



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	Sichuan Muchuan County Huogu Hydropower Project		
UNFCCC reference number of the project activity	3309		
Version number of the PDD applicable to this monitoring report	PDD Version: 4.2		
Version number of this monitoring report	1.0		
Completion date of this monitoring report	30/07/2021		
Monitoring period number	3 rd		
Duration of this monitoring period	26/05/2016-24/07/2019		
Monitoring report number for this monitoring period	Not applicable.		
Project participants	Sichuan Muchuan County Qixing Huogu Hydropower Development Co., Ltd.		
Host Party	P. R. China		
Applied methodologies and standardized baselines	ACM0002 ver. 12 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources		
Sectoral scopes	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	367,633	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	446,639		

SECTION A. Description of project activity

A.1. General description of project activity

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Sichuan Muchuan County Huogu Hydropower Project (hereinafter referred to as the "Project") which is located in Lidian Town, Muchuan County, Leshan City, Sichuan Province, P. R. China, is constructed and operated by Sichuan Muchuan County Qixing Huogu Hydropower Development Co., Ltd.

The Proposed Project aims to generate electricity from hydropower resources and to displace the same amount of electricity from the China Central Power Grid (CCPG) whose generation mix is dominated by coal-fired, electricity generating power plants.

The project employs two units of ZZ550-LH-340 turbines and two units of SF20-30/5500 generators to convert mechanical energy available in the water flow into electrical energy.

The earlier starting date of the project is 06/06/2007, on which main equipment contract of the project was signed. The project starts commercial operation on 22/01/2012. The units were in good condition during the operation of the project.

During the monitoring period, a net electricity of 431064.282MWh has been delivered to the power grid by the project, thus there are totally 367,633tCO_{2e} reduced by the project.

A.2. Location of project activity

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The Project is located in Lidian Town, Muchuan County, Leshan City of Sichuan Province, P. R. China. The straight-line distance from the location of the dam to Mabian County and Muchuan County are respectively 18km and 21km. The geographical coordinates of the Project site are 103°40'27"E and 28°55'23"N.

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host)	Sichuan Muchuan County Qixing Huogu Hydropower Development Co., Ltd.	No

A.4. References to applied methodologies and standardized baselines

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The Project applies to the approved methodology: ACM0002 "Consolidated Baseline Methodology for grid-connected electricity generation from renewable sources" (Version 12.3.0). Information regarding to the methodology could be found at:

<http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT>

In line with the approved methodology, the Project applies to the following tools:

"Tool to calculate the emission factor for an electricity system" (Version 02.2.1)

Information regarding to the tools could be found respectively at:

<http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.2.1.pdf>

A.5. Crediting period type and duration

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The Project adopts renewable crediting period. The first crediting period is from 25/07/2012 to 24/07/2019. This monitoring period is from 26/05/2016-24/07/2019.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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The model of the hydro turbine used in the Project is ZZ550-LH-340 and the model of generator is SF20- 30/5500. The key technical specifications of these two equipment are listed as Tables below:

Table A-1 Key technical specifications of Hydro turbines

Parameters Name	Unit	Data
Model	/	ZZ550-LH-340
Quantity	/	2
Rated Output	MW	20.619
Rated Rotation	r/min	200
Rated head	m	26
Rated flow	m ³ /s	86.4
Equipment life time	year	40

Table A-2 Key technical specifications of Generators

Parameters Name	Unit	Data
Model	/	SF20-30/5500
Quantity	/	2
Installed capacity	MW	20
Rated Voltage	kV	10.5
Rated current	A	1294
Rated frequency	Hz	50
Rated Rotation	r/min	200
Rated Power Factor	%	85
Equipment life time	year	40

There is no special events happened during the monitoring period. No overhaul or equipment exchange occurred during the monitoring period 26/05/2016- 24/07/2019.

No events or situation that occurred during the monitoring period, which may impact the GHG emission reductions or removals and monitoring.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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Not applicable.

B.2.2. Corrections

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Not applicable.

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

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Not applicable.

