



**Monitoring report form**  
**(Version 04.0)**

**MONITORING REPORT**

<b>Title of the project activity</b>	Vaayu India Wind Power Project in Gujarat.
<b>Reference number of the project activity</b>	4700
<b>Version number of the monitoring report</b>	1.0
<b>Completion date of the monitoring report</b>	19/03/2015
<b>Registration date of the project activity</b>	09/05/2011
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period number: Fourth Monitoring period duration: 01/09/2013 to 31/12/2014 (Inclusive of both days)
<b>Project participant(s)</b>	1. Vaayu (India) Power Corporation Private Limited 2. Swedish Energy Agency (withdrawn) 3. Kingdom of Spain (withdrawn)
<b>Host Party(ies)</b>	India
<b>Sectoral scope and selected methodology(ies), and where applicable, applied standardized baseline(s)</b>	Sectoral Scope: 1, Energy industries (renewable/ non-renewable sources)  Project Category: ACM0002, Version-11,EB-52 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	141,934 tCO <sub>2</sub> e
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	109,925 tonnes of CO <sub>2</sub> e.
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)</b>	NA
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).</b>	109,925 tonnes of CO <sub>2</sub> e.

**SECTION A. Description of project activity****A.1. Purpose and general description of project activity**

&gt;&gt;

**Purpose of the project activity and the measures taken to reduce greenhouse gas emissions:**

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 expected operational lifetime of the project is for 20 years. The length of the Crediting period of the project activity as per registered PDD is 10 years (Fixed). Project was registered on 9 May 2011 and the length of crediting period is from 01 Jun 2011 to 31 May 2021. In first CER verification, the monitoring period considered was the period from 01 Jun 2011 to 29 Feb 2012. The second monitoring period was from 01 Mar 2012 to 31 Dec 2012. The third monitoring period was from 01 Jan 2013 to 31 Aug 2013. This is the fourth monitoring report associated with the project activity and the period covered under this monitoring report is from 01/09/2013 to 31/12/2014 (Including first and last day).

The total emission reductions achieved during the monitoring period is 109,925 tCO<sub>2</sub>.

**Brief description of the installed technology and equipment:**

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. The technical specifications of the Wind world E-53 make WECs with rated capacity 800 KW are given below:

Main Specifications E-53	
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) Ltd 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.



**E-53: Technology Diagram**

**Relevant dates for the project activity:**

The expected operational lifetime of the project is for 20 years. This is the fourth monitoring report associated with the project activity and the period covered under this monitoring report is from 01/09/2013 to 31/12/2014 (Including first and last day). The details of issuance of CERs for the previous monitoring periods are as follows:

Monitoring Period (Inclusive of both days)	CERs Issued
01 Jun 2011 - 29 Feb 2012	61,182
01 Mar 2012 - 31 Dec 2012	87,690
01 Jan 2013 - 31 Aug 2013	68,389

