



Monitoring report form for CDM project activity
(Version 08.0)

MONITORING REPORT

Title of the project activity	4.5MW grid-connected Sugur Mini Hydel Scheme at SLS Power Industries Ltd in Bellary District, Karnataka		
UNFCCC reference number of the project activity	0921		
Version number of the PDD applicable to this monitoring report	04.1		
Version number of this monitoring report	01		
Completion date of this monitoring report	03/05/2021		
Monitoring period number	9 th in overall and 1 st in second CP		
Duration of this monitoring period	24/03/2014 to 23/03/2021		
Monitoring report number for this monitoring period	Not Applicable		
Project participants	Bhoruka Power Corporation Limited		
Host Party	India		
Applied methodologies and standardized baselines	AMS-I.D. Version 18.0 - Grid connected renewable electricity generation Standardized baselines – Not Applicable		
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 e	25,541 tCO ₂ e	106 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	68,695 tCO ₂ e		

SECTION A. Description of project activity

A.1. General description of project activity

The 3x1.5 MW Sugur Mini Hydel Scheme developed by Boruka Power Corporation Limited, is in Bellary district of Karnataka State, India. The purpose of project activity is to generate electrical power using hydro potential and exports the net generated power to the Tekkalkota sub-station. The electrical power is wheeled utilizing the grid and is supplied to the local consumers drawing electricity from the grid. Hence, electricity generation by the project activity does not depend upon burning of fossil fuels consequently producing no GHG emissions.

It is a Run-off the river scheme across River Tunga Bhadra, 2 km downstream of the Right bank of Tunga Bhadra River at the existing anicut near M. Sugur Village. Major components of the project are anicut across the river, diversion structure power canal (intake structure), individual steel penstock to convey water each hydel generating unit of power house and a open tail race channel (700 m) to release water back into the river.

Sugur Mini Hydel Scheme utilizes the flows in Tunga Bhadra River and the natural head is available in at site for power generation. The flows in the river are predominant during the months of July to November. The flow in the river varies from 15.17 m³/sec (Min) to 786.5 m³/sec (Max.). A gross head of about 6.1 m and the rated flow is about 32.2 m³/sec through each machine is available for power generation.

The generated electricity is evacuated to 33/11kV Sub-station, Tekkalkota owned by KPTCL, which is 25 km away from the project site through Double Circuit 33 kV transmission line (Line-1 and Line-2) and fed into the state grid. In case of a line failure, the other line can be used to export the generated power by the project activity. Each line is having two energy meters (Main and Check meter) for quantifying the electricity, export/import by the project activity. The electricity is sold to Karnataka Power Corporation Limited (KPTCL) as per Power Purchase Agreement (PPA).

The relevant dates for the project activity are as follows:

Provisional approval for commissioning 18/11/2004

Synchronization date: 03/12/2004

Continued operation date: 18/12/2004

Commissioning approval unit 1 & 2: 20/12/2004

Commissioning approval unit 3: 26/09/2005

The project activity has resulted in GHG emissions reductions of 25,647 tCO₂ during the current monitoring period 24/03/2014 to 23/03/2021 by supplying net electricity of 28,867 MWh using hydroelectric energy resources.

A.2. Location of project activity

Host Party: India

District/State: Bellary District, Karnataka State.

Village/Taluk: M. Sugur village, Siruguppa Taluk

Geographical coordinates: 15°38' 57" N and Longitude 76°52' 58" 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)
India	Bhoruka Power Corporation Limited	No

A.4. References to applied methodologies and standardized baselines

Applied Approved Baseline methodology (AMS I.D Ver. 9).

A.5. Crediting period type and duration

Type: Renewable

Start Date: 24/03/2014

Length of crediting period: 7 years 00 months

Duration of crediting period: 24/03/2014 to 23/03/2021 (2nd Crediting Period)

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The Project has been completed as planned and the monitoring equipment were installed to monitor the parameters as described in the registered Project Design Document (PDD). The Plant is in operation continuously with outages since 20/12/2004 (Unit 1 & 2) and 26/09/2005 (Unit 3).

No significant issues or situations that have occurred during the monitored period, which may impact the applicability of the methodology.

