



Monitoring report form for CDM project activity (Version 09.0)

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

MONITORING REPORT

Title of the project activity	5 MW Debal Grid-connected Hydroelectric Project in Uttarakhand, India		
UNFCCC reference number of the project activity	2965		
Version number of the PDD applicable to this monitoring report	04		
Version number of this monitoring report	01		
Completion date of this monitoring report	27-11-2021		
Monitoring period number	02		
Duration of this monitoring period	01/04/2011 to 14/03/2020 (Inclusive of both days)		
Monitoring report number for this monitoring period	01		
Project participants	M/s Chamoli Hydro Power Pvt. Ltd		
Host Party	India		
Applied methodologies and standardized baselines	AMS-I.D. Ver 13- Grid connected renewable electricity generation		
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
	18,408	1,05,441	-
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	2,14,006 tCO ₂		

SECTION A. Description of project activity

A.1. General description of project activity

>> Chamoli Hydro Power Private Limited (CHPPL) has implemented small hydropower project with two units of 2.5 MW each totalling to 5.0 MW in Narain Bagar taluk of district Chamoli, of Uttarakhand State. The Small Hydro-Power project is proposed on the right bank of Kailganga River just before its confluence with Pinder River near Debal village.

The project activity comprises a diversion structure, water conducting system, feeder channel, desilting tank, power channel (Pipe), fore-bay tank, penstock, power house, and tail race channel. After power generation the water goes back into the river. The generated voltage 6.6 kV is stepped up to 33 kV and evacuated from the powerhouse to 33 kV grid sub-station at Debal (near Nandakesari). In this process there are no greenhouse gas emissions or burning of any fossil fuels. Thus electricity is generated through sustainable means without causing any negative effect on the environment.

Both the Units of project were commissioned on 21/07/2007, from there onwards both units of the project activity are in continuous operation to till date.

The present monitoring period is chosen from 01/04/2011 to 14/03/2020. The net electricity exported to the state grid by the project activity is 153.081GWh and the net emission reductions are 1,23,849 tCO₂e for the present monitoring period.

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 project.

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 small hydro project on Kailganga River is established in a rural area. Majority of population in this area depend on marginal cultivation in the terraced fields or work as labourers for their livelihood. The economic condition of the area is poor due to low agricultural yield and adverse climatic conditions.

Setting up of the hydro project has opened employment opportunities in the local area during construction and operation phase by making available clean hydro power especially for power intensive industries and cater to its population for their socio-economic upliftment as well as improving their living conditions.

The project activity feeds the generated power to the nearest Debal substation at Nandakesari located at a distance of 5 km, thus energy availability and quality of power improves significantly under the service area of the substation.

Economic Well-Being :

Project proponent will mobilised investment in the region to an extent of about Rs. 289.5 millions which otherwise would not have happened in the absence of the project activity. This is a significant investment in a hilly area. The project proponent has developed basic infrastructures like road, communication facilities etc and the same could be utilised by the local population.

Environmental Well-Being:

The proposed project activity utilises hydro potential available for power generation. The state of Uttarakhand is a part of the Indian regional grid system where power generation is dominated by fossil fuels. The project activity will not result in increase of GHG emissions and hence cause no negative impact on the environment both at local as well as at the global level. Further, the project activity does not result in degradation of any natural resources, health standards, etc. at the project area. The project will not cause any air, water, or noise pollution.

Technological Well-Being:

The project is a result in utilisation of environmentally safe and sound technologies in small-scale hydroelectric power sector. Further, the project demonstrates harnessing hydro potential in small streams and encourages setting up of such new projects in future. Thereby, the project generated real, measurable and long term emission reductions.

The above benefits due to the project activity is ensuring that the project would contribute to the sustainable development of the region.

