



Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

Title of the project activity	3 MW Wind power project in Madhyapradesh	
UNFCCC reference number of the project activity	9402 ¹	
Version number of the PDD applicable to this monitoring report	02	
Version number of this monitoring report	01	
Completion date of this monitoring report	15/03/2021	
Monitoring period number	01	
Duration of this monitoring period	01/01/2013 to 31/12/2019 (Inclusive of both the dates)	
Monitoring report number for this monitoring period	01	
Project participants	M/s Kohinoor Hatcheries Pvt. Ltd.	
Host Party	India	
Applied methodologies and standardized baselines	Methodology: AMS-I.D. Version 17 Standardized Baseline: N/A	
Sectoral scopes	1 : Energy industries (renewable - / non-renewable sources)	
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
	0 tCO ₂	31,788 tCO ₂
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	40,019 tCO ₂	

¹<https://cdm.unfccc.int/Projects/DB/DNV-CUK1356772280.79/view?cp=1>

SECTION A. Description of project activity

A.1. General description of project activity

The purpose of the project activity is to generate clean energy by utilizing velocity of the wind for generation of electricity. The technology adopted in the wind power generation is conversion of kinetic energy into mechanical energy and then converted into electrical energy by the generators. In this process there are no greenhouse gas emissions or burning of any fossil fuels. Thus, electricity being generated through sustainable means without causing any negative impact on the environment. Therefore, the technology is environmentally safe and sound.

The project activity is a small scale wind power project consists of two Wind Turbine Generators (WTGs) of 1.5MW capacity each totalling to a capacity of 3MW. The WTG's are located at Barda Barkheda village (Mahuriya), Barod Tehsil, Shajapur District of Madhya Pradesh State. The annual net saleable electricity by this project activity is about 6,000 MWh at a PLF of 22.83% and it reduced GHG emissions approximately 5,717 tCO₂ / annum and 40,019 tCO₂ during first crediting period. The power generated from the project activity is exported to Unified Indian grid.

No power generation facility existed at the project site prior to the start of implementation of the project activity.

The WTG with location number M-38 located at Barda-Barkheda was commissioned on 28/03/2011 and WTG with location number M-48 located at Barda-Barkheda was commissioned on 11/05/2011.

The total number of emission reduction achieved for this monitoring period is 31,788 tCO₂e.

Contribution to GHG emissions reduction:

The electricity generated from the project displaces the grid electricity (a grid mix contributed from different fuel sources) by its equivalent units. Thus, the project activity is preventing the anthropogenic greenhouse gas (GHG) emissions generated by the fossil fuel (coal, diesel, Furnace oil and gas etc.) based thermal power stations in the grid and is contributing to sustainable development through conservation of environment.

Contribution of project activity to sustainable development

Ministry of Environment and Forests (MoEF), Government of India, has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects:

1. Social well being
2. Economic well being
3. Environmental well being and
4. Technological well being

The project activity contributes to the above indicators in the following manner:

Social well being

The project activity leads to alleviation of poverty by establishing direct and indirect employment benefits during erection of WTGs and for operation and maintenance of the project activity. The infrastructure in and around the project area also improves due to project activity. This includes development of road network and other activities.

Economic well being

The generation of electricity by the project activity improves availability of electricity to the State grid.

The project activity provides business opportunity for local stakeholders such as suppliers, manufacturers, contractors etc.

Environmental well being

The project utilizes wind energy for generating electricity which would otherwise been generated through other alternative fuels (most likely fossil fuels) thus, reducing the carbon intensity of the grid

