



**Monitoring report form for CDM project activity  
(Version 06.0)**

**MONITORING REPORT**

<b>Title of the project activity</b>	Wind power project in Rajasthan	
<b>UNFCCC reference number of the project activity</b>	8591	
<b>Version number of the PDD applicable to this monitoring report</b>	06	
<b>Version number of this monitoring report</b>	02	
<b>Completion date of this monitoring report</b>	26/07/2018	
<b>Monitoring period number</b>	01	
<b>Duration of this monitoring period</b>	31/12/2012 to 21/01/2014 (Inclusive of both days)	
<b>Monitoring report number for this monitoring report</b>	NA	
<b>Project participants</b>	Mytrah Energy (India) Limited	
<b>Host Party</b>	India	
<b>Sectoral scopes</b>	Sectoral Scope: 1 - Energy industries (renewable / non-renewable sources)	
<b>Applied methodologies and standardized baselines</b>	Methodology: ACM0002 Consolidated baseline methodology for grid-connected electricity from renewable energy version 12.3.0 Standardized baselines: Not Applicable	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	<b>Amount achieved before 1 January 2013</b>	<b>Amount achieved from 1 January 2013</b>
	21 tCO <sub>2</sub> e	70,627 tCO <sub>2</sub> e
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	74,938 tCO <sub>2</sub> e	

## SECTION A. Description of project activity

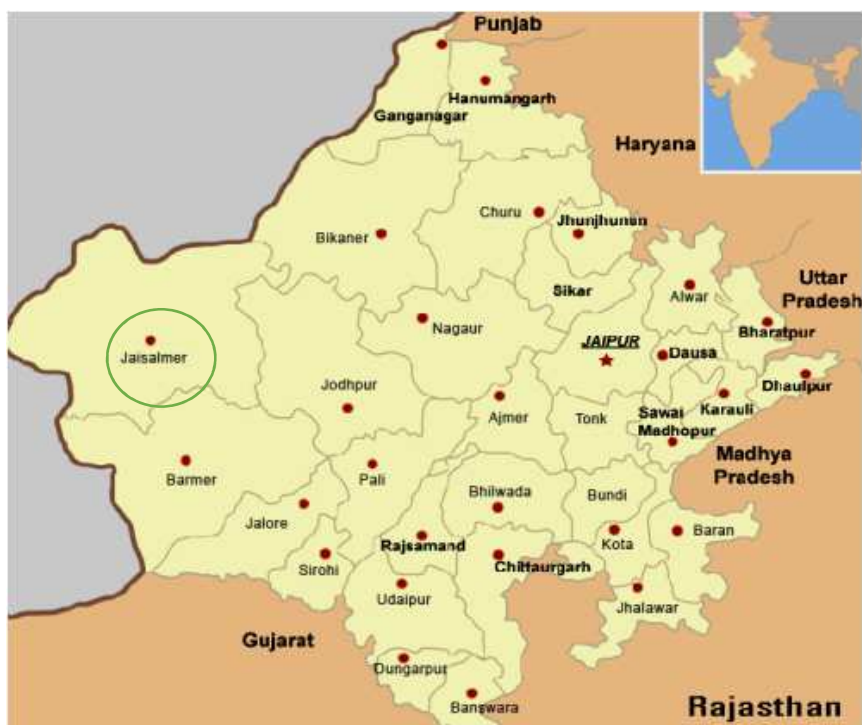
### A.1. General description of project activity

Mytrah Energy (India) Limited (MEIL, formerly called Caparo Energy (India) Limited) has implemented a greenfield 42MW wind Power project in Jaisalmer District in the state of Rajasthan. The proposed project activity involves power generation using Wind Turbine Generator (WTG). Suzlon Energy Limited had been identified as the technology supplier for this project. The purpose of the project activity is to commission and operate 20WTGs of 2.1 MW capacity each. The power generated by this project activity is being supplied to Amarsagar sub-station located in Jaisalmer district and further to Jodhpur Vidyut Vitran Nigam Limited which is located in North East West and North East (NEWNE) electricity grid, India. The grid is currently dominated with fossil fuel based power plants<sup>1</sup>. The project activity is helping in contributing to the sustainable development by using wind energy as the source of power generation and also meet the electricity demand which is lower than supply in the state<sup>2</sup>.

