



GUIZHOU QINGSHUIHE GELIBRIDGE HYDROPOWER PROJECT



Document Prepared By LGAI Technological Center, S.A. (Applus+ Certification)

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Summary:

LGAI Technological Center, S.A. (hereafter referred to as “Applus+ Certification”) has been commissioned by Beijing Sindicatum Clean Energy Technology and Services Co., Ltd. to perform the verification of greenhouse gas emission reductions of the project activity “Guizhou Qingshuihe Gelibridge Hydropower Project” (VCS Ref. No. 656, hereafter referred to as “the project activity”) reported in the monitoring report /1/ during monitoring period 01/09/2012 to 31/08/2018.

The project activity has been validated by TÜV SÜD Industrie Service GmbH based on the CDM PDD /3/ version 09 dated 25/09/2010 and reported in the validation report No. 600500250 /4/, version 5, completed on 29/09/2010. The project activity was registered as a CDM project activity on 04/10/2010 which is available at <https://cdm.unfccc.int/Projects/DB/TUEV-SUED1265278332.26/view>. After the registration, a change in PDD has been made and indicated in the updated CDM PDD /3/, version 10 dated 25/02/2011 approved by CDM EB which is the basis for verification. A gap validation was performed by China Quality Certification Centre (CQC) which is available at <https://registry.terra.org/app/projectDetail/VCS/656>.

The project activity is a hydropower project located at Maoyun village in Kaiyang county of Guizhou province, P. R. China which is to use hydropower resource for electricity generation. The installed capacity of the project activity is 150 MW, involves the installation of 2 sets of hydro turbine generators with a unit capacity of 75 MW. The average annual power delivered to the grid by the project is expected to be 497.3 GWh. The project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in South China Power Grid (SCPG). It's estimated that the proposed project could achieve GHG emission reductions of 387,570 tCO₂e annually.

The purpose and scope of this verification is to ensure that reported emission reductions are complete and accurate in accordance with applicable VCS standards and relevant UNFCCC requirements in order to be certified. A desk review and a site visit have been conducted to verify the data submitted in the monitoring report /1/. Applus+ Certification confirms the following has been reviewed:

- Monitoring plan included in the registered CDM PDD /3/ version 10 dated 25/02/2011;
- Gap Validation report No. CDM-VER-2010-0015 /4/, completed on 20/05/2011 by CQC;

- Approved methodology, ACM0002 /7/, version 9.0, dated 27/02/2009;
- VCS standards version 4.1 and guidance version 4.0, as well as relevant UNFCCC requirements;
- All information and references relevant to the project activity's resulting in emission reductions.

During this verification, no finding was identified related to the monitoring, implementation or operations of the project activity in relation to relevant VCS standards, guidance and UNFCCC requirements and relevant host party criteria and the applied baseline and monitoring methodology etc.

Applus+ Certification confirms that the project is implemented in accordance with the registered PDD /3/. The monitoring plan complies with the applied methodology ACM0002 /7/ version 9.0 and the monitoring has been carried out in accordance with the registered PDD. The monitoring system is in place and the emission reductions are calculated without material misstatements. The level of assurance of the verification is reasonable. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information reviewed and evaluated Applus+ Certification confirms that the implementation of the project has resulted in 2,609,525 tCO₂e emission reductions during period 01/09/2012 to 31/08/2018.

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1 INTRODUCTION

1.1 Objective

- LGAI Technological Center, S.A. (Applus+ Certification) has been commissioned by Beijing Sindicatum Clean Energy Technology and Services Co., Ltd. to perform the verification of greenhouse gas emission reductions of the project activity “Guizhou Qingshuihe Gelibridge Hydropower Project” (VCS Ref. No. 656) reported in the Monitoring Report /1/ during monitoring period 01/09/2012 to 31/08/2018.
- LGAI Technological Center, S.A. (Applus+ Certification) as the verification body of the project activity has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2013.
- The objective of verification is to have an independent review and ex post determination by a Validation and Verification Body (VVB) of the monitored reductions in GHG emissions that have occurred as a result of the registration of VCS project. Certification is the written assurance by the VVB that, during a specific time period, a proposed VCS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified.
- The objective of this verification/certification is to verify and certify emission reductions, reported for the “Guizhou Qingshuihe Gelibridge Hydropower Project” in China for the period 01/09/2012 to 31/08/2018.