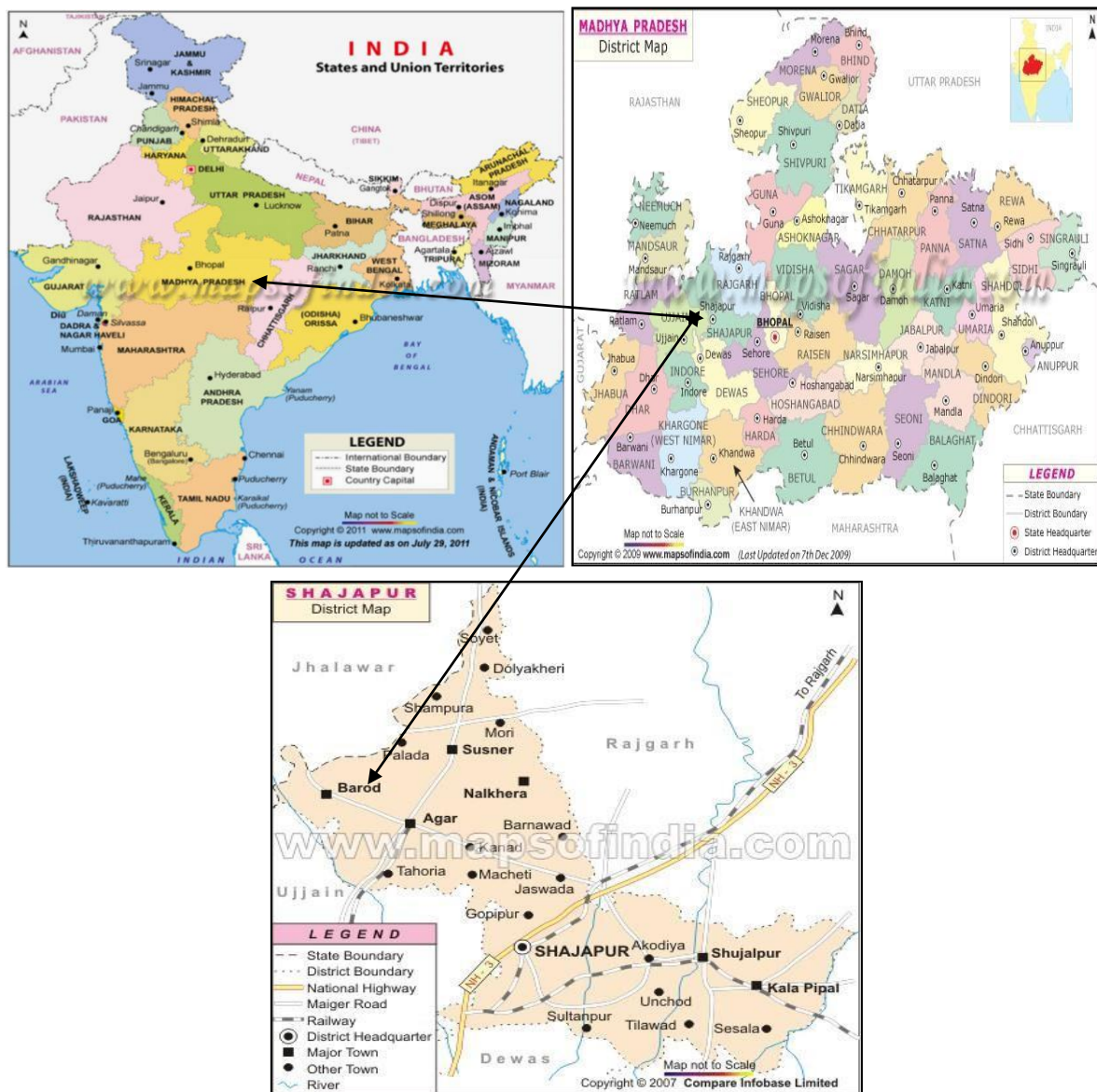
The Project helps in conserving the conventional fossil fuels used for power generation and helps in GHGs emission mitigation as well as mitigation of emission of local pollutants like SO_x, NO_x, SPM etc., as arises from conventional fossil fuel based power generation.

A.2. Location of project activity

Site : Mahuriya
 Village : Barda Barkheda
 Tehsil : Barod
 District : Shajapur
 State : Madhya Pradesh
 Country : India

WTG	Location Number	Capacity of turbine	Village Name	Tehsil & District	Geographical Co-ordinates	Date of Commissioning
1	M-38	1.5 MW	Barda-Barkheda	Barod, Shajapur	23° 50'27.2"N 76° 03'45.9"E	28/03/2011
2	M-48	1.5 MW			23° 50'03.5"N 76° 04'48.4"E	11/05/2011

Maps depicting location of the project activity are given below:-



The WTG M 38 and M 48 located at Barda Barkheda Village, Shajapur district of Madhya Pradesh State are connected to Suzlon Feeder-I Susner.

