Monitoring report form for CDM project activity
(Version 08.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT			
Title of the project activity	Wind Power Project in Maharashtra by M/s L. B. Kunjir Engineers & Contractors		
UNFCCC reference number of the project activity	3554[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	15/07/2021		
Monitoring period number	04		
Duration of this monitoring period	01/04/2015 to 31/03/2020 (First and last date included)		
Monitoring report number for this monitoring period	NA		
Project participants	M/s L. B. Kunjir		
Host Party	India		
Applied methodologies and standardized baselines	Applied Methodologies: AMS-I.D. Grid connected Renewable Electricity Generation, Version 13 Standardized baselines: NA		
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 until 31 December 2020	Amount achieved from 1 January 2021
	0 tCO_2	14,153 tCO_2e	0 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	10,657 tCO_2e		

[1] https://cdm.unfccc.int/Projects/DB/RINA1269599134.41/view

SECTION A. Description of project activity

A.1. General description of project activity

The project activity involves the implementation of SUZLON make small scale wind electric generators (WEG) of capacity 1.5 MW by M/s L.B. Kunjir. The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to sell the generated electricity to the state electricity utility namely Maharashtra State Electricity Distribution Company Limited (MSEDCL) which falls under Northern, Eastern, Western and North Eastern Grid (NEWNE Grid) of India and thus leads to CO_2 emission reduction due to the displacement of equivalent amount of electricity

Total emission reductions achieved in this monitoring period:

During the reported monitoring period 01 April 2015 to 31 March 2020 (First and last date included) the project activity has supplied 17,292.66 MWh of electricity, and thus contributing to the GHG reductions of 14,153 tCO_2e.

A.2. Location of project activity

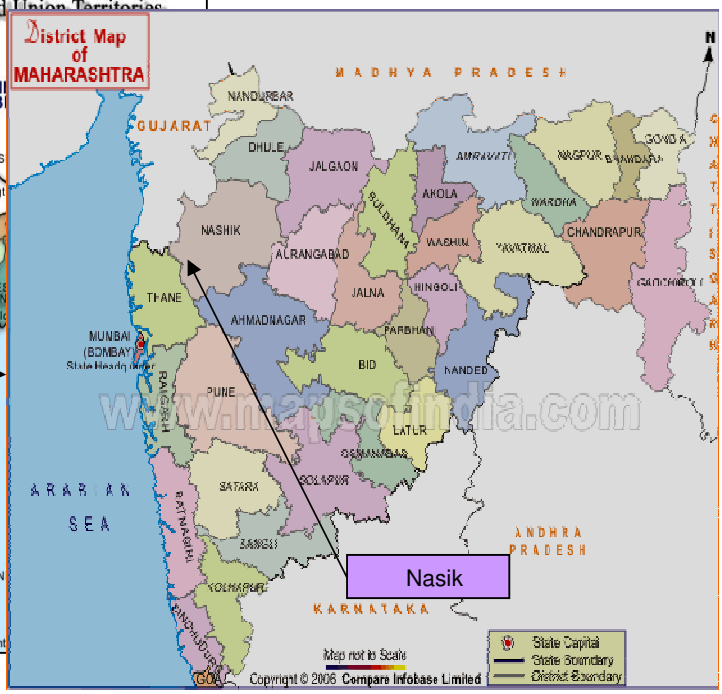
Country: India
State: Maharashtra
District: Nasik

The WEG of this project activity is situated in Nasik districts of Maharashtra, India. Complete information of the location of all the WEGs of the project activity: Site, Taluka, R.S. No. and GPS coordinates is provided under the below table:

WTG Location No.	Site	Taluk	R.S.No	Latitude	Longitude
AD 27	Adwadi	Sinnar	134	21° 21' 57.31" N	74° 14' 32.09" E

Figure 1: Map of India

Figure 2: District Map of



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 country)	Private entity - M/s L. B. Kunjir	No

A.4. References to applied methodologies and standardized baselines

Type: I-Renewable Energy Projects
Sectoral Scope: 01
Title: Grid connected Renewable Electricity Generation, Version 13
Reference: AMSI D

"Tool to calculate the emission factor for an electricity system." Version 02

A.5. Crediting period type and duration

Duration of Crediting period: 01/04/2010 to 31/03/2020.
Type of crediting period: Fixed crediting period.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The proposed project activity is a 1.5 MW wind power project being developed by M/s L.B. Kunjir (hereafter referred to as LBK or PP). It consists of a single wind mill of 1500 KW capacity installed in Nasik District of Maharashtra.

