70 ^{O} 08' 36.9"
63	1045	EIL/800/09-10/1780	Bodi	N22 ^{O} 08' 43.4"	E70 ^{O} 15' 11.4"
64	1046	EIL/800/09-10/1781	Bodi	N22 ^{O} 08' 48.8"	E70 ^{O} 15' 08.5"

A.4. Technical description of the project

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The project activity involves 64 numbers wind energy converters (WECs) of Enercon make (800 kW, E-53) with internal electrical lines connecting the project activity with local evacuation facility. The WECs generate 3-phase power at 400V, which is stepped up to 33 kV. The E-53 WECs can operate in the frequency range of 46–54 Hz. As per the specification of WEC the output voltage of WEC is 400V as specified by manufacture. The average life time of the WEC is around 20 years as per the equipment supplier specifications. The technology employed is environmentally safe and sound since project activity doesn't uses fossil fuel for electricity generation though project activity uses wind as source of energy and there is no project emission or leakage into the environment. Enercon (India) Limited wind turbines are equipped with state-of-the-art microelectronic control technology produced in-house at our Daman plant (http://www.enerconindia.net/electricals.jsp). Wind has considerable amount of kinetic energy when blowing at high speed. When this kinetic energy passes through the blades of the WEGs, it rotates the blades and producing the electrical energy.

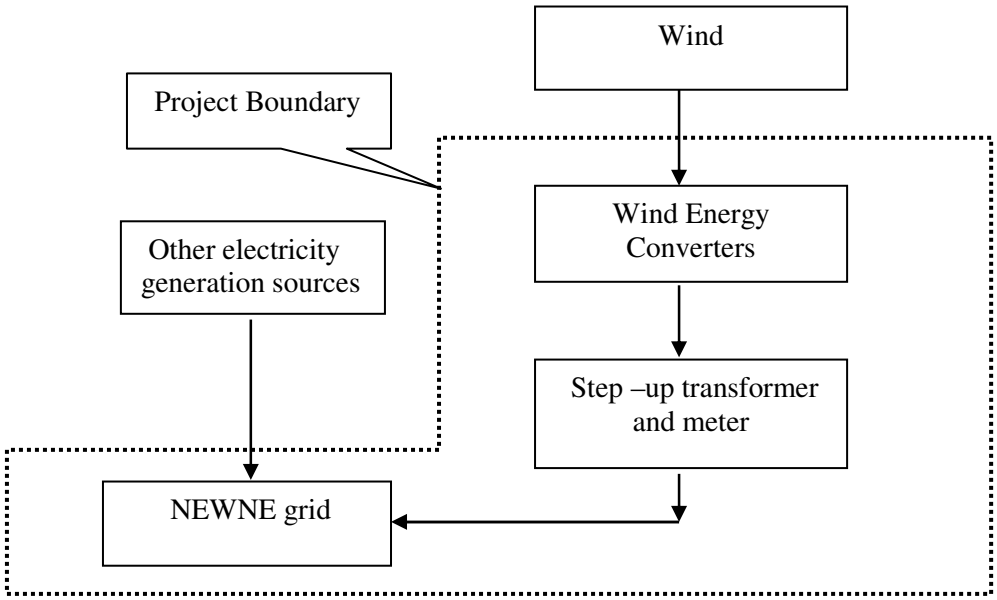
The other salient features of the state-of-art-technology are mentioned below:

E 53 Specifications

Parameter	Value
Turbine model	Enercon E- 53
Rated power	800 kW
Rotor 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

Parameter	Value
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	Gear less
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

Schematic Diagram of the Project Activity:



Enercon has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, Enercon has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.

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

[1] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

>>

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

Reference: Approved consolidated baseline methodology ACM0002 (Version 11, EB 52)

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

- Tool to calculate the emission factor for an electricity system – Version 02
- Tool for the demonstration and assessment of additionality – Version 5.2

Further information with regards to the methodology / tools can be obtained at http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

A.6. Registration date of the project activity:

>>

The project has been registered with UNFCCC on 9th May 2011

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

>>

Crediting period of the project activity as per registered PDD is from 1st June 2011 to 31st May 2021 (10 years, Fixed). The monitoring period considered under this monitoring report is from 1st June 2011 to 29th February 2012.