B.2.4. Inclusion of monitoring plan

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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

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Not applicable.

B.2.6. Changes to project design

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Not applicable.

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

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Not applicable.

SECTION C. Description of monitoring system

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The monitoring plan is made according to ACM0002 "Consolidated Baseline Methodology for grid-connected electricity generation from renewable sources". Monitoring procedure should be implemented firmly according to monitoring plan to ensure real, measurable and long-term greenhouse gas (GHG) emission reduction of the Project is monitored and reported.

1. Monitoring Objective

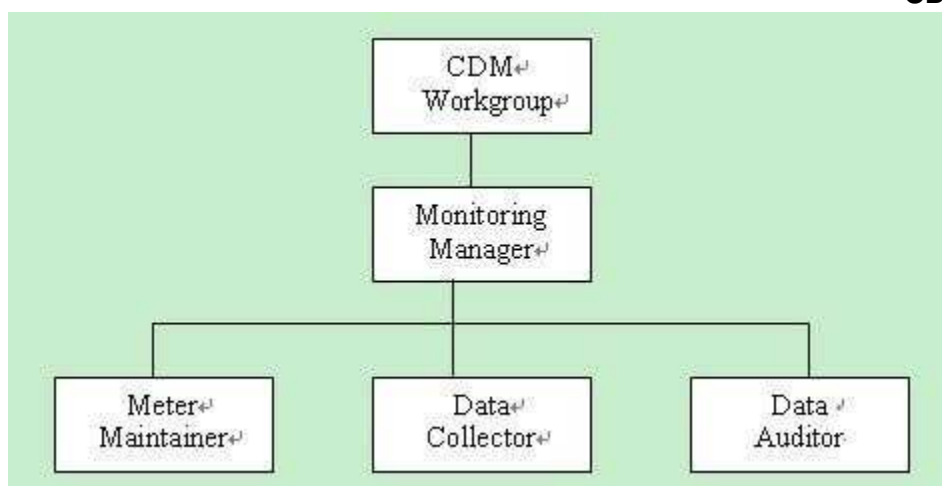
Since the emission factor is calculated as ex-ante and according to the Monitoring Methodology ACM0002, the following data should be monitored:

- a) Quantity of net electricity generation supplied by the project plant to the grid in year y ($EG_{facility,y}$)
- b) Installed capacity of the hydro power plant after the implementation of the project activity (Cap_{PJ})
- c) Area of the reservoir measured in the surface of the water, after the implementation of the Project activity, when the reservoir is full (A_{PJ}).

2. Monitoring Organization

A CDM group will be established to carry out the monitoring plan. The project owner will designate a CDM manager to responsible for daily monitoring and reporting. Under the CDM manager, there will be three positions involved, respectively referred as meter maintainer, data collector and data auditor.

Followed figure shows the CDM group structure:



The CDM Manager is fully responsible for implementing monitoring plan and reviewing monitoring results.

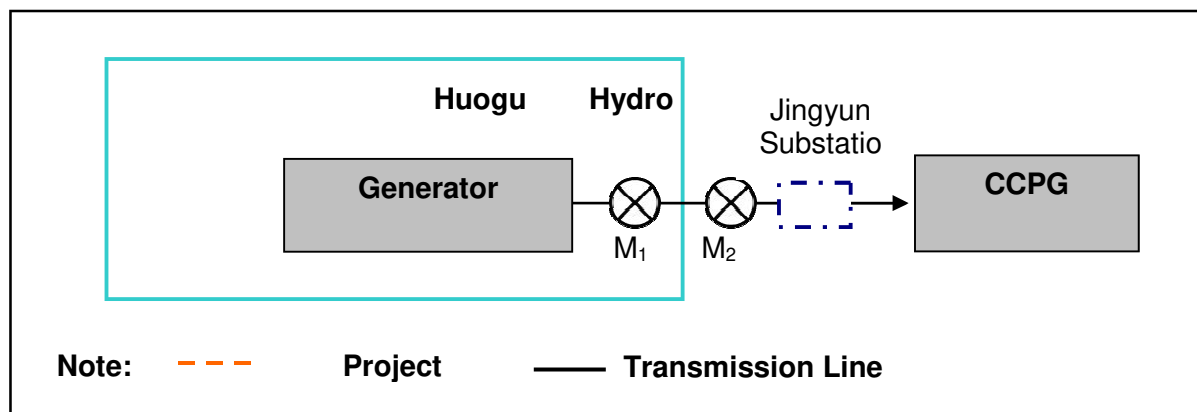
The maintainer is in charge of the organization of calibration tasks and regular maintenance of the meters equipped in the Project. The meters will be calibrated by specific technical staff and third party verification in accordance to relevant regulation and standard. The surface area of the reservoir at full reservoir level and installed capacity will be measured by competent Authority yearly.