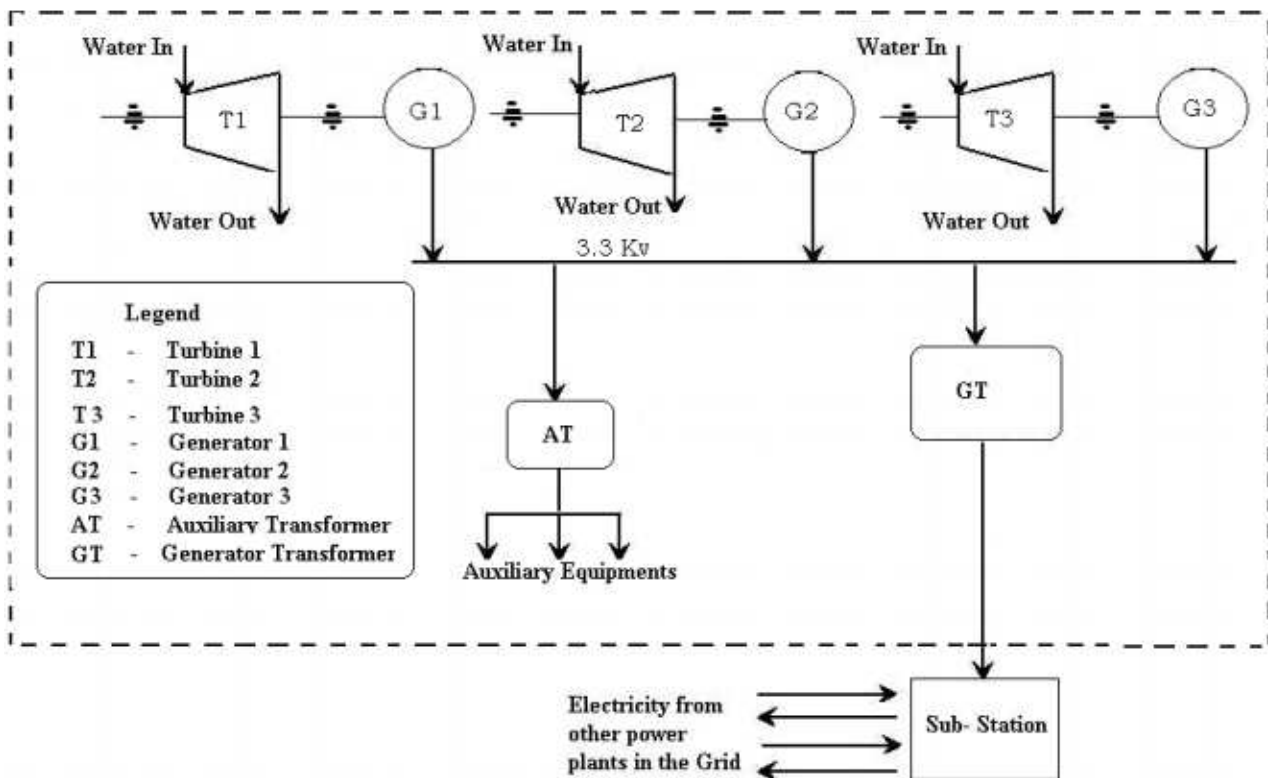
The Technical Specification of the equipment are as follows:

The technology or power generation process using hydro resources is converting the potential energy available in the water flow into mechanical energy using hydro turbines and then to

electrical energy using alternators. The generated power is transformed to match the nearest grid sub-station for proper interconnection and smooth evacuation of power.

The powerhouse comprises three numbers of synchronous generators of a capacity 1500 kW each and separately coupled to three vertical shaft full Kaplan turbine of 1500 kW each. The generated voltage at the generator terminals is 3.3 kV, which is stepped-up to 33 kV to match the nearest substation voltage level.

The process diagram and major plant equipment details are furnished below:



Technical Particulars of the Project Activity

Hydrology

Design flow:	29 m3/sec
Gross head:	6.1 meters
Net rated head:	5.7 meters
Runner Diameter	3000mm
Rated Speed	750 rpm

Energy

Expected annual generation:	24.40 GWh Generation
voltage level:	3.3kV
Grid interfacing voltage:	33 kV
Expected net annual export	11.04 GWh

Plant Equipment

Hydro Turbine:	Vertical shaft full Kaplan
Rated flow:	32.2 m3/sec per turbine
Rated Net Head:	5.7 m

Rated Speed:	132 rpm
Type of generator:	Synchronous
No. of generating units:	3 Nos.
Rated capacity of generating unit:	1765 kVA
Power factor :	0.85 (Lag)
Total Installed capacity :	4500 kW

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 were corrections requested in technical particulars of project activity, change in PP name and same is revised in PDD revised on 26/05/2011. The revised PDD is approved by UNFCCC on 13/07/2011.