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)	M/s Kohinoor Hatcheries Pvt. Ltd.	No

A.4. References to applied methodologies and standardized baselines

Methodology : AMS-I.D Grid connected renewable electricity generation (Version 17.0)²

Tool Used : Tool to calculate the emission factor for an electricity system (Version 02.2.1)³

Standardized Baseline: N/A⁴

² <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQQOFQQH4SBK>

³ https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf/history_view

A.5. Crediting period type and duration

Renewable Crediting Period.
7 Years-0 months.

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

The Project activity utilizes the velocity of the wind for power generation by installation of Wind Turbine Generators (WTG). A set of turbine blades mounted on a metallic hub to seize power from the up-stream wind this in turn drives the generator to produce electric power. The generator along with its associated components is housed in a common enclosure called Nacelle. The turbine blades and the nacelle are mounted on the tower for better reach to un-obstructed wind. The power captured by the turbine blades is transferred to the generator through the drive train. A gear box is included in the drive train to increase the speed at the generator and of the shaft. A yaw mechanism turns the Nacelle and the rotor assembly to face the wind as it changes its direction. The control panel at the base of Tower monitors various parameters and working condition of WTG on continuous basis.

The technology adopted in the wind power generation is conversion of kinetic energy into mechanical energy and then converted into electrical energy by the generators. In this process there is no greenhouse gas emissions or burning of any fossil fuels. Thus, electricity would be generated through sustainable means without causing any negative impact on the environment. Therefore, the technology is environmentally safe and sound.

The WTG M 38 and M 48 located at Barda Barkheda Village, Shajapur district of Madhya Pradesh State are connected to Suzlon Feeder-I Susner.

WTG	Location Number	Capacity of turbine	Village Name	Tehsil & District	Date of Commissioning
1	M-38	1.5 MW	Barda-Barkheda	Barod, Shajapur	28/03/2011
2	M-48	1.5 MW			11/05/2011

The technology of wind power is established in India and the WTG installed at the project activity is indigenous and hence it does not involve any technology transfer.

Technical specifications of Suzlon S82 (1500 kW) wind turbine generator is furnished below:-

Rotor	
Type	3 Blades, Upwind/horizontal axis
Diameter	82m
Rotational Direction	Clockwise
Swept area	5281 m ²
Hub Height	78.5m
Regulation	Active pitch regulated
Operational Data	

⁴ <https://cdm.unfccc.int/Projects/DB/DNV-CUK1356772280.79/view>

Cut-in wind speed	4 m/s
Rated wind speed	14 m/s
Cut-out wind speed	20 m/s
Gear Box	
Type	Integrated 3 stage 1 planetary & 2 helical
Gear Ratio	1:95:09
Manufacturer	Winergy/ Hansen
Nominal Speed	1650 kW
Generator	
Type	Asynchronous 4 pole
Rotation speed	1511 RPM
Rated output	1500 kW
Rated voltage	690 V
Frequency	50 Hz
Cooling system	Air Cooled
Operational Brakes	
Aerodynamic Brakes	3 independent systems with blades pitching
Mechanical Brakes	Hydraulic disc brakes
Yaw Drive	
Method of Operation	Active electrical yaw motor
Bearing type	Polyamide slide

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

There are no deviations from the registered monitoring plan or applied methodology.

B.2.2. Corrections

There are no corrections.

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

No. There has been no change in the start date of the monitoring period.

B.2.4. Inclusion of monitoring plan

There has been no change in the monitoring plan.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

There are no any permanent changes from registered monitoring plan or applied methodology.

B.2.6. Changes to project design

There are no changes to project design of registered project activity.

B.2.7. Changes specific to afforestation or reforestation project activity

Not Application.

