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	Hunan Zhugaotan Hydropower Project		
UNFCCC reference number of the project activity	4713		
Version number of the PDD applicable to this monitoring report	05		
Version number of this monitoring report	02		
Completion date of this monitoring report	10/06/2021		
Monitoring period number	2nd monitoring period		
Duration of this monitoring period	01/01/2013-24/05/2014		
Monitoring report number for this monitoring period	NA		
Project participants	Huayuan ChunJiang Power Generation 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 11.0)		
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	95,790	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	133,597		

SECTION A. Description of project activity

A.1. General description of project activity

>>Zhugaotan Hydropower Project (hereinafter referred to as "the project") is a newly-built hydropower project, located on the downstream of Youshui River in Huayuan County, Hunan Province, P. R. China. The total installed capacity of the project is 33 MW (3×11MW). The purpose of the project is to generate electricity by using water resources to alleviate electricity shortage in Central China. The project will contribute to the reduction of GHG emission by displacing part of the electricity from the fossil fuel fired power plants of the CCPG (Central China Power Grid), which is dominant with fossil fuel fired power plants.

Relevant dates for the project activity is as below:

Event	Date
Project starting date	08/09/2007
Registration date	11/02/2011
Operation of the 1st generator	08/10/2011
Operation of the 2nd generator	13/01/2012
Operation of the 3rd generator	15/03/2012
2nd monitoring period	01/01/2013-24/05/2014

Total emission reductions achieved in this monitoring period are 95,790tCO_2e.

A.2. Location of project activity

>>
The project is located on the downstream of Youshui River within Huayuan County, Hunan Province, which is 1.5 km away from the Huayuan County, and its geographical coordinates are east longitude of 109.4644°and north latitude of 28.5944°.

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
The Peoples' Republic of China (Host)	Huayuan ChunJiang Power Generation 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 11.0)
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 02)
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 crediting period is 01/06/2011. The fixed crediting period of the project activity is from 01/06/2011 to 31/05/2021.

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 is as follows:

Event	Time
Project starting date	08/09/2007
Registration date	04/05/2011
Crediting period	01/06/2011-31/05/2021 (fixed)
Operation of the 1st generator	08/10/2011
Operation of the 2nd generator	13/01/2012
Operation of the 3rd generator	15/03/2012
2nd monitoring period	01/01/2013-24/05/2014

The key technical parameters and data of the project equipment are as follows:

Parameters		unit	value
Reservoir	Normal Water Level	m	259
	Area	km^2	3
Hydraulic Turbine	Model	—	ZZ550-LH-265
	Quantity	unit	3
	Rated output	MW	12.95
	Rated rotation	r/min	333.33
	Rated water head	m	26.8
	Rated flow	m^3/s	45
	Efficiency	—	94.0%
Generator	Model	—	SF11-24/4250
	Quantity	unit	3
	Rated Capacity	MW	11
	Rated Voltage	kV	10.5
	Load Factor	—	0.85
	Efficiency	—	98.0%

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 start date of the crediting period for the 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.

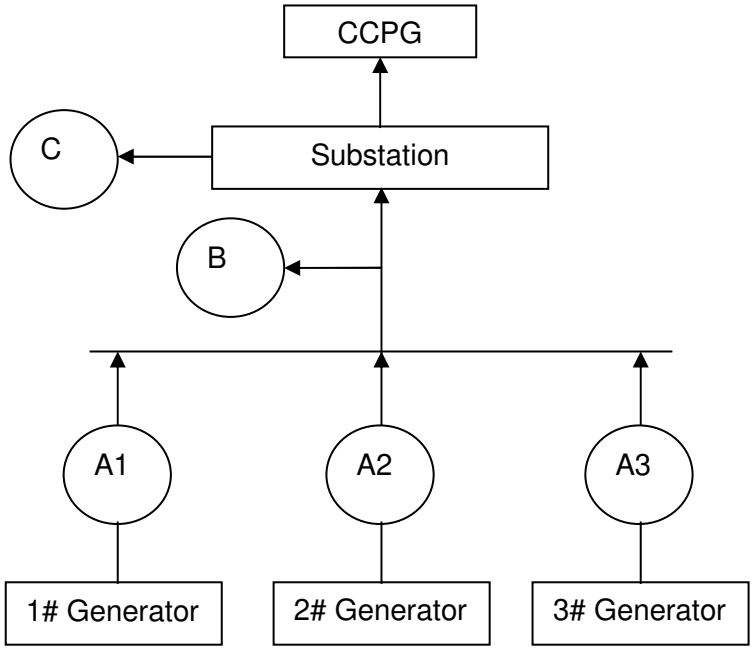
SECTION C. Description of monitoring system