A.8. Name of responsible person(s)/entity(ies):

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Contact Information of Vaayu (India) Power Corporation Private Limited is given in the table below:

Organization:	Vaayu (India) Power Corporation Private Limited
Street/P.O.Box:	Plot No. 33, Daman Patalia Road
Building:	
City:	Bhimpore
State/Region:	Daman (UT)
Postfix/ZIP:	396210
Country:	India
Telephone:	+91-260-2220624, 2220628
FAX:	+91-260-2221508
E-Mail:	yogesh.mehra@enerconindia.net
URL:	
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Mehra
Middle Name:	
First Name:	Yogesh
Department:	Corporate
Mobile:	+91-98200 40301
Direct FAX:	+91-260-2221508
Direct tel:	+91-22-22-6702 2832 extn. 7111
Personal E-Mail:	yogesh.mehra@enerconindia.net

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The first WEC under the project activity was commissioned on 25th June 2010 and last WEC under the project activity was commissioned on 4th July 2011. The commissioning date for all the WECs included in the project activity is given in the table below.

Sr. No.	Location No	WTG-ID No.	Commissioning Date
1	3020	EIL/800/10-11/1826	12th Jul 10
2	3021	EIL/800/10-11/1827	12th Jul 10
3	3022	EIL/800/10-11/1828	12th Jul 10
4	3072	EIL/800/09-10/1738	25th Jun 10
5	3073	EIL/800/09-10/1739	25th Jun 10
6	3075	EIL/800/09-10/1740	25th Jun 10
7	3076	EIL/800/09-10/1741	25th Jun 10
8	3088	EIL/800/09-10/1742	25th Jun 10
9	62	EIL/800/09-10/1766	27th Jun 11
10	63	EIL/800/09-10/1767	4th Jul 11
11	64	EIL/800/09-10/1768	4th Jul 11
12	539	EIL/800/09-10/1789	14th Feb 11
13	540	EIL/800/09-10/1790	14th Feb 11
14	541	EIL/800/09-10/1791	14th Feb 11
15	543	EIL/800/09-10/1792	18th Feb 11
16	544	EIL/800/09-10/1793	14th Feb 11
17	545	EIL/800/09-10/1794	18th Feb 11
18	546	EIL/800/09-10/1795	18th Mar 11
19	547	EIL/800/09-10/1796	18th Feb 11
20	548	EIL/800/09-10/1797	18th Feb 11
21	903	EIL/800/09-10/1747	4th May 11
22	904	EIL/800/09-10/1748	4th May 11

Sr. No.	Location No	WTG-ID No.	Commissioning Date
23	905	EIL/800/09-10/1749	4th May 11
24	906	EIL/800/09-10/1750	5th Mar 11
25	907	EIL/800/09-10/1751	5th Mar 11
26	908	EIL/800/09-10/1752	5th Mar 11
27	909	EIL/800/09-10/1753	5th Mar 11
28	910	EIL/800/09-10/1754	5th Mar 11
29	912	EIL/800/09-10/1746	14th Feb 11
30	926	EIL/800/09-10/1769	10th Jun 11
31	927	EIL/800/09-10/1770	10th Jun 11
32	928	EIL/800/09-10/1771	10th Jun 11
33	929	EIL/800/09-10/1772	10th Jun 11
34	931	EIL/800/10-11/1870	10th Jun 11
35	932	EIL/800/09-10/1773	10th Jun 11
36	933	EIL/800/09-10/1774	10th Jun 11
37	934	EIL/800/09-10/1775	10th Jun 11
38	935	EIL/800/09-10/1776	10th Jun 11
39	936	EIL/800/09-10/1777	27th Jun 11
40	937	EIL/800/09-10/1778	27th Jun 11
41	938	EIL/800/09-10/1779	27th Jun 11
42	939	EIL/800/09-10/1760	24th May 11
43	941	EIL/800/09-10/1761	24th May 11
44	942	EIL/800/09-10/1762	24th May 11
45	943	EIL/800/09-10/1763	24th May 11
46	944	EIL/800/09-10/1764	24th May 11
47	945	EIL/800/09-10/1765	24th May 11
48	947	EIL/800/09-10/1755	6th May 11
49	948	EIL/800/09-10/1756	6th May 11