SECTION C. Description of monitoring system

The project proponent has purchased Wind Turbine Generator from Suzlon Energy Ltd., As per the purchase order placed for the WTG, Suzlon Energy operated and maintained the WTGs for

the 1st year from the date of commissioning. From 2nd year onwards the project proponent executed a contract with Suzlon Infrastructure Services (P) Ltd., for Operation and Maintenance of the WTGs. Besides operation and maintenance of the WTG, the scope of the work of Suzlon is as under:

- i. Monitoring the functioning of the metering arrangements and getting them calibrated as per the DISCOM norms, so that the accuracy and reliability levels are maintained.
- ii. Periodic verifications and onsite inspections to ensure the quality of the data recorded by the personnel.
- iii. Ensure monthly recording of the generation particulars by the DISCOM authorities.
- iv. Obtaining and archiving the generation certificates properly for aggregation at the required intervals.

The Operational and Management Structure for monitoring emission reductions is furnished below:

Designation	Responsibilities
Managing Director (Project proponent)	Verify the Monthly Joint Meter Reading report which shows Electricity export and electricity import and net electricity supplied to the grid submitted by Site In-charge of respective WTG locations for monitoring of emission reductions.
Site In-charge (O&M Service provider) of WTG Location M-38 and WTG location M-48	The Site In-charges (O&M Service provider) of respective WTG locations, records monthly energy meter readings jointly with the representatives of M.P.Pashchim Kshetra V.V.Co.Ltd., and submit the Joint Meter Reading statement to the project proponent.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	EF _{CO₂, grid,y}
Unit	tCO ₂ /MWh
Description	CO ₂ emission factor of the grid in year, y
Source of data	CO ₂ Baseline Database, Version 7.0 published by Central Electricity Authority (CEA) http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value(s) applied	0.95285
Choice of data or measurement methods and procedures	In order to facilitate adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO ₂ emission reductions by CDM project developers, Central Electricity Authority (CEA), Government of India, Ministry of Power has compiled a database containing the necessary data on CO ₂ emissions for all grid-connected power stations in India. The latest version of CO ₂ Baseline Database, Version 7.0 available at the time of preparation of PDD is used for calculation of emission factor. Calculated as a weighted average of Operating Margin and Build Margin emission factors as per the "Tool to calculate the emission factor for an electricity system".
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	This value is fixed for the first crediting period.

Data/Parameter	EF _{grid,OM,y}
Unit	t CO ₂ /MWh
Description	Operating Margin CO ₂ Emission Factor for the project electricity system in year y (NEWNE Grid) (Now Indian Grid)
Source of data	CO ₂ Baseline Database, Version 7.0 published by Central Electricity Authority (CEA) http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value(s) applied	0.98421
Choice of data or measurement methods and procedures	In order to facilitate adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO ₂ emission reductions by CDM project developers, Central Electricity Authority (CEA), Government of India, Ministry of Power has compiled a database containing the necessary data on CO ₂ emissions for all grid-connected power stations in India. The latest version of CO ₂ Baseline Database, Version 7.0 available at the time of preparation of PDD is used for calculation of emission factor. Most recent 3 years (2008-09, 2009-10, 2010-11) net generation values of NEWNE Grid (Now Indian Grid) and Operating Margin (OM) emission factor values have been used to calculate 3 year generation weighted average OM.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	This is fixed for the entire crediting period.

Data/Parameter	EF _{grid,BM,y}
Unit	tCO ₂ /MWh
Description	Build Margin CO ₂ Emission Factor for the project electricity system in year y (NEWNE Grid) (Now Indian Grid)
Source of data	CO ₂ Baseline Database, Version 7.0 published by Central Electricity Authority (CEA) http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value(s) applied	0.85878
Choice of data or measurement methods and procedures	In order to facilitate adoption of authentic baseline emissions data and also to ensure uniformity in the calculations of CO ₂ emission reductions by CDM project developers, Central Electricity Authority (CEA), Government of India, Ministry of Power has compiled a database containing the necessary data on CO ₂ emissions for all grid-connected power stations in India. The latest version of CO ₂ Baseline Database, Version 7.0 available at the time of preparation of PDD is used for calculation of emission factor. Build Margin emission factor data (for the year 2010-11) is used for calculation of combined margin emission factor
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	This value is fixed for the first crediting period. For the second crediting period, the build margin emission factor will be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE.

