



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

MONITORING REPORT

Title of the project activity	Sinner wind power project in Maharashtra	
UNFCCC reference number of the project activity	9297	
Version number of the PDD applicable to this monitoring report	03	
Version number of this monitoring report	02	
Completion date of this monitoring report	06/09/2018	
Monitoring period number	01	
Duration of this monitoring period	31/12/2012 to 07/05/2015 (Inclusive of both days)	
Monitoring report number for this monitoring report	NA	
Project participants	Bindu Vayu Urja Private Limited (BVUPL)	
Host Party	India	
Sectoral scopes	Sectoral Scope: 1 - Energy industries (renewable / non-renewable sources)	
Applied methodologies and standardized baselines	Methodology: Approved consolidated baseline methodology ACM0002 (Version 12.3.0, EB 66) Standardized baselines: Not Applicable	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	19 tCO ₂ e	54,227 tCO ₂ e

Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	54,677 tCO ₂ e ¹
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¹ Out of total 29.4 MW capacity, only 12.60 MW capacity is commissioned during current monitoring period. Thus only 12.60 MW is considered for ER estimation.

SECTION A. Description of project activity

A.1. General description of project activity

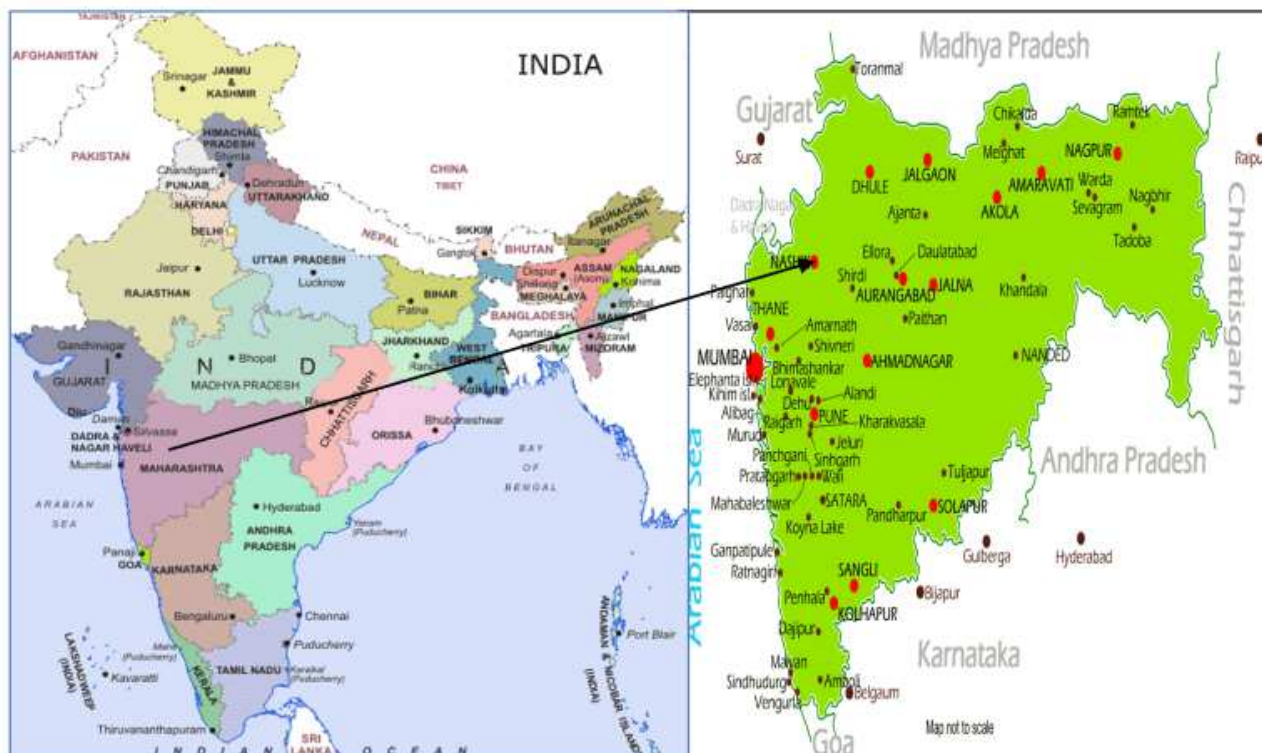
M/s Bindu Vayu Urja Private Limited is setting up a 29.4 MW Wind Power Plant in Sinner, in the state of Maharashtra in India. The main purpose of the project is to generate electricity using wind energy.