Sr. No.	Location No	WTG-ID No.	Commissioning Date
50	950	EIL/800/09-10/1757	6th May 11
51	951	EIL/800/09-10/1758	6th May 11
52	952	EIL/800/09-10/1759	6th May 11
53	958	EIL/800/09-10/1743	4th May 11
54	959	EIL/800/09-10/1744	4th May 11
55	960	EIL/800/09-10/1745	4th May 11
56	992	EIL/800/09-10/1782	18th Mar 11
57	993	EIL/800/09-10/1783	18th Mar 11
58	994	EIL/800/09-10/1784	18th Mar 11
59	995	EIL/800/09-10/1785	18th Mar 11
60	996	EIL/800/09-10/1786	18th Mar 11
61	997	EIL/800/09-10/1787	18th Mar 11
62	1028	EIL/800/09-10/1788	4th May 11
63	1045	EIL/800/09-10/1780	4th Jul 11
64	1046	EIL/800/09-10/1781	4th Jul 11

The information regarding the actual operation of the project

The project activity consists of 64 WECs (800 kW) of Enercon make E-53 totaling to a capacity of 51.2 MW. During the monitoring period, the WECs were operating normally. No major breakdown was found during this monitoring period.

Enercon (India) limited is responsible for operation and maintenance activities for this project. Enercon (India) limited operation and maintenance activities are ISO 9001:2008 certified and all the events are recorded in the log book available at the project site. Referring to the data available it can be inferred that there have not been any major special events for any of the WECs that are included in the project activity. As a part of regular maintenance the WECs are stopped for mechanical, electrical, grease and visual maintenance. Detailed maintenance procedures of the WECs are mentioned below:

Description of maintenance intervals:

There is a pre-defined maintenance schedule for annual maintenance for all the WECs at project site. There are four types of maintenance activity have been executed for all the WECs. During maintenance, WEC needs to stop for defined time period which are as follows:

1) Visual maintenance : Average 3 to 4 hr stoppage of WEC
2) Grease maintenance : Average 3 to 4 hr stoppage of WEC
3) Electrical maintenance : Average 16 to 20 hr stoppage of WEC

4) Mechanical maintenance: Average 16 to 20 hr stop of WEC

Other than the above mentioned maintenance activity, WEC were generating electricity continuously without any technical fault. Hence no break down has been noted during the monitoring period. Except scheduled maintenance, during the monitoring period, no such incident occurred which stopped the project activity and impact the additionality.

Further, the land of the project activity was belonged to the Vish Wind Infrastructure LLP. During the implementation of the project, Vish Wind Infrastructure LLP leased out the land to Vaayu (India) Power Corporation Private Limited. The application regarding request for transfer of land lease pertaining to "Vaayu India power project in Gujarat" project in favor of Vaayu (India) Power Corporation Private Limited to Forest & Environment Department, Govt of India has been submitted on 7th July 2011.

B.2. Revision of the monitoring plan

>>
Not applicable

B.3. Request for deviation applied to this monitoring period

>>
Not applicable

B.4. Notification or request of approval of changes

>>
Not Applicable

SECTION C. Description of the monitoring system

>>
Approved monitoring methodology ACM0002 Version 11 Sectoral Scope: 1, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

Enercon (India) Limited is the O&M contractor for the project activity. Enercon (India) Limited will be responsible for maintaining all the monitoring data on behalf of VIPCPL in respect of the project activity. Enercon (India) Limited has implemented the management structure for managing the monitored data.

The approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex post* determination of grid emission factor has been chosen

Since the baseline methodology is based on ex ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required. Further, wind based electricity generation is not associated with any kind of leakages.

The project activity have various clusters and each cluster has exclusive metering arrangement and the meter readings taken at these metering points have been provided by the representatives of Enercon to GEDA.

Enercon substation at Sadodar has main meter(s) also known as revenue meter which is connected to wind turbines installed by the project proponent and wind turbines installed by other project owners. Gujarat Electricity Development Authority (GEDA) apportion the net electricity supplied to the grid at the Enercon substation to all the project owners after adjusting transmission loss to the meter readings taken at dedicated cluster meters of different project owners. The meter reading is being taken jointly by the representatives of Enercon and GEDA/GETCO in the form of JMR. The electricity from Enercon's substation has been finally supplied to the utility's substation at Moti Paneli. The net electricity

generated by the project owners is being provided by GETCO in the share certificate of electricity generated. The value of the net electricity generated by the project activity has been taken directly by the project proponent from the share certificate provided by GETCO for calculation of emission reductions.

