



GUIZHOU QINGSHUIHE GELIBRIDGE HYDROPOWER PROJECT

Document Prepared by Beijing Sindicatum Clean Energy Technology
and Services Co., Ltd.

Project Title	Guizhou Qingshuihe Gelibridge Hydropower Project
Version	3
Report ID	N/A
Date of Issue	03/06/2022
Project ID	656
Monitoring Period	01/09/2012 to 31/08/2018
Prepared By	Beijing Sindicatum Clean Energy Technology and Services Co., Ltd.
Contact	Room 316 Block 2, Lexianghui Plaza, No. 2 Qingheyong East Road, Chaoyang District, Beijing 100012, China Tel: +8610 64035880 Email: Sindicatum@163.com

CONTENTS

1	PROJECT DETAILS	3
1.1	Summary Description of the Implementation Status of the Project.....	3
1.2	Sectoral Scope and Project Type.....	3
1.3	Project Proponent.....	3
1.4	Other Entities Involved in the Project	4
1.5	Project Start Date	4
1.6	Project Crediting Period.....	4
1.7	Project Location.....	4
1.8	Title and Reference of Methodology.....	5
1.9	Participation under other GHG Programs	5
1.10	Other Forms of Credit	6
1.11	Sustainable Development	6
2	SAFEGUARDS.....	7
2.1	No Net Harm.....	7
2.2	Local Stakeholder Consultation	8
2.3	AFOLU-Specific Safeguards.....	10
3	IMPLEMENTATION STATUS	10
3.1	Implementation Status of the Project Activity	10
3.2	Deviations	12
3.3	Grouped Projects	12
4	DATA AND PARAMETERS	12
4.1	Data and Parameters Available at Validation.....	12
4.2	Data and Parameters Monitored.....	14
4.3	Monitoring Plan	20
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS ..	22
5.1	Baseline Emissions	22
5.2	Project Emissions	29
5.3	Leakage.....	31
5.4	Net GHG Emission Reductions and Removals	31
	ANNEX 1 THE CALIBRATION RECORDS OF ELECTRICITY METERS.....	32

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Guizhou Qingshuihe Gelibridge Hydropower Project (hereafter referred to as the project) is located at Maoyun village in Kaiyang county of Guizhou province, the People's Republic of China. The project is owned, constructed and operated by Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. The project is a run of river hydropower plant with the total installed capacity of 150MW (2×75MW) and a reservoir with power density of 70.10W/m² at its implementation. The designed operation lifetime of the project is 30 years with annual electricity generation of 508GWh, of which 497.3 GWh is supplied to the South China Power Grid (SCPG) via the local Guizhou Power Grid.

The construction of the project was started in June 2007, and 2 units of 75MW turbine and generator sets were commissioned on 06/02/2010 and 12/03/2010 respectively, and the project has been in full operation afterwards. The project mainly consists of a reservoir, power house, switch station, the turbines, generators, and transformers. As a renewable energy project, Guizhou Qingshuihe Gelibridge Hydropower Project produces positive environmental and economic benefits and contributes to the local sustainable development.

The implementation of the project achieves CO₂ emission reductions by replacing electricity supplied from the SCPG which is mainly generated by fossil fuel fired power plants. The first crediting period is from 06/02/2010 to 05/02/2020, the credits in the monitoring period from 06/02/2010 to 03/10/2010 have been issued as VCU, and the credits in the monitoring periods from 04/10/2010 to 31/08/2012 have been issued as CERs (Refer to section 1.9 for details). This monitoring period is from 01/09/2012 to 31/08/2018 (the first and last days included), and the emission reductions generated in this monitoring period is 2,609,525 tCO₂e.

1.2 Sectoral Scope and Project Type

Sectoral Scope 1: Energy industries (renewable /non-renewable sources);

Project type: Renewable energy project;

The project is not a grouped project.

1.3 Project Proponent

Organization name	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.
Contact person	Mei Xiao

Title	Director, Department of Planning and Development
Address	16 th Floor, Qianyuan Tower, No. 5 Airport Road, Nanming District, Guiyang, Guizhou, China
Telephone	+860851 85208069
Email	meixiao@chd.com.cn/vcsissuance@163.com

1.4 Other Entities Involved in the Project

Organization name	Beijing Sindicatum Clean Energy Technology and Services Co., Ltd.
Role in the Project	Consultancy and VCU Buyer
Contact person	Jia Bao Qiang
Title	General Manager
Address	Room 316 Block 2, Lexianghui Plaza, No. 2 Qingheying East Road, Chaoyang District, Beijing 100012, China
Telephone	+8610 64035880
Email	Sindicatum@163.com

1.5 Project Start Date

The project started on 06/02/2010 (The commissioning date of 1st generator).

1.6 Project Crediting Period

The crediting period of the project is ten years, twice renewable for a total of 30 years. However, as the project is also registered as a CDM project with a seven year twice renewable crediting period, it is not eligible for VCU issuance beyond the end of those 21 years. The project first crediting period is from 06/02/2010 to 05/02/2020.

1.7 Project Location

The location of the project activity is: Maoyun village in Kaiyang county of Guizhou province, the People's Republic of China. The dam is located at 27°00'30"N and 107°12'22"E (Google Earth coordinates 27.008333 and 107.206111) and the powerhouse is located at 27°00'33"N and 107°12'02"E (Google Earth coordinates 27.009167 and 107.200556), as shown in Figure 1.

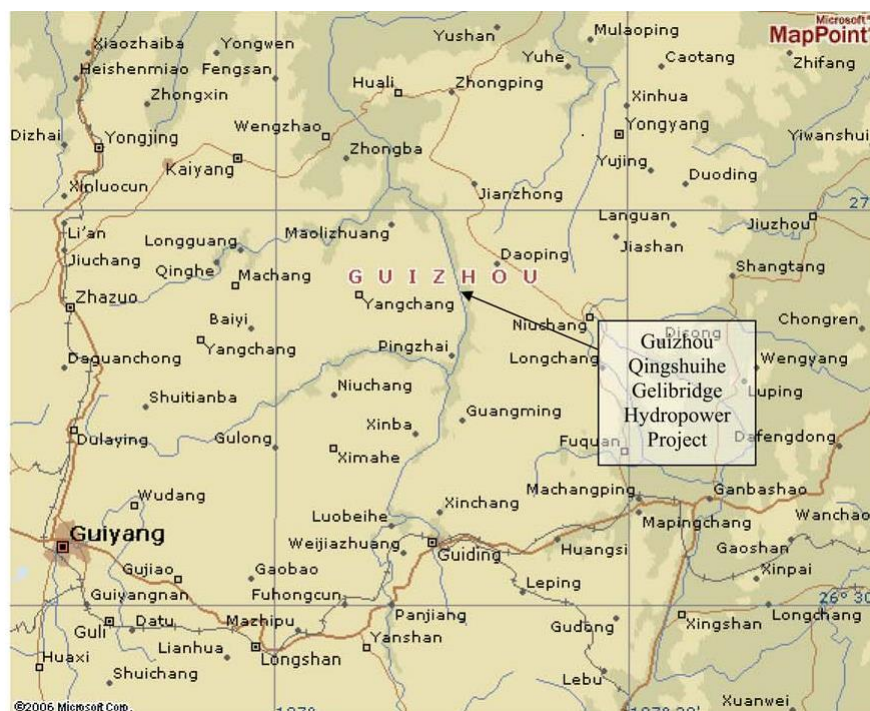


Figure 1. Location of the project activity

1.8 Title and Reference of Methodology

Methodology

Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (version 09)