The project activity consist of one WEG of SUZLON make (S-82) having a capacity of 1.5 MW. The WEG of project activity is situated in Nasik district of Maharashtra. The project activity does not involve any technology transfer.

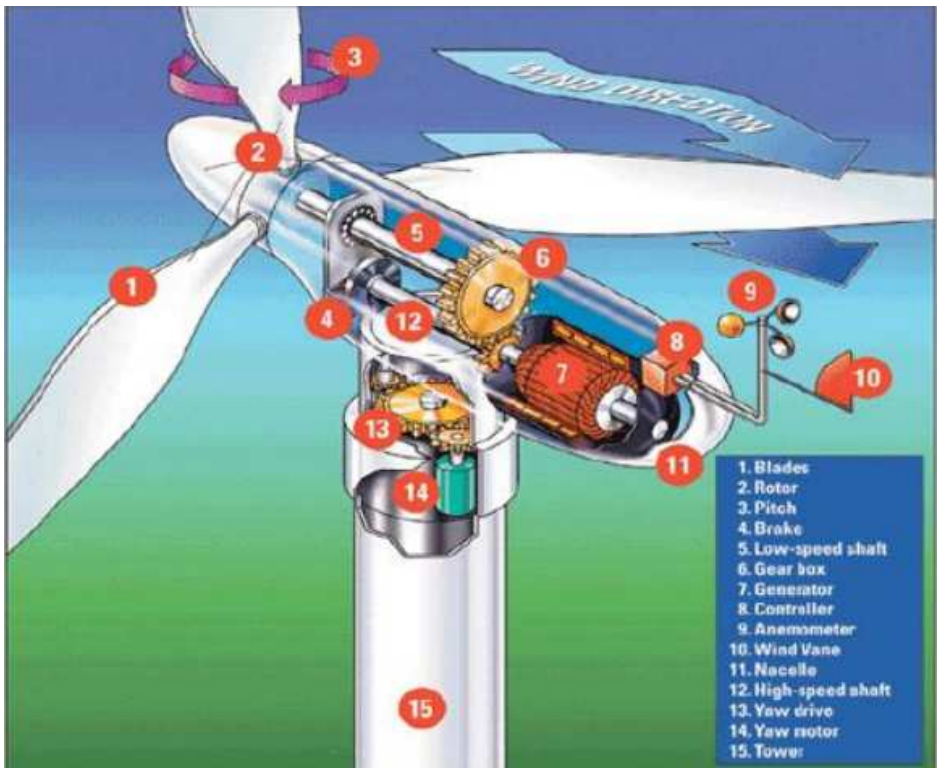
Relevant dates for the project activity:

WEG Location No.	Installed Capacity Technology	Date of Commissioning	Technology	Village/ District
AD 27	1.5 MW	30/03/2009	SUZLON S-82	Adwadi/ Nasik

Brief Description of the installed Technology:

The WTG is manufactured by Suzlon make S-82. The important parts of windmill are:

1. Main tower
2. Blades
3. Nacelle
4. Hub
5. Main shaft
6. Gearbox, bearing and housing
7. Brake
8. Generator



Salient Features of Suzlon (S-82) 1500 KW WEG

Rotor diameter	82.0 m
Installed electrical output	1500 kW
Cut –in wind speed	4 m/s
Rated wind speed	14 m/s
Cut-out wind speed	20 m/s
Rotor swept area	5281 m^2
Rational speed	16.30 RPM
Rotor material	GRP
Regulation	Pitch
Generator	Asynchronous Generator,4 poles
Rated output	1500 kW
Rotational speed	1511 rpm
Operating voltage	690 v
Frequency	50 Hz
Protection	IP 54
Insulation class	H
Cooling system	Air -cooled
Gear box	3 stage gear box,1 planetary and 2 helical
Manufacturer	Winergy
Gear Ratio	95.09
Nominal load	1650 kW
Type of cooling	Oil cooling system
Yaw drive system	4 active electrical yaw motors
Yaw bearing	Polyamide slide bearing
Safety system	
Aerodynamic brake	3 times independent pitch regulation
Mechanical brake	Spring powered disc brake, hydraulically released fail safe
Control unit	Microprocessor controlled, indicating actual operating conditions, UPS back up system
Design standards	GL/IEC

B.2. Post-registration changes

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

As there are no post registration changes in the project activity, therefore, there are no deviations in baseline as well as in monitoring plan.