## Total emission reductions achieved in this monitoring period

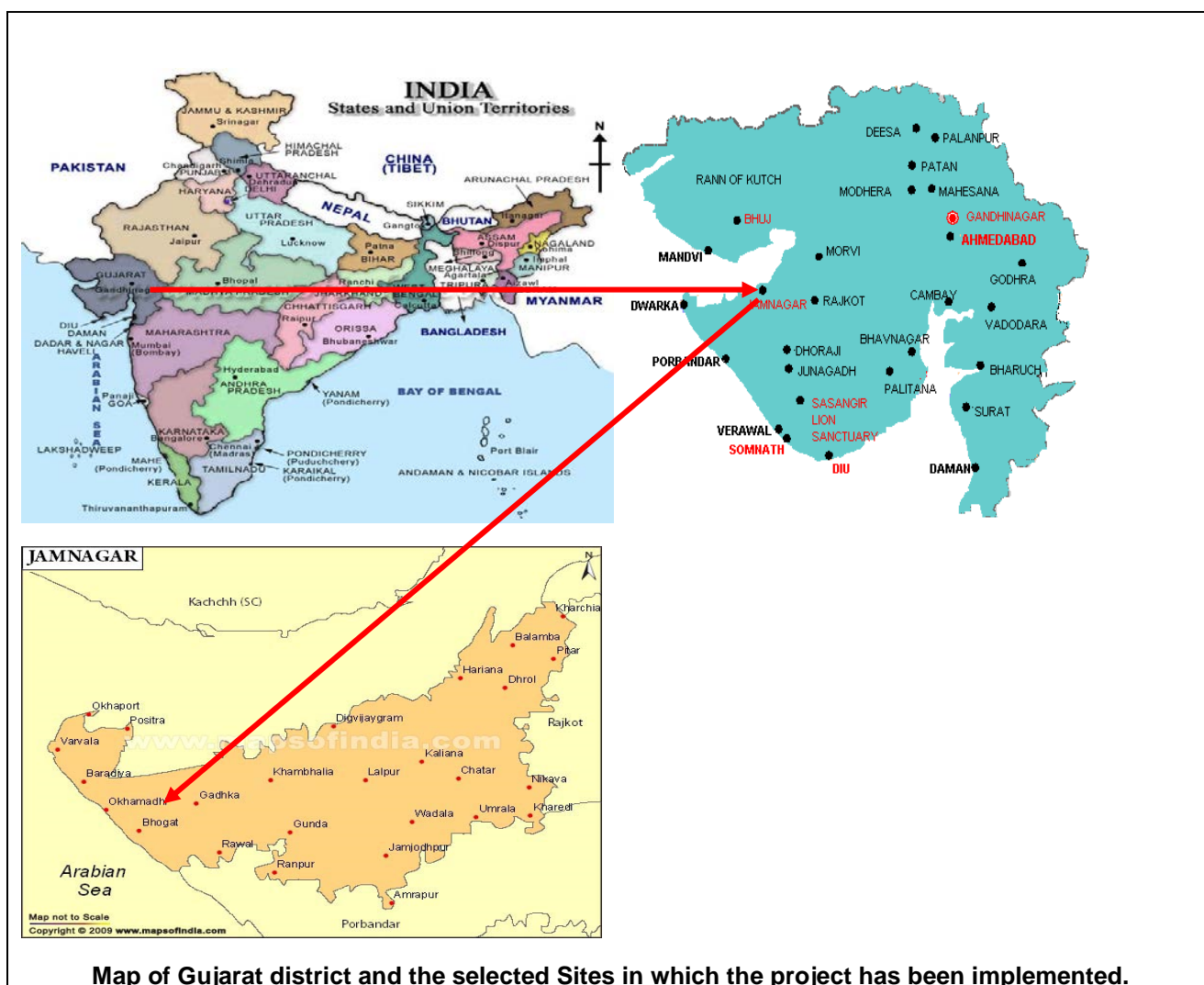
This is the fourth monitoring report for the project activity. The total emission reductions achieved under the monitoring period 01/09/2013 to 31/12/2014 (Inclusive of both days) are 109,925 tCO<sub>2</sub>e.

### A.2. Location of project activity

>>

- (a) Host Party(ies); India
- (b) Region/State/Province, etc.; Gujarat State
- (c) City/Town/Community, etc.; Jamnagar and Rajkot
- (d) Physical/ Geographical location. The location details of project activity are given in appendix 2 table including site name, village, latitude- longitude details etc.