The allocation plan for the project activity is given below:-

$EG_{GETCO, Export}$ = Electricity exported, as recorded by the main meter at Enercon substation
$EG_{GETCO, Import}$ = Electricity imported, as recorded by the main meter at Enercon 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 Enercon substation, as measured at Cluster Meter
$EG_{Cluster, WF, Import}$ = Electricity imported by all the project owners connected to Enercon substation, as measured at Cluster Meter
$EG_{PJ,export,y}$ = Electricity exported by the project activity to the grid, calculated
$EG_{PJ,import,y}$ = Electricity imported from the project activity to the grid, calculated
$EG_{PJ,y}$ = Net Electricity exported by the project activity to the grid, calculated

Electricity Exported to the Grid by the project activity

$EG_{PJ,export,y} = EG_{GETCO, Export} \text{ X } EG_{Cluster, Export} / EG_{Cluster, WF, Export}$

Electricity Imported from the Grid by the project activity

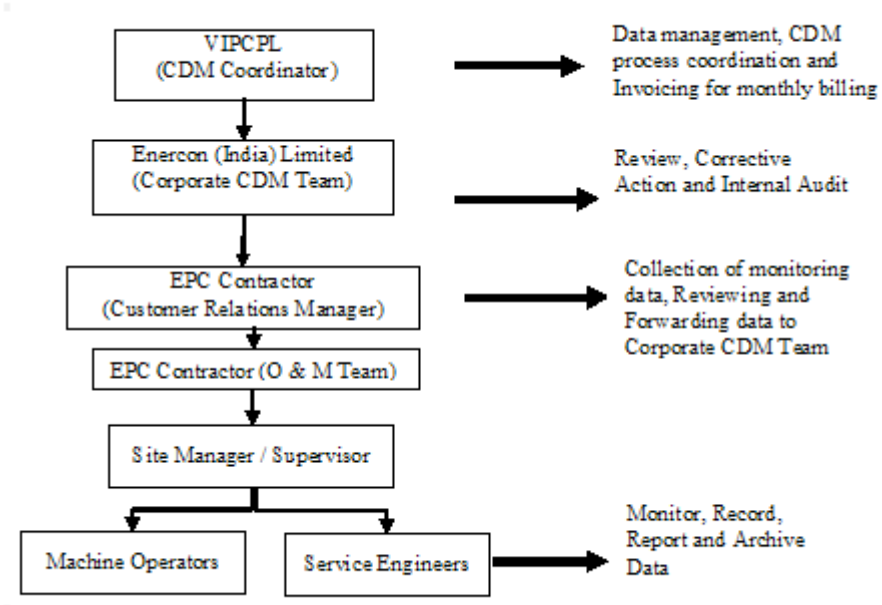
$EG_{PJ,Import,y} = EG_{GETCO, Import} \text{ X } EG_{Cluster, Import} / EG_{Cluster, WF, Import}$

Net Electricity Exported to the grid by the project activity

$EG_{PJ,y} = EG_{PJ,export,y} - EG_{PJ,Import,y}$

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

The operational and management structure implemented for data monitoring is as follows:



The reading is monitored continuously by the online monitoring station (online monitoring station is located at the project site where all the data [historical and instantaneous] from the LCS or panel meters of all WECs is retrieved) at the project site. In case of data loss, the data can be archived from this online monitoring system.

The data (electricity supplied to the grid) will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period.

Training imparted to the Personnel

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that Enercon's service staffs is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The Enercon Training Academy provides need-based training to meet the training requirements of Enercon projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.

Calibration Details

The metering equipments were inspected & calibrated by state utility. Meter details for the main meters/GETCO meters are as follows:-

Name of EIL Substation	(Main Meter/GETCO Meter)Meter Serial No	Type/ Make	Accuracy Class	Frequency of Calibration	Calibration Dates		
					Previous Calibration 2010	Present Calibration 2012	Calibration Due on
Sadodar S/s	GJB01470	Secure	0.2	Annual	22th Jan10	17th Jan 12	16th Jan 13
	GJU04175	Secure	0.2	Annual	22th Jan10	17th Jan 12	16th Jan 13
	GJU04176	Secure	0.2	Annual	22th Jan10	17th Jan 12	16th Jan 13
	KAB11082	Secure	0.2	Annual	29th May 10	17th Jan 12	16th Jan 13