B.2.2. Corrections

Not Applicable

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

Not Applicable

B.2.4. Inclusion of monitoring plan

Not Applicable

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

Not Applicable

B.2.6. Changes to project design

Not Applicable

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

Not Applicable

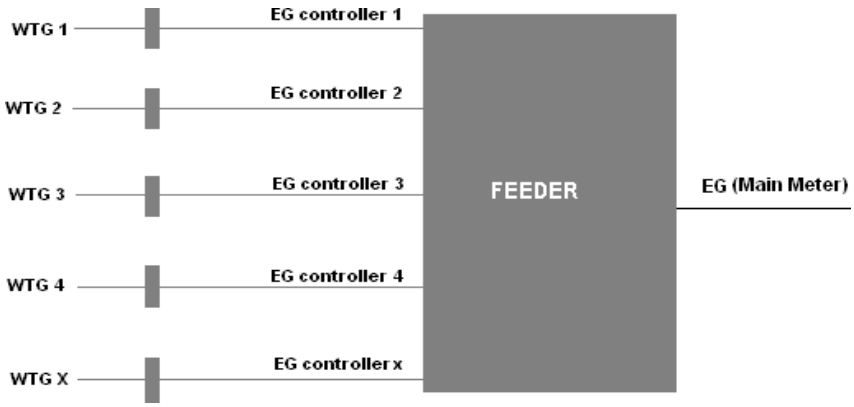
SECTION C. Description of monitoring system

Monitoring Methods and Procedures

The net electricity exported to MSEDCL Kahaprale Substation is monitored through MSEDCL meters. The meter reading at the metering point is undertaken jointly by the representatives of MSEDCL and the authorized representative of the seller on 1st of every month for the preceding month. When more than one power producer are delivering energy produced by their individual WTGs using common evacuation system, they have to identify a common agency responsible for joint meter reading. In this case Suzlon Energy Limited has been assigned this responsibility. The joint meter reading taken at common evacuation system has to be supported by meter readings of individual power producers using such common evacuation system. Based on this break up and limited to the total energy delivered, the power generated from individual power plant is certified by MSEDCL. A credit report is issued every month by MSEDCL to the Project Promoter indicating the electricity imported (Import KWh) as well as exported (Export KWh) by the substation to the WTG. Net generation is calculated by deducting Export KWh from Import KWh.

Apportioning of electricity supplied to the Feeder

Each feeder is connected to a number of wind turbines. The generation reading is collectively displayed by the main meter connected to the feeder. The net generation of each of the wind turbines is then calculated in the following manner:



The generated electricity is measured through a twostep procedure wherein the first metering is carried out at the controller of the turbine with on-board meter. The monitoring of all these wind turbines is done from a common monitoring station as a part of central monitoring system. The system consists of a state- of- the- art controlling and monitoring. Well trained staff of O&M contractor is always present on site to monitor various parameters of power generation and deal with any problem related to generation, transmission or maintenance. $EG_{n,y}$ is the electricity generated from an individual wind turbine measured through its controller meter.

$$EG_{n,y}$$

And the summation of total electricity generated (KWh) from all the wind turbines connected to the particular feeder as measured at their individual controllers is presented as

$$\sum_{0}^{m} EG_{m,y}$$

A ratio based on these two sets of measured values is used for apportioning the net electricity supplied to the grid by the project activity.

The second metering is carried out at grid interconnection point (main meter connected to a particular feeder) wherein the Joint Meter Reading (JMR) is carried out, usually in the first week of every month, in presence of the representatives of the project proponent & the state electricity utility. The main meter reading gives the net value of export from all the WTGs after line losses and auxiliary consumption by all wind turbines connected to a particular feeder. The apportioning of electricity generated from the various wind turbines is done by the EPC contractor on the basis of following equation

$$\underset{\text{Net export from the project activity}}{EG} = \frac{EG_{n,y} * EG}{\sum_{0}^{m} EG_{m,y}}$$

Net export from all the WTGs connected to the same feeder

Where

EG(Net import from project activity)	EG(Net export from all WTGs connected to the same feeder)
EGn, y	Total electricity generated by the promoter's WEG as measured at the controller.
EG(Net export from all WTGs connected to the same feeder)	Net electricity exported from all wind turbines connected to the same feeder at the main meter

	as calculated by Export KWh Import KWh at the substation feeder.
$\sum_{0}^{m} EG_{m,y}$	Total generation of all the WEGs connected to the feeder as measured at controller.

The responsibility of apportioning lies with wind farm developer, in this case Suzlon Energy Limited. As per Section 11.05 (c) of the PPA, this generation bifurcation of individual wind mills is used by Circle officer of MSEDCL to prepare credit report for the individual developers.

