

CHONGQING CHENGKOU COUNTY BASHAN HYDROPOWER STATION PROJECT

Document Prepared By Beijing Cronus Technology Consultancy Centre

Project Title	Chongqing Chengkou County Bashan Hydropower Station Project
Version	3
Report ID	N/A
Date of Issue	07-01-2013
Project ID	N/A
Monitoring Period	19-06-2009 to 30-06-2011
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1 PROJECT DETAILS

1.1 Summary Description of Project

Chongqing Chengkou County Bashan Hydropower Station Project (hereafter referred to as “the Project”) is a newly built diversion type hydropower project with limited storage capacity. The Project reduces greenhouse gas emissions by generating carbon neutral power that displaces carbon intensive power from Central China Power Grid (hereafter referred to as “the grid”). The total installed capacity of the Project is 140 MW (2×70MW). The Project uses hydro power generation technology for electricity generation and transmission.

1.2 Sectoral Scope and Project Type

The Project falls in the sectoral scope 1: energy industries (renewable-/non-renewable sources). The Project is not a grouped project. The project is a newly built diversion type hydropower project with limited storage capacity.

1.3 Project Proponent

Chongqing Bashan Hydropower Development Co., Ltd (Project Owner)

Address: 54# Chenglan Road, Chengkou County, Chongqing Municipality, China, 405900

Tel: 86-235-9228222

Fax: 86-235-9226222

1.4 Other Entities Involved in the Project

There is no any other project participant(s).

1.5 Project Start Date

19-06-2009, the date on which the project started commissioning.

1.6 Project Crediting Period

19-06-2009 to 30-06-2011, in total 742 days, covering 2 years and 12 days.

1.7 Project Location

The Project is located in Bashan town of Chengkou County, Chongqing Municipality, China. The GPS coordinates of dam are 32°06'11"N, 108° 27'44"E. The GPS coordinates of powerhouse are 32°06'12"N, 108° 26'20"E.

1.8 Title and Reference of Methodology

The consolidated baseline and monitoring methodology: ACM0002: "Consolidated baseline methodology for grid connected electricity generation from renewable sources" version 12.1.0, in effect as of 26 of November 2010

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

Tool for the demonstration and assessment of additionality, Version 05.2

(<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>)

Tool to calculate the emission factor for an electricity system, Version 02

(<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf>)

Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2

(<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v2.2.pdf>)

Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, Version 02

(http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf/history_view)

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project was registered under CDM on 06-05-2011 and installed two sets of turbine and generator (70MW each) which are the same as described in the project PDD. The technical specifications are listed as below:

Table 1. Technical data of the turbine/generator units (specificatins are per unit)

Turbines	Type number	HLA855-LJ-255
	Main shaft arrangement	Vertical shaft
	Rated speed	333.3r/min
	Rated output	71.8MW
Generators	Type number	SF70-18/5700
	Rated power	70MW
	Rated voltage	10.5kV

	Power factor	0.85
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The Project consists of one site only and the implementation is not phased. The construction of the first set of turbine and generator was completed on 02/06/2009 and commissioned on 19/06/2009, the construction of the second set of turbine and generator was completed on 28/07/2009 and commissioned on 10/08/2009. The project operated normally during the indicated monitoring period, however Meter 1 (as indicated in the Line diagram below) was replaced on 22-05-2011 and the backup line and Meter 2 were installed and put into use since 1 May 2010

2.2 Project Description Deviations

N/A

2.3 Grouped Project

N/A

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	EF _y
Data unit:	tCO ₂ /MWh
Description:	Baseline emission factor
Source of data:	Calculated according to the procedure outlined in B.6.1 of the validated PDD
Value applied:	0.85280
Purpose of the data:	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	Cap _{BL}
Data unit:	W
Description:	Installed capacity of the hydropower plant before the implementation of the project activity. For new hydropower plants the value is zero.
Source of data:	Methodology ACM0002 version 12.1.0
Value applied:	Zero
Purpose of the data:	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	A _{BL}
Data 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. For new reservoirs, this value is zero.
Source of data:	Methodology ACM0002 version 12.1.0
Value applied:	Zero
Purpose of the data:	Calculation of baseline emissions
Any comment:	N/A

3.2 Data and Parameters Monitored

Data Unit / Parameter:	EG _{facility,y}		
Data unit:	MWh		
Description:	Quantity of net electricity generation supplied by the project plant to the grid		
Source of data:	Electricity meter readings		
Description of measurement methods and procedures to be applied:	Measured by Meter 1 (old meter from 19-06-2009 to 22-05-2011, new meter from 22-05-2011 to 30-06-2011) and Meter 2 (As the backup line was put into use since 1 May 2010 ¹ , Meter 2 started operaiton since 01-05-2010.)		
Frequency of monitoring/recording:	Continuous measurement, monthly recording		
Value monitored:	614,594 (for monthly records, please refer to the VER calculation spreadsheet)		
Monitoring equipment:	Meter 1: continuous 2-way electricity meter, calibration frequency yearly,		
		Meter1 (old)	Meter 1 (new)
	Operation period	19-06-2009 ~ 22-05-2011	22-05-2011 ~ 30/06/2011
	No.	20071213020381	1208000041
	Accuracy	0.5s	0.5s
	Calibration date	10-04-2009	20-02-2011

¹ The meter readings for the Bashan and Baiguoping back-up line, issued by Chengkou County Power Supply Company on 1 July 2011.