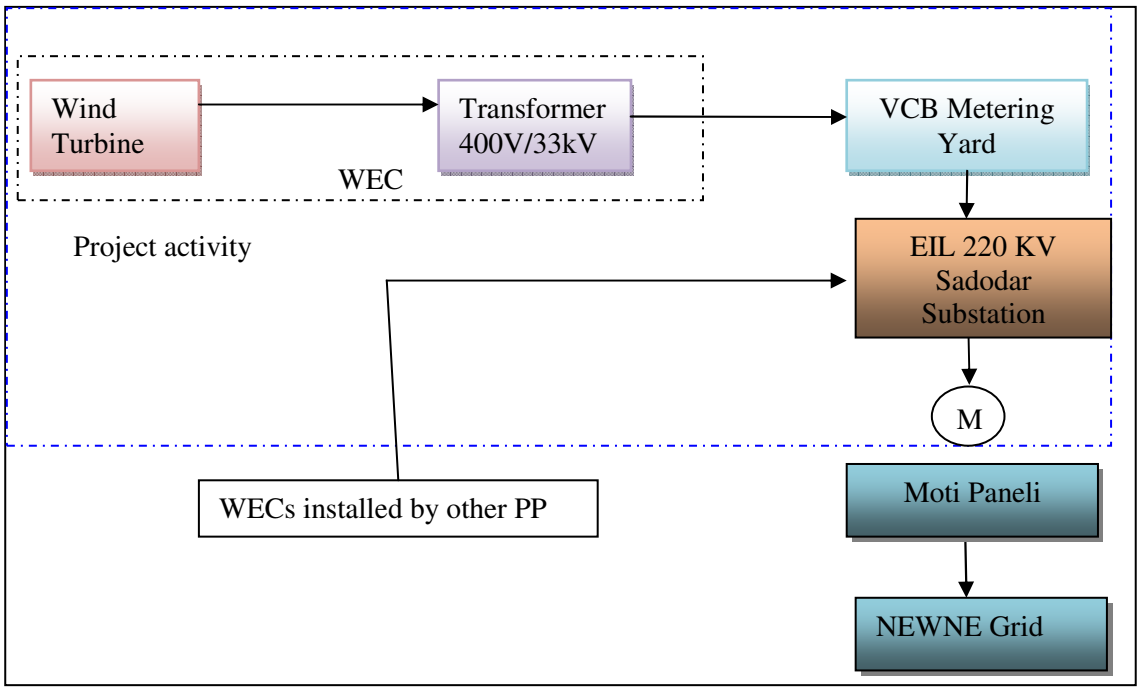
As per the Monitoring plan, the meters shall be tested for accuracy once annually. However from the above table, it is observed that the consecutive calibrations for the year 2011 are not conducted for the main meter . Therefore, in accordance with "Guidelines For Assessing Compliance With The Calibration Frequency Requirements"–Annex 60 to EB 52, Paragraph 4(a) where calibration is not carried out in line with the frequency mentioned in the registered PDD, as a conservative approach, the net energy export values (as mentioned in the share certificate of electricity) can be considered after applying the maximum possible error of the instrument.

Since the latest calibration certificate shows that meters are operating within their accuracy class 0.2%. In accordance with para 4(a) Annex 60, EB 52, a correction factor for the delayed duration has been applied on the net export of electricity.

Emergency procedure:

If during meter testing the main meter at the Enercon substation is found beyond the permissible limit of error, the meter reading will be taken from the meter located at the utility substation at Moti Paneli after addition of average historical transmission losses. Further, there were no instances of application of emergency procedures during the applied monitoring period.

The line diagrams showing all relevant monitoring points are attached as Appendix 1.



M = Electricity export and import meter

SECTION D. Data and parameters
>>

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
Data / Parameter:	$EF_{grid,OM,y}$
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data used:	"CO_2 Baseline Database for Indian Power Sector", version 5 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) :	1.00498
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This data is used for baseline emission calculation.
Additional comment:	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" version 5 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) :	0.67518
Indicate what the data	This data is used for baseline emission calculation.

are used for (Baseline/ Project/ Leakage emission calculations)	
Additional comment:	The value is calculated on ex-ante basis and it will remain same throughout the crediting period

Data / Parameter:	$EF_{grid,,CM,y}$
Data unit:	tCO2e/MWh
Description:	Combined Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data used:	The "CO_2 Baseline Database for Indian Power Sector" version 5 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) :	0.92252
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This data is used for baseline emission calculation.
Additional comment:	The value is calculated on ex-ante basis and it will remain same throughout the crediting period