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 Chhattar, Narmana, Seth Wadala, Jam Ambardi, Mevasa, Dhun Dhoraji, Sadodar, Bodi, Padavala and Machharda in Jamnagar and Rajkot Districts of Gujarat state in India



**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 if the Party involved wishes to be considered as project participant (Yes/No)
Government of India (host)	Vaayu (India) Power Corporation Private Limited (Private Entity)	No
Spain	Kingdom of Spain (withdrawn)	No
Sweden	Swedish Energy Agency (withdrawn)	No

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

&gt;&gt;

Title: ACM0002, Version-11, EB 52, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

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

The following tools have been used CDM PDD:

- Tool for demonstration and assessment of additionality, version 5.2.0
- Tool to calculate the emission factor for an electricity system, Version 02.0

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**

&gt;&gt;

Crediting period of the project activity as per registered PDD is from 1st June 2011 to 31st May 2021 (10 years, Fixed). The first monitoring period was from 1 Jun 2011 to 29 Feb 2012. The second monitoring period was from 1 Mar 2012 to 31 Dec 2012. The third monitoring period was from 01 Jan 2013 to 31 Aug 2013. The monitoring period considered under this monitoring report is from 01/09/2013 to 31/12/2014 (Inclusive of both days).

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

&gt;&gt;

Vaayu (India) Power Corporation Private Limited  
Plot No. 33, Daman Patalia Road  
Bhimpore, Daman (UT)  
Daman (UT) - 396210  
India

The detailed contact information has been provided in Appendix 1. The above mentioned person/entity is also a project participant.

**SECTION B. Implementation of project activity****B.1. Description of implemented registered project activity**

&gt;&gt;

The start date of the project activity is 05 December 2009 as per registered PDD. The detailed commissioning dates for all the machines included in the project activity are given in the table below:

<b><u>Sr. No.</u></b>	<b><u>Location No</u></b>	<b><u>WTG-ID No.</u></b>	<b><u>Commissioning Date</u></b>
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

There are no changes that have happened in project activity which may impact the applicability of the methodology. The operation and maintenance activities of Wind World India 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**

>>

There is no deviation from registered monitoring plan or applied methodology during this monitoring period.

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

>>

There are no corrections from the registered PDD during this monitoring period.

##### **B.2.3. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline**

>>

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.2.4. Changes to project design of registered project activity**

>>

There are no permanent Changes to project design of registered project activity.



**B.2.5. Changes to start date of crediting period**

&gt;&gt;

There are no changes to the start date of the crediting period.

**B.2.6. Types of changes specific to afforestation or reforestation project activity**

&gt;&gt;

Not applicable to the project activity.

**SECTION C. Description of monitoring system**

&gt;&gt;

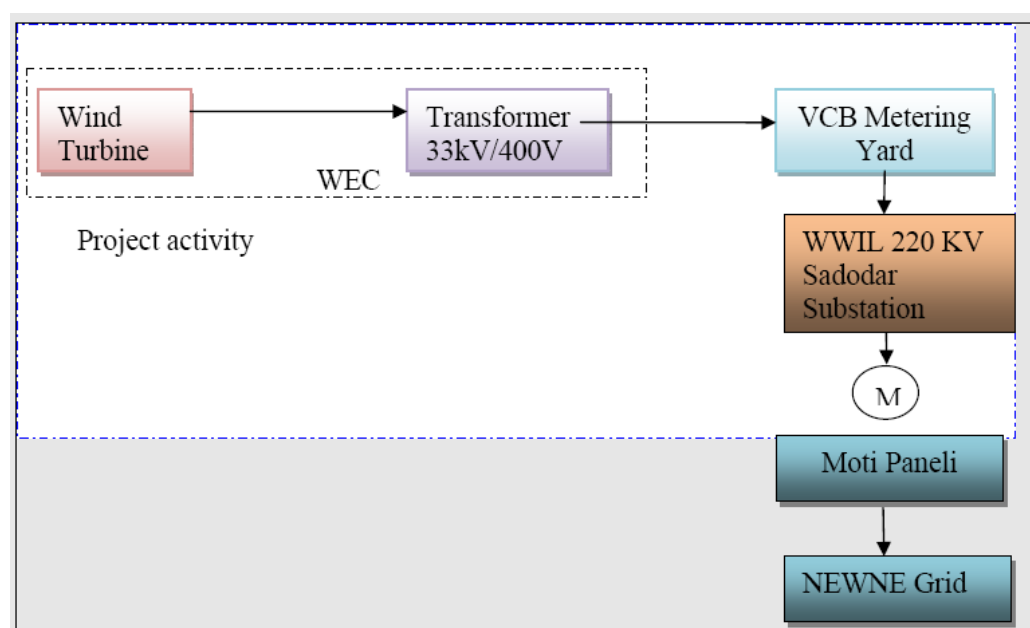
Approved monitoring methodology ACM0002 Version 11 Sectoral Scope: 1, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