1.2 Scope and Criteria

- The verification scope is defined as an independent and objective review of the registered PD and PDD, the Project’s baseline study and Monitoring Report (MR) and other relevant documents. The information in these documents is reviewed against VCS Version 4.1 requirements, UNFCCC rules and associated interpretations.
- The verification is not meant to provide any consulting towards the client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the Project monitoring towards reductions in the GHG emissions.

1.3 Level of Assurance

- The verification report is based on the CDM-PDD, the VCS Monitoring Report (MR), supporting evidences made available to the verifier and information collected through performing interviews and during the on-site assessment.
- The verification conclusion is assured a reasonable level of assurance.

1.4 Summary Description of the Project

Project title	Guizhou Qingshuihe Gelibridge Hydropower Project
VCS reference number	656
Project Participants	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. (Project Owner, host country, P. R. China)
Location of the project	Maoyun village in Kaiyang county of Guizhou province, People's Republic of China Central Geographic coordinates: Dam: East longitude: 107 ° 12'22" North latitude: 27 ° 00'30" Power Plant: East longitude: 107 ° 12'02" North latitude: 27 ° 00'33"
Project start date	Construction start date: 06/2007 Operation start date: 06/02/2010
Version of VCS PD	Version 1, dated 25/11/2010 (VCS PD)
Version of CDM PDD	Version 10, dated 25/02/2011 (CDM PDD and basis for verification)
Monitoring period	01/09/2012 to 31/08/2018
First monitoring report	Version 1, dated 28/12/2021
Final monitoring report	Version 3, dated 03/06/2022
Applied Methodology/Version	ACM0002, version 9.0, dated 27/02/2009

Scope/Technical Area	1/1.2
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The project activity is a hydropower project located at Maoyun village in Kaiyang county of Guizhou province, P. R. China which is to use hydropower resource for electricity generation. The installed capacity of the project activity is 150 MW, involves the installation of 2 sets of hydro turbine generators with a unit capacity of 75 MW. The average annual power delivered to the grid by the project is expected to be 497.3 GWh. The project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in South China Power Grid (SCPG). It's estimated that the proposed project could achieve GHG emission reductions of 387,570 tCO₂e annually.

The project activity has been validated by TÜV SÜD Industrie Service GmbH based on the CDM PDD /3/ version 09 dated 25/09/2010 and reported in the validation report No. 600500250 /4/, version 5, completed on 29/09/2010. The project activity was registered as a CDM project activity on 04/10/2010 which is available at <https://cdm.unfccc.int/Projects/DB/TUEV-SUED1265278332.26/view>. After the registration, a change in PDD has been made and indicated in the updated CDM PDD /3/, version 10 dated 25/02/2011 approved by CDM EB which is the basis for verification. A gap validation was performed by China Quality Certification Centre (CQC) which is available at <https://registry.terra.org/app/projectDetail/VCS/656>.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification was conducted using Applus+ Certification's procedures in line with the requirements specified in the VCS Standard version 4.1, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant UNFCCC requirements and applying standard auditing techniques.

Applus+ Certification completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

Applus+ Certification verified the implementation of the monitoring plan and the data presented in the Monitoring Report /1/ for the period in question. This involved a site visit and a desk review of the Monitoring Report. This Verification Report describes the findings of this assessment.

The information of the assessment team is included in below:

Assessment team

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in Applus+ Certification. The composition of assessment team has to be approved by the Applus+ Certification ensuring that the required skills are covered by the team. The four qualification levels for team members that are assigned by formal appointment rules as below:

- Leader Auditor (LA)
- Auditor (A)/ Auditor Trainee (AiT)

- Technical Reviewer (TR)
- Technical Experts (TE)

Name	Qualification	Coverage of scope	Coverage of Technical Area	Host country experience
<i>Doris Dai</i>	<i>LA/TE</i>	<i>Y (1.2)</i>	<i>Y</i>	<i>Y</i>
<i>Simon Shen</i>	<i>TR</i>	<i>Y (1.2)</i>	<i>Y</i>	<i>Y</i>

- **Doris Dai** (Master's Degree in Environmental Sciences, Bachelor's Degree in Environmental Technology) is an Auditor appointed by Applus+ LGAI for the GHG project assessment and auditing. She has more than 6 years of work experience in CDM/VCS project assessment. Before she joined Applus+ LGAI, she has been working for CTI Certification as senior GHG Auditor for 3.5 years.
- **Simon Shen** (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ Certification for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ Certification, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years.

