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	China Niaoerchao Hydropower Project		
UNFCCC reference number of the project activity	2993		
Version number of the PDD applicable to this monitoring report	06		
Version number of this monitoring report	01		
Completion date of this monitoring report	24/05/2021		
Monitoring period number	3rd monitoring period		
Duration of this monitoring period	01/01/2013-18/05/2014		
Monitoring report number for this monitoring period	NA		
Project participants	Hunan Guohong Investment Co., Ltd.		
Host Party	P. R. China		
Applied methodologies and standardized baselines	Methodologies Used: ACM0002-Consolidated methodology for grid-connected electricity generation from renewable sources (version 11)		
Sectoral scopes	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	51,698	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	85,009		

SECTION A. Description of project activity

A.1. General description of project activity

>>
China Niaoerchao Hydropower Project (Hereinafter referred to as "the project") is to generate electricity by using renewable water resources to alleviate electricity shortage in Central China. The project contributes to the reduction of GHG emission by displacing part of the electricity supplied by Central China Power Grid (CCPG), which is dominant of fuel-fired power plants.

The project is a newly built storage type hydropower plant with a seasonal pondage reservoir. There are two dams constructed for the project, one is the Niaoerchao dam, and another one is the Liujingtan diversion dam (small dam with 12m in height). The Liujingtan diversion dam is used to divert the water resources through a tunnel to the Niaoerchao reservoir. The distance between these two dams is 8.6 km. The power house is located on the bank of Dongtingxi River, which is a branch of Yuanjiang River located in Yuanling County, Huaihua City, Hunan Province, People's Republic of China. The surface of the flooded area at the full reservoir level of the Niaoerchao dam is 1.66km^2, and the surface of the flooded area at the full reservoir level of Liujingtan diversion dam is 0.143km^2. The total surface of the flooded area at the full reservoir level of the project is 1.803 km^2, the power density of the project is calculated as installed capacity/submerged area, which is equal to 11.09 W/m^2.The total installed capacity of the project is 20 MW, which is consisted of 2 units hydraulic turbines and generators with a single-unit capacity of 10MW. The annual net electricity supplied to CCPG is forecasted to be 72,331 MWh.

Relevant dates for the project activity is as below:

Event	Time
Project earliest starting date（the 1st payment of the Equipment Purchase Agreement）	08/12/2005
Project Construction Starting date	10/12/2006
Registration date	24/02/2011
Crediting period	24/02/2011-23/02/2021
Operation of 1#generator	21/08/2008
Operation of 2# generator	27/08/2008
1st monitoring period	24/02/2011-31/08/2011
2nd monitoring period	01/09/2011-31/12/2012
3rd monitoring period	01/01/2013-18/05/2014

Total emission reductions achieved in this monitoring period are 51,698 tCO_2e.

A.2. Location of project activity

>>
The project is located on Dongtingxi River, which is a branch of Yuanjiang River located in Qijiaping Town, Yuanling County, HuaihuaCity, Hunan Province, People's Republic of China. The geographical coordinates are shown as follows.
Liujingtan diversion dam: 28°52′31″ N and 110°48′12″ E.
Niaoerchao dam: 28°49′48″ N and 110°52′00″ E.
Power House: 28°49′50″ N and 110°52′15″ E.

A.3. Parties and project participants

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

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
The Peoples' Republic of China (Host)	Hunan Guohong Investment Co., Ltd.	No

A.4. References to applied methodologies and standardized baselines

>>

Title of the approved baseline and monitoring methodology: ACM0002-Consolidated methodology for grid-connected electricity generation from renewable sources (version 7)
Please refer to below link for the methodology:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

Title of the methodology to calculate the emission factor: Tool to calculate the emission factor for an electricity system (version 01.1)
Please refer to below link for the methodology:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

A.5. Crediting period type and duration

>> The fixed crediting period is chosen for the project. The start date of the fixed crediting period is from 24/02/2011 to 23/02/2021.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>>

The implementation and operation of project is in strict accordance with the description in the registered PDD. The implementation of the project and the equipment employed by the project are as follows:

Event	Time
Project earliest starting date（the 1st payment of the Equipment Purchase Agreement）	08/12/2005
Project Construction Starting date	10/12/2006
Registration date	24/02/2011
Crediting period	24/02/2011-23/02/2021
Operation of 1#generator	21/08/2008
Operation of 2# generator	27/08/2008
3rd monitoring period	01/01/2013-18/05/2014