Reference:

<https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQCOPWPGWDN8ED5PG>

Tools applied:

- “Tool for the Demonstration and Assessment of Additionality” (version 5.2)
- “Tool to calculate the emission factor for an electricity system” (version 01.1)
- “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” (version 02)

1.9 Participation under other GHG Programs

The project was registered with UNFCCC as a Clean Development Mechanism (CDM) project (reference number: 3351) with the 21 (3*7) years crediting period started from 04/10/2010. Please refer to the following link for details:

<https://cdm.unfccc.int/Projects/DB/TUEV-SUED1265278332.26/view>

Except for CDM, the project did not register under any other GHG program.

The emission reductions generated from the project from 06/02/2010 to 31/08/2012 were issued as the following credits as shown in the table below.

Start Date	End Date	GHG Emission Reductions (tCO ₂ e)	Credit	Program
06/02/2010	03/10/2010	235,894	VCU	VCS
04/10/2010	31/10/2010	57,401	CER	CDM
01/11/2010	31/08/2011	235,018	CER	CDM
01/09/2011	31/08/2012	425,174	CER	CDM

The emission reductions generated during this monitoring period, from 01/09/2012 to 31/08/2018 (the first and last days included) will request for VCU and will not be submitted for any other emission reduction certificate or carbon offset. Hence, it is confirmed that the emission reductions will not be double counted.

1.10 Other Forms of Credit

Emission Trading Programs and other Binding Limits

China launched a national emissions trading scheme at 16/07/2021 only covering the fossil fuel fired power industry. Other regional mandatory pilot emissions trading schemes which operated earlier in China include carbon intensive industries such as thermal power generation, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, aviation etc., not including renewable energy sector¹. The project activity is not included in any Chinese mandatory emissions trading scheme and there is no emission cap enforced for the project owner according to the compliance company list² publicly available.

Thus, the project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

Other Forms of Environmental Credit

The project has not sought or received other forms of Environmental Credit, including renewable energy certificates, during this monitoring period.

1.11 Sustainable Development

The construction and operation of the project has brought prominent environmental and social benefit, and contribute to regional sustainable development through the following aspects:

¹ http://www.mee.gov.cn/xxgk2018/xxgk/xxgk05/202103/t20210330_826728.html

² <http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf>

- Climate change benefits: The project activity achieves obvious greenhouse gas (CO₂) emission reductions by generating renewable energy and displacing fossil fuel-fired power from the South China Power Grid.
- Economic impacts: During the construction phase, there will be employment opportunities for the local people, which will significantly add to their income. The project is located in a very remote area and consequently, the project has brought infrastructure improvements, including road access, which had a massive impact on the quality of life of local residents. Mobile phone coverage and fixed-line telephones have been installed, providing internet access to the village for the first time. The project which resulted in new or improved transport links also improved access to potable water and water for localized irrigation. Additionally, the project will provide cheaper electricity for the villages directly adjacent to the power plants.
- Environmental impacts: By increasing renewable energy capacity, the project will displace electricity that may have been generated from fossil fuel fired power plants, such as coal, and consequently will deliver improved air quality, both locally and globally, by reducing NO_x, SO_x and PM emissions.

2 SAFEGUARDS

2.1 No Net Harm

According to the results of EIA and the approval from Guizhou Environmental Protection Bureau on 27/09/2006 (approval No. [2006]390). The environmental effects caused by the project include:

1. Noise Impact

The project owner will use equipment that meets national standards. The project owner also will take several measures to mitigate noises levels produced during the project construction period, such as strengthening construction management, limiting the construction time at night, banning blasting activities during the night time, and limiting the speed of and banning honking when transportation vehicles pass through the villages. As for the construction workers, the project owners will provide noise-proof equipment in line with national regulations.

2. Sewage

The waste water created from construction will be properly treated via usage of a sand basin and sedimentation basin. The water is recycled after treatment. The sewage produced during the construction and operation periods will be treated by integrated organic sewage treatment equipment. All the sewage discharged will meet the requirement of the first level standard of "Sewage discharge standards" (GB8978-1996).

3. Waste Residue

The project owner established two waste residue fields. In order to avoid water and soil loss caused by residue slipping, the waste residue field will be kept flat. Also, water and soil conservation measures will be undertaken to avoid water and soil loss. Vegetation protection and restoration will be carried out after the construction period.

4. Air pollution

Sprinklers will be used in the construction area to reduce dust in the excavation and blasting areas. Concrete Mixing System will be equipped with a dust catcher to limit the dust levels on site. Construction workers will be supplied with dustproof respirators.

5. Ecological Impact

In order to reduce ecological impacts during the construction period, measures, such as marking the construction area clearly and banning the activities of smoking, hunting, and fishing in the area, were taken. The construction operations and construction seasons will be strictly controlled to prevent water and soil lost during the construction period from entering the waters. In the construction area, topsoil should be stored and protected properly so that it can be reused to refill the temporarily occupied land. The project involves a small number of migrants, and they have been properly resettled.

In conclusion, the environmental impacts are not considered significant by the project proponent and local Environmental Protection Bureau.

2.2 Local Stakeholder Consultation

In order to collect stakeholder's comments, the project owner sponsored two stakeholder consultation meetings. The project owner pasted bulletins at markets around the project site to inform local stakeholders before distributing questionnaires. Furthermore, the project owner also entrusted the local government to distribute the questionnaires to local stakeholders, such as the migrant population. The geographic scope of the survey involved the Maoli, Duimen and Jiangshan villages. On 22/11/2006, the project owner held the first consultation meeting in Guiyang. Based on the EIA, the local stakeholders identified include the workers from the surrounding villages (such as Pingzhai Village). In addition, relevant stakeholders were also invited. Due to their involvement in the project approval process, the Environmental Protection Bureau (responsible for the approval of project EIA) and the local Development and Reform Committee (DRC responsible for project approval) were included as key stakeholders. As the project involves power generation, the Power Company was identified as a stakeholder. Participants of the first consultation meeting included investors and officials from Guizhou DRC, provincial power grid company, Municipal Council of Kaiyang, DRC of Kaiyang and Environmental Protection Bureau of Kaiyang, etc. On 24/11/2006, the second consultation meeting was held at Maoyun village, which was hosted by the project owner and attended by local farmers.