>>
1. Location of meters

The main meter installed is used to monitor the electricity exported to the CCPG and the electricity imported from the CCPG. All data used for CERs calculation are obtained from main meter during this monitoring period.

The main meter and back up meter have been calibrated once per year in accordance with the industry standard and the calibration records show the operation of the meters is in normal situation.

The meters position of the project is shown as follows:



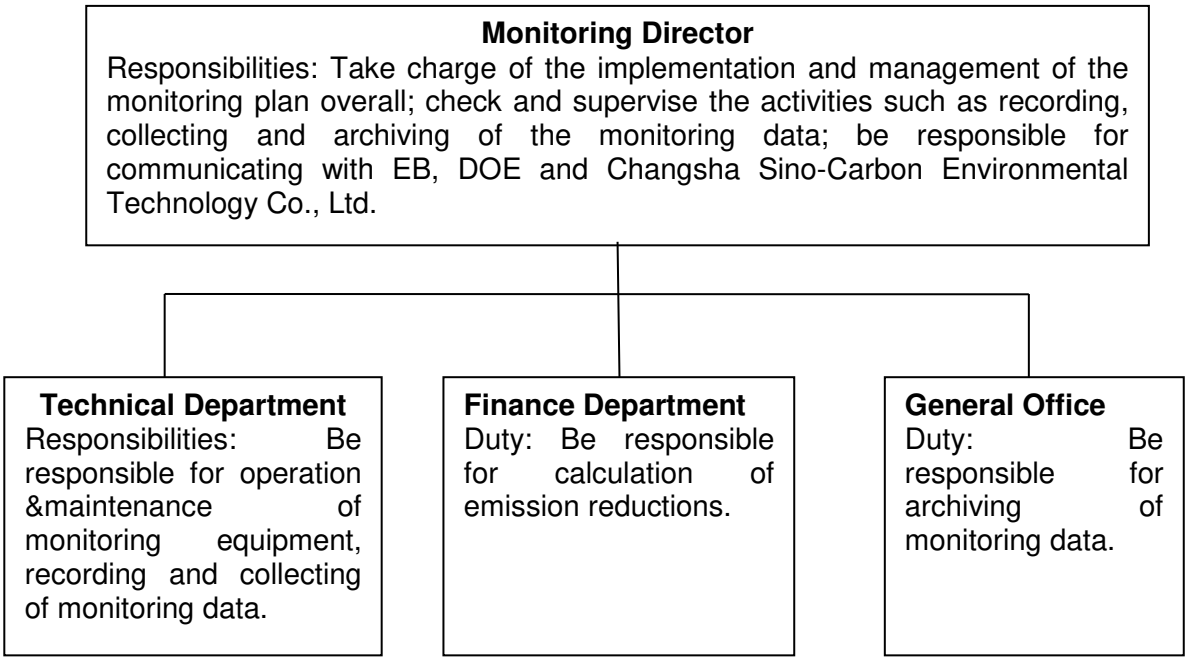
A: monitor meters of electricity generated by generators;
B: main monitor meter of net electricity generation delivered to the grid by the project;
C: back up monitor meter of net electricity generation delivered to the grid by the project.

