

CHONGQING YOUYANG COUNTY YOUCHOU HYDROPOWER STATION PROJECT

Document Prepared By Beijing Cronus Technology Consultancy Centre

Project Title	Chongqing Youyang County Youchou Hydropower Station Project
Version	3
Report ID	N/A
Date of Issue	24-11-2012
Project ID	N/A
Monitoring Period	21-12-2008 to 20-12-2010
Prepared By	Beijing Cronus Technology Consultancy Centre
Contact	Tel: +86 10 62258766

Table of Contents

CONTENTS

1	Project Details	3
1.1	Summary Description of Project.....	3
1.2	Sectoral Scope and Project Type.....	3
1.3	Project Proponent	3
1.4	Other Entities Involved in the Project.....	3
1.5	Project Start Date	3
1.6	Project Crediting Period	3
1.7	Project Location.....	4
1.8	Title and Reference of Methodology	4
2	Implementation Status.....	4
2.1	Implementation Status of the Project Activity.....	4
2.2	Deviations from the Monitoring Plan	4
2.3	Grouped Project	4
3	Data and Parameters	5
3.1	Data and Parameters Available at Validation	5
3.2	Data and Parameters Monitored	5
3.3	Description of the Monitoring Plan	9
4	Quantification of GHG Emission Reductions and Removals	12
4.1	Baseline Emissions	13
4.2	Project Emissions.....	13
4.3	Leakage.....	13
4.4	Summary of GHG Emission Reductions and Removals.....	13
5	Additional Information.....	14

1 PROJECT DETAILS

1.1 Summary Description of Project

Chongqing Youyang County Youchou Hydropower Station Project (hereafter referred to as “the Project”) is a grid-connected hydropower plant with an accumulation reservoir with a surface area of 7.7km². 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 120 MW (2×60MW). 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.

1.3 Project Proponent

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

Address: Youchou town, Youyang county, Chongqing Municipality, China, 408809

Tel: 86-23-75414057

Fax: 86-23-75414057

1.4 Other Entities Involved in the Project

There is no any other project participant(s).

1.5 Project Start Date

21-12-2008

1.6 Project Crediting Period

21-12-2008 to 20-12-2010, in total 730 days

1.7 Project Location

The Project is located in the Youchou town, Youyang county, Chongqing Municipality, China. The exact location of the project is defined using GPS coordinates 28°58'01"N latitude, 109° 08'51"E longitude.

1.8 Title and Reference of Methodology

The consolidated baseline and monitoring methodology: ACM0002: "Consolidated methodology for grid connected electricity generation from renewable sources" version 10, in effect as of 28 of May 2009 (<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>)

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 21-12-2010 and installed two sets of turbine and generator (60MW each) which are the same as described in the project PDD.

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 11/11/2008 and commissioned on 21/12/2008, the construction of the second set of turbine and generator was completed on 25/12/2008 and commissioned on 09/01/2009.

The project operated normally during the indicated monitoring period.

2.2 Deviations from the Monitoring Plan

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:	0.85285
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 electricity exported by the project plant to the grid in year y											
Source of data:	Project Activity Site											
Description of measurement methods and procedures to be applied:	The net electricity supplied to the grid by the project is calculated by measured result of ESy (electricity supplied to the grid) minus measured result EDy (electricity delivered from the grid to the project). ESy and EDy are continuously measured and monthly recorded by project entity with national standard electricity metering instruments Meter 1 and Meter 2. The measurement will be conducted technically in accordance with the “Technical administrative code of electric energy metering (DL/T448—2000)” .											
Frequency of monitoring/recording:	Continuous measurement, monthly recording											
Value monitored:	655,488 (for monthly records, please refer to the VER calculation spreadsheet)											
Monitoring equipment:	Meter 1: <table><tr><td></td><td>Main meter</td><td>Backup meter</td></tr><tr><td>Serial No.</td><td>6090003818 (94827621)</td><td>6090003909 (94827623)</td></tr><tr><td>Accuracy class</td><td>0.2S</td><td>0.2S</td></tr></table>				Main meter	Backup meter	Serial No.	6090003818 (94827621)	6090003909 (94827623)	Accuracy class	0.2S	0.2S
	Main meter	Backup meter										
Serial No.	6090003818 (94827621)	6090003909 (94827623)										
Accuracy class	0.2S	0.2S										