In April 2007, the project owner conducted a survey amongst local farmers to further gather stakeholder's comments on the project. During this activity, 99 questionnaires were

delivered to the farmers. The return rate of the questionnaires was 100%. Questions include:

- How much do you know about hydro-power projects and the project?
- Do you think the implementation of the project will bring any positive influence to your current life?
- Do you think the implementation of the project will bring any negative influence to your current life?
- What extent of impact will the project bring to the local environment?
- Do you think that the implementation of the project will bring any influence on the local economy?
- What is your attitude to the construction of the project?
- Other suggestions

During the consultation meetings, all the government and regulatory officials were very supportive of the project. They think that the implementation of the project will exert positive influence on the local energy structure, economic development, and tourism industry.

The villagers were very proud to host a hydropower project because they felt that it would be beneficial for their environment, in comparison to a coal-fired power plant. They were aware of many benefits, including: road access, piped drinking water, tourism potential, the construction of a central market, installation of mobile phone and fixed line telephones, etc.

All shareholders who participated in both meetings agreed with the construction of the project and looked forward to it. No objections were received during the consultation meetings.

According to the statistical results from the questionnaires, all stakeholders agreed to and supported the implementation of the project. Meanwhile, some different comments and suggestions were also received, but no objections. The details are shown below:

1. 100% of the participants questioned expressed that they had some knowledge about hydropower projects and the project. Some of them expressed that they have only a little knowledge on hydropower and the project;
2. 89.90% of the participants were willing to relocate for the project;
3. 77.55% of the participants thought that the project will bring them a positive or no change to their lives;
4. 69.70% of the participants indicated that they were willing to partake in the construction of the project;

5. 85.86% of the participants felt that the project would have a positive or no change to the local economy;
6. 45.12% of the participants felt that they had been well or adequately compensated for their relocation;
7. All participants support the implementation of the project.

On-gonging communication with local stakeholders

A grievance book is kept at the project owner office. Anyone can go there and record their grievance or comment in the book. The project owner personnel will review and respond to the comments and record the response in the book as well. Meanwhile, the local authority has also conducted spot checks on the implementation of the project from time to time as per the request from the local governments' regulations. There are no negative comments received for the project. In line with VCS requirements all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

2.3 AFOLU-Specific Safeguards

N/A

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The boundary of the project includes all the equipment and instruments installed in the system from the reservoir immediately leading up to the power output at the power station, as well as the power plants that are connected to the South China Power Grid. Detailed information is shown in Figure 2.

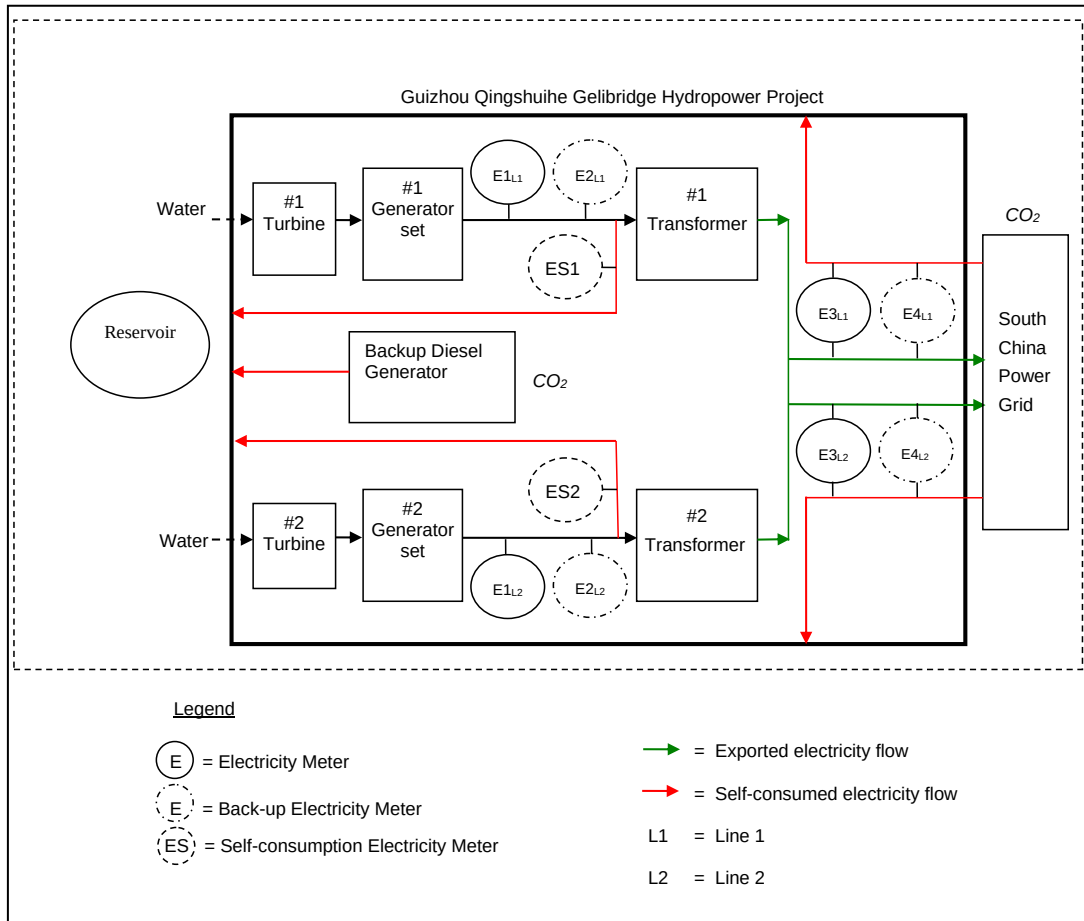


Figure 2. Diagram of project boundary and monitoring points

Two hydro turbine generator sets with an individual capacity of 75MW (total installed capacity of 150MW) are installed at the project site. The main equipment, such as the turbines, generators, and transformers, are all made in China. One back-up diesel generator is installed for emergency uses only. The power generation technology used by the project is commonly used in China and has proven to be reliable and unlikely to be replaced during the project lifetime.

The key technical specifications for the project are shown as follows:

Table 1. Key Project Technical Specifications

Items	Parameter
Total installed capacity	150 MW
Model for the turbines (FSR)	HL234-LJ-335
Model for the turbines (EPC / installed)	HL233-LJ-328
Model for the generators (FSR)	SF75-28/6740
Model for the generators (EPC /installed) *	SF75-28/7300

Estimated amount of electricity uploaded to the grid annually	497.3GWh
Normal water level	719m
Reservoir size under normal water level	2.13km ²
Rated water head	84m
Average flow rate over years	82.3m ³ /s

* The capacity of each generator is 75MW as indicated by the SF75 rating.

3.2 Deviations

3.2.1 Methodology Deviations

There are no methodology deviations applied during this monitoring period.

3.2.2 Project Description Deviations

There are no project description deviations during this monitoring period.