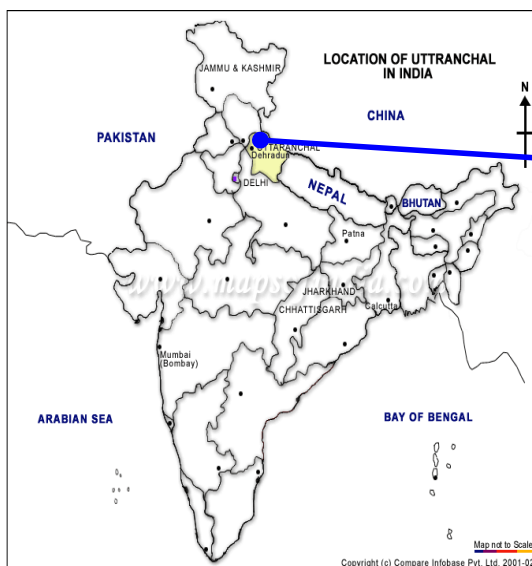
A.2. Location of project activity

>> The location of project activity is:

Village	:	Debal
Taluk	:	Narain Bagar
District	:	Chamoli
State	:	Uttarakhand
Country	:	India.

The geographical co-ordinates of the location are 79° 33' 10" E (longitude) and 30° 0' 3" N (latitude).

Physical location of the project is marked in the maps below:



Location of Uttaranchal state in India



Location of Chamoli District in Uttarakhand



Location of 5 MW Debal SHP in Chamoli District.

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	Private Entity: Chamoli Hydro Power Private Limited	No

A.4. References to applied methodologies and standardized baselines

Title : **Type I**, Renewable Energy Projects
 Reference : **AMS-I.D.** Grid connected renewable electricity generation
 Version : **Version 13**, AMS-I.D, Scope: 01, EB 36

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

A.5. Crediting period type and duration

>>15/03/2010 to 14/03/2020 (Fixed)

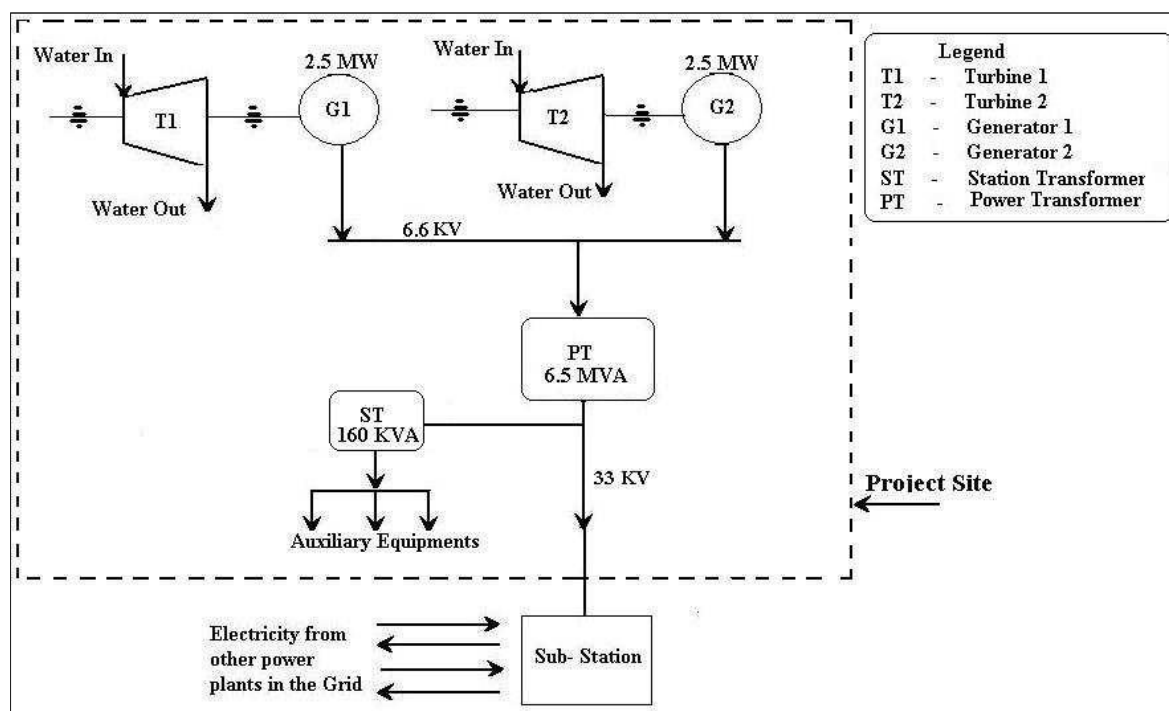
SECTION B. Implementation of project activity**B.1. Description of implemented project activity**

>> The technology or power generation process using hydro resources is converting the potential energy available in the water flows into mechanical energy using hydro turbines and then to electrical energy using alternators. The generated power will be transformed to match the nearest grid sub-station for proper interconnection and smooth evacuation of power.