The detailed features of the project are as below:

Parameters		Unit	Value	Comment
Turbine	Model	-	HLN255-LJ-150	
	Quantity	Unit	2	
	Rated output	MW	10.309	
	Rated rotation	r/min	428.6	
	Rated flow	m^3/s	20.04	
	Manufacturer	Fujian Nanping Hydropower Equipment Manufacture Co., Ltd.		
Generator	Model	-	SF10000-14/3250	Mixed flow set
	Quantity	Unit	2	

	Rated Capacity	MW	10	
	Rated rotation	r/min	428.6	
	Capacity factor	-	0.8	
	Rated Voltage		6.3	
	Manufacturer	Fujian Nanping Hydropower Equipment Manufacture Co., Ltd.		

There was no special events happened during this monitoring period, which may impact the applicability of the methodology. The project was under normal operation during this monitoring period.

B.2. Post-registration changes

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

>>
The project operation is in accordance with the monitoring plan (MP), and there was no any deviation to the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents.

B.2.2. Corrections

>>
There was no corrections to the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents.

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

>>
There is no changes to the starting date of the first crediting period of the registered project activity.

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

>>
There are no permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents.

B.2.6. Changes to project design

>>
There are no changes to the project design.

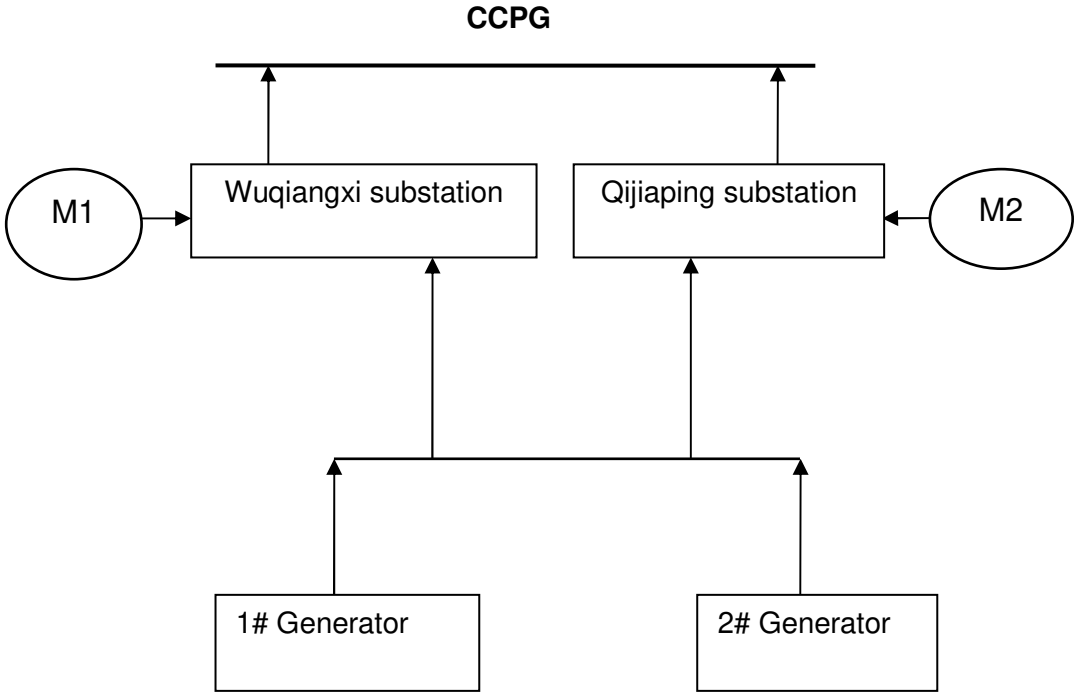
B.2.7. Changes specific to afforestation or reforestation project activity

>>
Not applicable.

