



**Monitoring report form**  
**(Version 05.1)**

**MONITORING REPORT**

<b>Title of the project activity</b>	Vaayu India Wind Power Project In Gujarat	
<b>UNFCCC reference number of the project activity</b>	4700	
<b>Version number of the monitoring report</b>	1	
<b>Completion date of the monitoring report</b>	03/05/2017	
<b>Monitoring period number and duration of this monitoring period</b>	Fifth (01/01/2015 to 31/03/2017) including both start and end date of monitoring period.	
<b>Project participant(s)</b>	Vaayu (India) Power Corporation Private Limited	
<b>Host Party</b>	India	
<b>Sectoral scope(s)</b>	1	
<b>Selected methodology(ies)</b>	"Consolidated baseline methodology for grid connected electricity generation from renewable sources" ACM0002 (Version 11, EB 52)	
<b>Selected standardized baseline(s)</b>	Not Applicable	
<b>Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD</b>	238,986	
<b>Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period</b>	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	NA	192,656

## SECTION A. Description of project activity

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

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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 leads to reduce 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 800 kW E-53 with internal electrical lines connecting the Project with local evacuation facility.

The first WEC under the project activity was commissioned on 25 June 2010 and the last WEC under the project activity was commissioned on 4 July 2011. The expected operational lifetime of the project is for 20 years. The length of the Crediting period of the project activity as per registered GS PDD is 10 years (Fixed). The fifth monitoring period considered is from 01 Jan 2015 to 31 Mar 2017.

The total emission reductions achieved during the monitoring period is 192,656 tCO<sub>2</sub>.

### A.2. Location of 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° 06' 19.0"	E70° 18' 45.7"
2	3021	EIL/800/10-11/1827	Machharda	N22° 06' 23.5"	E70° 18' 43.7"
3	3022	EIL/800/10-11/1828	Machharda	N22° 06' 29.7"	E70° 18' 44.6"
4	3072	EIL/800/09-10/1738	Padavala	N21° 57' 19.6"	E70° 15' 05.0"
5	3073	EIL/800/09-10/1739	Padavala	N21° 57' 14.9"	E70° 15' 11.7"
6	3075	EIL/800/09-10/1740	Padavala	N21° 56' 43.1"	E70° 15' 20.6"
7	3076	EIL/800/09-10/1741	Padavala	N21° 55' 59.2"	E70° 15' 33.7"
8	3088	EIL/800/09-10/1742	Padavala	N21° 56' 19.3"	E70° 14' 38.0"
9	62	EIL/800/09-10/1766	Chattar	N22° 07' 40.2"	E70° 15' 10.7"
10	63	EIL/800/09-10/1767	Chattar	N22° 07' 46.6"	E70° 15' 00.6"
11	64	EIL/800/09-10/1768	Chattar	N22° 07' 53.3"	E70° 14' 57.1"
12	539	EIL/800/09-10/1789	Seth Wadala	N22° 04' 46.7"	E70° 05' 34.3"
13	540	EIL/800/09-10/1790	Seth Wadala	N22° 04' 33.3"	E70° 05' 43.1"
14	541	EIL/800/09-10/1791	Seth Wadala	N22° 04' 27.4"	E70° 05' 47.6"
15	543	EIL/800/09-10/1792	Seth Wadala	N22° 04' 17.3"	E70° 05' 53.7"
16	544	EIL/800/09-10/1793	Seth Wadala	N22° 04' 13.5"	E70° 06' 00.7"
17	545	EIL/800/09-10/1794	Seth Wadala	N22° 03' 31.5"	E70° 05' 32.6"
18	546	EIL/800/09-10/1795	Jam Ambardi	N22° 03' 40.2"	E70° 05' 31.0"
19	547	EIL/800/09-10/1796	Jam Ambardi	N22° 03' 45.3"	E70° 05' 31.9"
20	548	EIL/800/09-10/1797	Jam Ambardi	N22° 03' 50.7"	E70° 05' 34.2"
21	903	EIL/800/09-10/1747	Mevasa/ Haripar	N22° 01' 23.0"	E70° 15' 35.2"
22	904	EIL/800/09-10/1748	Mevasa/ Haripar	N22° 01' 30.2"	E70° 15' 41.0"
23	905	EIL/800/09-10/1749	Mevasa/	N22° 01' 36.6"	E70° 15' 27.2"