2.2 Document Review

- The VCS monitoring report /1/ version 1 dated 28/12/2021, version 3 dated 03/06/2022 and the emission reduction calculations spreadsheet /2/, were assessed as part of the verification. In addition, the VCS PD /3/ version 1 dated 25/11/2010, CDM PDD /3/ version 10 dated 25/02/2011 in particular the baseline estimations and the monitoring plan, the VCS Validation Report /4/ dated 20/05/2011, as well as relevant documents, were reviewed. A detailed document reviewed are listed in Appendix 1 of the report.

2.3 Interviews

The key personnel interviewed are summarized in the table below:

Interviewed personnel	Role	Organization	Subject
Ms. Mei Xiao	Director	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.	Operation of the project activity; Implementation of the monitor plan of the project activity; Data collection and data achievement; Calibration of meters and equipment maintenance. Data collection and ER calculation.
Ms. Zhu Huhuai	Manager	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.	
Mr. Jiang Peng	Operator	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.	
Mr. Huang Jun	Operator	Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd.	
Mr. Jia Baoqiang	CEO	Beijing Sindicatum Clean Energy Technology and Services Co.,Ltd	
Ms. Zhang Min	Director	Beijing Sindicatum Clean Energy Technology and Services Co.,Ltd	
Mr. Zheng Jiangzhuo	Project Manager	Beijing Sindicatum Clean Energy Technology and Services Co.,Ltd	

2.4 Site Inspections

- The assessment team performed the on-site verification (Maoyun village in Kaiyang county of Guizhou province, P. R. China) on 04/01/2022. The interviewed personnel and objective are listed in above table.

2.5 Resolution of Findings

- As an outcome of the verification process, the team can raise different types of findings.
- Where a non-conformance arises the assessment team shall raise a Corrective Action Request (CAR). A CAR is issued, where:
 - a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
 - b) Modifications to the implementation, operation and monitoring of the project activity has not been sufficiently documented by the project participants;
 - c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
 - d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.
- The assessment team shall raise a Clarification Request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.
- All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.
- There is no CARs and CLs raised for this monitoring period for the project.

2.5.1 Forward Action Requests

- None FAR was raised during the verification process. Also there are no remaining from former validation.

2.6 Eligibility for Validation Activities

- Not applicable as LGAI Technological Center, S.A. holds the accreditation for the validation and verification for projects under scope 1.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

- Through reviewing the registered PDD /3/ and validation report /4/, it was validated that the project has been registered as a CDM project with reference No. 3351 first which is available at <https://cdm.unfccc.int/Projects/DB/TUEV-SUED1265278332.26/view>. Then the project has been registered as VCS project which is available at <https://registry.terra.org/app/projectDetail/VCS/656>. The project does not participate in the other emissions trading program by checking public information on Internet, interviewing with project owner and statement issued by project owner.
- During the period from 06/02/2010 to 05/02/2020 as the first VCS crediting period, the project would claim only for VCUs or CERs. But VCUs and CERs will not be claimed in the same period. Also, for period 04/10/2010 to 31/08/2012, the project has applied for the issuance of CERs.
- Therefore, Applus+ Certification consider the project is eligible to participate under the VCS Program as there is no double counting for the emission reduction during any period.

3.2 Methodology Deviations

- Not applicable as no deviation for methodology.

3.3 Project Description Deviations

- Not applicable as no deviation for project description.

3.4 Grouped Project

- Not applicable as not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

- By means of on-site visit, the assessment team confirms that all physical features of the proposed CDM project activity proposed in the registered CDM PDD /3/ are in place and the PP has operated the project as per registered CDM PDD /3/. The installed capacity of the project is 150 MW, involves the installation of 2 sets of hydro turbine generators with a unit capacity of 75 MW. The electricity generated is transmitted to the local Power Grid via a newly built transformer station, which was then exported to the SCPG. The project activity was expected to supply 497.3 GWh of electricity to the grid. The construction of the project started on 06/2007, the project has been put into operation on 06/02/2010 verified by checking information on the UNFCCC website and site visit. There are no changes on the key equipment and technology since the validation of the project. No special event which would affect the monitoring of the project has been observed during the monitoring period.
- The project would contribute to sustainable development in as below:
- 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.
- The technical parameters have been verified with the nameplates /9 / as below:

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	497.3 GWh
Normal water level	719 m
Reservoir size under normal water level	2.13 km ²
Rated water head	84 m
Average flow rate over years	82.3 m ³ /s

- By comparing the actual ER claimed in this monitoring period with the estimate in the registered PD, the actual emission reductions (2,609,525 tCO₂e) are 12.17% higher than what is stated in the registered PDD (i.e. 2,326,481 tCO₂e, equals to annual emission reductions, 387,570 tCO₂e multiplied by the actual operational days (2,191 days) then divided by 365 days). The assessment team consider this variation is acceptable due to following reasons:
 1. Abundant rainfall in this monitoring period on average is higher than the estimated rainfall as stated in the FSR lead to more electricity generation.
 2. Even consider this variation of electricity generation in the IRR calculation, the IRR is still under the benchmark.
- Therefore, the assessment team confirmed the ER in this monitoring period is not overestimated.
- The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period.
- All required equipments and procedures are available and implemented in an appropriate manner.
- All necessary monitoring instruments are installed. All required instruments including standby and operating procedures for the same have been implemented in an appropriate manner.
- The project is completely operational and the same has been confirmed on-site. Neither mistakes nor malfunction on main meters have been observed during this monitoring period.

4.2 Safeguards

4.2.1 No Net Harm

- By checking the EIA summary and conclusion provided in the registered PDD, it is confirmed that hydro power is green power and the impact caused by hydro power on the surrounding ecosystem and residents, water, and atmosphere etc. is very little, there would be no net harm caused due to the project activity. Also, the EIA of the project are approved by the government.
- Also, no potential environment or social economic matter was found during the site visit. The project is renewable energy project and thus no net harm observed in air or water quality on-site.

4.2.2 Local Stakeholder Consultation

- A survey was carried out in April 2007 through the information publication, distributing and collecting responses to questionnaires targeting on local residents, builders and members of the local authorities. The project owner introduced the proposed project, and then a survey was arranged through a one-page questionnaire, which was designed to be easily filled in. The opinions expressed by the stakeholders were recorded and are available on request.
- The stakeholder meeting and the survey showed that the proposed project receives strong support from the local community. They all believe the proposed project will promote local economic development and agree with the project development and construction.
- Communications with Local stakeholders was being carried out at periodic intervals. There are no negative comments received for the project.
- All such conclusion has been verified through site visit and check registered PDD.

4.3 AFOLU-Specific Safeguards

- Not applicable as non-AFOLU project.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

- The monitoring has been carried out in accordance with the monitoring plan contained in the CDM PDD /3/. All parameters were monitored and determined as per the monitoring plan which is listed in below table:

Data / Parameter:	EG _{out,y}
Data unit:	MWh
Description:	Electricity supplied by the project activity to the grid