SECTION C. Description of monitoring system

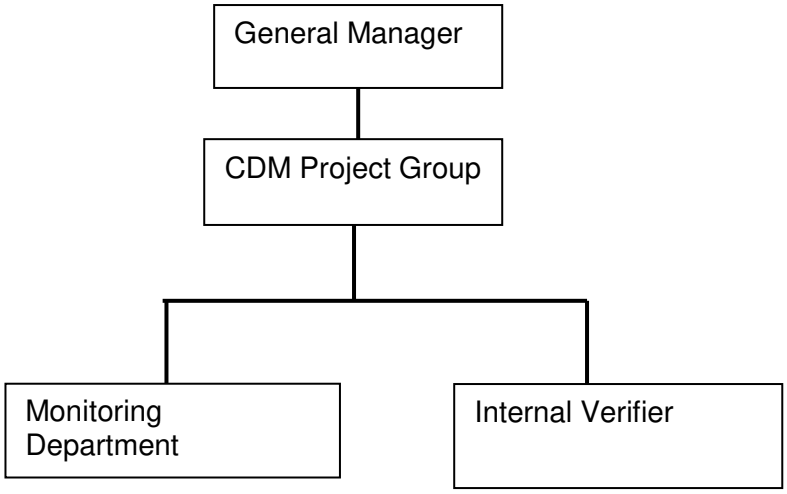
>>
1. General description of monitoring system

The generated electricity from 1# generator and 2# generator are transmitted into substations. Then the electricity is delivered through transmissions line to CCPG. The meters M1 and M2 are installed at the Wuqiangxi and Qijiaping substations to monitor the electricity exported to power grid and the electricity imported from power grid. The electric connection diagram for the project is as follows:



2. Organization Structure

In order to insure the monitor plan work effectively and efficiently, the project owner established the monitoring management structure as shown below.



3. Roles and responsibilities

General Manager is responsible for general management of the project. He/she is final approval of internal monitoring report.

The CDM Project Group is consisted of Monitoring Personal and Internal Verifier. The group is leaded by the General Manager.

Monitoring Department is responsible for data monitoring, recording and reporting. The department is also responsible for regular operation of the project and maintenance of equipments.

Internal Verifier is responsible for checking the monitoring data and financial settlement with grid company plus CERs calculation.

4. Training

Hunan CDM Project Service Centre has given the training works about CDM knowledge and monitoring requirements to the related staffs.

The training topics include background knowledge about CDM, Kyoto Protocol, monitoring management structure, monitoring team, responsibility of each staff, monitoring equipment, data collection and archives, and internal audit procedure. The CDM Monitoring and Management Manual for this project have been prepared in line with the actual project implementation situation.

5. Data collection procedure

The readings of main meter are used for calculating the emission reductions during this monitoring period. The data is monitored as following.

(1) The electricity exported to power grid and the electricity imported from power grid were measured continuously by M_1 and M_2 installed at each substation. The data is measured continuously and were recorded monthly. The net electricity is the difference of the electricity imported from power grid and exported to power grid.

(2) The grid company provided ETNs (Electricity Transaction Notes) to the project owner monthly, which is based on the main meter readings and is showed the net electricity generation data.

(3) The project owner checked the data of ETNs according to the data recorded. After the project owner confirmed the ETNs, they provided the grid company with sales invoices and preserves of the copies of the sales receipts.

(4) The sales receipts and other monitoring records are used for cross check for the monitored data.

(5) The project owner provides DOE with the sales receipts and monitoring records during verification.

(6) The surface area of reservoirs and installed capacity was measured yearly.

All the electricity and paper monitoring documents will be kept at least until two years after the crediting period and two years after last issuance of CERs.

Internal audit has been carried out. The general manager has checked the implementation and management of the monitoring plan overall such as recording, collection and archiving of the monitoring data, the intergrality of the monitoring data.

6. Emergency measures/procedures

If the reading of main meters is beyond allowable error, the project owner and power grid company shall jointly prepare a reasonable and conservative estimate of the correct reading.

If it is unable to reach an agreement between the project owner and the grid company, the emission reduction during the emergency period will not be claimed by project participants.

After handing of the emergency, the project owner must prepare a report regarding the emergency to explain to DOE that the handling method is reasonable.