The activity is a zero emissions wind based power generation project connected to NEWNE grid. The project is exporting around 74173 MWh to NEWNE Grid every year. As the project involves grid connected generation of greenhouse gas (GHG) free power from a renewable source the approved baseline methodology ACM0002 "*Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources*" is being used for calculating the emission reductions. The project activity thereby leads to reduction in emissions associated with grid-connected power plants and enables sustainable development. During the current monitoring activity, the total number of emission reduction achieved is 70,648 tCO<sub>2</sub>e.

### A.2. Location of project activity

The project activity is located in Tejwa – Mokal village, Jaisalmer District of Rajasthan State, India



<sup>1</sup> [http://www.cea.nic.in/reports/monthly/executive\\_rep/jun11/8.pdf](http://www.cea.nic.in/reports/monthly/executive_rep/jun11/8.pdf)

<sup>2</sup> [http://www.cea.nic.in/reports/yearly/lqbr\\_report.pdf](http://www.cea.nic.in/reports/yearly/lqbr_report.pdf), for year 2010-11

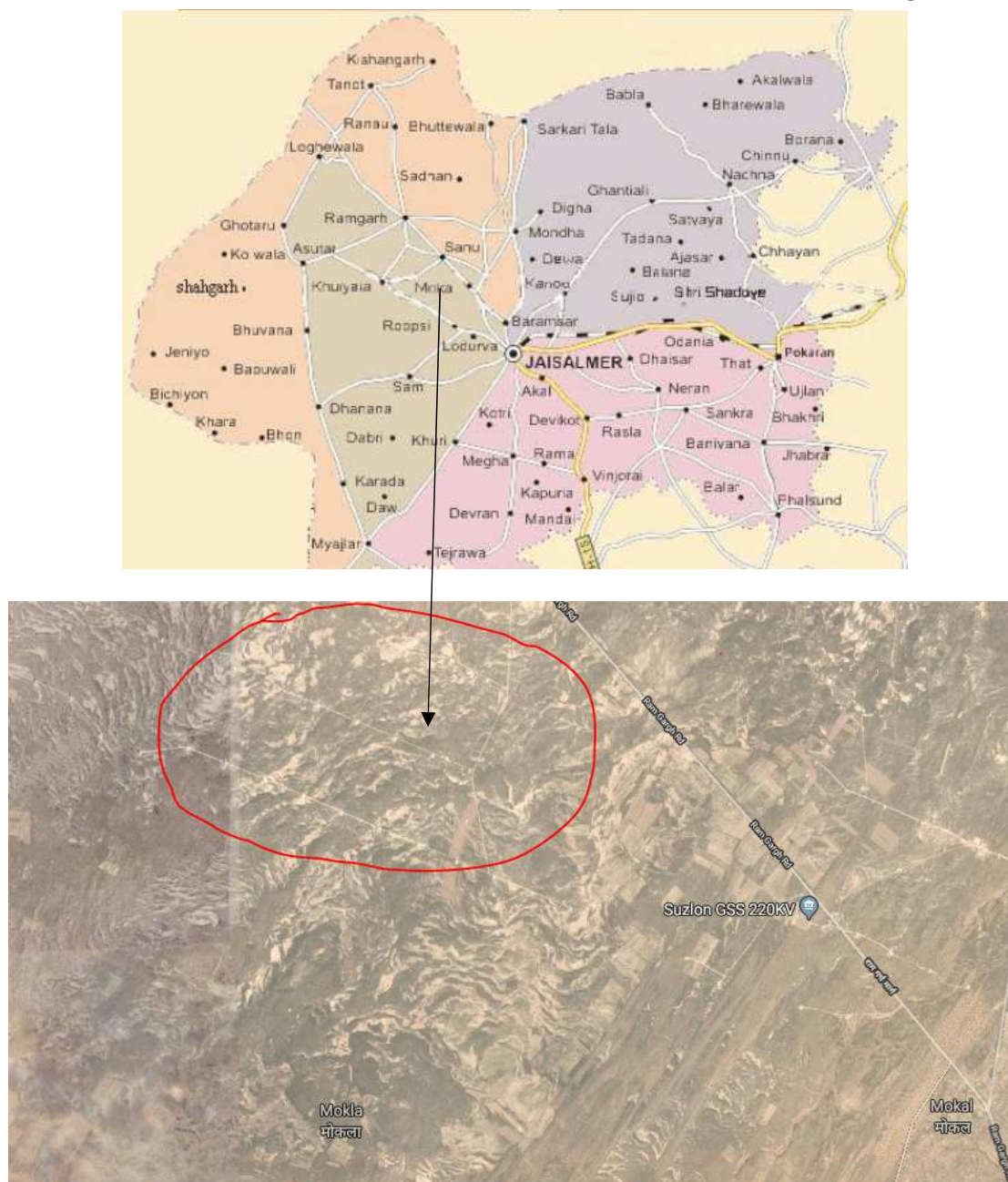


Figure 1. Project Site location

The location of WTGs and the commissioning dates are as follow:

Sr. No.	WTG ID	WTG Co-ordinate		Date of Commissioning
		Latitude	Longitude	
1	MK014	27.1631	70.6809	04-08-11
2	MK015	27.1612	70.6858	19-07-11
3	MK016	27.1594	70.6907	19-07-11
4	MK017	27.1576	70.6956	19-07-11
5	MK021	27.1466	70.7251	30-09-11
6	MK039	27.1697	70.6926	12-07-11
7	MK040	27.1715	70.6877	12-07-11
8	MK042	27.1752	70.6779	19-07-11
9	MK043	27.1771	70.673	04-08-11

10	MK066	27.1837	70.6848	12-07-11
11	MK067	27.1812	70.6891	30-06-11
12	MK068	27.1804	70.6949	30-06-11
13	MK069	27.1782	70.6995	30-06-11