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.

**Line Diagram of Monitoring System of Project activity:**

M = Electricity export and import meter

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 Wind World (India) Limited to GEDA.

Wind World (India) Limited 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 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 general conditions set out for metering, recording, meter readings, meter inspections, Test & Checking and communication are as per the agreement with state electricity board . However, the procedures adopted for metering details vary with the EPC contractor. The paragraphs below present the procedure adopted by the respective EPC contractors:

**Metering:** Project activity has 33kV individual metering point for individual customers installed at project site. In addition to 33kV metering point there is bulk/common metering point installed at Wind World Sub-station (220kV-Sadodar Sub-station) where metering is done for all the WEGs of project activity & non-project activity.

**Metering Equipment:** Metering equipment is an electronic trivector meter of accuracy class 0.2 required for the Project. The meter is installed and owned by GETCO. The metering equipment is maintained in accordance with electricity standards prevalent in Gujarat.

**Meter Test Checking:** The meter is tested for accuracy with reference to a portable standard meter. The portable standard meter is also owned by GETCO. The meter is deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy classes. The consumption registered by the meter alone holds good for the purpose of metering electricity supplied to the grid as long as the error in the meter is within the permissible limits.

If during the meter test checking, The meter is found to be beyond permissible limits of error, the meter shall be immediately calibrated and the correction applied to the reading registered by the meter to arrive the correct reading of energy supplied for metering electricity supplied to the grid for the period from the last month's meter reading up to the current test. Meter reading for the period thereafter till the next monthly reading shall be as per the calibrated meter.

**Monthly Meter Readings:** The Net electricity supplied to the grid is recorded monthly by taking a Joint Meter Reading (JMR) at individual metering point (33kV at project site) along with the bulk/common metering point installed at Wind World Sub-station (220kV-Sadodar) in the presence of officials from GETCO and Wind World as O&M contractor, on behalf of project sponsor on the first day of every month at the Delivery Point. The Joint meter reading contains the value of energy imported and exported and the net export to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of GETCO and by Wind World Officials. Based on the JMR reading recorded on monthly GETCO issues the share of electricity certificate mentioning the net electricity supplied to grid by individual customer.

**Calibration frequency:** The meter testing and checking procedures are solely within the purview of GETCO (Gujarat Energy Transmission Corporation Limited) and are outside the purview of the monitoring plan for the projects. Since meter testing and checking procedures are solely within the purview of GETCO, all the meters at the power evacuation sites are calibrated and tested once in a period of three years. (Please refer to order by GETCO, letter no: ACE(R&C)/SE/Telecom/ABT meter/37/10, Dated as 04/01/2012). The calibration details of all the energy meters are as follows:

Name of Substation	Meter Serial No	Previous Calibration Date (Year 2010)	Latest Calibration Date (Year 2012)	Validity
Sadodar	GJB 01470	22/01/2010	17/01/2012	16/01/2015
	GJU 04175	22/01/2010	17/01/2012	16/01/2015
	GJU 04176	22/01/2010	17/01/2012	16/01/2015
	KAB11082	29/05/2010	17/01/2012	16/01/2015

**QA/QC Procedures:** Every month these meter readings are jointly recorded by GETCO representative and Wind World officials. The meters at the project site and Wind World substation are the two-way tri-vector meters and are in the custody of GETCO. QA/QC procedures will be as implemented by GETCO. Since the readings are taken at the point of supply of power to the grid, the transmission and distribution losses and the minimum reactive power consumption has already been taken into account.