			Haripar		
24	906	EIL/800/09-10/1750	Mevasa/ Haripar	N22° 01' 30.7"	E70° 14' 55.0"
25	907	EIL/800/09-10/1751	Mevasa/ Haripar	N22° 01' 37.9"	E70° 14' 56.8"
26	908	EIL/800/09-10/1752	Mevasa/ Haripar	N22° 01' 44.8"	E70° 14' 54.1"
27	909	EIL/800/09-10/1753	Mevasa/ Haripar	N22° 01' 51.2"	E70° 14' 51.2"
28	910	EIL/800/09-10/1754	Mevasa/ Haripar	N22° 01' 57.7"	E70° 14' 55.7"
29	912	EIL/800/09-10/1746	Dhun Dhoraji	N22° 02' 09.1"	E70° 15' 04.4"
30	926	EIL/800/09-10/1769	Chattar	N22° 06' 57.6"	E70° 16' 33.0"
31	927	EIL/800/09-10/1770	Chattar	N22° 06' 59.3"	E70° 16' 23.3"
32	928	EIL/800/09-10/1771	Chattar	N22° 07' 10.0"	E70° 16' 16.5"
33	929	EIL/800/09-10/1772	Chattar	N22° 07' 15.9"	E70° 16' 11.3"
34	931	EIL/800/10-11/1870	Chattar	N22° 07' 12.7"	E70° 15' 23.5"
35	932	EIL/800/09-10/1773	Chattar	N22° 07' 05.5"	E70° 15' 27.2"
36	933	EIL/800/09-10/1774	Chattar	N22° 06' 59.3"	E70° 15' 31.5"
37	934	EIL/800/09-10/1775	Chattar	N22° 06' 53.9"	E70° 15' 27.9"
38	935	EIL/800/09-10/1776	Chattar	N22° 06' 46.0"	E70° 15' 22.7"
39	936	EIL/800/09-10/1777	Chattar	N22° 06' 40.3"	E70° 15' 25.7"
40	937	EIL/800/09-10/1778	Chattar	N22° 06' 32.0"	E70° 15' 23.4"
41	938	EIL/800/09-10/1779	Chattar	N22° 06' 25.7"	E70° 15' 22.1"
42	939	EIL/800/09-10/1760	Jamvadi	N22° 08' 19.5"	E70° 19' 02.3"
43	941	EIL/800/09-10/1761	Jamvadi	N22° 08' 07.2"	E70° 18' 57.8"
44	942	EIL/800/09-10/1762	Jamvadi	N22° 08' 08.6"	E70° 19' 30.2"
45	943	EIL/800/09-10/1763	Jamvadi	N22° 08' 00.9"	E70° 19' 25.4"
46	944	EIL/800/09-10/1764	Jamvadi	N22° 07' 53.9"	E70° 19' 26.0"
47	945	EIL/800/09-10/1765	Jamvadi	N22° 07' 49.5"	E70° 19' 31.4"
48	947	EIL/800/09-10/1755	Moti Vavdi	N22° 06' 04.0"	E70° 18' 16.9"
49	948	EIL/800/09-10/1756	Moti Vavdi	N22° 05' 57.0"	E70° 18' 17.8"
50	950	EIL/800/09-10/1757	Moti Vavdi	N22° 05' 45.7"	E70° 18' 21.5"
51	951	EIL/800/09-10/1758	Moti Vavdi	N22° 05' 38.3"	E70° 18' 18.4"
52	952	EIL/800/09-10/1759	Moti Vavdi	N22° 05' 31.6"	E70° 18' 16.9"
53	958	EIL/800/09-10/1743	Dhun Dhoraji	N22° 02' 32.4"	E70° 16' 42.8"
54	959	EIL/800/09-10/1744	Dhun Dhoraji	N22° 02' 26.2"	E70° 16' 44.6"
55	960	EIL/800/09-10/1745	Dhun Dhoraji	N22° 02' 19.0"	E70° 16' 44.4"
56	992	EIL/800/09-10/1782	Sadodar	N22° 03' 13.6"	E70° 10' 37.3"
57	993	EIL/800/09-10/1783	Sadodar	N22° 03' 09.5"	E70° 10' 40.0"
58	994	EIL/800/09-10/1784	Sadodar	N22° 02' 59.6"	E70° 10' 36.4"
59	995	EIL/800/09-10/1785	Sadodar	N22° 02' 54.2"	E70° 10' 33.5"
60	996	EIL/800/09-10/1786	Sadodar	N22° 02' 47.4"	E70° 10' 22.2"
61	997	EIL/800/09-10/1787	Sadodar	N22° 02' 41.3"	E70° 10' 32.4"
62	1028	EIL/800/09-10/1788	Seth Wadala	N22° 03' 06.0"	E70° 08' 36.9"
63	1045	EIL/800/09-10/1780	Bodi	N22° 08' 43.4"	E70° 15' 11.4"
64	1046	EIL/800/09-10/1781	Bodi	N22° 08' 48.8"	E70° 15' 08.5"