The details of major equipment of the project activity are furnished below:

Equipment Specifications	
<u>Turbine:</u>	<u>Generator:</u>
Make : Boving Fouress Ltd.	Make : WEG
Type : Horizontal Francis	Model : SSA710
Rated discharge : 14 cu.m/sec	Sl. No : 156668 & 156669
Rate Power : 2500 kW	Capacity : 3125 KVA.
Speed : 600 rpm	Power factor : 0.8
Quantity : 2 Nos.	Voltage : 6600 V
	Rated speed : 600 rpm
	Frequency : 50 Hz
	Quantity : 2 Nos.
<u>Power Transformer</u>	<u>Auxiliary Transformer</u>
Sl. No. : ST-34683	Sl. No. : ST-34701
Type : ONTR 6500/33	Capacity : 160 kVA
Capacity : 6500 kVA	Frequency : 50 Hz
Frequency : 50 Hz	Step down : 33000/415 V
Step up : 6.6/33 KV	
<u>DG Set</u>	
Make : Kirloskar	
Capacity : 63 KVA	
Frequency : 50	
Volts: 415, Power Factor: 0.8.	
Tank Capacity: 145 Litres	

Detailed technical process diagram of the project activity is furnished below:



The project activity has been commissioned on 21/07/2007 and registered with CDM EB on 15/03/2010. The project promoter has installed all monitoring equipments to monitor the parameters, which were described in the registered CDM-PDD.

The plant has been operated effectively by interchanging between the two units during less water flows in the river.

No significant events occurred during this monitoring period, which may impact the applicability of the methodology.

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 is no temporary deviation from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents during the current monitoring period.

B.2.2. Corrections

There is no corrections during the current monitoring period.

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

>>

There is no changes to start date of crediting period during the current monitoring period

B.2.4. Inclusion of monitoring plan

>>

There is no inclusion of monitoring plan during the current monitoring period.

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

>>

There is no permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents Changes to project design during the current monitoring period.

B.2.6. Changes to project design

>>

NA

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

>>

NA

SECTION C. Description of monitoring system

>>

The monitoring system was performed as per the registered PDD.

SECTION D. Data and parameters**D.1. Data and parameters fixed ex ante***(Copy this table for each data or parameter.)*

Data/Parameter	EF_y
Unit	tCO ₂ /GWh
Description	CO ₂ emission factor for the regional grid system
Source of data	CEA Published grid emission factor
Value(s) applied	810.46
Choice of data or measurement methods and procedures	--
Purpose of data/parameter	To calculate Baseline emissions
Additional comments	--

Data/Parameter	EF_{CO₂, i}
Unit	tCO ₂ /Tj
Description	CO ₂ emission coefficient of fuel type i
Source of data	IPCC 2006 upper bound value at 95% confidence interval Web Link: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf
Value(s) applied	74.8
Choice of data or measurement methods and procedures	--
Purpose of data/parameter	To Calculate Project emission
Additional comments	The project activity may combust only one type of fossil fuel i.e., diesel during the project operation to meet the emergency power requirement of the project. Hence only emission factor of diesel is provided in the Parameter

Data/Parameter	NCV Diesel
Unit	TJ/Gg
Description	Net Calorific value of diesel
Source of data	IPCC 2006 upper bound value at 95% confidence interval ("2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2T:aEbnl esrg1y.2, ") Web Link: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf
Value(s) applied	43.3
Choice of data or measurement methods and procedures	--
Purpose of data/parameter	To Calculate Project emission
Additional comments	--