Purpose of the data:	Calculation of baseline emissions																						
Parameter value:	3,349,187.6																						
Source of data used:	Electricity supplied by the project activity to the grid (EG _{out,y}) are all sourced from Meter Reading Record (MRRs) /10/ issued by the project owner and Electricity Transaction Notes (ETNs) /11/ issued by power grid company covering monitoring period.																						
Information flow:	2 sets of bidirectional electricity meters (one set as main (E3) and another as backup (E4)) installed at the grid interface on each of the lines (Line 1 and Line 2) were measured continuously, recorded monthly and archived electronically. At 24:00 hr of the last day of each month, the staff from project owner will record 2 sets of bidirectional electricity meters' readings and form Meter Reading Records (MRRs). The staff from power grid company will record the meter readings of main meters (E3) then transcribes the data into Electricity Transaction Notes (ETNs) then after the confirmation of the project owner for the ETNs, the project owner will issue the invoice. The data for MRRs and ETNs have been sent to the CDM consulting company for reporting of GHG emission reduction. The conservative one would be used for ER calculation.																						
Monitoring method, frequency and equipments:	The parameter was measured continuously and recorded monthly by 2 sets of bidirectional electricity meters (one set as main (E3) and another as backup (E4)) installed at the grid interface on each of the lines (Line 1 and Line 2) during the monitoring period verified by site visit. See below for the information of 2 sets of bidirectional electricity meters verified by site visit and checking calibration certificates /12/: <table><tr><th>Meter</th><th>Type</th><th>Serial Number</th><th>Accuracy</th></tr><tr><td>E3 (L1)</td><td>EDMI/2000-6E20</td><td>208368562</td><td>0.2s</td></tr><tr><td>E3 (L2)</td><td>EDMI/2000-6E20</td><td>208368563</td><td>0.2s</td></tr><tr><td>E4 (L1)</td><td>EDMI/2000-6E20</td><td>208368565</td><td>0.2s</td></tr><tr><td>E4 (L2)</td><td>EDMI/2000-6E20</td><td>208368572</td><td>0.2s</td></tr></table> The type, serial number and accuracy have been confirmed by site visit.			Meter	Type	Serial Number	Accuracy	E3 (L1)	EDMI/2000-6E20	208368562	0.2s	E3 (L2)	EDMI/2000-6E20	208368563	0.2s	E4 (L1)	EDMI/2000-6E20	208368565	0.2s	E4 (L2)	EDMI/2000-6E20	208368572	0.2s
Meter	Type	Serial Number	Accuracy																				
E3 (L1)	EDMI/2000-6E20	208368562	0.2s																				
E3 (L2)	EDMI/2000-6E20	208368563	0.2s																				
E4 (L1)	EDMI/2000-6E20	208368565	0.2s																				
E4 (L2)	EDMI/2000-6E20	208368572	0.2s																				
Calibration:	The calibration information is shown as below /12/: <table><tr><th>Meter</th><th>Calibration date</th><th>Valid until</th></tr><tr><td rowspan="2">E3 (L1)</td><td>09/06/2012</td><td>08/06/2013</td></tr><tr><td>03/12/2012</td><td>02/12/2013</td></tr></table>			Meter	Calibration date	Valid until	E3 (L1)	09/06/2012	08/06/2013	03/12/2012	02/12/2013												
Meter	Calibration date	Valid until																					
E3 (L1)	09/06/2012	08/06/2013																					
	03/12/2012	02/12/2013																					

		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
	E3 (L2)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
	E4 (L1)	28/07/2017	27/07/2018
		27/07/2018	26/07/2019
		09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
	E4 (L2)	12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
		09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
	For calibration from 09/06/2012 to 09/12/2014, the calibration was conducted by accredited third parties which is Guizhou Electric Power Testing and Research Institute was accredited by CNAS /13/. For calibration from 12/08/2015 to 26/07/2019, the calibration was conducted by accredited third parties which is Electric Power Research Institute of Guizhou Power Grid Co., LTD was accredited by CNAS /13/.		
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.		

Means of verification:	Data of the parameter was verified by checking MRRs and ETNs. All data is in line with MRRs and ETNs; Information flow was verified by checking MRRs and ETNs, and all information are consistent; Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the PDD; Calibration was verified by checking calibration certificate and Accreditation certificate, all calibration of monitoring equipment meets the requirement indicated in the PDD.
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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
Purpose of the data:	Calculation of baseline emissions
Parameter value:	1,009.8
Source of data used:	The amount of electricity received from the South China Power Grid, which is consumed by the project activity in year y ($E_{in,y}$) are all sourced from Meter Reading Record (MRRs) /10/ issued by the project owner and Electricity Transaction Notes (ETNs) /11/ issued by power grid company covering monitoring period.
Information flow:	2 sets of bidirectional electricity meters (one set as main (E3) and another as backup (E4)) installed at the grid interface on each of the lines (Line 1 and Line 2) were measured continuously, recorded monthly and archived electronically. At 24:00 hr of the last day of each month, the staff from project owner will record 2 sets of bidirectional electricity meters' readings and form Meter Reading Records (MRRs). The staff from power grid company will record the meter readings of main meters (E3) then transcribes the data into Electricity Transaction Notes (ETNs) then after the confirmation of the project owner for the ETNs, the power grid company will issue the invoice. The data for MRRs and ETNs have been sent to the CDM consulting company for reporting of GHG emission reduction. The conservative one would be used for ER calculation.