The project is a green field wind energy project. Hence there was no existing facility before the project. In absence of the project, an equivalent amount of electricity would be consumed from the grid which is dominated by thermal based power plants. The project would be using 14 Wind Turbine Generators of Suzlon (Model no: S95) each with capacity of 2.1 MW. The project would be generating around 44,220 MWh of electricity per annum. The electricity is being exported to the Maharashtra State Electricity Distribution Company Limited. The clean electricity generated from the project would aid in sustainable development of that region. It would also help in reducing greenhouse gas emissions by generating clean and green electricity.

The 54,246 tCO₂e is the amount of CERs generated during the current monitoring plan.

A.2. Location of project activity

The project is located in Sinner village in Nashik district, in the state of Maharashtra in India



The project consists of 14 WTGs of 2.1 MW each. The latitude and longitude of each WTG is given below:

Sl.No	WTG-No	State	Longitude	Latitude	Date of Commissioning
1	ADW-06	Maharashtra	19° 42' 47.89 " N	73° 54' 12.71" E	21-09-2012
2	ADW-07	Maharashtra	19° 42' 37.7 " N	73° 54' 27.87" E	26-09-2012
3	ADW-09	Maharashtra	19° 43' 13.9" N	73° 58 '5.2" E	11-07-2012
4	ADW-10	Maharashtra	19° 43' 25.4 " N	73° 58 '0.3" E	11-07-2012
5	ADW-11	Maharashtra	19° 43' 50.5 " N	73° 58' 20.6" E	Not commissioned

6	ADW-12	Maharashtra	19° 44' 1.7" N	73° 58' 16.1" E	Not commissioned
7	ADW-28	Maharashtra	19° 43' 31.7" N	74° 0' 13.3" E	Not commissioned
8	ADW-29	Maharashtra	19° 43' 19.7" N	74° 0' 18.4" E	Not commissioned
9	ADW-30	Maharashtra	19° 43' 6.9" N	74° 0' 20.9" E	Not commissioned
10	ADW-39	Maharashtra	19° 43' 36.58 " N	73° 57' 56.29" E	11-07-2012
11	S01	Maharashtra	19° 51 '48.62" N	73° 55' 45.31" E	Not commissioned
12	S03	Maharashtra	19° 51 ' 26.34" N	73° 55' 45.94" E	Not commissioned
13	S04	Maharashtra	19° 51 ' 37.33 " N	73° 55' 44.77" E	Not commissioned
14	S023	Maharashtra	19° 49 ' 0.8" N	73° 55' 16.5" E	11-07-2012

It is to be noted that project activity commissioned only 6 WTGs and rest 8 WTGs are yet to commission and delay is commissioning is due to approval process.

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)	M/s Bindu Vayu Urja Private Limited (BVUPL) (Private entity)	No

A.4. Reference to applied methodologies and standardized baselines

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

Reference: Approved consolidated baseline methodology ACM0002 (Version 12.3.0, EB 66)²
ACM0002 draws upon the following tools which have been used in the PDD:

- Tool to calculate the emission factor for an electricity system – Version 2.2.1 (EB 63 annex 19)³
- Tool for the demonstration and assessment of additionality – Version 6.0.0 (EB 65 annex 21)⁴

A.5. Crediting period type and duration

Type of crediting period	Fixed
Crediting period from	31 Dec 2012 – 30 Dec 2022
Length of the Crediting Period	10 Years
Monitoring period from	31 Dec 2012 to 07 May 2015 (Inclusive of both days)
Length of the Monitoring Period	858 Days

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project is a Greenfield project. In absence of the project an equivalent amount of electricity would have been consumed from the NEWNE grid, which is connected to fossil fuel based power plants. The project would be using 14 Wind Turbine Generators of Suzlon each with capacity of 2.1 MW. Wind Turbine Generators of Suzlon (Model no: S95). Turbines are designed for generating the optimal power output even at sites with a modest wind speed regime. The Suzlon Flexi-slip