14	MK092	27.1887	70.7016	19-06-11
15	MK093	27.1905	70.6966	25-06-11
16	MK094	27.1924	70.6917	30-06-11
17	MK161	27.2195	70.6917	25-06-11
18	MK163	27.2237	70.6833	25-06-11
19	MK164	27.2255	70.6784	16-06-11
20	MK165	27.2274	70.6735	19-06-11

### A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	Mytrah Energy (India) Limited	No

### A.4. Reference to applied methodologies and standardized baselines

Applied Methodology: ACM0002 "Grid-connected electricity generation from renewable sources"  
Reference: ACM0002 of version 12.3.0<sup>3</sup>

### A.5. Crediting period type and duration

Type of crediting period	Fixed
Crediting period from	31-12-2012 – 30-12-2022
Length of the Crediting Period	10 Years
Current Monitoring period from	31-12-2012 to 21-01-2014
Length of the current Monitoring Period	387 Days

## SECTION B. Implementation of project activity

### B.1. Description of implemented project activity

The technology employed by the Proposed Project Activity includes the usage of Wind Energy Turbines with an aggregate of 42 MW generation capacity to supply the generated electricity to the NEWNE Grid. The generation and consumption of the Project Activity is monitored continuously through the energy meters at project site & substations. The data is used for the calculation of exports to the grid and imports from the grid. The project activity implements 20 WTGs of Suzlon Energy Limited's 2.1 MW S88 Model<sup>4</sup>.

The electricity exported by the proposed project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the Grid which relies predominantly on fossil fuels. Thus, it contributes towards reduction in the demand-supply gap during periods of electricity shortage and increase in the share of renewable energy in the grid mix.