Monitoring method, frequency and equipments:	The parameter was measured continuously and recorded monthly by 2 sets of bidirectional electricity meters (one set as main (E3) and another as backup (E4)) installed at the grid interface on each of the lines (Line 1 and Line 2) during the monitoring period verified by site visit.		
	See below for the information of 2 sets of bidirectional electricity meters verified by site visit and checking calibration certificates /12/:		
	Meter	Type	Serial Number
	E3 (L1)	EDMI/2000-6E20	208368562
	E3 (L2)	EDMI/2000-6E20	208368563
Calibration:	E4 (L1)	EDMI/2000-6E20	208368565
	E4 (L2)	EDMI/2000-6E20	208368572
	The type, serial number and accuracy have been confirmed by site visit.		
	Meter	Calibration date	Valid until
	E3 (L1)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
	E3 (L2)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
	E4 (L1)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019

	E4 (L2)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
		For calibration from 09/06/2012 to 09/12/2014, the calibration was conducted by accredited third parties which is Guizhou Electric Power Testing and Research Institute was accredited by CNAS /13/.	
For calibration from 12/08/2015 to 26/07/2019, the calibration was conducted by accredited third parties which is Electric Power Research Institute of Guizhou Power Grid Co., LTD was accredited by CNAS /13/.			
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.		
Means of verification:	Data of the parameter was verified by checking MRRs and ETNs. All data is in line with MRRs and ETNs;		
	Information flow was verified by checking MRRs and ETNs, and all information are consistent;		
	Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the PDD;		
	Calibration was verified by checking calibration certificate and Accreditation certificate, all calibration of monitoring equipment meets the requirement indicated in the PDD.		

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
Purpose of the data:	Calculation of project emissions
Parameter value:	3,372,223.2
Source of data used:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads in year y (TEG _y) are all sourced from Meter Reading Record (MRRs) /10/ issued by the project owner covering monitoring period.

Information flow:	2 sets of electricity meters (one set as main (E1) and another as backup (E2)) installed at outlet of each generator (#1 and #2) were measured continuously, recorded monthly and archived electronically. At 24:00 hr of each day, the staff from project owner will record 2 sets of electricity meters' readings and form Meter Reading Records (MRRs). The data for MRRs have been sent to the CDM consulting company for reporting of GHG emission reduction.																							
Monitoring method, frequency and equipments:	The parameter was measured continuously and recorded monthly by 2 sets of electricity meters (one set as main (E1) and another as backup (E2)) installed at outlet of each generator (#1 and #2) during the monitoring period verified by site visit. See below for the information of 2 sets of electricity meters verified by site visit and checking calibration certificates /12/:																							
	<table><tr><th>Meter</th><th>Type</th><th>Serial Number</th><th>Accuracy</th></tr><tr><td>E1 (#1)</td><td>EDMI/2000-A605</td><td>207502248</td><td>0.5s</td></tr><tr><td>E1 (#2)</td><td>EDMI/2000-A605</td><td>207502246</td><td>0.5s</td></tr><tr><td>E2 (#1)</td><td>EDMI/2000-A605</td><td>207502257</td><td>0.5s</td></tr><tr><td>E2 (#2)</td><td>EDMI/2000-A605</td><td>207502242</td><td>0.5s</td></tr></table>				Meter	Type	Serial Number	Accuracy	E1 (#1)	EDMI/2000-A605	207502248	0.5s	E1 (#2)	EDMI/2000-A605	207502246	0.5s	E2 (#1)	EDMI/2000-A605	207502257	0.5s	E2 (#2)	EDMI/2000-A605	207502242	0.5s
	Meter	Type	Serial Number	Accuracy																				
	E1 (#1)	EDMI/2000-A605	207502248	0.5s																				
	E1 (#2)	EDMI/2000-A605	207502246	0.5s																				
	E2 (#1)	EDMI/2000-A605	207502257	0.5s																				
	E2 (#2)	EDMI/2000-A605	207502242	0.5s																				
The type, serial number and accuracy have been confirmed by site visit.																								
Calibration:	Meter		Calibration date	Valid until																				
	E1 (L1)		09/06/2012	08/06/2013																				
			03/12/2012	02/12/2013																				
			11/06/2013	10/06/2014																				
			10/12/2013	09/12/2014																				
			10/06/2014	09/06/2015																				
			09/12/2014	08/12/2015																				
			12/08/2015	11/08/2016																				
			30/07/2016	29/07/2017																				
			28/07/2017	27/07/2018																				
			27/07/2018	26/07/2019																				
	E1 (L2)		09/06/2012	08/06/2013																				
			03/12/2012	02/12/2013																				
			11/06/2013	10/06/2014																				
			10/12/2013	09/12/2014																				
			10/06/2014	09/06/2015																				
			09/12/2014	08/12/2015																				
			12/08/2015	11/08/2016																				
			30/07/2016	29/07/2017																				
28/07/2017			27/07/2018																					
27/07/2018			26/07/2019																					