² <http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L>

³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf>

⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf>

System provides efficient control of the load and power control. The turbine operation is efficiently controlled by the Suzlon controller. These technologies are all well-known in the wind power industry and have proven themselves. Wind power generation is an environmentally safe and sound technology that has no harmful emissions during its entire lifetime operations. The WTGs was supplied by Suzlon Energy Limited to the project participant. The components are manufactured in India and assembled at the project site. There is no transfer of technology from outside the host country for this project activity. The project would be generating around 44,220 MWh of electricity per annum. The electricity is exported to the Maharashtra State Electricity Distribution Company Limited. The clean electricity generated from the project would aid in sustainable development of that region. It would also help in reducing green house gas emissions by generating clean and green electricity.

Technical specifications of the WTGs are detailed below:

Operating Data	
Rated power	2.1MW
Cut-in wind speed	3.5 m/s
Rated wind speed	11 m/s
Cut-out wind speed	25 m/s
50 years gust wind speed	59.5 m.s
Wind Class	IEC - IIA
Rotational Speed	15 to 17.6 rpm
Rotor	
Pitch system	Pitch regulated, electrical
Diameter	95 m
Swept area	7085 m ²
Blade material type	Epoxy bounded fibre glass
Generator	
Type	Asynchronous 3 phase induction with slip rings operated with rotor circuit inverter system (DFIG)
Frequency	50/60 Hz
Protection	IP 54, IP23 for slip ring unit
Cooling system	Air cooled
Insulation	Class H
Slip control	Unique Flexi-Slip providing slip up to 16.67%
Braking System	
Aerodynamic brake	3 independent systems with blade pitching mechanism
Mechanical brake	Hydraulic fail-safe disc brake system
Gearbox	
Type	3 stages (One planetary & Two helical)
Yaw System	
Type	Driven by 3 electrical driven planetary drives
Bearings	Polyamide slide
Tower	
Type	Tubular Steel Tower (4 sections)

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

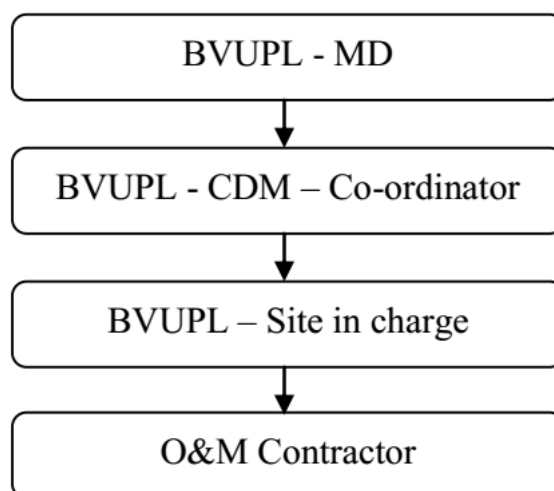
Not Applicable.

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 organisational structure of this CDM project activity is as follows:

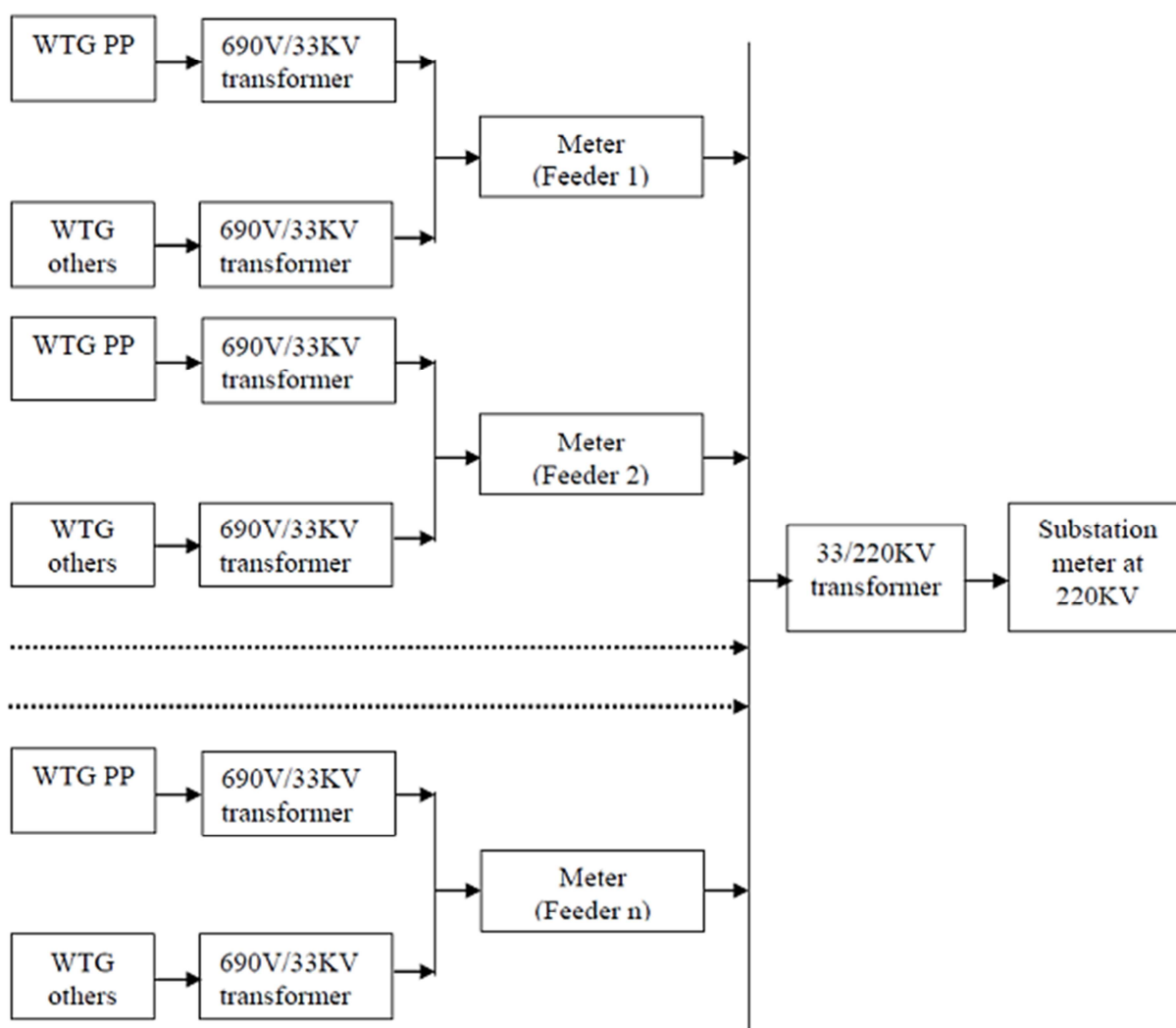


The project proponent has entered into agreement with the WTG- Supplier – Suzlon Energy Limited for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well equipped O&M team⁵ for day-to-day Operation and maintenance of each WTG. O&M contractor provides a monthly report, which includes wind data, generation data, major breakdown events and machine availability. Site in-charge is responsible for recording of monthly Joint Meter Readings of export and import. Monthly power export and import data is sent regularly to CDM coordinator of BVUPL. The detailed monitoring plan has been provided in Annex 4 of the registered PDD.

⁵ Suzlon Energy limited is an ISO certified company with all training needs identified and document as per the ISO requirement. O&M is one of their service offering for which they have trained staff.

Energy generated from the wind farm is being recorded at the metering point at the HT end of the respective Pooling station which shall be considered as the energy for billing. The station may be having more than one metering point depending on the No. of feeders connected by No. of Wind farms. This entire meter is termed as Feeder meter/s. The total energy recorded in the feeder meter/s is considered as the energy for billing. The option for considering the meter reading shall be Main meter in normal practice. In case of fault in the Main meter check Meter reading will be considered (However no such case has been occurred). The meter reading is taken jointly by MSETCL (representative of state grid)/ MSEDCL and the company/ its representative every month. The Main meter reading is jointly certified by the above entity. Using the above meter reading MSEDCL will provide the credit note on generation through letter. The energy referred in the credit note shall be considered for raising invoice accordingly payment will be received from MSEDCL. All the meters are calibrated by MSEDCL once a year.