	Validity	09-04-2010	19-02-2012
	Calibration date	12-03-2010	
	Validity	11-03-2011	
	Calibration date	20-02-2011	
	Validity	19-02-2012	
	All calibrations were done by	Metrology and Quality Inspection Center Wanzhou in Chongqing (certification: 26/12/2006~25/12/2009 & 22/09/2009~21/09/2014)	
Meter 2: continuous 1-way electricity meter, serial no.6090008905, accuracy class 0.5s, calibration frequency yearly, Operation period: 01-05-2010~30-06-2011 Date of calibration: 12-03-2010, valid until 11-03-2011; Date of last calibration: 20-02-2011, valid until 19-02-2012. All the calibrations were done by the Metrology and Quality Inspection Center Wanzhou in Chongqing (certification: 26/12/2006~ 25/12/2009 & 22/09/2009~ 21/09/2014)			
QA/QC procedures to be applied:	The accuracy class of meters complies with national standard “Technical Administrative Code of Electric Energy Metering” (DL/T 448-2000). And meters are calibrated according to the national standard “Verification Regulation of Electrical Energy Meter with Electronics” (JJG 596-1999). Data measured by the meters are cross checked using Electricity Transaction Notes (ETNs).		
Calculation method:	Net electricity supplied = $EG_{\text{facility},y}$ = ESy(electricity supplied to the grid)- EDy(electricity delivered from the grid to the project)		
Any comment:	N/A		

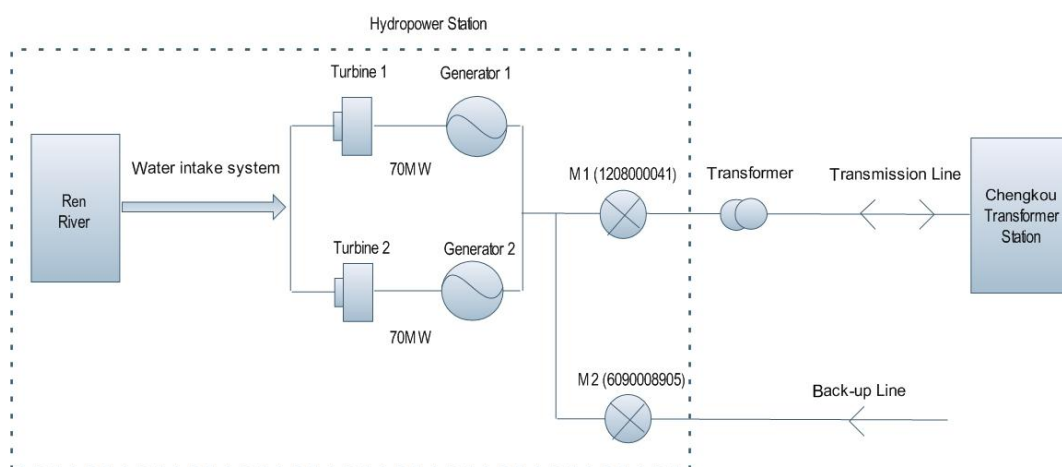
Data Unit / Parameter:	Cap _{PJ}
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data:	Project activity site
Description of measurement methods and procedures to be applied:	Installed capacity of the project activity is determined according to installed equipments' nameplates and is monitored annually. The nameplate will be checked by DOE during verification.
Frequency of monitoring/recording:	Yearly
Value monitored:	140,000,000
Monitoring equipment:	Determined according to installed equipments' nameplates
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Any comment:	N/A

Data Unit / Parameter:	A _{PJ}
Data unit:	m ²
Description:	Area of the reservoir measured in the surface of the water, when the reservoir is full
Source of data:	Measurement reports
Description of measurement methods and procedures to be applied:	The project entity commissions a third party to conduct the measurement. A measurement report is issued by this qualified party. The surface area is calculated using the design schematics and area maps
Frequency of monitoring/recording:	Yearly
Value monitored:	5,720,000 (measured in November 2009) 5,720,000 (measured in November 2010)
Monitoring equipment:	Measured from topographical surveys and maps
QA/QC procedures to be applied:	A qualified third party, Chongqing Survey and Design Institute of water resource, electric power and architecture (certification number 500107, validity 06/03/2005~05/03/2010 & 03/03/2010~02/03/2015) is commissioned to measure reservoir surface area when the reservoir is full. Qualification is issued by governmental surveying and mapping

	department.
Calculation method:	N/A
Any comment:	N/A

3.3 Description of the Monitoring Plan

- Line diagram



- Quality assurance and quality control system

The accuracy of the monitoring results are in conformity with calibration requirements, recording frequency and quality assurance and quality control procedures stated in the monitoring plan. Please refer to Section 3.2.