### A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
Party A: India	Private entity : Vaayu (India) Power Corporation Private Limited	No
Party B: United Kingdom	Private entity: Numerco Limited	No

**A.4. Reference of applied methodology and standardized baseline**

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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.5. Crediting period of project activity**

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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 Jan 2015 to 31st Mar 2017.

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

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**SECTION B. Implementation of project activity****B.1. Description of implemented registered 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 starting date of operation of the project activity is 21/05/2011.

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	12/07/2010
2	3021	EIL/800/10-11/1827	12/07/2010
3	3022	EIL/800/10-11/1828	12/07/2010
4	3072	EIL/800/09-10/1738	25/06/2010
5	3073	EIL/800/09-10/1739	25/06/2010
6	3075	EIL/800/09-10/1740	25/06/2010
7	3076	EIL/800/09-10/1741	25/06/2010
8	3088	EIL/800/09-10/1742	25/06/2010
9	62	EIL/800/09-10/1766	27/06/2011
10	63	EIL/800/09-10/1767	04/07/2011
11	64	EIL/800/09-10/1768	04/07/2011
12	539	EIL/800/09-10/1789	14/02/2011
13	540	EIL/800/09-10/1790	14/02/2011

14	541	EIL/800/09-10/1791	14/02/2011
15	543	EIL/800/09-10/1792	18/02/2011
16	544	EIL/800/09-10/1793	14/02/2011
17	545	EIL/800/09-10/1794	18/02/2011
18	546	EIL/800/09-10/1795	18/03/2011
19	547	EIL/800/09-10/1796	18/02/2011
20	548	EIL/800/09-10/1797	18/02/2011
21	903	EIL/800/09-10/1747	04/05/2011
22	904	EIL/800/09-10/1748	04/05/2011
23	905	EIL/800/09-10/1749	04/05/2011
24	906	EIL/800/09-10/1750	05/03/2011
25	907	EIL/800/09-10/1751	05/03/2011
26	908	EIL/800/09-10/1752	05/03/2011
27	909	EIL/800/09-10/1753	05/03/2011
28	910	EIL/800/09-10/1754	05/03/2011
29	912	EIL/800/09-10/1746	14/02/2011
30	926	EIL/800/09-10/1769	10/06/2011
31	927	EIL/800/09-10/1770	10/06/2011
32	928	EIL/800/09-10/1771	10/06/2011
33	929	EIL/800/09-10/1772	10/06/2011
34	931	EIL/800/10-11/1870	10/06/2011
35	932	EIL/800/09-10/1773	10/06/2011
36	933	EIL/800/09-10/1774	10/06/2011
37	934	EIL/800/09-10/1775	10/06/2011
38	935	EIL/800/09-10/1776	10/06/2011
39	936	EIL/800/09-10/1777	27/06/2011
40	937	EIL/800/09-10/1778	27/06/2011
41	938	EIL/800/09-10/1779	27/06/2011
42	939	EIL/800/09-10/1760	24/05/2011
43	941	EIL/800/09-10/1761	24/05/2011
44	942	EIL/800/09-10/1762	24/05/2011
45	943	EIL/800/09-10/1763	24/05/2011
46	944	EIL/800/09-10/1764	24/05/2011
47	945	EIL/800/09-10/1765	24/05/2011
48	947	EIL/800/09-10/1755	06/05/2011
49	948	EIL/800/09-10/1756	06/05/2011
50	950	EIL/800/09-10/1757	06/05/2011
51	951	EIL/800/09-10/1758	06/05/2011
52	952	EIL/800/09-10/1759	06/05/2011
53	958	EIL/800/09-10/1743	04/05/2011
54	959	EIL/800/09-10/1744	04/05/2011
55	960	EIL/800/09-10/1745	04/05/2011
56	992	EIL/800/09-10/1782	18/03/2011
57	993	EIL/800/09-10/1783	18/03/2011
58	994	EIL/800/09-10/1784	18/03/2011
59	995	EIL/800/09-10/1785	18/03/2011
60	996	EIL/800/09-10/1786	18/03/2011
61	997	EIL/800/09-10/1787	18/03/2011
62	1028	EIL/800/09-10/1788	04/05/2011
63	1045	EIL/800/09-10/1780	04/07/2011
64	1046	EIL/800/09-10/1781	04/07/2011