<sup>3</sup> <http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L>

<sup>4</sup> <http://www.suzlon.com/pdf/product/Suzlon-S88-2.1MW-product-brochure.pdf>

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

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

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

There is no request for deviation applied during this monitoring period.

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

There have not been any corrections to project information or parameters fixed at validation during the current monitoring period.

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

There is no changes in the start date of the crediting period.

### **B.2.4. Inclusion of monitoring plan**

There has not been any change in the monitoring plan during the current monitoring period.

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

Not Applicable.

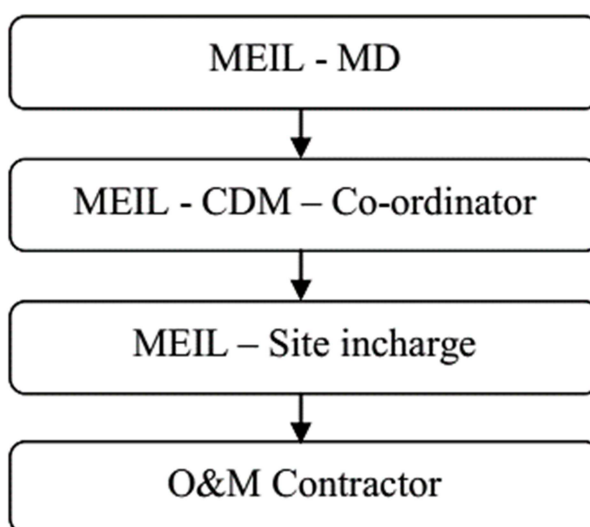
### **B.2.6. Changes to project design**

There has not been any change in the PDD during the current monitoring period.

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

The electricity exported to the grid through the project activity and the electricity imported from the JVVNL grid is being monitored. The electricity export and import is through a common evacuation system having common metering equipments. Suzlon Energy Limited has been identified as the common agency responsible for joint metering.

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





The project proponent has entered into agreement with the WTG- Supplier – Suzlon Energy Limited for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well-equipped O&M team for day-to-day Operation and maintenance of each WTG. O&M contractor provides the monthly report, which includes wind data, generation data, major breakdown events and machine availability, which forms the basis for invoicing and emission reduction computation. Project Manager is responsible for recording of monthly Joint Meter Readings of export and import. Monthly power export and import data is being sent regularly to CDM coordinator of MEIL. All data is being archived for a period two years after crediting period.

The Operation & Maintenance of the project is being done by Suzlon Energy Limited. As per the monitoring plan, the electricity exported to the grid through the project activity and the electricity imported from the JVVNL grid is monitored.

#### Measurement of Energy and Metering:

- Since there are power producers other than the project proponent injecting electricity produced by them using the common evacuation / injection system and through the common metering equipment, Suzlon Energy Limited has been identified as the common agency responsible for joint metering.
- The joint meter reading taken at the common evacuation / injection system is supported by controller readings of individual power producers using the common evacuation / injection system. Based on this breakup, limited to the total energy injection, net electricity exported by the project proponent is calculated as mentioned below.

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

Where

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

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

A schematic diagram indicating the metering system is provided below.