3.3 Grouped Projects

The project is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

The baseline grid emission factor $EF_{grid,CM,y}$ is obtained directly from the official source “Baseline Emission Factors for China’s Regional Power Grid” issued by Chinese DNA. Thus, the relevant basic parameters for calculation are not described in detail here. With consideration of the fact of the project, data and parameters that are available at validation are summarized in the following tables:

Data / Parameter	EF_{Res}
Data unit	kgCO ₂ e/MWh
Description	Default emission factor for emissions from reservoirs
Source of data	EB23
Value applied	90 kgCO ₂ e/MWh.

Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of Data	This data is used for the project emissions calculations for reservoirs with a power density greater than 4 W/m ² and less than 10W/m ² , which does not apply to this project since the power density of the project activity is always greater than 10W/m ² in this monitoring period.
Comments	No comment

Data / Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ e/MWh
Description	The baseline Emission Factor of the South China Power Grid
Source of data	Calculated based on “Baseline Emission Factors for China’s Regional Power Grid”, published and updated by Chinese DNA on 15/12/2006
Value applied	0.7794
Justification of choice of data or description of measurement methods and procedures applied	As per the requirements of “Tool to calculate the emission factor for an electricity system” (version 01.1)
Purpose of Data	Calculation of baseline emissions
Comments	No comments

Data / Parameter	Cap _{BL}
Data unit	W
Description	Installed capacity of the hydropower plant before the implementation of the project activity. For new hydropower plants, this value is zero.
Source of data	Project site
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	The proposed hydropower plant is new.
Purpose of Data	Calculation of project emissions
Comments	No comments

Data / 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 (m^2). For new reservoirs, this value is zero.
Source of data	Project site
Value applied	0
Justification of choice of data or description of measurement methods and procedures applied	The proposed hydropower plant is a new plant with a new reservoir.
Purpose of Data	Calculation of project emissions
Comments	No comments

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{out,y}$
Data unit	MWh
Description	Electricity supplied by the project activity to the grid in year y
Source of data	Directly measured by the bi-directional transaction electricity meters E3 and E4 (back-up meter) installed at the power grid interface in each of the two connection lines.
Description of measurement methods and procedures to be applied	Continuously measured by bi-directional transaction electricity meters E3 and E4 (back-up meter) installed on Lines 1 and 2, as shown in Figure 2. An Operation and Maintenance Team member from the project owner checks the daily-recorded data and inserts the daily into weekly/monthly spreadsheets. Archiving procedure: Electronic
Frequency of monitoring/recording	Continuous measurement and manually recorded on a daily basis
Value monitored	See values of yearly data in Table 2 and monthly data in Table 3.
Monitoring equipment	Bi-directional transaction electricity meters E3 and/or E4 (back-up), for more details about the model, serial number and accuracy

	please refer to Annex 1 “The calibration records of electricity meters”.
QA/QC procedures to be applied	Calibration by an institute under the Guizhou Power Grid Company at least once per year for the E3 and E4 transaction electricity meters in line with national calibration standard. Refer to Annex 1 “The calibration records of electricity meters”. Net electricity generation delivered to the grid is recorded by both the project owner and the grid company. The collected data are cross checked by electricity invoices. The data will be archived electronically and stored for two years after the end of the crediting period.
Purpose of the data	Calculation of baseline emissions
Calculation method	N/A
Comments	No comments

Data / Parameter	$E_{in,y}$
Data unit	MWh
Description	The amount of electricity received from the South China Power Grid, which is consumed by the project activity in year y
Source of data	Directly measured by the bi-directional transaction electricity meters E3 and E4 (back-up meter) installed at the power grid interface in each of the two connection lines.
Description of measurement methods and procedures to be applied	Continuously measured by bi-directional transaction electricity meters E3 and E4 (back-up meter) installed on Lines 1 and 2, as shown in Figure 2. An Operation and Maintenance Team member from the project owner checks the daily-recorded data and inserts the daily into weekly/monthly spreadsheets. Archiving procedure: Electronic
Frequency of monitoring/recording	Continuous measurement and manually recorded on a daily basis
Value monitored	See values of yearly data in Table 2 and monthly data in Table 3.
Monitoring equipment	Bi-directional transaction electricity meters E3 and/or E4 (back-up), for more details about the model, serial number and accuracy please refer to Annex 1 “The calibration records of electricity meters”.
QA/QC procedures to be applied	Calibration by an institute under the Guizhou Power Grid Company at least once per year for the E3 and E4 transaction electricity

	meters in line with national calibration standard. Refer to Annex 1 “The calibration records of electricity meters”. Net electricity generation delivered to the grid is recorded by both the project owner and the grid company. The collected data are cross checked by electricity invoices. The data will be archived electronically and stored for two years after the end of the crediting period.
Purpose of the data	Calculation of baseline emissions
Calculation method	N/A
Comments	No comments

Data / Parameter	TEG _y
Data 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
Source of data	Measurements are based on continuous electricity readings from meters E1 and E2 (back-up meter)
Description of measurement methods and procedures to be applied	Measurements are based on continuous electricity readings from meters E1 and E2 (back-up meter) as shown in Figure 2. An Operation and Maintenance Team member from the project owner checks the daily-recorded data and inserts the daily into weekly/monthly spreadsheets. Archiving procedure: Electronic
Frequency of monitoring/recording	Continuous measurements and manually recorded on a daily basis
Value monitored	See values of yearly data in Table 2 and monthly data in Table 3.
Monitoring equipment	Electricity meters E1 and E2 (back-up meter)) Refer to Annex 1 “The calibration records of electricity meters”.
QA/QC procedures to be applied	E1 and E2 are calibrated once a year (at least)
Purpose of the data	Not used for emission reductions calculation, only for operational purpose
Calculation method	N/A
Comments	No comments

Data / Parameter	Cap_{PJ}
Data unit	W
Description	Installed capacity of the hydropower plant after the implementation of the project activity
Source of data	Nameplates
Description of measurement methods and procedures to be applied	Check the nameplate of the equipment on site.
Frequency of monitoring/recording	Annually
Value monitored	150,000,000
Monitoring equipment	-
QA/QC procedures to be applied	An Operation and Maintenance Team member checks the nameplate of the equipment for the total installed capacity. If there is an unexpected variation, he/she investigates. Regular independent internal audits will capture changes and follow up actions will be initiated. The data will be archived electronically and stored for two years after the end of the crediting period.
Purpose of the data	Calculation of project emissions
Calculation method	-
Comments	No comments

Data / 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	The project owner bought services from the Planning and Design Branch of the Guiyang Hydroelectric Investigation, Design &

and procedures to be applied	Research Institute of China Hydropower Engineering Consulting Group, including an automatic measuring system with a detector for determining the water depth of the reservoir, and a software system to calculate the surface area and volume of the reservoir automatically.		
Frequency of monitoring/recording	Annually		
Value monitored	Year	$A_{PJ}(m^2)$	Recorded date
	2012	2,050,000	20/08/2012
	2013	2,110,000	20/08/2013
	2014	2,000,000	20/08/2014
	2015	2,050,000	20/08/2015
	2016	2,100,000	20/08/2016
	2017	2,070,000	20/08/2017
	2018	2,070,000	20/08/2018
Monitoring equipment	-		
QA/QC procedures to be applied	The area of the reservoir is measured annually and recorded by the project owner. The document is archived by Guizhou Qingshuihe Gelibridge Hydropower Plant staff. The consistency with the previous annual values is checked. All relevant staff active in data collection have been trained and implementation of the monitoring plan/procedures has been checked by means of an independent internal audit. The data will be archived electronically and stored for two years after the end of the crediting period.		
Purpose of the data	Calculation of project emissions		
Calculation method	-		
Comments	No comments		

Data / Parameter	$FC_{i,j,y}$
Data unit	t or m^3
Description	Quantity of fuel type i combusted in process j during the year y
Source of data	Measured. Data recorded at the beginning/end of each reporting period.