D.2. Data and parameters monitored

Data/Parameter	EG _{BL,y}
Unit	MWh
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y.
Measured/calculated/Default	Calculated

Source of data	Monthly report on generation & consumption certified by M.P.Pashchim Kshetra V.V.Co.Ltd., (DISCOM).
Value(s) of monitored parameter	33,361
Monitoring equipment	Energy Meter
Measuring/reading/recording frequency	Continuous monitoring, monthly recording
Calculation method (if applicable)	Monitoring: Tri-vector energy meter installed at Suzlon Feeder-I Data Type : Measured & calculated Recording : Monthly Credit Notes/JMR Reports Archiving Policy : Paper & Electronic Calibration Frequency : Yearly Accuracy: 0.5s class The quantity of net electricity supplied by the project activity to the grid is calculated as under: Net electricity supplied to grid for given month = Export – import.
QA/QC procedures	The measurement results are cross checked with records of sold/purchased electricity (e.g. invoices/receipts).
Purpose of data/parameter	Calculation of baseline emissions.
Additional comments	Data is archived for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.

Data/Parameter	EG _{WEG}
Unit	MWh
Description	Data of electricity generation captured at WEG Controller during the year y
Measured/calculated/default	Calculated
Source of data	Monthly report on generation recorded at CRMS database
Value(s) of monitored parameter	34,132
Monitoring equipment	Energy Meter
Measuring/reading/recording frequency	The energy generated is updated in the controller by the energy counter at a predetermined time slots in a day which is usually kept at 10 Min slot. The data is downloaded by Suzlon team & uploaded into CRMS data base which is relayed to project proponent on daily basis.
Calculation method (if applicable)	There is a micro-processor based intelligent controller which uses Multi-function relay. A software program reads and displays the parameters such as voltage, current, power factor, kVAh, kVArh, and kWh. Data Type : Measured Recording : Daily Archiving Policy: Paper & Electronic Calibration Frequency: Calibration of the controller is not possible and not required as it is only a relay which displays the energy generated through a software program.
QA/QC procedures	The measurement results are cross checked with records of monthly JMR.
Purpose of data/parameter	To arrive net electricity export to the grid by WTG locations M-38 and M48 and also to arrive electricity export for a particular period in case mismatch of monitoring period with billing cycle occurs.
Additional comments	Data is archived for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.

D.3. Implementation of sampling plan

No sampling approach required for the parameters monitored.

SECTION E. Calculation of emission reductions or net anthropogenic removals**E.1. Calculation of baseline emissions or baseline net removals**

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{BL,y} * EF_{CO_2, grid, y}$$

Where:

BE_y = Baseline Emissions in year y (t CO₂)

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO_2, grid, y}$ = CO₂ Emission Factor in year y (t CO₂ /MWh)

Therefore,

$$BE_y = 33,361 \text{ MWh} * 0.95285 \text{ tCO}_2/\text{MWh}$$

$$BE_y = 31,788 \text{ tCO}_2\text{e (round down)}$$

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

Being a renewable energy based small scale wind project, emissions from the project activity are not anticipated.

Therefore,

$$PE_y = 0 \text{ tCO}_2 \text{ per year}$$

E.3. Calculation of leakage emissions

No leakage has been identified from the project activity as per the methodology used.

Therefore,

$$LE_y = 0 \text{ tCO}_2 \text{ per year}$$

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	31,788	0	0	0	31,788	31,788

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 for this monitoring period in the PDD (t CO ₂ e)
31,788	40,019

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

The explanation regarding calculation of estimated ex ante for this monitoring period is mentioned below:

Start date of the monitoring Period	01-01-13
End date of monitoring period	31-12-19
Number of days in monitoring period	2,555
Annual estimated reductions as per the PDD	5,717
Estimated emission reductions for this monitoring period	40,019
Actual emission reductions for this monitoring period	31,788.00
Percentage deviation of actual reductions as compared to estimated reductions for this monitoring period	-26%

E.6. Remarks on increase in achieved emission reductions

It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 40,019 tCO₂e, whereas actual emission reductions achieved are 31,788 tCO₂e, which is approximately 26% lower than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, which are not within the control of the project participant. The higher generation during the current verification period is due to certain natural conditions. Hence, it is acceptable.

E.7. Remarks on scale of small-scale project activity

The project activity remained within the limit of small scale project activity in each year of the crediting period as the emission reductions are less than the limit of small scale CDM Project activity.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
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.

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