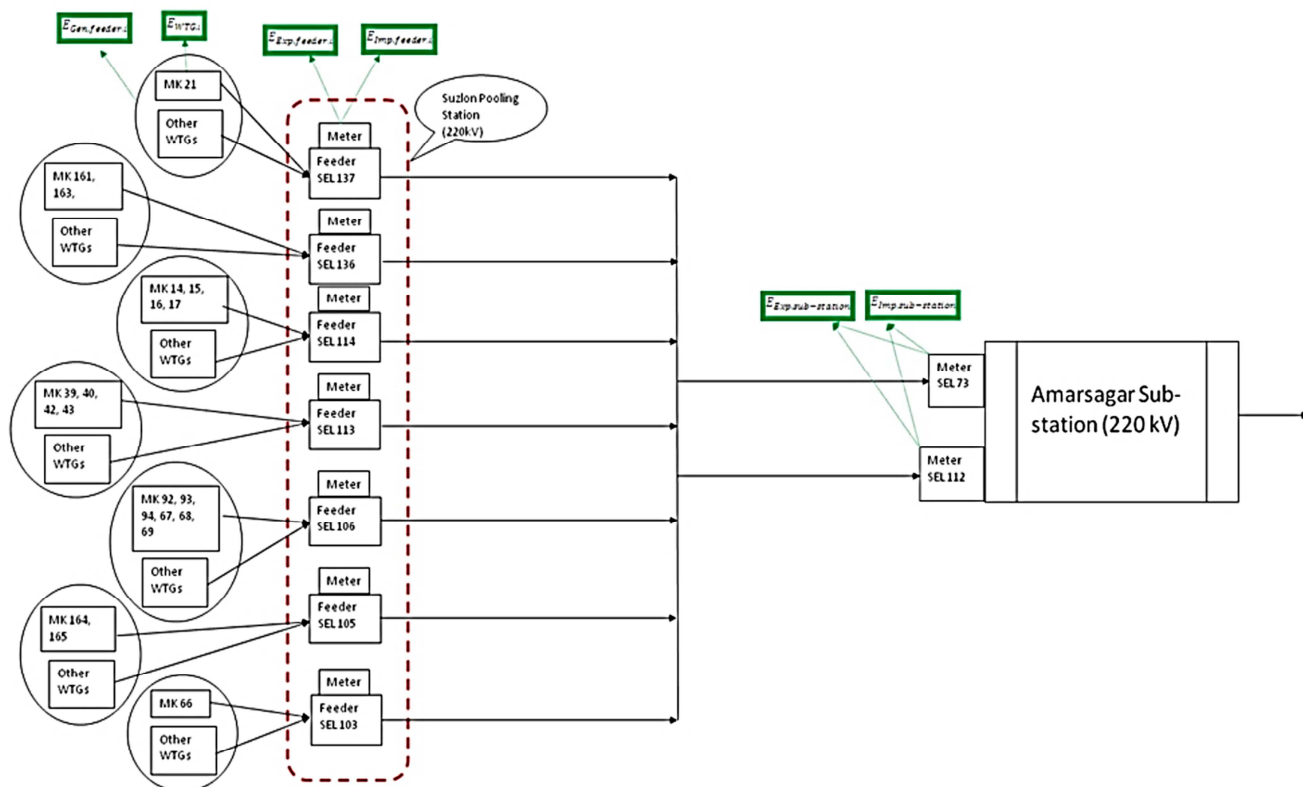


Figure 2. A schematic diagram indicating the metering system.

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OMsimple,y}$
Unit	tCO <sub>2</sub> /MWh
Description	Operating margin CO2 emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO2 Emission Database CEA CO2 Baseline database Version 07 <sup>5</sup>
Value(s) applied	0.9842
Choice of data or measurement methods and procedures	The operating margin emission factor data has been deduced from CO <sub>2</sub> Database.
Purpose of data/parameter	The parameter is used for calculation of the baseline emissions.
Additional comments	The operating margin emission factor is a 3-year generation-weighted average data, based on the most recent data available on CEA database at the time of submission of the CDM-PDD to the DOE for validation

Data/Parameter	$EF_{grid,BM,y}$
Unit	tCO <sub>2</sub> /MWh
Description	Build margin CO2 emission factor of NEWNE grid

<sup>5</sup> [http://www.cea.nic.in/reports/planning/cdm\\_co2/cdm\\_co2.htm](http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm)

Source of data	Central Electricity Authority:CO2 Emission Database CEA CO2 Baseline database Version 07 <sup>5</sup>
Value(s) applied	0.8588
Choice of data or measurement methods and procedures	The build margin emission factor data has been deduced from CO <sub>2</sub> Database.
Purpose of data/parameter	The parameter is used for calculation of the baseline emissions.
Additional comments	The build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data available has been used and the build margin thus calculated is 0.8588