The schematic representation of project WTG and metering arrangement is shown below:



SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OM,y}$
Unit	tCO ₂ e/MWh
Description	Operating Margin Emission Factor of NEWNE Regional Electricity Grid

Source of data	"Last 3 years average from CO2 Baseline Database for Indian Power Sector", version 7 published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	0.9841
Choice of data or measurement methods and procedures	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.
Purpose of data/parameter	This is required for the calculation of the baseline emissions.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period

Data/Parameter	EF_{grid, BM,y}
Unit	tCO2e/MWh
Description	Build Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data	"The value for most recent year BM from CO2 Baseline Database for Indian Power Sector" version 7 published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	0.8587
Choice of data or measurement methods and procedures	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002
Purpose of data/parameter	This is required for the calculation of the baseline emissions.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period

Data/Parameter	EF_{grid, CM,y}
Unit	tCO2e/MWh
Description	Combined Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data	Calculated from the Operating Margin and Build Margin.
Value(s) applied	0.9527
Choice of data or measurement methods and procedures	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002
Purpose of data/parameter	This is required for the calculation of the baseline emissions.
Additional comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period

D.2. Data and parameters monitored

Data/Parameter	EG_{pi,y}
Unit	MWh
Description	Net Electricity exported to the grid by the project activity in the year y
Measured/calculated/default	Calculated based on the difference between measured values of "export" and "import" on the MSEDCL meter
Source of data	Monthly Joint Meter Readings
Value(s) of monitored parameter	56,939.5 MWh

Monitoring equipment	All the meters will be trivector meters, capable of measuring both export and import of electricity. The meters will have an accuracy class of 0.2s. The meter reading is taken by MSEDCL officials in presence of BVUPL officials. The measurement is done once a month. Refer to registered PDD for more details on apportioning and accounting of transmission loss percentage.
Measuring/reading/recording frequency	Reading frequency on monthly basis
Calculation method (if applicable)	Delivered/Net electricity supplied to the MSEDCL is calculated based on the difference between measured values of "export" and "import" on the MSEDCL meter and the percentage transmission loss incurred in the transmission line between the project and the interconnection point (i.e. substation).
QA/QC procedures	The quantity of net electricity supplied will be cross-verified from the invoices raised on MSEDCL by the project proponent and the readings available from the meter available at site. The meters are calibrated annually as per the metering code. Monitoring: Continuous monitoring and monthly recording of electricity export and import. Recording: Electronic/ Paper Recording Frequency: Continuous monitoring and monthly recording Calibration Frequency: Once a year. Accuracy class of 0.2s
Purpose of data/parameter	Calculation of baseline emission
Additional comments	Data will be archived for crediting period plus two years after the end of Crediting period.

D.3. Implementation of sampling plan

No sampling is required for the current monitoring period.

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

According to the approved methodology ACM0002 (Version 12.3.0) Emission Reductions are calculated as:

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission reductions in year y (t CO₂e)

BE_y = Baseline emissions in year y (t CO₂)

PE_y = Project emissions in year y (t CO₂e)

The baseline emissions are to be calculated as follows:

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

Where,

BE_y = Baseline emissions in year y (tCO₂)

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

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

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

Where,

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

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

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,

$$ER_y = BE_y$$

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

$$BE_y = 56,939.5 \times 0.9527$$

$$BE_y = 54,246 \text{ tCO}_2\text{e}$$

E.3. Calculation of leakage emissions

As per ACM0002 no leakage has been considered for the calculation of emission factor.

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

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	54,246	0	0	19	54,227	54,246

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

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante (t CO ₂ e)
54,246	54,677

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 -0.79% due to the low power factor. There is delay in commissioning 8 WTGs of the project. The actual emission reductions is for commissioned 6 WTGs, hence estimation of emission reductions are calculated based 6 WTGs (12.60 MW capacity). There is less actual emission reductions than estimated emission reductions.