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 applicable as this is not an afforestation or reforestation project activity.

SECTION C. Description of monitoring system

Data Collection Procedures

Information flow including data generation and recording

Energy meters (Main and Check) installed at Switchyard near the plant to measure and monitor electricity exported to the grid and also electricity imported from the grid. Measurement of electricity exported / imported by these meters is on daily basis .It is carried out by the shift engineer/operator and recorded in the designated register at the power house.

The monthly electricity generation is also recorded and certified jointly by the representatives of GESCOM, KPTCL and Bhoruka Power Limited on monthly (1st week of every month) basis. The

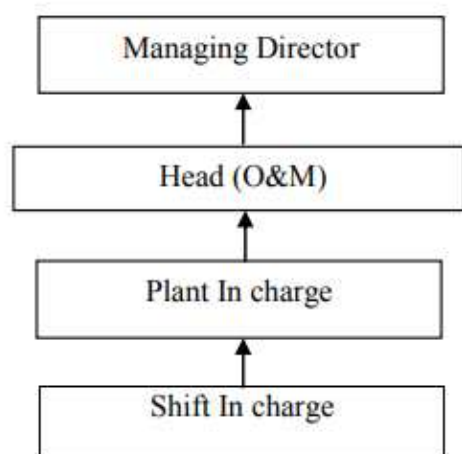
joint meter readings are presented in the form of Form-B. This Form-B presents net electricity export and import by each main and check meters.

Form-B, the log books and sales bills/receipts would be kept in hard copy format for 2 years after the end of crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Data aggregating, calculation and reporting

The generation data is aggregated annually based on monthly Form-B for calculation of the emission reductions and this is reported to the Managing Director.

Organizational structure (for monitoring of emission reductions)



Roles and responsibilities of Team

Managing Director

Managing Director is responsible for the total monitoring plan. The Managing Director examines the reports generated by Head- O & M w.r.t; the monthly electricity exported to grid, electricity imported from grid and annual emission reduction calculations as per the monitoring plan. He also examines the internal audit reports prepared by internal auditor / Head- O & M every six months once and in particular takes note of any deviations in data over the norms and monitor that the corrective actions have resulted in adherence to standards.

Head- O & M Head

O & M is assisting and reporting to Managing Director for completing the task discussed above. The Head- O & M is responsible for the electricity generations at their individual locations. They cross checks, sign the log book regularly and report to Managing director for any abnormality. The calibration of the meters installed are taken care by him as per the monitoring plan.

Plant In charge

The plant in charge examines the reports generated by Shift in charge w.r.t, the monthly electricity generated, exported and plant down times, if any etc. The monthly reports are generated and submitted to the Head- O & M for verification and emission reduction calculations. The responsibility of storage and archiving of information in good condition also lies with the head- O& M. He also maintains internal audit reports and whenever necessary, is submitted to Managing Director.

Shift In charges

Shift In charge is responsible for recording the electricity meter readings in the electricity main meter and check meter, monitor the equipment healthiness on daily basis. He is also responsible to take note of electricity exported to grid and Import from grid plant shut down times, if any etc.

Emergency procedures for the monitoring system Fire hydrants and sand buckets are provided at important locations in the plant where there might be a situation leading to a fire hazard.