	Date of 1st calibration	21/05/2008, valid until 20/05/2009	21/05/2008, valid until 20/05/2009		
	1st calibration was done by	Chongqing Electric Power Research Institute (certification: 15/11/2006~14/11/2011)			
	Date of 2nd calibration	20/05/2009, valid until 19/05/2010	20/05/2009, valid until 19/05/2010		
	2nd calibration was done by	Metrology and Quality Inspection Center Wanzhou in Chongqing (certification: 26/12/2006~ 25/12/2009)			
	Date of 3rd calibration	21/04/2010, valid until 20/04/2011	21/04/2010, valid until 20/04/2011		
	3rd calibration was done by	Metrology and Quality Inspection Center Wanzhou in Chongqing (certification: 22/09/2009~ 21/09/2014)			
	Meter 2:				
		Main meter	Backup meter-old		Backup meter-new*
	Serial No.	6090003904 (94827622)	6090003912 (94827624)		6090007053 (95771017)
	Accuracy class	0.2S	0.2S		0.2S
Used period	12/21/2008~20/12/2010	12/21/2008~29/04/2009	29/04/2009~20/12/2010		
Date of 1st calibration	21/05/2008, valid until 20/05/2009	21/05/2008, valid until 20/05/2009			
1st calibration was done by	Chongqing Electric Power Research Institute (certification: 15/11/2006~14/11/2011)				
Date of 2nd calibration	20/05/2009, valid until 19/05/2010		21/04/2009, valid until 20/04/2010		
2nd	Metrology		Chongqing		

	calibration was done by	and Quality Inspection Center Wanzhou in Chongqing (certification: 26/12/2006~25/12/2009)		Electric Power Research Institute (certification: 15/11/2006~14/11/2011)
	Date of 3rd calibration	21/04/2010, valid until 20/04/2011		21/04/2010, valid until 20/04/2011
	3rd calibration was done by	Metrology and Quality Inspection Center Wanzhou in Chongqing (certification: 22/09/2009~21/09/2014)		Metrology and Quality Inspection Center Wanzhou in Chongqing (certification: 22/09/2009~21/09/2014)
* the old backup meter is displaced by a new backup meter on 29/04/2009				
QA/QC procedures to be applied:	The accuracy class of meters is complied 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 = EGfacility,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:	120,000,000
Monitoring equipment:	Determined according to installed equipments' nameplates
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Any comment:	N/A

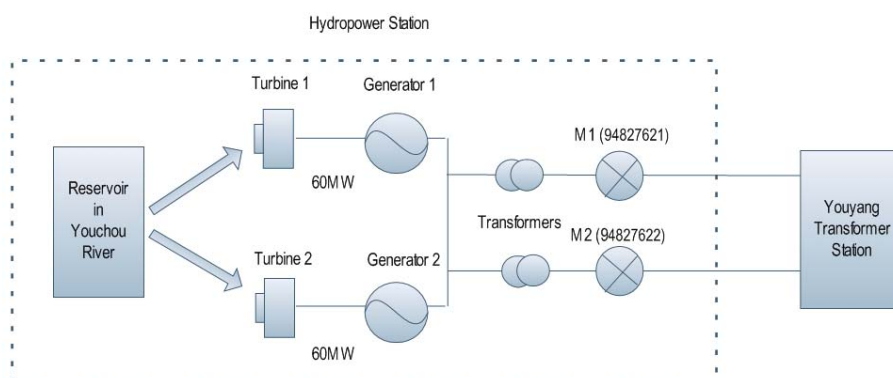
Data Unit / Parameter:	A _{PJ}
Data unit:	m ²
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data:	Measured at the project site
Description of measurement methods and procedures to be applied:	The project entity commissions a third party to conduct the measurement from topographical surveys and maps. A measurement report will be issued by this qualified party. The surface area is calculated using the design schematics and area maps.
Frequency of monitoring/recording:	Yearly
Value monitored:	7,700,180 (measured in May 2009) 7,700,180 (measured in May 2010)
Monitoring equipment:	Measured from topographical surveys and maps
QA/QC procedures to be applied:	A qualified third party, Chongqing Qingfeng Land Survey Co., Ltd. (certification number 50010077, valid from 15/05/2009 to 30/12/2014), 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

Data Unit / Parameter:	Operational hours of emergency back-up diesel generator
Data unit:	Hours / year
Description:	Annual hours that the emergency back-up gasoline generator is running either for the purpose of commissioning/maintenance or actual

	emergencies
Source of data:	Project site
Description of measurement methods and procedures to be applied:	The project entity will record the operational hours in the daily operation logs.
Frequency of monitoring/recording:	Simultaneous measurement and recording along with operation
Value monitored:	24
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Based on the "product basic specification & main components" for the diesel generator, the highest oil consumption is 107 kg/h, so the quantity of diesel oil that was consumed during this monitoring period is calculated as: $24\text{hr/year} \times 2\text{year} \times 107\text{kg/h} = 5136\text{kg}$. According to the Table 1.4 of Chapter 1 of volume 2 of the "2006 IPCC Guidelines for National Greenhouse Gas Inventories", the effective CO₂ emission factor of diesel is 74800 kgCO₂/TJ (upper 95% confidence interval value is chosen to be conservative). According to the China Energy Statistic Yearbook 2011, the net calorific value of diesel is 42652 MJ/t. So the CO₂ emission of the diesel consumed during this monitoring period is calculated as: $5136\text{kg} \times 74800\text{kgCO}_2/\text{TJ} \times 42652\text{MJ/t} / 10^9 = 16386\text{kg}.$ The 16386 kg CO₂ emission is about 0.003% of the total emission reductions (559031t). Because the actual emissions resulted from the operation of the diesel generator is much less than 1% of emission reduction, there is no need to deduct this emission from baseline emissions.
Calculation method:	N/A
Any comment:	N/A