Data/Parameter	Density i
Unit	Kg/Lit

Description	Density of fossil fuel used for the project site (Diesel)
Source of data	Indian Oil Corporation Ltd http://www.iocl.com/Products/HSD_BS_IV_Specification.pdf
Value(s) applied	0.845
Choice of data or measurement methods and procedures	--
Purpose of data/parameter	To Calculate Project emission
Additional comments	---

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	EG_{gross,y}
Unit	GWh
Description	Total electricity generated by the project during the year y
Measured/calculated/Default	Measured using calibrated meters
Source of data	On-site measurement
Value(s) of monitored parameter	162.079 (The month wise generation details are provided in ER spread sheet)
Monitoring equipment	Please refer below Table-1
Measuring/reading/recording frequency	Measured continuously, recorded daily and aggregated monthly.
Calculation method (if applicable)	This value is used for cross check the electricity exported to grid by the project activity.
QA/QC procedures	---
Purpose of data/parameter	---
Additional comments	The meters are calibrated as per industrial standards of energy meters, but at least once in three years

Data/Parameter	EG_{Auxiliary,y}
Unit	GWh
Description	Auxiliary electricity consumption of the project during the year y
Measured/calculated/Default	Measured using calibrated meter
Source of data	On-site measurement
Value(s) of monitored parameter	0.768 ((The month wise generation details are provided in ER spread sheet)
Monitoring equipment	Please refer below Table-1
Measuring/reading/recording frequency	Measured continuously, recorded daily and aggregated monthly.
Calculation method (if applicable)	This value is used for cross check the electricity exported to grid by the project activity.
QA/QC procedures	---
Purpose of data/parameter	---
Additional comments	The meters are calibrated as per industrial standards of energy meters, but at least once in three years

Data/Parameter	EG _{export,y}
Unit	GWh
Description	Electricity supplied to the grid by the project during the year y
Measured/calculated/Default	Measured at Grid interconnection point
Source of data	Monthly Joint Meter Readings Reports certified by UPCL officials
Value(s) of monitored parameter	153.143 (Month wise export details and adjustment of export figures due to delay in calibration is provided in ER sheet).
Monitoring equipment	Please refer below Table-1
Measuring/reading/recording frequency	Measured continuously and recorded monthly.
Calculation method (if applicable)	Meters are recalibrated & inspected periodically by UPCL. Records of measurements are used for verification of emissions reductions. Sales bills / receipts are used for cross verification.
QA/QC procedures	---
Purpose of data/parameter	To Calculate Baseline emissions
Additional comments	

Data/Parameter	EG _{import,y}
Unit	GWh
Description	Grid electricity import to the project activity during the year y
Measured/calculated/Default	Measured at Grid interconnection point
Source of data	Monthly Joint Meter Readings Reports certified by UPCL officials
Value(s) of monitored parameter	0.062 (wise import details and adjustment of import figures due to delay in calibration is provided in ER sheet).
Monitoring equipment	Please refer below Table-1
Measuring/reading/recording frequency	Measured continuously and recorded monthly.
Calculation method (if applicable)	Meters are recalibrated & inspected periodically by UPCL. Records of measurements are used for verification of emissions reductions. Sales bills / receipts are used for cross verification.
QA/QC procedures	---
Purpose of data/parameter	To Calculate Baseline emissions
Additional comments	

Data/Parameter	F _{i,y}
Unit	Litres
Description	Quantity of fossil fuel type i (Diesel) combusted in the project plant during year y
Measured/calculated/Default	Recorded on daily basis in D.G. Set log books and aggregated on monthly basis.
Source of data	On-site records (DG set log book)
Value(s) of monitored parameter	53,733

Monitoring equipment	Controller Make : Koel Green Model No. : 225MM Error limits : $\pm 0.49\%$ Calibrated on 27.07.2021 Calibration will be valid till 26.07.2024 ¹
Measuring/reading/recording frequency	Recorded on daily basis in D.G. Set log books and aggregated on monthly basis.
Calculation method (if applicable)	The data recorded can be cross checked against the fuel purchase receipts.
QA/QC procedures	---
Purpose of data/parameter	To Calculate Project emissions (Month wise details provided in ER Calculations sheet)
Additional comments	--

Table 1: Main / Check meters, Gross Energy meter & Auxiliary meter Recalibration Test Details