Description of measurement methods and procedures to be applied	Measured. Data recorded at the beginning/end of each reporting period.
Frequency of monitoring/recording	Recorded at the beginning and end of each monitoring period
Value monitored	Quantity of diesel consumed during this monitoring period:0.55 tons
Monitoring equipment	Fuel consumption will be monitored by means of fuel purchase receipts and stock taking at the beginning and end of each monitoring period.
QA/QC procedures to be applied	-
Purpose of the data	Calculation of project emissions
Calculation method	Difference between opening and closing stock (adding purchased amount if applicable)
Comments	No comments

Data / Parameter	$NCV_{i,y}$
Data unit	GJ/t
Description	Net caloric value for fuel i
Source of data	China Energy Statistical Yearbook
Description of measurement methods and procedures to be applied	Default
Frequency of monitoring/recording	Review appropriateness of the value annually.
Value monitored	42.652 (NCV of diesel value from China Energy Statistical Yearbook 2018)
Monitoring equipment	N/A
QA/QC procedures to be applied	Value provided by “China Energy Statistical Yearbook” is collected and the consistency of the data with the range of IPCC default values will be checked. The data value should fall in the range of the IPCC default values provided in Table 1.2 of Chapter 1, Volume 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.

Purpose of the data	Calculation of project emissions
Calculation method	-
Comments	No comments

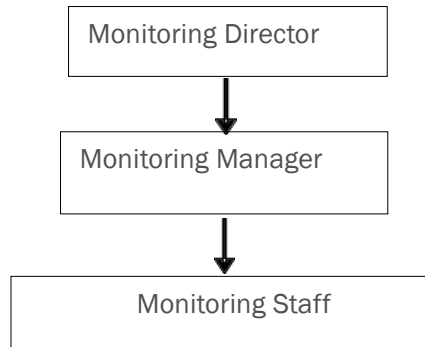
Data / Parameter	EF _{CO₂,i,y}
Data unit	tCO ₂ e/GJ
Description	CO ₂ emission factor per unit of energy for fuel i
Source of data	IPCC default value as provided in Table 1.4 of Chapter 1, Volume 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Description of measurement methods and procedures to be applied	Default
Frequency of monitoring/recording	Review appropriateness of any future revision to the value in the IPCC Guidelines annually
Value monitored	0.0748(CO ₂ emission factor of diesel)
Monitoring equipment	N/A
QA/QC procedures to be applied	Value provided by the IPCC Guidelines is collected and review the appropriateness of any future revision to the value in the IPCC Guidelines.
Purpose of the data	Calculation of project emissions
Calculation method	-
Comments	No comments

4.3 Monitoring Plan

- The organizational and monitoring structure

In order to process monitored data, the project owner has established a monitoring management structure, which identifies the relevant staff for data collection, recording, reporting, and archiving. In addition, the project owner designates a monitoring director to supervise the process. The monitoring director is end responsible for the checks of monitoring and recording tasks (such as meter readings and electricity invoices), emission reductions calculations and the preparation of monitoring reports.

The detailed general structure is as follows:



- Data measuring, recording, and storing

Electricity meters are installed in the system and data from those meters are monitored by the staff from the project owner as part of their routine check in order to monitor the proper operation of the system. Bi-directional electricity meters E3 (and back-up E4) installed in the two grid connection lines as shown in Figure 2 measure the amount of electricity exported to ($EG_{out,y}$) and imported from ($E_{in,y}$) the grid. The power grid company owns electricity meters E3 and E4. The net recordings from the E3 (and/or E4) meters are used for VCS purposes. Data from electricity meters E3 (and E4) are manually recorded daily at 00:00 hours by the duty operators. The daily data are transferred to a spreadsheet on a weekly basis. Every month a data report with detailed daily readings from electricity meters E3 and/or E4 is prepared. The monthly data report is cross-checked with the weekly spreadsheet to guarantee consistency in the electricity meter readings. The amount of electricity readings from the E3 (and/or E4) electricity meters can be cross-checked with the amount of electricity exported listed on electricity invoices.

The generator output meters (check meters) (refer to the E1 meters in Figure 2) monitor the amount of electricity generated by the project activity (TEG_y). One back-up meter (refer to E2 meters in Figure 2) has been installed for each of E1 meters. The E1 and E2 meters are owned by the project owner.

Data management system describes the procedure for data recording and storing which is collected during the monitoring period. All monitoring data will be stored in a computer system. Regular backup will be foreseen to secure data. Electricity invoices will be retained at a central place. All data will be stored for a period of 2 years after the end of the crediting period.

- Internal auditing and training

All staff involved in the monitoring process will be trained. The training contains CDM&VCS knowledge, operational regulations, quality control (QC) standard flow, data monitoring requirements and data management regulations, etc.

A site-specific monitoring manual comprising monitoring procedures will be developed and implemented to ensure a robust data gathering system at the project location. All relevant monitoring personnel will receive specific training and responsibilities within the monitoring process.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

$$BE_y = (EG_y - EG_{\text{baseline}}) \times EF_{\text{grid, CM, y}} \quad (1)$$

Where:

BE_y = Baseline emissions in year y (tCO₂e/y);

EG_y = Net electricity supplied by the project activity to the grid (MWh);

EG_{baseline} = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero;

$EF_{\text{grid, CM, y}}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂e/MWh) .

Since this project installs a new grid-connected renewable power plant/unit, $EG_{\text{baseline}} = 0$; therefore, $BE_y = EG_y \times EF_{\text{grid, CM, y}}$.

In accordance with the above stated monitoring parameters in section 4.2, for the project activity:

$$EG_y = EG_{\text{out, y}} - E_{\text{in, y}} \quad (2)$$

The baseline emissions calculations are shown below in Table 2 and Table 3.

Baseline emissions calculations

The annually and monthly baseline emissions calculations are shown in Table 2 and Table 3.