3.3 Description of the Monitoring Plan

- Line diagram¹



- 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

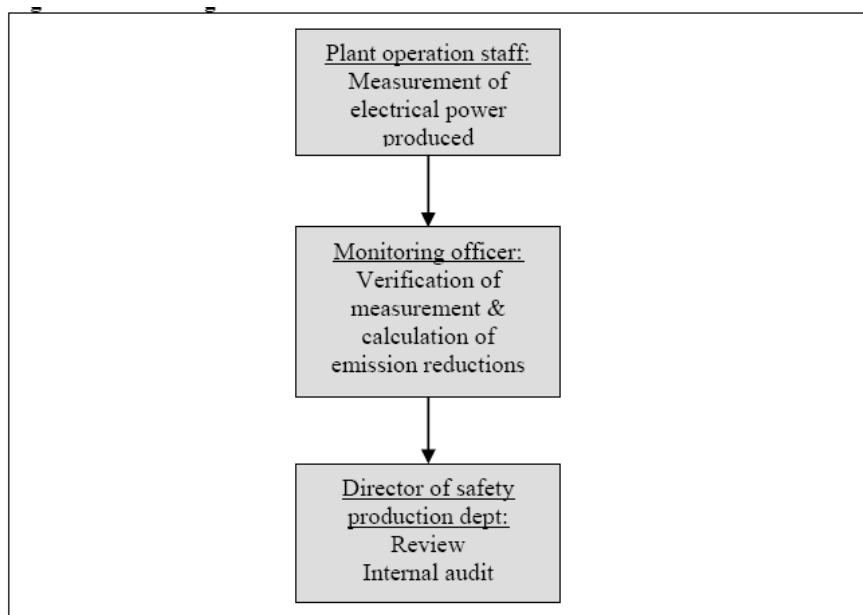
Parameter	Data collection procedures
$EG_{\text{facility},y}$	Data generation: The power output and import is measured by the Meter 1 and Meter 2 continuously. Data recording: The electricity output data are monthly recorded at 0:00 AM of 1st of each month and the electricity import data are monthly recorded at 0:00 AM of 25th of each month. 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. Output and import per month is the difference between the cumulative values on the power meters. Net electricity supplied to the grid is electricity output 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.

¹ As per the approved monitoring plan's requirement, the back-up line from local transformer station has been dismantled before the start of the project, so it is not included in the diagram.

	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 will be 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.
Operational hours of emergency back-up diesel generator	Data generation: The operational hours are measured by the project developer during each run. Data recording: The operation hours are recorded along with operation logs of the emergency back-up diesel generator. Data aggregation: The calculated operational hours per year is summed over the monitoring period. 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 director of the Safety Production department 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 is carried out by the plant operation staff.

The project owner appoints a monitoring officer who is responsible for verification of the measurement, collection of sales receipts, collection of billing receipts 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 is reviewed by the director of the Safety Production department.

- 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
Electricity supplied to grid	EGfacility,y	655,488	MWh		1
Baseline emission factor	EFy	0.85285	tCO ₂ e/MWh		2
Total baseline emissions	BEy	559,031	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 2008: 1626 MWh

In 2009: 263527 MWh

In 2010: 390335 MWh

4.2 Project Emissions

Calculation of project emissions	Symbol	Amount	Unit	Formula	Remarks
Surface area of the reservoir at full reservoir level	APJ	7,700,180	m ²	N/A	1
Installed capacity of the plant after implementation	CapPJ	120,000,000	W	N/A	2
Power density	PD	15.6	W/m ²	PD=CapPJ/APJ	3
Total project emissions	PEy	0	tCO ₂ e	N/A	4

Remarks

1. Measured by a qualified third party.

2. Determined according to installed equipments' nameplates

3. As per methodology and PDD, PD=CapPJ/APJ

4. As per methodology and PDD, PEy=0 if PD>10.

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.

4.4 Summary of GHG Emission Reductions and Removals

Calculation of emission reductions	Symbol	Amount	Unit	Formula	Remarks
Total baseline emissions	BEy	559,031	tCO ₂ e	BEy=EGy*EFy	
Total project emissions	PEy	0	tCO ₂ e		
Total leakage emissions	Ly	0	tCO ₂ e		
Total emission reductions	ERy	559,031	tCO ₂ e	ERy=BEy-PEy	1

Remarks

1. As per methodology and PDD, ERy=BEy-PEy

In 2008: 1,386 tCO₂e

In 2009: 224,749 tCO₂e

In 2010: 332,896 tCO₂e

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)	665,222 ²	559,031

² 332,611 tCO₂e(annual GHG emission reductions estimated in registered PDD) / 365 days*730 days (the days length of this monitoring period)