The calibration information of Main Meter is as follows:

Name of the meter	Serial No.	Accuracy	Calibration date	Valid until	Calibration entity
main meter	43414010000187979	0.2S	13/10/2012 13/10/2013	12/10/2013 12/10/2014	Xiangxi metering center of Hunan Electric Power Co., Ltd
back up meter	43414040000187980	0.2S	13/10/2012 13/10/2013	12/10/2013 12/10/2014	
1# generator meter	11030611780208	0.5S	13/10/2012 13/10/2013	12/10/2013 12/10/2014	
2# generator meter	11030611780205	0.5S	13/10/2012 13/10/2013	12/10/2013 12/10/2014	
3# generator meter	11030611780210	0.5S	13/10/2012 13/10/2013	12/10/2013 12/10/2014	

2. Monitoring management structure

In order to obtain reliable monitoring data, the project developer will establish a monitoring management structure prior to the starting of the crediting period. Clear responsibilities will be assigned to all staffs involved in the CDM project. A monitoring director will be appointed who has the overall responsibilities for the monitoring of the project, other staffs will be responsible for the data recording, data collecting, data archiving and emission reductions calculation. The detailed structure is as follows:



3. Data collection procedure

The readings of the main meter are used for calculating the emission reductions when the main meter is in normal operation state. The monitoring processes are as follows:
(1) The designated persons from the grid company and the project company record the readings of the meter for the electricity delivered to CCPG and consumed by the project activity from CCPG;
(2) The power grid company provides the project owner with a settling accounts sheet about the net electricity supplied to CCPG monthly;
(3) The project owner provides the power grid company with a sale receipt after the power grid company has confirmed the settling accounts sheet, and preserves the copy of the sale receipt.

4. Emergency measures/procedures

When the main meter or back-up meter have a breakdown, the electricity generation difference will be treated as follows:
(1) When one of the two meters has a breakdown, the readings of another meter will be adopted;
(2) If both of the main meter and back up meter have breakdowns, the net electricity supplied to the grid will be calculated with the readings of other meters such as the meter installed at the exit of the generator deducting the loss after the discussion between the owner and the grid company.

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	0.9735
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.

[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.

Purpose of data/parameter	EF_{OM} is 1.2783 tCO_2e/MWh, and EF_{BM} is 0.6687 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	/

D.2. Data and parameters monitored

Data/Parameter	TEG_y
Unit	MWh
Description	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y*
Measured/calculated/ default	Measured
Source of data	Meters installed on the exit of generators
Value(s) of monitored parameter	101,135.66 MWh

<table>
<tr><td>Monitoring equipment</td><td>The data was measured by the generator meters.
1# generator meter:
Type: DTSD341
Accuracy class: 0.5S
S/N number: 11030611780208
Calibration frequency: annually
Calibration information:
<table>
<tr><th>Calibration date</th><th>Valid until</th></tr>
<tr><td>13/10/2012
13/10/2013</td><td>12/10/2013
12/10/2014</td></tr>
<tr><td colspan="2">Calibration entity: Xiangxi metering center of Hunan Electric Power Co., Ltd.</td></tr>
</table>
2# generator meter:
Type: DTSD341
Accuracy class: 0.5S
S/N number: 11030611780205
Calibration frequency: annually
Calibration information:
<table>
<tr><th>Calibration date</th><th>Valid until</th></tr>
<tr><td>13/10/2012
13/10/2013</td><td>12/10/2013
12/10/2014</td></tr>
<tr><td colspan="2">Calibration entity: Xiangxi metering center of Hunan Electric Power Co., Ltd.</td></tr>
</table>
3# generator meter:
Type: DTSD341
Accuracy class: 0.5S
S/N number: 11030611780210
Calibration frequency: annually
Calibration information:
<table>
<tr><th>Calibration date</th><th>Valid until</th></tr>
<tr><td>13/10/2012
13/10/2013</td><td>12/10/2013
12/10/2014</td></tr>
<tr><td colspan="2">Calibration entity: Xiangxi metering center of Hunan Electric Power Co., Ltd.</td></tr>
</table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuous measurement by meters installed on the exit of generators daily reading and monthly recording.</td></tr>
<tr><td>Calculation method (if applicable)</td><td>The meters will be calibrated once a year.</td></tr>
<tr><td>QA/QC procedures</td><td>/</td></tr>
<tr><td>Purpose of data/parameter</td><td>To calculate the project emission.</td></tr>
<tr><td>Additional comments</td><td>/</td></tr>
</table>