**Procedure for apportioning of electricity:**

Project activity has the dedicated metering system for individual customer at WEGs location which is used to calculate the export and import of electricity by individual customer's machines. Wind World has installed the meters for each customer, which is sealed in presence of representatives of Wind World and GETCO. This value of the monthly joint meter reading of the WWIL sub-station is then apportioned to the EB reading taken for each customer to get the net supply of electricity to the grid for that particular customer. The share certificate is signed by the GETCO officials, which is used to produce invoice on behalf of the customer. 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**

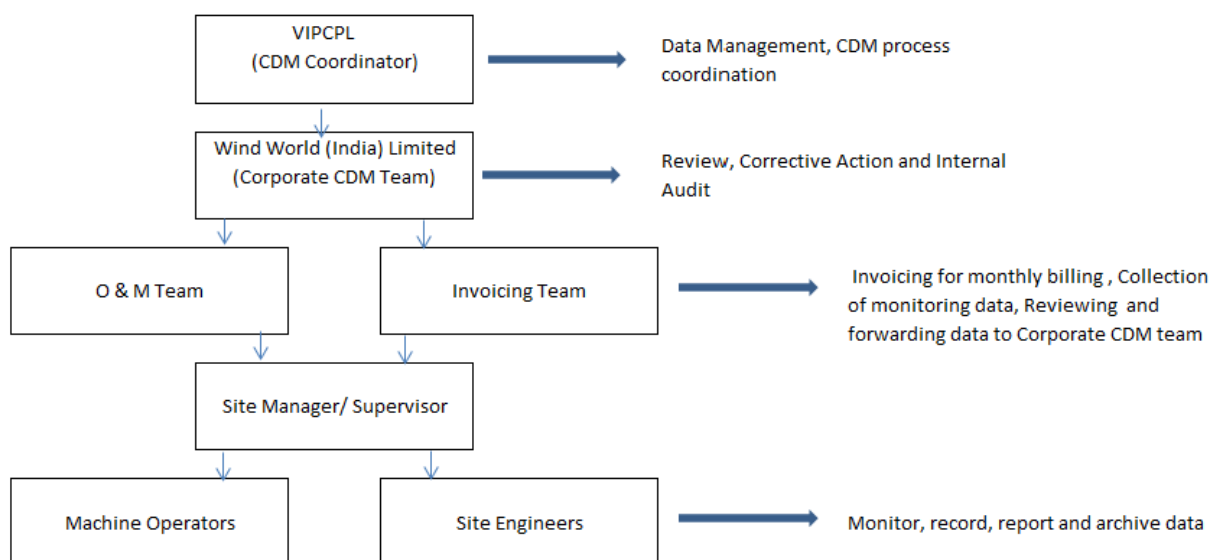
$$EGPJ, Import, y = EG_{GETCO, Import} \times EG_{Cluster, Import} / EG_{Cluster, WF, Import}$$

#### **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.

**Monitoring roles and responsibilities** The sole parameter for monitoring is the electricity supplied to the grid. 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 and maintenance:

In order to ensure that Wind World's staffs who are positioned to take care all the activities starting from project construction to operation and maintenance, Wind World Training Academy provides need based periodical training to meet the requirements of the project. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all the trainees. The training facility is located at Daman and is fully functional and equipped with qualified trainers, training equipments, classrooms and hostel facilities.