The Data collector is responsible for regular collecting of the financial data, including meters reading records and the electricity sales invoices or receipts. Those data will be audited and verified by the CDM group.

The Data Auditor will check the validity of the data by comparing with previous recorded data and data from third party such as the Power Corporation. If an obvious discrepancy does exist, it should be reported to Monitoring Manager. The validated data will be archived electronically in CDM data management system by the Data auditor.

3. Installation of meters

The metering equipment will be properly configured and checked annually according to the requirement from Technical administrative code of electric energy metering (DL/T448 — 2000). The metering equipment will be checked by the Project owner and Grid Company before operation. The diagram of the meters' position is shown as following:



Two meters with accuracy of 0.2s are installed in order to ensure maximum availability of CDM data, and to improve the appropriate level of quality. Total electricity produced by the project activity is recorded by M₁ which installed at the output end of the station. M₂ installed at the substation is a bidirectional meter that measures quantity of net electricity generation supplied by the Project to the Grid and the electricity deliver to the Project from the Grid, and the difference of the two readings is the net electricity supplied by the Project ($EG_{facility,y}$). Above data will be measured continuously, recorded hourly and monthly aggregated.

M₁ is owned and maintained by the project owner, and M₂ is owned and maintained by Sichuan Power Grid which belongs to CCPG. In addition, in case of a conflict between M₁ and M₂ the latter should govern. Meanwhile, if one of the meters exceeds the allowable range specified in the national standards, then it should be replaced by a new meter. If a breakdown of M₂ happened, the net electricity data should be data from M₁ minus line loss and internal consumption. The calculation of line loss should be the average of at least three months' data.

4. Data Collection

The main meter data collection process is presented as follow:

- The project owner read M_1 on site hourly and record the data everyday
- The power grid read M_2 monthly and recorded
- At a fixed day of each month, Grid Company sends the project owner notification of net electricity generation. Then, the project owner offers the electricity sales invoices to Grid Company. After that, the Project owner records the net electricity generation of the Project.

The surface area of the reservoir at full reservoir level and installed capacity will be measured by competent Authority yearly. The data will be recorded and archived in electronic form annually.

Data and records are checked prior to being stored and archived. Data from the project are checked to identify possible errors or omissions. The data checks include cross checks of the two electricity meters, and checks of the electricity figures on the receipts.

The supplementary information regarding to the monitoring for Quantity of net electricity generation supplied by the project plant to the grid in year y ($EG_{\text{facility},y}$) has been provided. The power grid read M_2 and recorded at 0:00 everyday. The data were measured continuously, recorded daily and monthly aggregated. Grid company issued settlement to the project owner according to the recorded electricity data from 0:00 on the 26th of the previous month to it of this month. The exact data were the electricity delivered to the power grid minus the electricity supplied by the power grid. Data measured by M_2 were cross checked by the electricity sales documents, the conservative data between the measured data and data from Electricity Transaction Notes (ETN) were used to calculate CERs during the verification.

5. Calibration

The Power Interchange Agreement between the owner and the Grid Company defines the metering arrangements and the required quality control procedures to ensure accuracy.