QA/QC procedures

Calibration of Main & Check Meters

The main & check meters are scheduled to be calibrated once every year or whenever required. The entire responsibility of this task lies with the state utility and the promoter has no control over this activity. The meters have an accuracy class of 0.2 %.

Calibration of WEG Controller meter

SCS Controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current/voltage are converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed/stored. Woodward relay does not have a display and needs special protocol to view energy readings as this relay communicates digital signal through special communication protocol.

In case of Malfunctioning of the controller, the WTG is programmed for automatic shut-down. Hence probability of error in controller meters is negligible.

Data uncertainties and adjustments

Data uncertainties are likely under following conditions:

- In case of error in MSEDCL meter
- When records are lost

As per PPA, Section 11.02(d) “if during any of the monthly meter reading, the variation between the main meter & the check meter is more than 0.5%, all the meters are re-tested and calibrated immediately by MSEDCL”. Hence the permissible deviation between the main meter and check meter is 0.5% to identify the faulty meter.

When records are lost, the JMRs by state utility are used as reference.

Management structure:

Role & responsibility

Designation	Responsibilities
Project Head	• Overall performance monitoring • Project Execution
Project Executer and Controller (Site Engineer)	• Operation • Verification of data • Site visit to check authenticity of data and take corrective action, wherever necessary

	• Storage of data
Site Main Controller (Technician)	• Operation, Monitoring and Verification of data • Data recording • Storage of data

Routine Maintenance Services

The project proponents have signed an "Operation and Maintenance" agreement with the suppliers i.e. Suzlon. The O & M management structure is as follows:

Routine Maintenance Labour Work involves making available suitable manpower for operation and maintenance of the equipment and covers periodic preventive maintenance, cleaning and upkeep of the equipment including –

a) Tower Torquing
b) Blade Cleaning
c) Nacelle Torquing and Cleaning
d) Transformer Oil Filtration
e) Control Panel & LT Panel Maintenance
f) Site and Transformer Yard Maintenance

Security Services

This service includes watch & ward and security of the wind farm and the equipment.

Management Services:

a) Data logging in for power generation, grid availability, machine availability.
b) Preparation and submission of monthly performance report in agreed format.
c) Taking monthly meter reading jointly with utility of power generated at wind farm and supplied to grid from the meter/s maintained by utility for the purpose and co-ordinate to obtain necessary power credit report/ certificate

Technical Services:

a) Visual inspection of the WTG and all parts thereof.
b) Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services.
c) Annual and monthly training schedules are organized by the manufacturers and suppliers of the wind turbines.

Reporting

The Site Engineers (SE) working for the O&M contractor review the promoter's energy meter log books on daily basis and record the data in computer. This data is compiled and uploaded on the O&M Contractor's website. This website data is accessible by the project promoter.

Data archiving

Once the monthly reports are approved at the promoter's end, it is archived in paper and electronic form at the respective administrative office. Along with generation reports, joint meter reading documents as well as copy of invoices is also maintained at the promoter's office for cross verification at any given time. One copy of generation records is maintained at the site in form of Log books.

Training

Training of staff operating and maintaining the WTGs will be carried out by the WTG manufacturer and supplier. Special emphasis will be given to the training of the employees to enable them to develop their skills to meet changing WTG technology and to provide efficient and effective O&M services. There is an initial learning program as well as continuous learning programs for all employees. All newly-hired employees are required to attend an intensive two- to four-week, fulltime training program to familiarize them with business and operations.

The training program focuses mainly on the management, monitoring and maintenance, and safety & reliability aspects of wind power. The objectives include:

1. Understanding the various stages and aspects in the management of wind power systems.
2. Understanding the importance of monitoring and maintenance of wind power systems and hence the various tasks involved in this.
3. Understanding the importance of safety and reliability aspects involved with wind power and the measures taken.
4. Managing generation and other data for future reference.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**Grid emission factor, EFgrid**
Unit	tonnes of CO_2 eq./MWh
Description	Grid emission factor
Source of data	CO_2 Baseline Database for the Indian Power Sector, User Guide, Version 4.0 CEA
Value(s) applied	0.810
Choice of data or measurement methods and procedures	The value has been provided by Central Electricity Authority for the year 2007-2008
Purpose of data/parameter	NA
Additional comments	NA