The project activity involves 64 numbers wind energy converters (WECs) of 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. Wind World (India) Limited wind turbines are equipped with state-of-the-art microelectronic control technology produced in-house at our Daman plant.

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

### **E 53 Specifications**

Parameter	Value
Turbine model	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
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

Wind World (India) Limited is responsible for operation and maintenance activities for this project. Wind World (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.

## **B.2. Post-registration changes**

### **B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

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Not applicable

### **B.2.2. Corrections**

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During the second monitoring period, PP has incorporated changes in the PDD from the registered PDD. These changes were approved by UNFCCC on 1 Aug 2013.

### **B.2.3. Changes to start date of crediting period**

>>

Not applicable

### **B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration**

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Not applicable

### **B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline**

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During the second monitoring period, PP has incorporated following changes in the PDD from the registered PDD. These changes were approved by UNFCCC on 1 Aug 2013.

1. Change in coordinates for 3 WECs
2. Change in monitoring and organization structure
3. Change in calibration frequency from 1 year to 3 years

### **B.2.6. Changes to project design of registered project activity**

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Not applicable

### **B.2.7. Types of changes specific to afforestation or reforestation project activity**

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Not applicable

## **SECTION C. Description of monitoring system**

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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.

Wind World (India) Limited is the O&M contractor for the project activity. Wind World (India) Limited will be responsible for maintaining all the monitoring data on behalf of VIPCPL in respect of the

project activity. Wind World (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 has seventeen clusters and each cluster has exclusive metering arrangement and the meter readings taken at these metering points have been provided by the representatives of Wind World (India) Limited to GEDA. Line diagram showing the relevant monitoring points is provided at end of this section.

Wind World (India) Limited substation at Sadodar has four 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 Wind World (India) Limited 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 Wind World (India) Limited and GEDA/GETCO in the form of JMR. The electricity from Wind World (India) Limited'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 Wind World (India) Limited substation

$EG_{GETCO, Import}$  = Electricity imported, as recorded by the main meter at Wind World (India) Limited 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 Wind World (India) Limited substation, as measured at Cluster Meter

$EG_{Cluster, WF, Import}$  = Electricity imported by all the project owners connected to Wind World (India) Limited substation, as measured at Cluster Meter

$EGPJ, export, y$  = Electricity exported by the project activity to the grid, calculated

$EGPJ, import, y$  = Electricity imported from the project activity to the grid, calculated

$EGPJ, y$  = Net Electricity exported by the project activity to the grid, calculated

#### **Electricity Exported to the Grid by the project activity**

$$EGPJ, export, y = EG_{GETCO, Export} \times EG_{Cluster, Export} / EG_{Cluster, WF, Export}$$

#### **Electricity Imported from the Grid by the project activity**

$$EGPJ, import, y = EG_{GETCO, Import} \times EG_{Cluster, Import} / EG_{Cluster, WF, Import}$$