## SECTION D. Data and parameters

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

<b>Data / Parameter</b>	<b><math>EF_{grid,OM,y}</math></b>
<b>Unit</b>	tCO <sub>2</sub> e/MWh
<b>Description</b>	Operating Margin Emission Factor of NEWNE Electricity Grid
<b>Source of data</b>	“CO <sub>2</sub> Baseline Database for Indian Power Sector”, version 5 published by the Central Electricity Authority, Ministry of Power, Government of India. 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> <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>
<b>Value(s) applied</b>	1.00498
<b>Purpose of data</b>	Calculation of baseline emissions
<b>Additional comment</b>	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,BM,y}</math></b>
<b>Unit</b>	tCO <sub>2</sub> e/MWh
<b>Description</b>	Build Margin Emission Factor of NEWNE Regional Electricity Grid
<b>Source of data</b>	“CO <sub>2</sub> Baseline Database for Indian Power Sector”, version 5 published by the Central Electricity Authority, Ministry of Power, Government of India. 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>
<b>Value(s) applied</b>	0.67518
<b>Purpose of data</b>	Calculation of baseline emissions
<b>Additional comment</b>	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>
<b>Unit</b>	tCO <sub>2</sub> e/MWh
<b>Description</b>	Combined Margin Emission Factor of NEWNE Regional Electricity Grid
<b>Source of data</b>	“CO <sub>2</sub> Baseline Database for Indian Power Sector”, version 5 published by the Central Electricity Authority, Ministry of Power, Government of India. 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>
<b>Value(s) applied</b>	0.92252
<b>Purpose of data</b>	This data is used for baseline emission calculation.
<b>Additional comment</b>	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>	$EG_{PJ,y}$
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Net Quantity of Electricity exported to the grid
<b>Measured/Calculated /Default</b>	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
<b>Source of data</b>	Share certificate issued by GETCO
<b>Value(s) of monitored parameter</b>	119,157.310 MWh
<b>Monitoring equipment</b>	Calculated as per the procedures shown in section C.
<b>Measuring/Reading/ Recording frequency</b>	Monthly basis
<b>Calculation method (if applicable)</b>	<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>
<b>QA/QC procedures</b>	Details of the QA/QC procedures have been described in section C.
<b>Purpose of data</b>	Calculation of Baseline emissions.
<b>Additional comment</b>	The data is archived on paper as well as on electronic media; however the data will be kept for two years after the end of the crediting period or the last issuance for this project activity, whichever occurs later.

<b>Data / Parameter</b>	EG <sub>GETCO, Export</sub>
<b>Unit</b>	kWh
<b>Description</b>	Net Electricity export recorded at Wind World (India) Limited Substation
<b>Measured/Calculated /Default</b>	Measured at Main Meter
<b>Source of data</b>	Joint Meter Reading (JMR)
<b>Value(s) of monitored parameter</b>	877,174,000,000 kWh <sup>1</sup>
<b>Monitoring equipment</b>	Calculated as per the procedures shown in section C.
<b>Measuring/Reading/Recording frequency</b>	Monthly basis
<b>Calculation method (if applicable)</b>	<p>Monitoring: Electricity export to the grid is recorded by the main meter at Wind World (India) Limited Substation.</p> <p>Frequency of recording data: Monthly</p> <p>Recording: The values of electricity exports to the grid are sourced from JMR.</p> <p>Responsibility: Joint responsibility of Wind World (India) Limited and state utility</p>
<b>QA/QC procedures</b>	Details of the QA/QC procedures have been described in section C.
<b>Purpose of data</b>	Calculation of Baseline emissions.
<b>Additional comment</b>	The data is archived on paper as well as on electronic media; however the data will be kept for two years after the end of the crediting period or the last issuance for this project activity, whichever occurs later.