Data/Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant to CCPG in year y
Measured/calculated/ default	Measured
Source of data	Main meter

<table>
<tr><td>Value(s) of monitored parameter</td><td>98398.08 MWh</td></tr>
<tr><td>Monitoring equipment</td><td>The data was measured by the main meter:
Type: DTSD341
Accuracy class: 0.2S
S/N number: 43414010000187979
Calibration frequency: annually
Calibration information:
<table><tr><th>Calibration date</th><th>Valid until</th></tr><tr><td>13/10/2012
13/10/2013</td><td>12/10/2013
12/10/2014</td></tr><tr><td colspan="2">Calibration entity: Xiangxi metering center of Hunan Electric Power Co., Ltd.</td></tr></table>
And the backup meter if the Main meter does not work in normal function:
Type: DTSD341
Accuracy class: 0.2S
S/N number: 43414010000187980
Calibration frequency: annually
Calibration information:
<table><tr><th>Calibration date</th><th>Valid until</th></tr><tr><td>13/10/2012
13/10/2013</td><td>12/10/2013
12/10/2014</td></tr><tr><td colspan="2">Calibration entity: Xiangxi metering center of Hunan Electric Power Co., Ltd.</td></tr></table></td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuous measurement by meter installed at the connection point to the grid, daily reading 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>When the main meter or back-up meter have a breakdown, the electricity generation difference will be treated as follows:
(1) When one of the two meters has a breakdown, the readings of another meter will be adopted;
(2) If both of the main meter and back up meter have breakdowns, the net electricity supplied to the grid will be calculated with the readings of other meters such as the meter installed at the exit of the generator deducting the loss after the discussion between the owner and the grid company.</td></tr>
<tr><td>Purpose of data/parameter</td><td>To calculate the project emission.</td></tr>
<tr><td>Additional comments</td><td>/</td></tr>
</table>

Data/Parameter	Cap_{PJ}
Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity.
Measured/calculated/ default	Measured
Source of data	Project site

Value(s) of monitored parameter	33,000,000
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	Project site
Value(s) of monitored parameter	3,000,000
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 project emission.
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:

$BE_y = EG_{facility,y} * EF_y$

Where:
$EG_{facility,y}$ 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 $0.9735tCO_2e/MWh$, 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
26/12/2012-31/12/2012*	267.52	7.92	259.600	267.52	7.92	259.600
26/12/2012-25/01/2013[2]	4114.88	39.6	4075.280	4114.88	39.6	4075.280
26/01/2013-25/02/2013	3352.8	22.88	3329.920	3352.8	22.88	3329.920
26/02/2013-25/03/2013	3164.48	24.64	3139.840	3164.48	24.64	3139.840
26/03/2013-25/04/2013	9300.72	7.04	9293.680	9300.72	7.04	9293.680
26/04/2013-28/05/2013	12844.48	5.28	12839.200	12844.48	5.28	12839.200
29/05/2013-28/06/2013	12039.28	3.52	12035.760	12039.28	3.52	12035.760
29/06/2013-28/07/2013	5986.64	22.88	5963.760	5986.64	22.88	5963.760
29/07/2013-28/08/2013	3196.16	26.4	3169.760	3196.16	26.4	3169.760
29/08/2013-28/09/2013	11787.6	4.4	11783.200	11787.6	4.4	11783.200
29/09/2013-28/10/2013	4787.2	14.08	4773.120	4787.2	14.08	4773.120
29/10/2013-28/11/2013	4026	19.36	4006.640	4026	19.36	4006.640
29/11/2013-28/12/2013	2456.08	34.32	2421.760	2456.08	34.32	2421.760
29/12/2013-30/01/2014	1183.6	44.88	1138.720	1183.6	44.88	1138.720
31/01/2014-27/02/2014	1386	36.08	1349.920	1386	36.08	1349.920
28/02/2014-30/03/2014	2824.8	26.4	2798.400	2824.8	26.4	2798.400
31/03/2014-26/04/2014	5547.52	7.04	5540.480	5547.52	7.04	5540.480
27/04/2014-24/05/2014	11001.76	3.52	10998.240	11001.76	3.52	10998.240
SUM	**99000**	**342.32**	**98398.08**	**99000**	**342.32**	**98398.08**
*** As the monitoring period starts from 01/01/2013, that means the electricity generated before 2013 should be deducted, thus the export and import electricity during 26/12/2012 to 31/12/2012 is deducted among the calculation.**						