During the given monitoring period, the main meter was in well functions and no emergency situation happened.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante[1]

Data/Parameter	EF_y
Unit	tCO_2e/MWh
Description	Emission factor of CCPG
Source of data	Registered PDD
Value(s) applied	0.85285
Choice of data or measurement methods and procedures	The data is used for baseline emission calculations. The figure is calculated ex-ante and is fixed during the crediting period.
Purpose of data/parameter	EF_{OM} is 1.1255 tCO_2e/MWh, and EF_{BM} is 0.5802 tCO_2e/MWh.
Additional comments	EF_y

Data/Parameter	Cap_{BL}
Unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity. The proposed project is a new hydro power plant, this value is zero.
Source of data	Project site
Value(s) applied	0
Choice of data or measurement methods and procedures	Determine the installed capacity based on recognized standards.
Purpose of data/parameter	Used for project emission calculation.
Additional comments	/

Data/Parameter	A_{BL}
Unit	m^2
Description	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2) For the project, the reservoir is new, this value is zero.
Source of data	Project site
Value(s) applied	0
Choice of data or measurement methods and procedures	Measured from topographical surveys and maps.
Purpose of data/parameter	Used for project emission calculation.
Additional comments	/

[1] As other parameters for ex anti in the registered PDD are not being used in the calculation of ER, thus are not list in the MR table.

D.2. Data and parameters monitored

<table>
<tr><td>Data/Parameter</td><td>$EG_{facility,y}$</td></tr>
<tr><td>Unit</td><td>MWh</td></tr>
<tr><td>Description</td><td>Net electricity supplied to CCPG in year y.</td></tr>
<tr><td>Measured/calculated/ default</td><td>Measured</td></tr>
<tr><td>Source of data</td><td>Main meter</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>60619.02 MWh</td></tr>
<tr><td>Monitoring equipment</td><td>The data were measured continuously by two bidirectional Main meters (M_1 and M_2) and were recorded monthly. The information of meters are as follows.

<table>
<tr><td>Item</td><td>Main Meter(M1)</td><td>Main Meter (M2)</td></tr>
<tr><td>Type</td><td>DTSD8848</td><td>DSSD876</td></tr>
<tr><td>Serial Number</td><td>12A5430446</td><td>12F5110087</td></tr>
<tr><td>Accuracy</td><td>0.2S</td><td>1.0</td></tr>
</table>

Calibration information:
<table>
<tr><td>Meter</td><td>Calibration Date</td><td>Valid Until</td></tr>
<tr><td rowspan="2">Main Meter (M1)</td><td>08/11/2012</td><td>07/11/2013</td></tr>
<tr><td>08/11/2013</td><td>07/11/2014</td></tr>
<tr><td rowspan="2">Main Meter (M2)</td><td>09/11/2012</td><td>08/11/2013</td></tr>
<tr><td>09/11/2013</td><td>08/11/2014</td></tr>
<tr><td>Calibration Frequency</td><td colspan="2">Yearly</td></tr>
<tr><td>Calibration Organization</td><td colspan="2">Huaihua Power Measurement Centre of Hunan Power Company which is authorized by Hunan Quality and Technical Supervision Bureau.</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuous measurement and monthly recording.</td></tr>
<tr><td>Calculation method (if applicable)</td><td>The meter will be calibrated once a year.</td></tr>
<tr><td>QA/QC procedures</td><td>The main meters were calibrated according to national standard in the monitoring period. The quantity of net electricity supplied to CCPG can be cross-check by sold electricity.

All the electronic and paper documents will be archived at least two years after the end of the crediting period.</td></tr>
<tr><td>Purpose of data/parameter</td><td>The data is used for the calculation of baseline emission.</td></tr>
<tr><td>Additional comments</td><td>/</td></tr>
</table>

Data/Parameter	Cap_{PJ}
Unit	W
Description	Installed capacity of the hydropower plant after the implementation of the project activity
Measured/calculated/ default	Measured

Source of data	The value is attained from the Generator Nameplate and Technical Agreement of Generator.
Value(s) of monitored parameter	20,000,000
Monitoring equipment	/
Measuring/reading/recording frequency	Yearly monitored based on recognized standards.
Calculation method (if applicable)	/
QA/QC procedures	/
Purpose of data/parameter	The data are used for the calculation of project emission.
Additional comments	/

Data/Parameter	A_{PJ}
Unit	m^2
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Measured/calculated/ default	Measured
Source of data	Huaihua Hydropower Surveying & Design Institute
Value(s) of monitored parameter	The surface area of flooded area at the full reservoir level of Niaoerchao dam is 1660000m^2, and the surface area of flooded area at the full reservoir level of Liujingtan diversion dam is 143000m^2. The total surface area of flooded area at the full reservoir level of the project is 1803000m^2.
Monitoring equipment	/
Measuring/reading/recording frequency	Yearly monitored from topographical surveys, maps, satellite pictures, etc
Calculation method (if applicable)	/
QA/QC procedures	/
Purpose of data/parameter	The data are used for the calculation of power density.
Additional comments	/