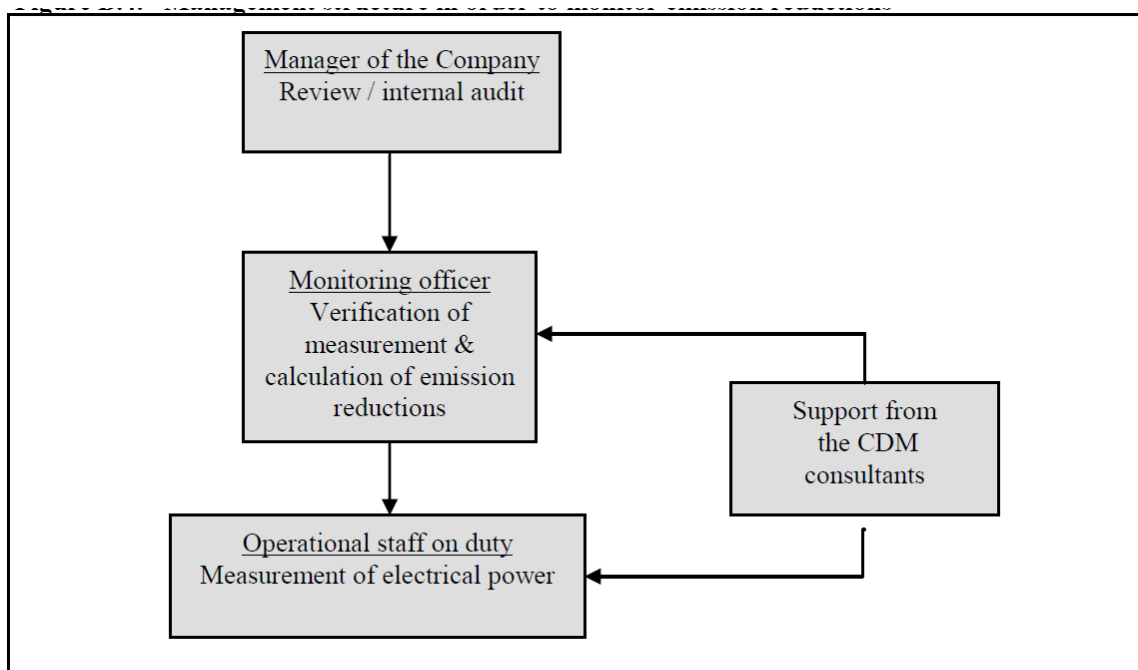
- Data collection procedures

Parameter	Data collection procedures
EG _{facility,y}	Data generation: The power export is measured by Meter 1 and the power import is measured by the Meter 1 and Meter 2 continuously. Data recording: The electricity export data measured by Meter 1 are monthly recorded at 24:00 AM of the last day of each month. The electricity import data measured by Meter 1 are monthly recorded at 24:00 AM of 24th of each month. The electricity import data measured by Meter 2 are monthly recorded at 24:00 AM of 6th of each month. Besides, the electricity export and import data are also recorded at 24:00PM of 31st Dec of each year, at the beginning of the project start date and on 24:00PM of 30th Jun 2011. The data are written down in a form and put into an excel sheet. Data will be archived at least for two years after the end of the crediting period. Data aggregation: The calculated net electricity output per month is summed over the

	monitoring period. Calculation: see section 4. Export and import per month is the difference between the cumulative values on the power meters. Net electricity supplied to the grid is electricity export minus electricity import. Net electricity supplied to the grid multiplied by emission factor is emission reductions. Reporting: The calculated values are included in an Excel sheet and reported in the VER calculation spreadsheet.
Cap _{PJ}	Data generation: The installed capacity of the hydro power plant is reflected on the nameplate of the turbine & generator. Data recording: The data are recoded yearly and written down in a form and put into an excel sheet. Data will be archived at least for two years after the end of the crediting period. Data aggregation: N/A Calculation: N/A Reporting: The values are included in an Excel sheet and reported in the VER calculation spreadsheet.
A _{PJ}	Data generation: The project developer commissions a third party to conduct the measurement from topographical surveys and maps. Data recording: A measurement report is issued by this qualified party. Data aggregation: N/A Calculation: N/A Reporting: The values are included in an Excel sheet and reported in the VER calculation spreadsheet.