Data and parameters monitored:

Data / Parameter:	$EG_{PJ,y}$
Data unit:	MWh
Description:	Net Quantity of Electricity exported to the grid
Measured /Calculated /Default:	The net electricity supplied to the grid by the wind farm is calculated by GEDA on the basis of GETCO main meter reading and the meter readings taken at individual cluster meters after adjusting transmission loss.
Source of data:	Share certificate issued by GETCO
Value(s) of monitored parameter:	66,321.44[2]
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This data is directly used for baseline estimation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated as per formulas described under section C.
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	The procedures for metering have been as per the provisions of the power purchase agreement. The WECs of a single customer (VIPCPL in this case) has been divided into clusters and each cluster has dedicated metering system. Different clusters are connected to different Vacuum Circuit Breaker metering

[2] Considering Annex 60 of EB 52

	yards (VCB) which ultimately lead to the shared main GETCO meter (also known as revenue meter) at the Sadodar substation maintained by Enercon (India) Limited. Data monitoring takes place at the cluster metering points and GETCO main meter at the EIL substation. The net electricity supplied to the grid by the wind farm has been calculated by GEDA on the basis of GETCO main meter reading and the meter readings taken at individual cluster meters after adjusting transmission loss. For adjustment of transmission loss, the electricity metered at the GETCO meter has been proportionally divided by GEDA among the customers connected to the revenue meter on the basis of the pro rata readings taken at the cluster meters metering point . The net electricity generated by the project activity has been taken directly from the share certificate issued by GETCO on monthly basis.
QA/QC procedures applied:	Refer section C for an illustration of the provisions for QA/QC procedures.

Data / Parameter:	$EG_{GETCO, Export}$
Data unit:	MWh (Mega-watt hour)
Description:	Net Electricity export recorded at Enercon Substation
Measured /Calculated /Default:	Measured at Main Meter
Source of data:	Joint Meter Reading (JMR)
Value(s) of monitored parameter:	554,763.4[3] (Month wise details mentioned in Annex-1)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Please refer section C under heading calibration details of the MR
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Monitoring: Electricity export to the grid is recorded by the main meter at Enercon Substation. Frequency of recording data: Monthly Recording: The values of electricity exports to the grid are sourced from JMR. Responsibility: Joint responsibility of Enercon and state utility
QA/QC procedures applied:	Refer section C for an illustration of the provisions for QA/QC procedures.

Data / Parameter:	$EG_{GETCO, Import}$
Data unit:	MWh (Mega-watt hour)
Description:	Net Electricity import recorded at Enercon Substation
Measured /Calculated /Default:	Measured at Main Meters

[3] This reading is used for calculation of transmission loss by GEDA and is not directly used for calculation of emission reductions. Further, as per para 4(a) of Annex 60 of EB 52 has been applied.

Source of data:	Joint Meter Reading (JMR)
Value(s) of monitored parameter:	163.3[4] (Month wise details mentioned in Annex-1)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Refer section C under heading calibration details of the MR
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Monitoring: Electricity import to the grid is recorded by the main meter at Enercon Substation. Refer section C & D.2 for an illustration of the provisions for QA/QC procedures. Frequency of recording data: Monthly Recording: The values of electricity exports to the grid are sourced from JMR. Responsibility: Joint responsibility of Enercon and state utility
QA/QC procedures applied:	Refer section C for an illustration of the provisions for QA/QC procedures.

The data will be stored in hard format and soft format by PP (Enercon) at the project site office. Joint meter reading is taken in the presence of the persons representing Enercon Operation and Maintenance Contractor. The archive will be kept for the period up to two years after the completion of the crediting period.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

"The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/kWh) calculated in a transparent and conservative manner as the weighted average emissions (in kg CO2e/kWh) as described in registered PDD.

$\mathbf{BE_y = EG_y * EF_y}$

Where,

BE is baseline emissions in year y, tCO2e

EGy is the net electricity supplied to the grid in year y and is applied directly from GEDA sharing certified by state utility. This value can also be cross checked from the invoice.

EFy *is* the CO2 emission factor of the grid (0.92252 tCO_2e/MWh fixed ex-ante)

[4] This reading is used for calculation of transmission loss by GEDA and is not directly used for calculation of emission reductions. Further, as per para 4(a) of Annex 60 of EB 52 has been applied.