<b>Data/Parameter</b>	<b>EF<sub>grid,CM,y</sub></b>
Unit	tCO <sub>2</sub> /MWh
Description	Combined margin CO <sub>2</sub> emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO2 Emission Database CEA CO2 Baseline database Version 07 <sup>5</sup>
Value(s) applied	0.9529
Choice of data or measurement methods and procedures	Calculated as per the procedures in “Tool to calculate the emission factor for an electricity system” with data deduced from CEA
Purpose of data/parameter	The parameter is used for calculation of the baseline emissions.
Additional comments	The Combined Margin would be calculated ex ante and fixed during the crediting period.

## D.2. Data and parameters monitored

<b>Data/Parameter</b>	<b>EG<sub>PJ,y</sub></b>
Unit	MWh
Description	Quantity of Net Electricity exported to the grid during the year y.
Measured/calculated/default	Calculated value based on Measured electricity export and import values
Source of data	Calculated value based on Measured electricity export and import values
Value(s) of monitored parameter	74140.662 MWh
Monitoring equipment	Net electricity supplied is calculated based on the difference between calculated values of “export” and calculated value “import” on the JVVNL energy meter at the common evacuation point and the percentage transmission loss as prescribed in the PPA for metering at 220 kV. Refer to section C of this MR for more details on the calculation procedure
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	Net electricity supplied is calculated based on the difference between calculated values of “export” and calculated value “import” on the JVVNL energy meter at the common evacuation point.
QA/QC procedures	All Energy meters will be tested for accuracy at least once in a years. The accuracy class of the energy meter is 0.2s. The Net electricity supplied to the grid by the project activity is cross checked with invoices submitted to JVVNL.
Purpose of data/parameter	Calculation of the baseline emission
Additional comments	-



Data/Parameter	$E_{WTG,i,y}$
Unit	MWh
Description	Quantity of Electricity generated by the individual WTGs of the PP in year y
Measured/calculated/default	Calculated value based on Measured electricity export and import values
Source of data	WTG Controller meter reading
Value(s) of monitored parameter	77063.686 MWh
Monitoring equipment	Electricity generated by the WTG will be continuously monitored by the controller meter installed within the WTG. These reading are recorded online by the technology supplier. All the data items monitored under the monitoring plan is being archived for entire crediting period or till the last issuance of CERs for this project activity whichever occurs later. Calibration Frequency: The WTG controller meter does not require calibration as per the specification provided by the technology supplier.
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	NA
QA/QC procedures	The quantity of electricity generated by the individual WTG is crosschecked with the online tracking system provided by the technology supplier
Purpose of data/parameter	This parameter is not directly used for emission reduction calculation purpose. However can be considered for comparison purpose.
Additional comments	-

### D.3. Implementation of sampling plan

There is no sampling plan is required for current monitoring plan.

## SECTION E. Calculation of emission reductions or net anthropogenic removals

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

The project activity reduces carbon dioxide by displacing thermal coal fired grid electricity generation with renewable energy based generation. The emission reduction  $ER_y$  by the project activity during a given year y is the difference between baseline emissions ( $BE_y$ ) and project emissions ( $PE_y$ ) as per the consolidated methodology ACM002 version 12.3.0 as follows:, Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

*As per ACM002 version 12.3.0, baseline emissions include only CO<sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:*

$$BE_y = EG_{\text{facility}, y} * EF_{\text{grid}, CM, y}$$

$BE_y$  = Baseline emissions in year y (tCO<sub>2</sub>)  
 $EG_{\text{facility}, y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of CDM project activity in year y (MWh)  
 $EF_{\text{grid}, CM, y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system (tCO<sub>2</sub>/MWh)"

Baseline emission factor (Combined Margin) is 0.9529 tCO<sub>2</sub>e.

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

As the project activity is wind power project, project emissions are zero and the resulting emission reduction is as follows.