- Organizational structure, roles and responsibilities

The monitoring of the emission reductions is carried out according to the scheme shown in the figure below.



The manager of the company holds the overall responsibility for the monitoring process, but as indicated below parts of the process are delegated. The first step is the measurement of the electrical energy supplied to the grid and reporting of daily operations, which are carried out by the operational staff on duty.

The project owner appoints a monitoring officer who is responsible for verification of the measurement, collection of sales records, collection of grid statements of the power supplied by the grid to the hydropower plant and the calculation of the emissions reductions. The monitoring officer prepares operational reports of the project activity, recording the daily operation of the hydropower station including operating periods, power generation, power delivered to the grid, equipment defects, etc. Finally, the monitoring reports are reviewed by the manager of the company.

Staff responsible for monitoring obtains enough training and training materials will be kept.

- Emergency procedures for the monitoring system

In case of emergencies, the project entity will not claim emission reductions due to the project activity for the duration of the emergency. The project entity will follow the below procedure for declaring the emergency period to be over:

1. The project entity will ensure that all requirements for monitoring of emission reductions have been re-established.
2. The monitoring officer and the head of operations of the hydropower station will both sign a statement declaring the emergency situation to have ended and normal operations to have resumed.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Calculation of baseline emissions	Symbol	Amount	Unit	Formula	Remarks
Net electricity supplied to grid	EGfacility,y	614,594	MWh		1
Baseline emission factor	EFy	0.85280	tCO ₂ e/MWh		2
Total baseline emissions	BEy	524,125	tCO ₂ e	BEy=EGfacility,y × EFy	

Remarks

1. EGfacility,y = ESy(electricity supplied to the grid)-EDy(electricity delivered from the grid to the project)

In 2009: 154718 MWh

In 2010: 339732 MWh

In 2011: 120145 MWh

2. EFy fixed for crediting period.

Note: for detailed data, please refer to the VER calculation spreadsheet

4.2 Project Emissions

Calculation of project emissions	Symbol	Amount	Unit	Formula	Remarks
Surface area of the reservoir at full reservoir level after the implementation of the project activity	A _{PJ}	5,720,000	m ²	N/A	1
Surface area of the reservoir at full reservoir level before the implementation of the project activity	A _{BL}	0	m ²	N/A	2
Installed capacity of the plant after the implementation of the project activity	Cap _{PJ}	140,000,000	W	N/A	3
Installed capacity of the plant before the implementation of the project activity	Cap _{BL}	0	W	N/A	4
Power density	PD	24.5	W/m ²	PD=(Cap _{PJ} -Cap _{BL})/(A _{PJ} -A _{BL})	5
Total project emissions	PEy	0	tCO ₂ e	N/A	6

Remarks

1. Measured by a qualified third party.

2. Available at validation

3. Determined according to installed equipments' nameplates

4. Available at validation

5. As per methodology and PDD, PD=(Cap_{PJ}-Cap_{BL})/(A_{PJ}-A_{BL})

6. As per methodology and PDD, PEy=0 if PD>10 W/m².

Note: for detailed data, please refer to the VER calculation spreadsheet

4.3 Leakage

Calculation of leakage emissions	Symbol	Amount	Unit	Formula	Remarks
Total leakage emissions	Ly	0	tCO ₂ e	N/A	1

Remarks

1. As per methodology and PDD, Ly=0.

Note: for detailed data, please refer to the VER calculation spreadsheet

4.4 Summary of GHG Emission Reductions and Removals

Calculation of emission reduction	Symbol	Amount	Unit	Formula	Remarks
Total baseline emissions	BE _y	524,125	tCO ₂ e	BE _y =EG _y *EF _y	
Total project emissions	PE _y	0	tCO ₂ e		
Total leakage emissions	Ly	0	tCO ₂ e		
Total emission reductions	ER _y	524,125	tCO ₂ e	ER _y =BE _y -PE _y	1

Remarks

1. As per methodology and PDD

In 2009: 131,943 tCO₂e

In 2010: 289,723 tCO₂e

In 2011: 102,459 tCO₂e

Note: for detailed data, please refer to the VER calculation spreadsheet

5 ADDITIONAL INFORMATION

The following table shows the comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD. This table shows that the actual value is less than the estimated emission reduction of the registered CDM-PDD during this monitoring period.

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO ₂ e)	778,264 ²	524,125

² 382,839 tCO₂e(annual GHG emission reductions estimated in registered PDD) / 365 days*742 days (the days length of this monitoring period)