	E2 (L1)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
	E2 (L2)	09/06/2012	08/06/2013
		03/12/2012	02/12/2013
		11/06/2013	10/06/2014
		10/12/2013	09/12/2014
		10/06/2014	09/06/2015
		09/12/2014	08/12/2015
		12/08/2015	11/08/2016
		30/07/2016	29/07/2017
		28/07/2017	27/07/2018
		27/07/2018	26/07/2019
For calibration from 09/06/2012 to 09/12/2014, the calibration was conducted by accredited third parties which is Guizhou Electric Power Testing and Research Institute was accredited by CNAS /13/.			
For calibration from 12/08/2015 to 26/07/2019, the calibration was conducted by accredited third parties which is Electric Power Research Institute of Guizhou Power Grid Co., LTD was accredited by CNAS /13/.			
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.		

Data / Parameter:	Cap _{PJ}
Data unit:	W
Description:	Installed capacity of the hydropower plant after the implementation of the project activity
Purpose of the data:	Calculation of project emissions
Parameter value:	150,000,000
Source of data used:	Installed capacity of the hydropower plant after the implementation of the project activity (Cap _{PJ}) is determined by checking nameplate of the equipment on site.
Information flow:	Installed capacity of the hydropower plant after the implementation of the project activity (Cap _{PJ}) is determined by checking nameplate of the equipment on site.

Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

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
Purpose of the data:	Calculation of project emissions
Parameter value:	2012: 2,050,000 2013: 2,110,000 2014: 2,000,000 2015: 2,050,000 2016: 2,100,000 2017: 2,070,000 2018: 2,070,000
Source of data used:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (A _{PJ}) is determined by checking data from software system provided by Planning and Design Branch of the Guiyang Hydroelectric Investigation, Design & Research Institute of China Hydropower Engineering Consulting Group.
Information flow:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (A _{PJ}) is determined by checking data from software system provided by Planning and Design Branch of the Guiyang Hydroelectric Investigation, Design & Research Institute of China Hydropower Engineering Consulting Group. The area of the reservoir is measured annually and recorded by the project owner.
Monitoring method, frequency and equipments:	Not applicable

Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

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
Purpose of the data:	Calculation of project emissions
Parameter value:	0.55
Source of data used:	Quantity of fuel type i combusted in process j during the year y ($FC_{i,j,y}$) is sourced from diesel consumption record /16/.
Information flow:	Quantity of fuel type i combusted in process j during the year y ($FC_{i,j,y}$) is sourced from diesel consumption record /16/.
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/t
Description:	Net caloric value for fuel i
Purpose of the data:	Calculation of project emissions
Parameter value:	42.652
Source of data used:	Net caloric value for fuel i ($NCV_{i,y}$) is determined by checking China Energy Statistical Yearbook /17/.
Information flow:	Net caloric value for fuel i ($NCV_{i,y}$) is determined by checking China Energy Statistical Yearbook /17/.
Monitoring method, frequency and equipments:	Not applicable

Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

Data / Parameter:	EF _{CO2,i,y}
Data unit:	tCO ₂ /GJ
Description:	CO ₂ emission factor per unit of energy for fuel i
Purpose of the data:	Calculation of project emissions
Parameter value:	0.0748
Source of data used:	CO ₂ emission factor per unit of energy for fuel i (EF _{CO2,i,y}) is sourced from IPCC 2006/18/.
Information flow:	CO ₂ emission factor per unit of energy for fuel i (EF _{CO2,i,y}) is sourced from IPCC 2006/18/.
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

- Parameters available at validation stage:
- Below data has been verified against the data sources and the PDD.