[2] The export and import electricity are from ETNs which are recorded and the duration is in line with which is checked for balance account monthly by the grid company.

The monitoring results based on the meter installed at the exit of the generator are as follows, the total electricity generation is the sum of each data from three generators.

Total Electricity generation				
Duration	Electricity generated by 1# Generator(MWh)	Electricity generated by 2# Generator(MWh)	Electricity generated by 3# Generator(MWh)	Total Electricity Generation(MWh)
	A	B	C	D=A+B+C
01/01/2013-31/01/2013	1886.808	0	1411.704	3298.512
01/02/2013-28/02/2013	2398.2	0	951.384	3349.584
01/03/2013-31/03/2013	1677.984	536.088	1606.08	3820.152
01/04/2013-30/04/2013	3613.512	2413.488	5130.888	11157.888
01/05/2013-31/05/2013	4313.568	4303.656	5713.344	14330.568
01/06/2013-30/06/2013	3876.264	5347.776	3069.192	12293.232
01/07/2013-31/07/2013	697.2	2630.376	599.088	3926.664
01/08/2013-31/08/2013	1309.896	1128.288	783.216	3221.4
01/09/2013-30/09/2013	3415.272	4020.576	5216.568	12652.416
01/10/2013-31/10/2013	2101.176	1834.056	1105.608	5040.84
01/11/2013-30/11/2013	2089.248	1656.312	723.576	4469.136
01/12/2013-31/12/2013	1283.016	1169.952	0	2452.968
01/01/2014-31/01/2014	608.16	414.288	134.232	1156.68
01/02/2014-28/02/2014	286.776	548.352	512.232	1347.36
01/03/2014-31/03/2014	1008.84	1063.104	1025.304	3097.248
01/04/2014-30/04/2014	2243.304	2048.088	2689.512	6980.904
01/05/2014-24/05/2014	3131.184	2780.064	2628.864	8540.112
Sum	35940.41	31894.46	33300.79	101135.66

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 98398.08MWh. The baseline emission factor (EF_y) is 0.9735tCO_2/MWh, which is fixed during the first crediting period. Then the baseline emissions (BE_y) are calculated as follows:

$BE_y = EG_{facility,y} * EF_y$ =98398.08MWh*0.9735tCO_2/MWh =95,790 tCO_2

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

>>
According to the registered PDD, the project is a newly built hydropower station, the power density (PD)of the project is calculated as: PD=(33,000,000W-0W)/(3,000,000m^2-0m^2) =11W/m^2, which is greater than 10W/m^2. According to baseline methodology, it is not needed to consider project emissions.

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	95,790	0	0	0	95,790	0	95,790

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)
95,790	133,597* *as the total operation days is 509 days from 01/01/2013 to 24/05/2014, thus the total estimated emission reduction can be calculated as: 95802/365*509=133,597 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.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report