Table 2 Annually baseline emissions calculations

Year	Total Electricity Produced by the Project Activity (TEGy) (MWh)	Electricity Supplied to the Grid (Electricity Meter Readings) (EG _{out,y}) (MWh)	Electricity Consumed by the Plant from the Grid (E _{in,y}) (MWh)	Net Electricity Supplied to the Grid (Electricity Meter Readings) (EG _y) (MWh)	Electricity Supplied to the Grid (Electricity invoices) (EG _y) (MWh)	Net Electricity Supplied to the Grid (EG _y) (MWh)	Grid Emission Factor (EF _{grid,CM,y}) (tCO ₂ e/MWh)	Baseline Emissions (BE _y) (tCO ₂ e) BE _y = EG _y × EF _{grid, CM, y}
	A	B	C	D=B-C	E	F=Min(D,E)	G	H=Rounddown(F*G)
01/09/2012-31/12/2012	107,127.3	106,326.0	60.5	106,265.5	106,265.5	106,265.5	0.7794	82,823
2013	436,280.1	433,341.7	144.1	433,197.6	433,180.5	433,180.5	0.7794	337,620
2014	621,741.8	617,648.9	372.9	617,276.0	617,276.0	617,276.0	0.7794	481,104
2015	621,852.1	617,729.2	90.2	617,639.0	617,615.9	617,615.9	0.7794	481,368
2016	585,329.1	581,354.4	34.1	581,320.3	581,320.3	581,320.3	0.7794	453,081
2017	562,863.4	558,905.6	176.0	558,729.6	558,728.5	558,728.5	0.7794	435,472
01/01/2018-31/08/2018	437,029.4	433,881.8	132.0	433,749.8	433,752.0	433,749.8	0.7794	338,064
In total	3,372,223.2	3,349,187.6	1,009.8	3,348,177.8	3,348,138.7	3,348,134.3	-	2,609,532

Table 3 The monthly Baseline Emissions calculations

Year	Total Electricity Produced by the Project Activity (TEG _y) (MWh)	Electricity Supplied to the Grid (Electricity Meter Readings) (EG _{out,y}) (MWh)	Electricity Consumed by the Plant from the Grid (E _{in,y}) (MWh)	Net Electricity Supplied to the Grid (Electricity Meter Readings) (EG _y) (MWh)	Electricity Supplied to the Grid (Electricity invoices) (EG _y) (MWh)	Net Electricity Supplied to the Grid (EG _y) (MWh)	Grid Emission Factor (EF _{grid,CM,y}) (tCO ₂ e/MWh)	Baseline Emissions (BE _y) (tCO ₂ e) BE _y = EG _y × EF _{grid, CM, y}
	A	B	C	D=B-C	E	F=Min(D, E)	G	³ H=F*G
September 2012	26,090.3	25,934.7	4.4	25,930.3	25930.3	25,930.3	0.7794	20,210.1
October 2012	32,399.6	32,156.3	5.5	32,150.8	32150.8	32,150.8	0.7794	25,058.3
November 2012	32,127.8	31,861.5	13.2	31,848.3	31848.3	31,848.3	0.7794	24,822.6
December 2012	16,509.6	16,373.5	37.4	16,336.1	16336.1	16,336.1	0.7794	12,732.4
Sub-total of 2012	107,127.3	106,326.0	60.5	106,265.5	106,265.5	106,265.5	-	82,823
January 2013	30,686.4	30,430.4	22.0	30,408.4	30408.4	30,408.4	0.7794	23,700.3
February 2013	14,661.8	14,533.2	24.2	14,509.0	14509	14,509.0	0.7794	11,308.3
March 2013	17,506.0	17,327.2	8.8	17,318.4	17318.4	17,318.4	0.7794	13,498.0
April 2013	36,429.2	36,149.3	24.2	36,125.1	36125.1	36,125.1	0.7794	28,155.9
May 2013	91,522.3	90,970.0	2.2	90,967.8	90960	90,960.0	0.7794	70,894.2

³ Only the annually baseline emissions round-down, the monthly baseline emissions does not round-down

June 2013	106,954.1	106,360.1	0.0	106,360.1	106360.1	106,360.1	0.7794	82,897.1
July 2013	25,279.5	25,128.4	12.1	25,116.3	25116.3	25,116.3	0.7794	19,575.6
August 2013	20,584.8	20,460.0	8.8	20,451.2	20451.2	20,451.2	0.7794	15,939.7
September 2013	20,690.3	20,561.2	6.6	20,554.6	20554.6	20,554.6	0.7794	16,020.3
October 2013	22,580.9	22,424.6	5.5	22,419.1	22416.1	22,416.1	0.7794	17,471.1
November 2013	26,778.2	26,590.3	17.6	26,572.7	26572.7	26,572.7	0.7794	20,710.8
December 2013	22,606.5	22,407.0	12.1	22,394.9	22388.6	22,388.6	0.7794	17,449.7
Sub-total of 2013	436,280.1	433,341.7	144.1	433,197.6	433,180.5	433,180.5	-	337,620
January 2014	31,731.0	31,454.5	3.3	31,451.2	31451.2	31,451.2	0.7794	24,513.1
February 2014	7,518.9	7,448.1	110.0	7,338.1	7338.1	7,338.1	0.7794	5,719.3
March 2014	5,004.6	4,952.2	185.9	4,766.3	4766.3	4,766.3	0.7794	3,714.9
April 2014	64,035.5	63,549.2	14.3	63,534.9	63534.9	63,534.9	0.7794	49,519.1
May 2014	74,228.8	73,729.7	1.1	73,728.6	73728.6	73,728.6	0.7794	57,464.1
June 2014	83,961.3	83,444.9	5.5	83,439.4	83439.4	83,439.4	0.7794	65,032.7
July 2014	110,727.1	110,084.7	0.0	110,084.7	110084.7	110,084.7	0.7794	85,800.0
August 2014	88,014.3	87,534.7	3.3	87,531.4	87531.4	87,531.4	0.7794	68,222.0
September 2014	32,514.9	32,324.6	11.0	32,313.6	32313.6	32,313.6	0.7794	25,185.2
October 2014	36,512.7	36,271.4	3.3	36,268.1	36268.1	36,268.1	0.7794	28,267.4

November 2014	63,101.2	62,657.1	3.3	62,653.8	62653.8	62,653.8	0.7794	48,832.4
December 2014	24,391.5	24,197.8	31.9	24,165.9	24165.9	24,165.9	0.7794	18,834.9
Sub-total of 2014	621,741.8	617,648.9	372.9	617,276.0	617,276.0	617,276.0	-	481,104
January 2015	1,978.2	1,956.9	23.1	1,933.8	1910.7	1,910.7	0.7794	1,489.2
February 2015	25,169.8	24,928.2	7.7	24,920.5	24920.5	24,920.5	0.7794	19,423.0
March 2015	19,561.5	19,390.8	14.3	19,376.5	19376.5	19,376.5	0.7794	15,102.0
April 2015	31,499.9	31,265.3	4.4	31,260.9	31262	31,260.9	0.7794	24,364.7
May 2015	93,126.5	92,528.7	0.0	92,528.7	92527.6	92,527.6	0.7794	72,116.0
June 2015	114,206.7	113,516.7	0.0	113,516.7	113516.7	113,516.7	0.7794	88,474.9
July 2015	79,980.0	79,512.4	4.4	79,508.0	79508	79,508.0	0.7794	61,968.5
August 2015	73,047.5	72,617.6	2.2	72,615.4	72615.4	72,615.4	0.7794	56,596.4
September 2015	55,825.8	55,487.3	3.3	55,484.0	55484	55,484.0	0.7794	43,244.2
October 2015	82,764.1	82,218.4	1.1	82,217.3	82217.3	82,217.3	0.7794	64,080.2
November 2015	23,461.4	23,283.7	9.9	23,273.8	23273.8	23,273.8	0.7794	18,139.6
December 2015	21,230.6	21,023.2	19.8	21,003.4	21003.4	21,003.4	0.7794	16,370.0
Sub-total of 2015	621,852.1	617,729.2	90.2	617,639.0	617,615.9	617,614.8	-	481,368
January 2016	37,587.1	37,233.9	3.3	37,230.6	37230.6	37,230.6	0.7794	29,017.5
February 2016	23,519.3	23,298.0	2.2	23,295.8	23295.8	23,295.8	0.7794	18,156.7