The metering equipments are calibrated and checked annually for accuracy. Calibration of the two meters will be carried out by a third party who appointed by the Project owner. Both the calibration records will be maintained by Project owner and designated third party. The entire meter records shall be jointly inspected and sealed with the present of all parties involved, and shall not be interfered with by either party except the other party or its accredited representatives are present.

6. Data management system

All the data monitored under the monitoring plan will be kept in electronic and hard copy format for 2 years after the end of the last crediting period or the last issuance of CERs for this Project, whichever occurs later. The monitored data will be presented to DOE to for verification.

7. Monitoring Report

At the end of each crediting year, a monitoring report will be compiled including the metering results and evidence (i.e. sales receipts).

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

Data/Parameter	$EF_{\text{grid},CM,y}$
Unit	tCO ₂ /MWh
Description	Combined Margin Emission Factor
Source of data	Calculated according to the procedure outlined in B.6.1 of the registered PDD (Version 4.2)
Value(s) applied	0.85285
Choice of data or measurement methods and procedures	
Purpose of data/parameter	Baseline emission
Additional comments	/

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	$EG_{facility,y}$
Unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project plant to the grid in year y
Measured/calculated/default	Calculated
Source of data	Meter
Value(s) of monitored parameter	431064.282
Monitoring equipment	M ₁ : Accuracy class: 0.2s M ₂ : Accuracy class: 0.2s
Measuring/reading/recording frequency	The data will be measured continuously, recorded hourly and monthly aggregated.
Calculation method (if applicable)	The exact data will be the electricity exported to the power grid minus the electricity imported from the power grid. Calculated as: $EG_{facility,y} = EG_{ex} - EG_{im}$
QA/QC procedures	The meter is calibrated yearly. Data measured by the meter is cross checked by the electricity sales documents, the conservative data between the measured data and data from Electricity Transaction Notes (ETN) is used to calculate CERs during the verification.
Purpose of data/parameter	Baseline emission calculation
Additional comments	/

Data/parameter:	Cap_{PJ}
Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Measured/calculated/default	Monitored
Source of data	Equipment nameplates at Project site
Value(s) of monitored parameter	40,000,000
Monitoring equipment	/
Measuring/reading/recording frequency:	Yearly.
Calculation method (if applicable):	/
QA/QC procedures:	The data is crosschecked by specification manual.
Purpose of data:	Baseline emission calculation
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 from topographical surveys, maps
Source of data	Project site

Value(s) of monitored parameter	891,028
Monitoring equipment	/
Measuring/reading/recording frequency:	Yearly.
Calculation method (if applicable):	The calculation involves two steps: Input the water level monitored at any time when the reservoir is full and derive the according water surface area with water level- water surface graph depicted by topographical surveys which is carried out by qualified third party.
QA/QC procedures:	/
Purpose of data:	Project emission calculation
Additional comments:	/

D.3. Implementation of sampling plan

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Not applicable.

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

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The baseline emissions in year y (BE_y) are calculated as

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

The net electricity of the project is 431064.282MWh.

The emission factor of CCPG is 0.85285tCO₂e/MWh.

Thus the baseline emission is

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} = 367,633 \text{ tCO}_2\text{e}$$

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

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According to approved methodology and registered PDD, there is no project emission in the project.

E.3. Calculation of leakage emissions

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According to approved methodology and registered PDD, there is no leakage emission in the project.

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	367,633	0	-	0	367,633	0	367,633

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)
367,633	446,639

Daily amount ex ante for this monitoring period in PDD: $141,158.5/365=386.7$ CO₂e;
 There are 1155 days during 26/05/2016-24/07/2019;
 Amount estimated ex ante for this monitoring period in the PDD: $1155*386.7=446,639$ t CO₂e.

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

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It can be found from above that the actual emission reductions reached during the monitoring period are 17.7% less than the value applied in ex-ante calculation of the registered PDD. The reason is that the electricity generation of the hydropower plant highly depends on water resources availability. Thus the power generation of the project differs from month to month.

E.6. Remarks on increase in achieved emission reductions

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Not applicable.

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

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Not applicable.

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.
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).

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