S.No	Serial No.	Date of calibration	Validity (As per valid PPA)
Main/Check Meter			
1	7007478	25/07/2011 19/12/2012 21/11/2016	25/01/2012 19/06/2013 21/05/2017
2	7007475	08/12/2011 20/09/2019	08/06/2012 20/03/2020
3	8039587	28/07/2010 15/09/2011 06/06/2012 26/12/2015	28/01/2011 15/03/2012 06/12/2012 26/06/2016
4	8039591	28/07/2010	28/01/2011
5	10286992	18/05/2011 23/12/2014	18/06/2011 23/06/2015
6	10286995	18/05/2011 05/08/2013 15/10/2015 15/04/2016	18/11/2011 05/02/2014 15/04/2016 15/10/2016
7	UKD02994	19/12/2018 29/01/2020	19/06/2019 29/07/2020
8	UKD02995	19/12/2018	19/06/2019
9	UKD03091	05/04/2019	05/10/2019
Gross Energy Meter			
Unit-1	B3260957 B3230693	25/02/2012 25/07/2021	25/02/2015 25/07/2024
Unit-2	B3260958	25/02/2012 25/07/2021	25/02/2015 25/07/2024

¹ i. No calibration of controller was performed during the monitoring period.

ii. Hence, as a conservative approach, for the current verification total diesel procured during the current monitoring period has been considered as consumed. This resulted in overestimation of project emissions in comparison to project emissions calculated based on the actual diesel consumed.

S.No	Serial No.	Date of calibration	Validity (As per valid PPA)
Auxiliary Meter			
1	19599TM1106	25/02/2012 25/07/2021	25/02/2015 25/07/2024

D.3. Implementation of sampling plan

>>NA

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:

$$BE_y = EG_y * EF_y$$

Where

EG_y is the net electricity export to grid in a given year (GWh)

$$[EG_y = EG_{\text{Export}} - EG_{\text{Import}}]$$

EF_y is the emission factor for a given year (tCO₂/GWh)**E.2. Calculation of project emissions or actual net removals**

>>

The project emissions due to usage of fossil fuel (Diesel) are

calculated as:

$$PE_{\text{diesel},y} = F_{d,y} * \text{Density} * \text{NCV} * EF_{\text{CO}_2} * \text{OXID} / 10^6$$

Where,

F_{d,y} : The quantity of diesel used during the year (Ltrs)

Density : The density of diesel (0.845 kg/Ltr. as per Indian Oil Corporation Ltd

http://www.iocl.com/Products/HSD_BS_IV_Specification.pdf

NCV : The calorific value of diesel (43.3 TJ/Gg as per IPCC 2006 default value)

EF_{CO₂} : The CO₂ emission factor of Diesel (74.8 t CO₂/TJ as per IPCC 2006)

OXID : The oxidation factor of the coal (1 as per IPCC 2006 default value)

E.3. Calculation of leakage emissions

>>

Leakage is not considered from the project activity.

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	1,24,066 ²	149	--	18,408	1,05,441	--	1,23,849

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)
1,23,849	2,14,006

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

>>

Considering the annual average emission reductions as per the registered PDD which is 23,880 tCO₂e per year, the number of days since commissioning covered during the current monitoring period comes out to be 3271 days. The amount estimated is using unitary method i.e. $23,880/365 \times 3271 = 2,14,006$ tCO₂e.

E.6. Remarks on increase in achieved emission reductions

>>

During the present reporting period the project activity has achieved 42.13% less emissions reduction as compared with emissions indicated in Registered CDM- PDD. The main reasons for less generation during the monitored period are given below:

- More number of grids failures, due to which the plant was forced to shut down most of the time.
- More rainfalls in the project region, the project activity was forced to shut down due to slit accumulation in the penstock even after a moderate rainfall in the catchment area.

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

>>

The project activity remains as a Small scale project activity for the entire crediting period

- - - - -

² Delay calibration of main meter is calculated as 68 tCO₂, same is reduced from the baseline emissions. i.e. $1,24,066 - 68 = 1,23,998$ tCO₂.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	8 October 2021	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 03.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN).
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		