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

>>
According to ACM0002, the baseline emissions during this monitoring period is calculated as follows:

$BE_y = EG_y * EF_y$

Where:
EG_y is net electricity supplied by the project activity to the grid in year y, in MWh;

EF_y is baseline emission factor in year y, in tCO_2e/MWh. According to the registered PDD, the EF_y is $0.85285tCO_2e/MWh$, and is fixed during the crediting period.

The monitoring results based on main meter are as follows:

Period	Data from reading records			Data from ETN(for crosscheck)		
	Electricity export (MWh)	Electricity import (MWh)	Net electricity generation (MWh)	Electricity export (MWh)	Electricity import (MWh)	Net electricity generation (MWh)
	A	B	C = A - B	D	E	F=D-E
01/01/2013-31/01/2013	3000.690	52.140	2948.550	3000.690	52.140	2948.550
01/02/2013-28/02/2013	3389.430	19.800	3369.630	3389.430	19.800	3369.630
01/03/2013-31/03/2013	3701.280	25.410	3675.870	3701.280	25.410	3675.870
01/04/2013-30/04/2013	7673.160	7.590	7665.570	7673.160	7.590	7665.570
01/05/2013-31/05/2013	10879.110	0.000	10879.110	10879.110	0.000	10879.110
01/06/2013-30/06/2013	6823.740	6.930	6816.810	6823.740	6.930	6816.810
01/07/2013-31/07/2013	349.470	26.730	322.740	349.470	26.730	322.740
01/08/2013-31/08/2013	1501.500	24.090	1477.410	1501.500	24.090	1477.410
01/09/2013-30/09/2013	1736.790	2.970	1733.820	1736.790	2.970	1733.820
01/10/2013-31/10/2013	4621.320	14.190	4607.130	4621.320	14.190	4607.130
01/11/2013-30/11/2013	1729.200	20.790	1708.410	1729.200	20.790	1708.410
01/12/2013-31/01/2014	908.820	68.310	840.510	908.820	68.310	840.510
01/02/2014-28/02/2014	999.240	33.660	965.580	999.240	33.660	965.580
01/03/2014-31/03/2014	4355.670	0.000	4355.670	4355.670	0.000	4355.670
01/04/2014-30/04/2014	3976.830	0.000	3976.830	3976.830	0.000	3976.830
01/05/2014-18/05/2014	5275.380	0.000	5275.380	5275.380	0.000	5275.380
sum	60921.63	302.61	60619.02	60921.63	302.61	60619.02

Note: The data sources are from the main meter readings and can be cross checked by electricity transaction notes. There is no malfunction happened to main meter during this monitoring period.

According to above calculation methods, the net electricity generation used for emission reductions calculation is 60619.02MWh. The baseline emission factor (EF_y) is $0.85285tCO_2/MWh$, which is fixed during the first crediting period. Then the baseline emissions (BE_y) are calculated as follows:

$BE_y = EG_y * EF_y = 60619.02MWh * 0.85285tCO_2/MWh = 51,698\ tCO_2$

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

>>

According to the baseline methodology ACM0002 (Version 7), the power density(PD) of the project is calculated as: PD=(20,000000W-0W)/(1,803,000m^2-0m^2) =11.09W/m^2 which is greater than 10W/m^2, Therefore PE_y = 0.

E.3. Calculation of leakage emissions

>>
According to baseline methodology ACM0002, leakage is not to be considered.

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	51,698	0	0	0	51,698	0	51,698

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)
51,698	85,009* * As the generator operation duration is 503 days from 01/01/2013 to 18/05/2014 thus the total estimated emission reduction can be calculated as: 61,687/365*503=85,009 tCO_2e.

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

>>
It can be found from E.5 that the actual emission reduction achieved during the monitoring period is lower than the registered PDD. It is due to the availability of water resources during the monitoring period.

E.6. Remarks on increase in achieved emission reductions

>>
The achieved emission reduction is lower than the estimated in the PDD.

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

>>
Not applicable.

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.
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).

Version	*Date*	*Description*
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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