---

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



<b>Data / Parameter</b>	EG <sub>GETCO</sub> , Import
<b>Unit</b>	kWh
<b>Description</b>	Net Electricity export recorded at Wind World (India) Limited Substation
<b>Measured/Calculated /Default</b>	Measured at Main Meter
<b>Source of data</b>	Joint Meter Reading (JMR)
<b>Value(s) of monitored parameter</b>	288,000,000 kWh <sup>2</sup>
<b>Monitoring equipment</b>	Calculated as per the procedures shown in section C.
<b>Measuring/Reading/ Recording frequency</b>	Monthly basis
<b>Calculation method (if applicable)</b>	Monitoring: Electricity import 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 imports to the grid are sourced from JMR.  Responsibility: Joint responsibility of Wind World (India) Limited and state utility
<b>QA/QC procedures</b>	Details of the QA/QC procedures have been described in section C.
<b>Purpose of data</b>	Calculation of Baseline emissions.
<b>Additional comment</b>	The data is archived on paper as well as on electronic media; however the data will be kept for two years after the end of the crediting period or the last issuance for this project activity, whichever occurs later.

### D.3. Implementation of sampling plan

>>

As the parameter to be monitored does not require sampling approach for its determination this section is not applicable for the proposed project activity.

## SECTION E. Calculation of emission reductions or GHG removals by sinks

### E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

Baseline emission factor (combined margin) = 0.92252 tCO<sub>2</sub>e/MWh

Estimated annual electricity supplied to the grid by the Project = 119,157.310 MWh

Annual baseline emissions = 0.92252 tCO<sub>2</sub>e/MWh x 119,157.310 MWh  
= **109,925 tCO<sub>2</sub>e/year.**

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

The details of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity is provided in ER spreadsheet.

**Baseline Emission Reductions calculations for project activity:-**

Duration	Net electricity supplied to the grid by the Project [MWh]	Baseline Emission Factor (tCO <sub>2</sub> e/MWh)	Baseline Emissions (tCO <sub>2</sub> e)
01/09/2013 – 31/12/2013	24,705.985 <sup>3</sup>	0.92252	22,792
01/01/2014 – 31/12/2014	94,451.325	0.92252	87,133
<b>Total</b>	<b>112,159.719</b>		<b>109,925</b>

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

>>

The project activity uses wind power to generate electricity and hence, the emissions from the project activity have been taken as zero.

$$PE_y = 0$$

**E.3. Calculation of leakage**

>>

No leakage has been considered from the project activity as per approved methodology ACM0002. Hence,  $Ly = 0$

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

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)	Emission reductions or net anthropogenic GHG removals by sinks (t CO <sub>2</sub> e)
01/09/2013 to 31/12/2014 (Inclusive of both days)	109,925	0	0	109,925
<b>Total</b>	<b>109,925</b>	<b>0</b>	<b>0</b>	<b>109,925</b>

<sup>3</sup> Detailed calculations has been provided in ER spreadsheet.

**E.5. Comparison of actual emission reductions or net anthropogenic 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)	141,934	109,925

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

&gt;&gt;

There is change of 22.55 % (downside) in the expected and actual emission reductions. The difference in the total CERs is due to low wind availability leading to low plant load factor.

**E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	NA	109,925 tonnes of CO <sub>2</sub> e.

-----

## 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"/> Responsible person/ entity 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>	+91-22-2671 7176
<b>Fax</b>	+91 22 66921177
<b>E-mail</b>	<a href="mailto:yogesh.mehra@windworldindia.com">yogesh.mehra@windworldindia.com</a>
<b>Website</b>	<a href="http://www.windworldindia.com">www.windworldindia.com</a>
<b>Contact person</b>	
<b>Title</b>	Director
<b>Salutation</b>	Mr.
<b>Last name</b>	Mehra
<b>Middle name</b>	
<b>First name</b>	Yogesh
<b>Department</b>	Corporate
<b>Mobile</b>	+91-9820040301
<b>Direct fax</b>	+91 22 66921177
<b>Direct tel.</b>	+91-22-6692 4848 extn. 7111
<b>Personal e-mail</b>	<a href="mailto:yogesh.mehra@windworldindia.com">yogesh.mehra@windworldindia.com</a>

**Appendix 2: Details of Physical Location (Latitude and Longitude)**

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/ Haripar	N22 ° 01' 36.6"	E70 ° 15' 27.2"
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"

-----

**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
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 anthropogenic 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		