Appendix 1. Meter Calibration Details

Meter located at Feeder:

Location No.	Metering Point	Meter Make	Accuracy Class	Main Meter	Check Meter	Calibration Date	Calibration Date	Calibration Date
S23	Khaprale 1	Elster	0.2s	4932443	4932448	10-07-12	09-07-13	04-07-14
ADW06	Khaprale 3	Elster	0.2s	4932446	4961749	21-09-12	09-07-13	04-07-14
ADW07	Khaprale 3	Elster	0.2s	4932446	4961749	14-07-12	09-07-13	04-07-14
ADW09	Khaprale 4	Elster	0.2s	4961745	4961740	10-07-12	09-07-13	04-07-14
ADW10	Khaprale 4	Elster	0.2s	4961745	4961740	10-07-12	09-07-13	04-07-14
ADW39	Khaprale 4	Elster	0.2s	4961745	4961740	10-07-12	09-07-13	04-07-14

The due to for calibration is 04/07/2015.

Meter located at substation:

Location No.	MSEDCL Main Meter Serial Number	MSEDCL Check Meter Serial Number	Meter Make	Accuracy Class	Calibration Date	Calibration Date	Calibration Date
S23	14796425	14796423	Elster	0.2s	11-07-12	08-07-13	03-07-14
ADW06	14796435	14796431	Elster	0.2s	21-09-12	08-07-13	03-07-14
ADW07	14796435	14796431	Elster	0.2s	26-09-12	08-07-13	03-07-14
ADW09	14796475	14796476	Elster	0.2s	11-07-12	08-07-13	03-07-14
ADW10	14796475	14796476	Elster	0.2s	11-07-12	08-07-13	03-07-14
ADW39	14796475	14796476	Elster	0.2s	11-07-12	08-07-13	03-07-14

Appendix 2. Breakdown Details

Date	Loc. No	Duration	Description
04-01-13	S23	16	CT Failure
09-01-13	ADW09	19	CT Failure
09-01-13	ADW10	14	Preventive Action : Failure Rectification
15-01-13	ADW10	16	Major Breakdown
06-02-13	ADW10	15	error_converter_signal_DC_link_max
09-02-13	ADW39	18	Preventive Action : Failure Rectification
14-11-13	ADW10	24	error_converter_signal_DC_link_max
19-11-13	ADW06	16	Preventive Action : Failure Rectification
24-11-13	ADW09	12	CT Failure
29-11-13	ADW07	21	CT Failure
04-12-13	ADW09	16	CT Failure
02-01-14	ADW07	18	Preventive Action : Failure Rectification
05-01-14	S23	14	Major Breakdown
12-01-14	ADW09	16	error_converter_signal_DC_link_max
15-01-14	S23	15	CT Failure
28-01-14	ADW39	18	error_converter_generator_contactor
03-02-14	ADW09	24	CT Failure
08-01-15	ADW07	23.9	CT Failure
13-01-15	ADW09	24	Preventive Action : Failure Rectification
18-01-15	ADW07	23.9	Preventive Action : Failure Rectification
23-01-15	S23	24	CT Failure
28-01-15	ADW09	24	CT Failure
02-02-15	S23	24	CT Failure
07-02-15	ADW09	19.5	Preventive Action : Failure Rectification
12-02-15	S23	14	Major Breakdown
17-02-15	ADW09	16	error_converter_signal_DC_link_max
22-02-15	S23	15	CT Failure
27-02-15	ADW09	18	error_converter_generator_contactor
04-03-15	S23	24	CT Failure
09-03-15	ADW07	23.9	Preventive Action : Failure Rectification
14-03-15	ADW09	24	Preventive Action : Failure Rectification
19-03-15	ADW07	23.9	CT Failure
24-03-15	S23	24	CT Failure
29-03-15	ADW09	11	CT Failure
03-04-15	S23	23	Preventive Action : Failure Rectification
08-04-15	ADW09	18	Major Breakdown
13-04-15	S23	24	error_converter_signal_DC_link_max
18-04-15	ADW09	21	CT Failure
23-04-15	S23	22	error_converter_generator_contactor
28-04-15	ADW09	19	CT Failure
03-05-15	S23	24	CT Failure

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
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		