March 2016	40,596.1	40,275.4	3.3	40,272.1	40272.1	40,272.1	0.7794	31,388.1
April 2016	76,169.1	75,654.7	0.0	75,654.7	75654.7	75,654.7	0.7794	58,965.3
May 2016	79,908.2	79,417.8	4.4	79,413.4	79413.4	79,413.4	0.7794	61,894.8
June 2016	111,741.4	111,075.8	0.0	111,075.8	111075.8	111,075.8	0.7794	86,572.5
July 2016	80,694.1	80,240.6	3.3	80,237.3	80237.3	80,237.3	0.7794	62,537.0
August 2016	51,165.6	50,865.1	3.3	50,861.8	50861.8	50,861.8	0.7794	39,641.7
September 2016	32,323.7	32,105.7	2.2	32,103.5	32103.5	32,103.5	0.7794	25,021.5
October 2016	16,831.9	16,702.4	3.3	16,699.1	16699.1	16,699.1	0.7794	13,015.3
November 2016	19,694.7	19,530.5	3.3	19,527.2	19527.2	19,527.2	0.7794	15,219.5
December 2016	15,097.9	14,954.5	5.5	14,949.0	14949	14,949.0	0.7794	11,651.3
Sub-total of 2016	585,329.1	581,354.4	34.1	581,320.3	581,320.3	581,320.3	-	453,081
January 2017	23,324.1	23,107.7	3.3	23,104.4	23104.4	23,104.4	0.7794	18,007.6
February 2017	22,935.6	22,716.1	22.0	22,694.1	22694.1	22,694.1	0.7794	17,687.8
March 2017	21,972.4	21,767.9	3.3	21,764.6	21764.6	21,764.6	0.7794	16,963.3
April 2017	50,539.7	50,166.6	2.2	50,164.4	50165.5	50,164.4	0.7794	39,098.1
May 2017	58,262.2	57,820.4	4.4	57,816.0	57814.9	57,814.9	0.7794	45,060.9
June 2017	99,053.6	98,392.8	0.0	98,392.8	98392.8	98,392.8	0.7794	76,687.3
July 2017	110,215.8	109,535.8	0.0	109,535.8	109535.8	109,535.8	0.7794	85,372.2

August 2017	48,858.2	48,574.9	6.6	48,568.3	48568.3	48,568.3	0.7794	37,854.1
September 2017	79,981.4	79,499.2	0.0	79,499.2	79499.2	79,499.2	0.7794	61,961.7
October 2017	10,195.4	10,118.9	38.5	10,080.4	10079.3	10,079.3	0.7794	7,855.8
November 2017	20,158.4	19,992.5	59.4	19,933.1	19933.1	19,933.1	0.7794	15,535.9
December 2017	17,366.6	17,212.8	36.3	17,176.5	17176.5	17,176.5	0.7794	13,387.4
Sub-total of 2017	562,863.4	558,905.6	176.0	558,729.6	558,728.5	558,727.4	-	435,472
January 2018	26,381.5	26,121.7	60.5	26,061.2	26061.2	26,061.2	0.7794	20,312.1
February 2018	10,630.1	10,522.6	44.0	10,478.6	10480.8	10,478.6	0.7794	8,167.0
March 2018	43,885.4	43,468.7	15.4	43,453.3	43453.3	43,453.3	0.7794	33,867.5
April 2018	52,264.1	51,794.6	3.3	51,791.3	51791.3	51,791.3	0.7794	40,366.1
May 2018	91,620.3	91,019.5	1.1	91,018.4	91018.4	91,018.4	0.7794	70,939.7
June 2018	99,365.5	98,775.6	0.0	98,775.6	98775.6	98,775.6	0.7794	76,985.7
July 2018	75,886.9	75,442.4	3.3	75,439.1	75439.1	75,439.1	0.7794	58,797.2
August 2018	36,995.7	36,736.7	4.4	36,732.3	36732.3	36,732.3	0.7794	28,629.2
Sub-total of 2018	437,029.4	433,881.8	132.0	433,749.8	433,752.0	433,749.8	-	338,064
In Total	3,372,223.2	3,349,187.6	1,009.8	3,348,177.8	3,348,138.7	3,348,134.3	-	2,609,532

5.2 Project Emissions

Per ACM0002 version 9, project emissions, PE_y , equal to the sum of emissions from the reservoir and emissions from the diesel fired back-up generator.

- Reservoir related project emissions

The power density of the project in each year of this monitoring period is listed in Table 4 based on the installed capacity of the hydropower plant and the surface area of the reservoir.

Table 4. The power density of the project in this monitoring period

Year	Cap _{PI} (W)	A _{PI} (m ²)	Power Density (W/m ²)
2012	150,000,000	2,050,000	73.17
2013	150,000,000	2,110,000	71.09
2014	150,000,000	2,000,000	75.00
2015	150,000,000	2,050,000	73.17
2016	150,000,000	2,100,000	71.09
2017	150,000,000	2,070,000	72.46
2018	150,000,000	2,070,000	72.46

The power density in each year of this monitoring period is above the threshold of 10 W/m², as per the methodology ACM0002 version 9, the emissions from the reservoir are neglected.

- Backup generator related project emissions

One backup diesel generator is installed at the Guizhou Qingshuihe Gelibridge Hydropower Project for use for emergency purposes only. Backup power project emissions ($PE_{FC,j,y}$) are calculated for the on-site backup diesel generator. Methodology ACM0002 version 9 states that $PE_{FC,j,y}$ should be calculated using the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”. In accordance with this Tool (version 02), CO₂ emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted (i.e., the amount of diesel combusted by the backup generator in the project activity) and the CO₂ emission coefficient of those fuels, as follows:

$$PE_{FC,j,y} = \sum_i FC_{i,j,y} \times COEF_{i,y} \quad (3)$$

Where:

- $PE_{FC,j,y}$ = CO₂ emissions from fossil fuel combustion in process j during the year y (tCO₂e/y);
 $FC_{i,j,y}$ = Quantity of fuel type i combusted in process j during the year y (mass or volume unit/y);
 $COEF_{i,y}$ = CO₂ emission coefficient of fuel type i in year y (tCO₂e/mass or volume unit); i are the fuel types combusted in process j during the year y.