D.2. Data and parameters monitored

Data/Parameter	**$EG_{(Net\ export\ from\ the\ project\ activity)}$**
Unit	kWh
Description	Net electricity exported from the project activity as measured at the grid interconnection point
Measured/calculated/ default	Calculated
Source of data	Credit report issued by the State utility and invoices raised by the PP
Value(s) of monitored parameter	17,292,660.24 KWh
Monitoring equipment	Energy meters
Measuring/reading/recording frequency	Monthly Recording
Calculation method (if applicable)	Net Export from the project activity (Generation) is calculated by deducting Export KWh from Import KWh
QA/QC procedures	The value can be cross checked by calculating the value using apportioning procedure as explained in the section B.7.2 of the PDD. Same can be cross checked by verifying the receipt of money by the PP, which in turns confirm the generation occurred for the chosen duration.
Purpose of data/parameter	To calculate Baseline emissions

Additional comments	Data will be archived during the entire crediting period + 2 years. Incase when monitoring period and Credit report dates are not matching, the PP will not consider the said period(which is not common between both the activities mentioned above) for calculation of CERs.

Data/Parameter	**Grid Emission Factor**
Unit	tCO_2/MWh
Description	Weighted Average Grid Emission rate
Measured/calculated/ default	Calculated
Source of data	Latest version of CO_2 Baseline Database Version 16, March 2021 Published by Central Electricity Authority (CEA) and can be downloaded at https://cea.nic.in/cdm-co2-baseline-database/?lang=en
Value(s) of monitored parameter	**Indian Financial Year** / **tCO_2/MWh** 01/04/2015 to 01/03/2016 — 0.82 01/04/2016 to 01/03/2017 — 0.83 01/04/2017 to 01/03/2018 — 0.82 01/04/2018 to 01/03/2019 — 0.82 01/04/2019 to 01/03/2020 — 0.80
Monitoring equipment	NA
Measuring/reading/recording frequency	Yearly Recording
Calculation method (if applicable)	The calculation method, appropriateness and data to calculate the Emission Factor has been provided in Annexure I of MR
QA/QC procedures	The archive of data will be maintained for crediting period + 2 years. The archiving will be done both on paper and electronically.
Purpose of data/parameter	To calculate Baseline emissions
Additional comments	NA.

D.3. Implementation of sampling plan

Not Applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

"The kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner as:

Baseline emissions = Grid emission factor * Net electricity exported to the Substation (tons of CO_2) (tons of CO_2/MWh) (MWh/year)

$BE_y = EF_y \times EG_y$

The net electricity supplied (exported) to the grid is calculated as the difference between the total electricity supplied to the grid and total electricity imported from the grid i.e.

$EG_y = EG_{export, y} - EG_{import, y}$

$EG_{export, y} = 17{,}352.70$ MWh

$EG_{import, y}$ = 60.04 MWh

Therefore,
EG_y = 17,292.66 MWh

Baseline Emissions,
BE_y = 0.810* 17,292.66

Therefore,
BE_y =14,153 tons of CO_2

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

The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as nil. $PE_y = 0$

E.3. Calculation of leakage emissions

As per the applicable approved methodology AMS ID (version 17.0), leakage is to be considered if the energy generating equipment is transferred from another activity. The project activity is a green field power wind power generation facility and the energy generating equipment used in the project activity has not been transferred from any other activity. Hence, leakage is not considered. LEy = 0

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

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)			
				Before 01/01/ 2013	From 01/01/ 2013 until 31/12/ 2020	From 01/01/ 2021	Total amount
Total	14,153	0	0	0	14,153	0	14,153

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_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
14,153	10,657

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

As per the CDM registered PDD, the amount of CERs generated annually is 2,129 tCO_2e. Therefore, the amount of estimated ex ante for this monitoring period is identified as explained below.

The total number of days in this monitoring period is 1,827 days.
Hence, the amount of estimated ex ante for this monitoring period = 2,129 * (1,827/365)
= 10,657 tCO_2e

E.6. Remarks on increase in achieved emission reductions

The total emission reductions achieved during this monitoring period 14,007 tCO_2 which is 31.44% more than the estimates in the registered PDD.

However, electricity generation from wind power projects is seasonal and not equally distributed throughout the year. A wind power project generates power from wind resource. Therefore, wind power generation basically depends on local wind resource, and thus variation in wind resource basically determines the variation in wind power generation which is beyond the control of project promoter. Further, wind generation is a cyclic process with peaks and lows. Hence, this deviation is justified.

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

Version	*Date*	*Description*
08.0	6 April 2021	Revision to: • Reflect the "Clarification: Regulatory requirements under temporary measures for post-2020 cases" (CDM-EB109-A01-CLAR).
07.0	31 May 2019	Revision to: • 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: • 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: • 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: • 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 *F-CDM-MR* to *CDM-MR-FORM*; • 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.

Version	*Date*	*Description*
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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