Therefore,

$$ER_y = BE_y$$

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

$$BE_y = 74,141 \times 0.9529$$

$$BE_y = 70,648 \text{ tCO}_2\text{e}$$

**E.3. Calculation of leakage emissions**

No leakage emissions have been considered and hence the leakage emission is zero.

So the emission reductions is equal to baseline emissions  $ER_y = BE_y$ .

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

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Total</b>	70,648	0	0	21	70,627	70,648

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

Amount achieved during this monitoring period (t CO <sub>2</sub> e)	Amount estimated ex ante (t CO <sub>2</sub> e)
70,648	74,938

**E.6. Remarks on increase in achieved emission reductions**

From E.5 above, we can observe that actual emission reduction for the monitoring is lower than estimated emission reductions by -5.72% due the change in expected wind flow patterns.

## Appendix 1. Calibration Details

WEG	Feeder Number	Meter Number	Meter Make	Initial Calibration Date	Next Calibration date	Next Calibration date
MK 66	Fed No. 10	RJB 72831	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB 72832	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
MK 164 MK 165	Fed No. 11	RJB 73524	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB 73525	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
MK67 MK68 MK69 MK92 MK93 MK94	Fed No. 12	RJB 73521	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB 73522	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
MK14 MK15 MK16 MK17	Fed No. 14	RJB73571	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB73572	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
MK39 MK40 MK42 MK43	Fed No. 13	RJB73569	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB73570	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
MK 21	Fed No. 17	RJB74434	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB74435	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
MK 161 MK 163	Fed No. 16	RJB 74432	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013
		RJB 74433	Secure Meters Limited	19/06/2011	16/03/2012	11/03/2013

The accuracy class of the each above energy meter is 0.2s and calibration due date is 11/03/2014.

## Appendix 2. Major Breakdown details

Date	Loc. No	Duration	Description
14-Jan-13	MK-165	7:37	RS_Manual_SoftStop
16-Jan-13	MK-42	8:53	Elec_MFR_DFDT
16-Jan-13	MK-92	7:18	Pitch_Akku1Voltage_LowStop
11-Feb-13	MK-93	8:45	RS_Manual soft_stop
06-Mar-13	MK-161	5:08	Rep_Pitch_CANComFail
12-Mar-13	MK-163	5:08	RS_Manual soft_stop
13-May-13	MK-69	7:42	Pitch_LubricationStop
15-June-13	MK-67	7:32	Elec_MFR_DFDT
16-June-13	MK-68	8:05	RS_Manual soft_stop
17-July-13	MK-43	8:29	RS_Manual_SoftStop
08-July-13	MK-14	10:42	Pitch_Akku1Voltage_LowStop
12-Aug-13	MK-15	10:42	RS_Manual_SoftStop
12-Sep-13	MK-39	10:40	Rep_Pitch_CANComFail
15-Oct-13	MK-40	10:40	RS_Manual_SoftStop
15-Oct-13	MK-43	10:43	RS_Manual_SoftStop
16-Oct-13	MK-66	10:41	Elec_MFR_DFDT
01-Nov-13	MK-68	10:39	RS_Manual_SoftStop
03-Nov-13	MK-69	10:38	RS_Manual_SoftStop
09-Nov-13	MK-92	10:36	RS_Manual_SoftStop
09-Nov-13	MK-94	10:38	RS_Manual_SoftStop
19-Dec-13	MK-163	10:51	RS_Manual_SoftStop
19-Dec-13	MK-164	10:52	RS_Manual_SoftStop
19-Dec-13	MK-165	10:53	RS_Manual_SoftStop
23-Dec-13	MK-16	7:27	Elec_MFR_DFDT
28-Dec-13	MK-21	7:33	RS_Manual_SoftStop

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### Document information

Version	Date	Description
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>Make editorial improvements.</li> </ul>
05.1	4 May 2015	Editorial revision to correct version numbering.

<i>Version</i>	<i>Date</i>	<i>Description</i>
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 (EB 70, 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).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		