QA AND QC Procedures

The data is being recorded both at the project site as well as at the grid substation, which is under the control of KPTCL. The energy is being measured and recorded using calibrated meters at the KPTCL substation. Records of measurements are being used for verification of emissions reductions. Sales bills / receipts are compared as an alternative proof of the power exported to the grid. The energy meters are being calibrated 2 times during reported period and the calibration certificates are being maintained. The project proponents also have the provision of check meters which are also regularly calibrated. Whenever the main meter becomes faulty the check meter is used as reference for arriving at the energy generated data.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid, CM, y}$
Unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ grid Emission factor for the INDIAN electricity grid
Source of data	Calculated from CEA database, Version 14, Dec 2018
Value(s) applied	0.8885
Choice of data or measurement methods and procedures	The combined margin emissions factor is calculated as follows: $EF_{grid, CM, y} = EF_{grid, OM, y} * W_{OM} + EF_{grid, BM, y} * W_{BM}$ Where: $EF_{grid, BM, y}$ = Build margin CO ₂ emission factor in year y (tCO ₂ /MWh) $EF_{grid, OM, y}$ = Operating margin CO ₂ emission factor in year y (tCO ₂ /MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 25% W_{BM} = Weighting of build margin emissions factor (%) = 75%
Purpose of data/parameter	To calculate baseline emissions
Additional comments	The data will be archived 2 years after the end of the crediting period or the last issuance of CERs.

Data/Parameter	$EF_{grid, OM, y}$
Unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor for INDIAN electricity grid (weighted average of 3 years 2015-16, 2016-17 and 2017-18)
Source of data	Calculated from CEA database, Version 14, Dec 2018
Value(s) applied	0.9610
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 14, December 2018, published by the Central Electricity Authority, Ministry of Power, Government of India

Purpose of data/parameter	To calculate baseline emissions
Additional comments	The data will be archived 2 years after the end of the crediting period or the last issuance of CERs.

Data/Parameter	EF _{grid, BM,y}
Unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor of the INDIAN electricity grid
Source of data	Calculated from CEA database, Version 14, Dec 2018
Value(s) applied	0.8644
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 14, December 2018, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	To calculate baseline emissions
Additional comments	The data will be archived 2 years after the end of the crediting period or the last issuance of CERs.

D.2. Data and parameters monitored

Data/Parameter	EG _{export,y}
Unit	MWh
Description	Electricity exported to the grid by the project during the year y
Measured/calculated/default	Measured
Source of data	Import export Meters installed
Value(s) of monitored parameter	29,162.52

Monitoring equipment	Energy Meters Line 1				
			Main Meter		Check Meter
	Serial No.		10059245		10059270
	Type		ABT featured Tri vector		ABT featured Tri vector
	Make		L & T		L & T
	Accuracy class		0.2s		0.2s
	Calibration frequency		Once in a year		Once in a year
	Last calibration date		03/09/201 3	02/09/201 4	03/09/201 3 02/09/201 4
			26/08/201 4	25/08/201 5	26/08/201 4 25/08/201 5
			13/08/201 5	12/08/201 6	13/08/201 5 12/08/201 6
	Line 2				
			Main Meter		Check Meter
	Serial No.		10059282		10059258
	Type		ABT featured Tri vector		ABT featured Tri vector
	Make		L & T		L & T
	Accuracy class		0.2s		0.2s
	Calibration frequency		Once in a year		Once in a year
	Last calibration date		03/09/201 3	02/09/201 4	03/09/201 3 02/09/201 4
			26/08/201 4	25/08/201 5	26/08/201 4 25/08/201 5
			13/08/201 5	12/08/201 6	13/08/201 5 12/08/201 6
Considering the calibration dates, it can be concluded that calibration has been done in accordance with QA/QC procedures.					
Measuring/reading/recording frequency	Continuous monitoring and monthly recording				
Calculation method (if applicable)	Not applicable				
QA/QC procedures	The data is recorded both at the project site as well as at the grid substation, which is under the control of KPTCL. The energy is be measured and recorded using calibrated meters at the KPTCL substation. Records of measurements are be used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid. The energy meters are being periodically calibrated and the calibration certificates are being maintained. The project proponents also have the provision of check meters which are also regularly calibrated whenever the main meter becomes faulty the check meter is used as reference for arriving at the energy generated data.				
Purpose of data/parameter	To calculate baseline emissions				
Additional comments	--				

Data/Parameter	EG_{import, y}
Unit	kWh
Description	Grid electricity import to the project activity during the year y