#### **Net Electricity Exported to the grid by the project activity**

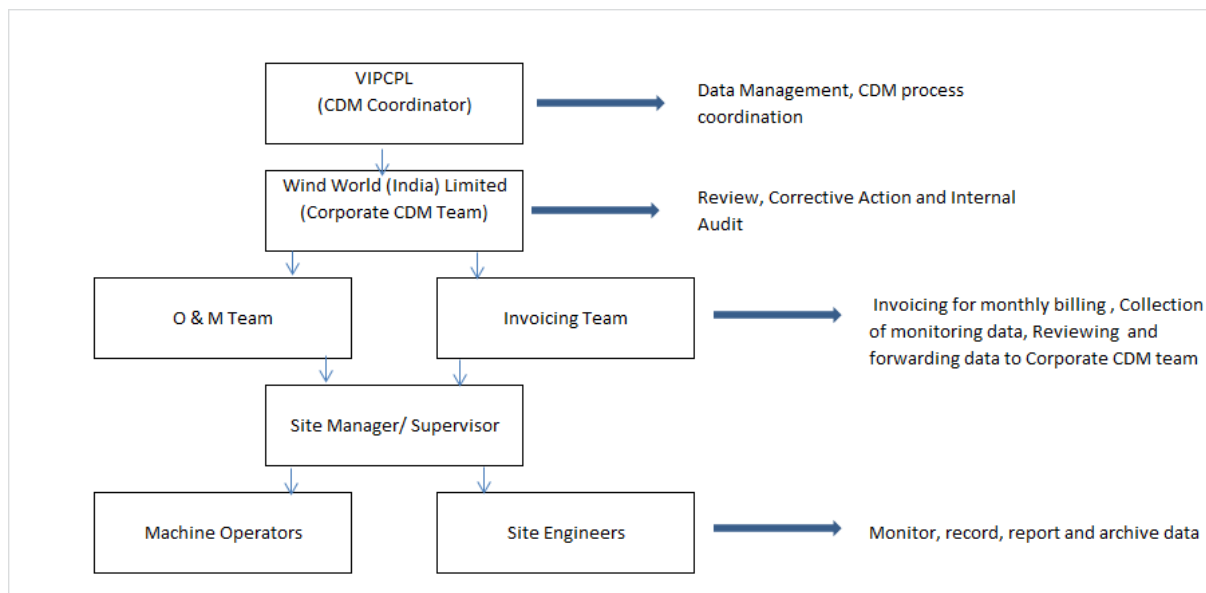
$$EGPJ, y = EGPJ, export, y - EGPJ, import, y$$

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 Wind World (India) Limited based on meter reading noted at Wind



World (India) Limited substation connecting all the machines of the project activity and other project developers. The meter reading at cluster meter and the Wind World (India) Limited substation is 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.

### 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 Wind World (India) Limited'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 Wind World (India) Limited Training Academy provides need-based training to meet the training requirements of Wind World (India) Limited 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 equipment were inspected & calibrated by state utility. Meter details for the main meters/GETCO meters are as follows:-

Name of WWIL 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	Once	22/01/2010	17/01/2012	30/09/2016
	GJU04175	Secure	0.2		22/01/2010	17/01/2012	30/09/2016

	GJU04176	Secure	0.2	in a three year	22/01/2010	17/01/2012	30/09/2016
	KAB11082	Secure	0.2		29/05/2010	17/01/2012	30/09/2016

Meter Details of Cluster Meters:

Meter Serial No	Make	Accuracy Class (%)	Calibration Dates During meter installation	Calibration Dates Latest	Validity
10059208	L&T	0.2	24/08/2010	25/09/2013	24/09/2016
10059203	L&T	0.2	24/08/2010	25/09/2013	24/09/2016
GJU60947	Secure	0.2	03/09/2010	25/09/2013	24/09/2016
GJU61707	Secure	0.2	29/01/2011	25/09/2013	24/09/2016
GJU61698	Secure	0.2	29/01/2011	25/09/2013	24/09/2016
GJU61321	Secure	0.2	05/02/2011	25/09/2013	24/09/2016
GJU61313	Secure	0.2	18/12/2010	25/09/2013	24/09/2016
GJU61690	Secure	0.2	29/01/2011	25/09/2013	24/09/2016
GJU61699	Secure	0.2	29/01/2011	25/09/2013	24/09/2016
GJU61322	Secure	0.2	09/12/2010	26/09/2013	25/09/2016
GJU61696	Secure	0.2	29/01/2011	26/09/2013	25/09/2016
GJU61310	Secure	0.2	18/12/2010	26/09/2013	25/09/2016
GJU61701	Secure	0.2	29/01/2011	26/09/2013	25/09/2016
GJU61693	Secure	0.2	29/01/2011	26/09/2013	25/09/2016
GJU61692	Secure	0.2	29/01/2011	25/09/2013	25/09/2016
GJU61691	Secure	0.2	29/01/2011	26/09/2013	25/09/2016
GJU60943	Secure	0.2	03/09/2010	26/09/2013	25/09/2016

As per the PPA and the guideline by GETCO, the calibration frequency of the meters which under the jurisdiction of GEDA/GETCO is once in three years.

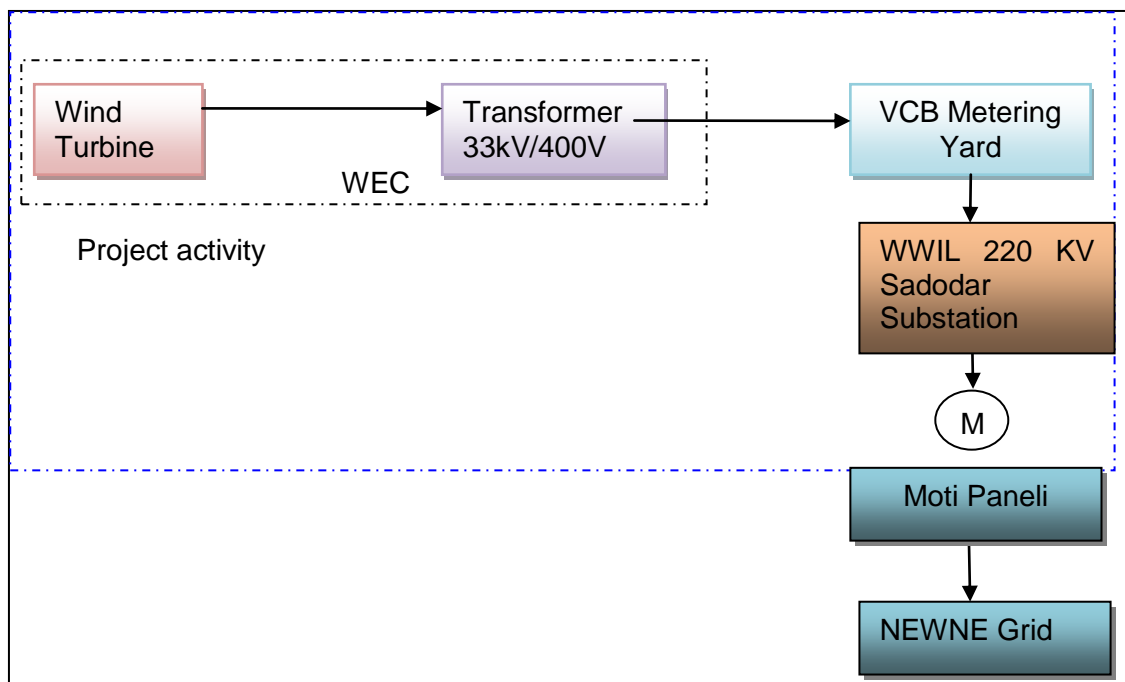
The error factor has been applied in net export values of GETCO Share certificates from the month of January 2015 to September 2016 as main meter were not calibrated as per the calibration frequency. No error was found during the calibration of energy meters. In Gujarat, we consider only the Net export values from GETCO Share certificates for emission reduction calculations and maximum permissible error of energy meters are 0.2%, and same have applied in the net export values from the month January 2015 to September 2016.