Parameter title	Description	Data	Source
EF _{grid,CM,y*}	The baseline Emission Factor of the South China Power Grid	0.7794	Notification on 2006 baseline emission factors for regional power grids in China, issued by China on 15/12/2006 /14/.
Cap _{BL}	Installed capacity of the hydropower plant before the implementation of the project activity	0	ACM0002 /7/

A_{BL}	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full	0	ACM0002 /7/
EF_{Res}	Default emission factor for emissions from reservoirs	90	EB23 /15/

- * $EF_{grid,CM,y}$ is not directly available in the registered PDD but calculated based on the ex-ante data fixed in the registered PDD.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

- The monitoring has been carried out in accordance with CDM PDD /3/ dated 25/02/2011.
- As a result of verification of the ER calculation process, the assessment team confirmed that all the parameters required for the determination of the emission reductions have been included in the MR Report and ER Calculation Spreadsheet /2/ and are consistent with the applied methodology ACM0002 version 9.0 and the monitoring plan. The parameters are complete in this monitoring period.
- After verifying the reported figures with the raw data sources, it's confirmed that the values of the parameters from the raw data sources are consistent with those quoted in the ER Calculation Spreadsheet and the MR Report. The verification process for the same has been clearly described above in section 4.4 of the report.

4.6 Non-Permanence Risk Analysis

- Not applicable as a renewable project.

5 VERIFICATION CONCLUSION

- Applus+ Certification has been commissioned by Beijing Sindicatum Clean Energy Technology and Services Co., Ltd. to perform the verification of greenhouse gas emission reductions of the project activity “Guizhou Qingshuihe Gelibridge Hydropower Project” (VCS Ref. No. 656).
- The management of Guizhou Wujiang Qingshuihe Hydropower Development Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the CDM PDD /3/ dated 25/02/2011.
- Our verification approach was based on the requirements as defined under the applicable VCS standards and relevant UNFCCC requirements. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:
 - - the project is implemented and operated as per the registered PDD and PD;
 - - the monitoring plan in the registered PDD is as per the applied methodology;
 - - the monitoring complies with the registered PDD and PD;
 - - the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS and CDM requirements;
 - - the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
 - - the monitoring system is in place and generates GHG emission reductions data;
 - - the GHG emission reductions are calculated without material misstatements.
- In our opinion, the GHG emission reductions for “Guizhou Qingshuihe Gelibridge Hydropower Project” during the monitoring period 01/09/2012 to 31/08/2018 as reported in Monitoring Report, prepared on the basis of the project’s Monitoring Plan are fairly stated. Based on the information we have seen and evaluated, we confirm the following statement:
- Verification period: From 01/09/2012 to 31/08/2018 (divided into 7 vintage periods). Verified GHG emission reductions or removals in the above reporting period:

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Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
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
2018	338,064	1	0	338,063
Total	2,609,532	7	0	2,609,525

APPENDIX 1: REFERENCE LIST

1. Monitoring report, version 1, dated 28/12/2021; version 3, dated 03/06/2022
2. ER calculation spreadsheet
3. Registered CDM PDD, version 09, dated 25/09/2010
Registered CDM PDD, version 10, dated 25/02/2011
Registered Gap VCS PD, version 1, dated 25/11/2010
4. Validation report, No. 600500250, version 03, completed by TÜV SÜD Industrie Service GmbH
Gap VCS Validation report, completed on 20/05/2011 by CQC
5. VCS standard version 4.1, dated on 22/04/2021
6. Statement issued by project owner
7. Approved methodology ACM0002, version 9.0, dated 27/02/2009
8. CDM Monitoring procedure
9. Nameplate of the equipment
10. Meter Reading Record (MRRs) for Meters
11. Electricity Transaction Notes covering the monitoring period
12. Calibration certificates of meters covering the whole monitoring period issued by Guizhou Electric Power Testing and Research Institute

Calibration certificates of meters covering the whole monitoring period issued by Electric Power Research Institute of Guizhou Power Grid Co., LTD

- 13 Accreditation certificates for Guizhou Electric Power Testing and Research Institute issued by CNAS

Accreditation certificates for Electric Power Research Institute of Guizhou Power Grid Co., LTD issued by CNAS

- 14 Notification on 2006 baseline emission factors for regional power grids in China issued by China DNA on 15/12/2006

- 15 EB23

- 16 Diesel consumption record

- 17 China Energy Statistical Yearbook

- 18 IPCC 2006

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