The CO₂ emission coefficient $COEF_{i,y}$ can be calculated using one of two options depending on the availability of data. We have opted to calculate $COEF_{i,y}$ based on Option B as public data is available:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO_2,i,y} \quad (4)$$

Where:

- $COEF_{i,y}$ = CO₂ emission coefficient of fuel type i in year y (tCO₂e/t);
 $NCV_{i,y}$ = Weighted average net calorific value of the fuel type i in year y (GJ/t);
 $EF_{CO_2,i,y}$ = Weighted average CO₂ emission factor of fuel type i in year y (tCO₂e/GJ); i are the fuel types combusted in process j during the year y.

Table 5. Project emissions calculations

Period	Quantity of diesel consumed by the back-up generator ($FC_{i,j,y}$) (t)	CO ₂ emission factor for diesel ($COEF_{i,y}$) (tCO ₂ e/t)	Project Emissions from Diesel consumption (PE_y) (tCO ₂ e)
	A	B	C=Roundup(A*B)
01/09/2012 - 31/12/2012	0.03	3.19	1
2013	0.09	3.19	1
2014	0.09	3.19	1
2015	0.09	3.19	1
2016	0.09	3.19	1
2017	0.09	3.19	1
01/01/2018- 31/08/2018	0.06	3.19	1
In total	0.55	3.19	7

5.3 Leakage

No leakage is considered in accordance with ACM0002 version 09.

5.4 Net GHG Emission Reductions and Removals

This monitoring period started from 01/09/2012 and ended at 31/08/2018 (first and last days included), with totally 2,191 days. Based on the annual estimated emission reductions from the registered VCS PD, the amount of emission reductions from this monitoring period would be $387,570 \text{ tCO}_2\text{e} / 365 \times 2,191 \text{ days} = 2,326,481 \text{ tCO}_2\text{e}$. The actual emission reductions in this monitoring period (2,191 days) are 2,609,525 tCO₂e, which is 12.17% higher than the estimation in the registered VCS PD. The main reason is that the net electricity supplied to the grid by the project in this monitoring period is higher than the estimated value in registered VCS PD. It is because the water flow of Qingshui River caused by the abundant rainfall in this monitoring period on average is higher than the estimated rainfall as stated in the feasibility study report.

As per the calculation of IRR under CDM program, if annual power supply increases 44.7% higher than the ex-ante estimation in registered CDM PDD, the IRR (post income tax) of the project will be 8% which does impact the additionality. During this monitoring period, the net electricity exported to the grid is only 12.17% higher than the ex-ante estimation in registered VCS PD, which is at normal fluctuation and does not impact the additionality.

So, it is reasonable that during this monitoring period, the actual emission reductions are higher than the estimated value in the registered VCS PD.

Year	Baseline emissions /removals (tCO ₂ e)	Project emissions/or removals (tCO ₂ e)	Leakage emissions/or removals (tCO ₂ e)	Net GHG emission reductions/or removals (tCO ₂ e)
01/09/2012-31/12/2012	82,823	1	0	82,822
2013	337,620	1	0	337,619
2014	481,104	1	0	481,103
2015	481,368	1	0	481,367
2016	453,081	1	0	453,080
2017	435,472	1	0	435,471
01/01/2018-31/08/2018	338,064	1	0	338,063
Total	2,609,532	7	0	2,609,525

ANNEX 1 THE CALIBRATION RECORDS OF ELECTRICITY METERS

Meter	Manufacturer/ Model No.	Serial Number	Accuracy	Calibration date	Valid until	Document No.
E3 (L1)	2000-6E20	208368562	0.2S	09/06/2012	08/06/2013	2012500100
				03/12/2012	02/12/2013	20125001261
				11/06/2013	10/06/2014	2013400100
				10/12/2013	09/12/2014	2013120100
				10/06/2014	09/06/2015	2014060100
				09/12/2014	08/12/2015	2014120100
				12/08/2015 ⁴	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
E4 (L1) (backup)	2000-6E20	208368565	0.2S	09/06/2012	08/06/2013	2012500101
				03/12/2012	02/12/2013	20125001262
				11/06/2013	10/06/2014	2013400101
				10/12/2013	09/12/2014	2013120101
				10/06/2014	09/06/2015	2014060101
				09/12/2014	08/12/2015	2014120101
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
E3 (L2)	2000-6E20	208368563	0.2S	09/06/2012	08/06/2013	2012500102
				03/12/2012	02/12/2013	20125001263
				11/06/2013	10/06/2014	2013400102
				10/12/2013	09/12/2014	2013120102
				10/06/2014	09/06/2015	2014060102
				09/12/2014	08/12/2015	2014120102
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
	2000-6E20	208368572	0.2S	09/06/2012	08/06/2013	2012500103
				03/12/2012	02/12/2013	20125001264

⁴ From 2012 to 2014 the meters were calibrated two times each year, from 2015 the meters were calibrated on a yearly basis.

E4 (L2) (backup)				11/06/2013	10/06/2014	2013400103
				10/12/2013	09/12/2014	2013120103
				10/06/2014	09/06/2015	2014060103
				09/12/2014	08/12/2015	2014120103
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
E1 (L1)	2000-A605	207502248	0.5S	09/06/2012	08/06/2013	2012500106
				03/12/2012	02/12/2013	20125001267
				11/06/2013	10/06/2014	2013400104
				10/12/2013	09/12/2014	2013120104
				10/06/2014	09/06/2015	2014060104
				09/12/2014	08/12/2015	2014120104
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
E2 (L1) (backup)	2000-A605	207502257	0.5S	09/06/2012	08/06/2013	2012500107
				03/12/2012	02/12/2013	20125001268
				11/06/2013	10/06/2014	2013400105
				10/12/2013	09/12/2014	2013120105
				10/06/2014	09/06/2015	2014060105
				09/12/2014	08/12/2015	2014120105
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
E1 (L2)	2000-A605	207502246	0.5S	09/06/2012	08/06/2013	2012500105
				03/12/2012	02/12/2013	20125001265
				11/06/2013	10/06/2014	2013400106
				10/12/2013	09/12/2014	2013120106
				10/06/2014	09/06/2015	2014060106
				09/12/2014	08/12/2015	2014120106
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042
E2 (L2) (backup)	2000-A605	207502242	0.5S	09/06/2012	08/06/2013	2012500104
				03/12/2012	02/12/2013	20125001266

				11/06/2013	10/06/2014	2013400107
				10/12/2013	09/12/2014	2013120107
				10/06/2014	09/06/2015	2014060107
				09/12/2014	08/12/2015	2014120107
				12/08/2015	11/08/2016	15-0087-0045
				30/07/2016	29/07/2017	16-0049-0015
				28/07/2017	27/07/2018	17-0038-0023
				27/07/2018	26/07/2019	18-0067-0042