**Emergency procedure:**

If during meter testing the main meter at the Wind World (India) Limited 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 Panelli after addition of average historical transmission losses.

If during meter testing the cluster meter is found beyond the permissible limit of error, the meter will be replaced by new meter.

The line diagram showing all relevant monitoring points is attached.



M = Electricity export and import meter

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante or at renewal of crediting period

<b>Data/parameter:</b>	$EF_{grid,OM,y}$
Unit	tCO <sub>2</sub> e/MWh
Description	Operating Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data	The “CO <sub>2</sub> Baseline Database for Indian Power Sector” is available at <a href="http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm">http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</a>
Value(s) applied)	1.00498
Choice of data or measurement methods and procedures	“CO <sub>2</sub> Baseline Database for Indian Power Sector”, version 5 published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	This data is used for baseline emission calculation.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

<b>Data/parameter:</b>	$EF_{grid,BM,y}$
Unit	tCO <sub>2</sub> e/MWh
Description	Build Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data	The “CO <sub>2</sub> Baseline Database for Indian Power Sector” is available at <a href="http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm">http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</a>
Value(s) applied)	0.67518
Choice of data or measurement methods and procedures	“CO <sub>2</sub> Baseline Database for Indian Power Sector”, version 5 published by the Central Electricity Authority, Ministry of Power, Government of India.

Purpose of data	This data is used for baseline emission calculation.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

<b>Data/parameter:</b>	<b><math>EF_{grid,CM,y}</math></b>
Unit	tCO <sub>2</sub> e/MWh
Description	Combined Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data	The "CO <sub>2</sub> Baseline Database for Indian Power Sector" is available at <a href="http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm">http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</a>
Value(s) applied)	0.92252
Choice of data or measurement methods and procedures	"CO <sub>2</sub> Baseline Database for Indian Power Sector", version 5 published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	This data is used for baseline emission calculation.
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

<b>Data/parameter:</b>	<b><math>EG_{PJ,y}</math></b>
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	208837.580 MWh
Monitoring equipment	Calculated as per formulas described under section C.
Measuring/reading/recording frequency:	Monthly
Calculation method (if applicable):	<p>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 yards (VCB) which ultimately lead to the shared main GETCO meter (also known as revenue meter) at the Sadodar substation maintained by Wind World (India) Limited. Data monitoring takes place at the cluster metering points and GETCO main meter at the WWIL substation.</p> <p>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.</p> <p>The net electricity generated by the project activity has been taken directly from the share certificate issued by GETCO on monthly basis.</p>
QA/QC procedures:	Refer section C for an illustration of the provisions for QA/QC procedures.
Purpose of data:	This data is directly used for baseline estimation
Additional comments:	The data will be archived for the entire crediting period plus two years.

<b>Data/parameter:</b>	EG <sub>GETCO, Export</sub> <sup>1</sup>
Unit	kWh
Description	Net Electricity export recorded at Wind World (India) Limited Substation
Measured/calculated/default	Measured at Main Meter
Source of data	Joint Meter Reading (JMR)
Value(s) of monitored parameter	2208837580 kWh
Monitoring equipment	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 Wind World (India) Limited Substation.  Frequency of recording data: Monthly  Recording: The values of electricity exports to the grid are sourced from JMR.  Responsibility: Joint responsibility of Wind World (India) Limited and state utility
QA/QC procedures:	Refer section C for an illustration of the provisions for QA/QC procedures.
Purpose of data:	Baseline Emissions
Additional comments:	The data will be archived for the entire crediting period plus two years.

<b>Data/parameter:</b>	EG <sub>GETCO, Import</sub> <sup>2</sup>
Unit	kWh
Description	Net Electricity import recorded at Wind World (India) Limited Substation
Measured/calculated/default	Measured at Main Meter
Source of data	Joint Meter Reading (JMR)
Value(s) of monitored parameter	156900 kWh
Monitoring equipment	Please 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 Wind World (India) Limited 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 Wind World (India) Limited and state utility
QA/QC procedures:	Refer section C for an illustration of the provisions for QA/QC procedures.
Purpose of data:	Baseline Emissions
Additional comments:	The data will be archived for the entire crediting period plus two years.