Month-wise Net Electricity Export Details

Period	Net Quantity of Electricity Exported to the Grid (MWh)	Net Quantity of Electricity Exported to the Grid After Applying Error Factor[5] (MWh)	Baseline Emission Factor (tCO2/MWh)	Baseline Emissions (tCO2e)
Jun-11	9,864.62	9,844.87	0.92252	9,082.09
Jul-11	8,586.82	8,569.63	0.92252	7,905.66
Aug-11	8,359.93	8,343.20	0.92252	7,696.77
Sep-11	4,437.00	4,428.12	0.92252	4,085.03
Oct-11	4,361.32	4,352.60	0.92252	4,015.36
Nov-11	4,874.25	4,864.50	0.92252	4,487.60
Dec-11	8,682.50	8,665.12	0.92252	7,993.75
Jan-12	8,216.34	8,199.90	0.92252	7,564.57
Feb-12	9,053.49	9,053.49	0.92252	8,352.03
Total	**66,436.28**	**66,321.44**	**-**	**61,182.85**

The total emission reductions achieved during the monitoring period is 61,182.85 tCO2.

E.2. Project emissions calculation

>>

Since the project activity is a renewable energy project which generates electricity using wind power and also electricity import is already considered in the net export estimation, hence does not result in project emissions.

PEy = 0

E.3. Leakage calculation

>>

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

E.4. Emission reductions calculation / table

Emission reduction calculation

Month	Baseline Emissions (tCO2e)	Project Emissions (tCO2e)	Leakage (tCO2e)	Emission Reduction (tCO2e)
Jun-11	9,082.09	0.00	0.00	9,082.09
Jul-11	7,905.66	0.00	0.00	7,905.66
Aug-11	7,696.77	0.00	0.00	7,696.77

[5] Considering error factor according to para 4a of Annex 60 EB 52

Month	Baseline Emissions (tCO2e)	Project Emissions (tCO2e)	Leakage (tCO2e)	Emission Reduction (tCO2e)
Sep-11	4,085.03	0.00	0.00	4,085.03
Oct-11	4,015.36	0.00	0.00	4,015.36
Nov-11	4,487.60	0.00	0.00	4,487.60
Dec-11	7,993.75	0.00	0.00	7,993.75
Jan-12	7,564.57	0.00	0.00	7,564.57
Feb-12	8,352.03	0.00	0.00	8,352.03
Total	**61,182.85**	**0.00**	**0.00**	**61,182.85**

Total baseline emissions : 61,182.85 tCO_2
Total project emissions : 0 tCO_2
Total leakage : 0 tCO_2

Hence, Emission reductions
ERy = BEy – PEy- Ly
= 61,182.85 – 0 – 0 tCO2
= 61,182.85 tCO2

Emission reductions are conservatively rounded off to nearest integer. Total emissions reductions for the monitoring period are 61,182 tCO2

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	78,856 tCO_2 (274 days equivalent of annually 106,378 emission reductions estimated in the registered PDD)	61, 182 tCO_2

E.6. Remarks on difference from estimated value in the PDD

>>

There is negative change of 22.41% in the expected and annual emission reductions. The difference in the total CERs is due to low wind availability leading to low plant load factor.

Annex-1

Month-wise Total Electricity Export and Import Details at Enercon Substation

Period	Net Electricity Export Recorded at Enercon Substation (MWh)	Net Electricity Export Recorded at Enercon Substation considering Error (MWh)	Net Electricity Import Recorded at Enercon Substation (MWh)	Net Electricity Import Recorded at Enercon Substation considering Error (MWh)
Jun-11	99,539	99,339.9*	13	13.03*
Jul-11	74,784	74,634.4*	18	18.04*
Aug-11	69,042	68,903.9*	11	11.02*
Sep-11	36,917	36,843.2*	15	15.03*
Oct-11	34,570	34,500.9*	46	46.09*
Nov-11	35,841	35,769.3*	30	30.06*
Dec-11	68,831	68,693.3*	10	10.02*
Jan-12	64,757	64,627.5*	14	14.03*
Feb-12	71,451	71,451.0	6	6.00
Total	**555,732**	**554,763.4**	**163**	**163.3**

*Considering error as per Para 4(a) of Annex 60 of EB 52.

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History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Guideline, Form **Business Function**: Issuance		