Measured/calculated/default	Measured																										
Source of data	Import Export Meters installed																										
Value(s) of monitored parameter	295.52																										
Monitoring equipment	Energy Meters Line 1																										
		Main Meter	Check Meter	Serial No.	10059245	10059270	Type	ABT featured Tri vector	ABT featured Tri vector	Make	L & T	L & T	Accuracy class	0.2s	0.2s	Calibration frequency	Once in a year	Once in a year	Last calibration date	03/09/2013	02/09/2014		26/08/2014	25/08/2015		13/08/2015	12/08/2016
		Main Meter	Check Meter																								
	Serial No.	10059245	10059270																								
	Type	ABT featured Tri vector	ABT featured Tri vector																								
	Make	L & T	L & T																								
	Accuracy class	0.2s	0.2s																								
	Calibration frequency	Once in a year	Once in a year																								
	Last calibration date	03/09/2013	02/09/2014																								
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		13/08/2015	12/08/2016																								
	Line 2																										
		Main Meter	Check Meter	Serial No.	10059282	10059258	Type	ABT featured Tri vector	ABT featured Tri vector	Make	L & T	L & T	Accuracy class	0.2s	0.2s	Calibration frequency	Once in a year	Once in a year	Last calibration date	03/09/2013	02/09/2014		26/08/2014	25/08/2015		13/08/2015	12/08/2016
		Main Meter	Check Meter																								
	Serial No.	10059282	10059258																								
	Type	ABT featured Tri vector	ABT featured Tri vector																								
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	Last calibration date	03/09/2013	02/09/2014																								
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	Considering the calibration dates, it can be concluded that calibration has been done in accordance with QA/QC procedures.																										
	Measuring/reading/recording frequency	Continuous monitoring and monthly recording																									
	Calculation method (if applicable)	Not applicable																									
QA/QC procedures	The data is recorded both at the project site as well as at the grid substation, which is under the control of KPTCL. The energy is measured and recorded using calibrated meters at the KPTCL substation. Records of measurements are used for verification of emissions reductions. Sales bills / receipts may be compared as an alternative proof of the power exported to the grid. The energy meters are being periodically calibrated and the calibration certificates are being maintained. The project proponents also have the provision of check meters which are also regularly calibrated whenever the main meter becomes faulty the check meter is used as reference for arriving at the energy generated data.																										
Purpose of data/parameter	To calculate baseline emissions																										
Additional comments	--																										

Data/Parameter	EG_y
Unit	kWh
Description	Net electricity supplied to the grid by the project
Measured/calculated/default	Calculated
Source of data	The electricity exported to grid and electricity imported from the grid values are taken from Joint Meter readings (Form-B).
Value(s) of monitored parameter	28,867.00
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	The net electricity supplied to the grid is calculated as difference between the electricity exported to the grid and electricity imported from the grid to the project. $EG_y = EG_{\text{export},y} - EG_{\text{imports},y}$.
QA/QC procedures	Sale records can be used to cross check
Purpose of data/parameter	To calculate baseline emissions
Additional comments	--

D.3. Implementation of sampling plan

No sampling plan is required for this project activity

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

The baseline emissions are calculated as follows:

Baseline emissions from the project activity (tCO₂) = (Baseline emission factor (tCO₂/MWh) X Net export from the project activity (MWh)

Baseline emission factor = 0.8885 tCO₂/MWh

Net export from the project activity = 28,867.00 MWh

Baseline emissions from the project activity (tCO₂) = 28,867.00 * 0.8885 = 25,647 tCO₂ (Round-down value)

Baseline emissions from the project activity = 25,647 tCO₂e

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

As per registered PDD, project emissions considered as zero i.e. **Project Emissions (PE_y) = 0 tCO₂e**

E.3. Calculation of leakage emissions

As per sec. 12 of AMS ID, the energy generating equipment is not transferred from another activity or the existing equipment is transferred to another activity. Hence the leakage emissions are considered zero.

Hence Leakage Emissions (LE_y) = 0 tCO₂e

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 until 31/12/2020	From 01/01/2021	Total amount
Total	25,647	0	0	0	25,541	106	25,647

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)
25,647	68,695

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	24/03/2014
End date of monitoring period	23/03/2021
Number of days in monitoring period	2557
Annual estimated reductions as per the PDD	9,806
Estimated emission reductions for this monitoring period	68,695
Actual emission reductions for this monitoring period	25,647

E.6. Remarks on increase in achieved emission reductions

Not applicable as the achieved emission reductions during this monitoring period are about 62% lower than the estimated emission reductions during this monitoring period. The variation is mainly attributed to fact of rainfall pattern, water availability etc., which are beyond the control of project participant.

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

The project activity remains small-scale throughout the monitoring period.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
08.0	6 April 2021	Revision to: <ul style="list-style-type: none"> • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
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		