<sup>1</sup> This reading is used for calculation of transmission loss by GEDA and is not directly used for calculation of emission reductions

<sup>2</sup> This reading is used for calculation of transmission loss by GEDA and is not directly used for calculation of emission reductions

**D.3. Implementation of sampling plan**

&gt;&gt;

Not Applicable

**SECTION E. Calculation of emission reductions or GHG removals by sinks****E.1. Calculation of baseline emissions or baseline net GHG removals by sinks**

&gt;&gt;

Emission reductions from the project activity are equal to the baseline emissions as project emissions and leakage are nil.

**Baseline emissions:**

Baseline emission factor (Combined Margin) ( $EF_y$ )

= 0.92252 tCO<sub>2e</sub>/MWh

Baseline Emissions Reduction:  $ER_y = EF_{grid,CM,y} * EG_{PJ,y}$

Where,

$ER_y$  is baseline emissions in year y, tCO<sub>2e</sub>

$EG_{PJ,y}$  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.

$EF_y$  or  $EF_{grid,CM,y}$  is the CO<sub>2</sub> emission factor of the grid (0.92252 tCO<sub>2e</sub>/MWh fixed ex-ante)

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

For period 01/01/2015 to 31/03/2017

208837.580 \* 0.92252 = 192,656

**E.2. Calculation of project emissions or actual net GHG removals by sinks**

&gt;&gt;

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.

$PE_y = 0$

**E.3. Calculation of leakage**

&gt;&gt;

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

**E.4. Summary of calculation of emission reductions or net GHG removals by sinks**

Item	Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2e</sub> )	Project emissions or actual net GHG removals by sinks (t CO <sub>2e</sub> )	Leakage (t CO <sub>2e</sub> )	GHG emission reductions or net GHG removals by sinks (t CO <sub>2e</sub> ) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
01/01/2015 to 31/12/2015	99,411	0	0	0	99,411	99,411

Item	Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	GHG emission reductions or net GHG removals by sinks (t CO <sub>2</sub> e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
01/01/2016 to 31/12/2016	76,060	0	0	0	76,060	76,060
01/01/2017 to 31/03/2017	17,185	0	0	0	17,185	17,185
<b>Total</b>	192,656	0	0	0	192,656	192,656

**E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD**

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	238,986	192,656

**E.6. Remarks on difference from estimated value in registered PDD**

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Proportionate number of ERs for a period of 821 days as per PDD comes out to be 238,986 tCO<sub>2</sub>e. However, actual number of ERs achieved in the present monitoring period is 192,656 tCO<sub>2</sub>e. This reflects a difference of 19.38% on the downside, which is due to the low PLF achieved by the project activity during the monitoring period.

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

<b>Project participant and/or responsible person/ entity</b>	<input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
<b>Organization name</b>	Vaayu (India) Power Corporation Private Limited
<b>Street/P.O. Box</b>	Plot No. 33, Daman Patalia Road
<b>Building</b>	
<b>City</b>	Bhimpore
<b>State/region</b>	Daman (UT)
<b>Postcode</b>	396210
<b>Country</b>	India
<b>Telephone</b>	+91-260-2220624, 2220628
<b>Fax</b>	+91-260-2221508
<b>E-mail</b>	<a href="mailto:yogeshh.mehra@windworldindia.com">yogeshh.mehra@windworldindia.com</a>
<b>Website</b>	
<b>Contact person</b>	
<b>Title</b>	Managing Director
<b>Salutation</b>	Mr.
<b>Last name</b>	Mehra
<b>Middle name</b>	
<b>First name</b>	Yogeshh
<b>Department</b>	Corporate
<b>Mobile</b>	+91-98200 40301
<b>Direct fax</b>	+91-260-2221508
<b>Direct tel.</b>	+91-22-22-6702 2832 extn. 7111
<b>Personal e-mail</b>	<a href="mailto:yogeshh.mehra@windworldindia.com">yogeshh.mehra@windworldindia.com</a>



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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to the Host Party;</li> <li>• Remove reference to programme of activities;</li> <li>• Overall editorial improvement.</li> </ul>
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul>
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		