



GUIZHOU WENJIABA CMM POWER GENERATION PROJECT



Document Prepared By Shenzhen CTI International Certification Co., Ltd

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Summary:

- **A brief description of the verification and the project**

The project activity developed in Pingzai Village, Zhijin County, Bijie City, Guizhou Province, P. R. China, is a Coal Mine Methane Power Generation Project. It utilizes the coal mine methane (CMM) with low methane concentration extracted from Wenjiaba coal mine located in Pingzai Village to generate electricity for captive use by coal mines and if surplus supply electricity to CSPG. The CMM power generation units will be installed with a total installed capacity of 3.5MW (2*0.75MW & 2*1MW), destroying estimated 5.645 million m³ of methane annually. The project is expected to achieve 103,297 tCO₂e of emission reduction annually. The project started construction on 15-July-2018 and started operation on 24-September-2020, it was allocated with VCS ID 2383.

- **The purpose and scope of verification**

The objective of the verification is to have an independent review ex-post determination by a VVB (Validation and Verification Body) of the monitored GHG emission reductions that have occurred as a result of the implementation of the project activity during a defined monitoring period.

- **The monitoring period**

This is the 2nd monitoring period started from 26-August-2021 to 25-May-2022 for VCS scheme.

- **The method and criteria used for verification**

Verification is conducted using Shenzhen CTI International Certification Co., Ltd. procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The verification team assessed the project activity's compliance against the VCS Version 4.3, the selected CDM methodology and the project monitoring report. The project is eligible under Project Scope 8. Energy (renewable/non-renewable). The verification criteria followed the guidance documents provided by VCS included the following:

VCS Version 4.3, VCS Program Guide Version 4.2 and the applied CDM methodology "ACM0008. Abatement of methane from coal mines" (Version 08.0).

- **The number of findings raised during verification**

In the course of the verification, 5 Corrective Action Requests (CARs), 2 Clarification Request (CL) were raised and successfully closed. The assessment is included in the report.

- **Any uncertainties associated with the verification**

There are no restrictions of uncertainty with the verification.

- **Summary of the verification conclusion**

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project, "Guizhou Wenjiaba CMM Power Generation Project" (No. 2383) with regards to the relevant requirements of VCS standard Version 4.3. CTI confirms all verification activities including objectives, scope and criteria, level of assurance, monitoring and monitoring report adhere to VCS Version 4.3 and all associated updated as documented in this report, are complete.

CTI concludes that the project activity "Guizhou Wenjiaba CMM Power Generation Project" in China, as described in the final version of the Monitoring Report, meets all relevant requirements for VCS verification activity and correctly applied the methodology ACM0008. Version 08.0. Hence CTI is able to certify that the GHG emission reduction from the project during the monitoring period from 26-August-2021 to 25-May-2022 amount to 60,032 tCO₂e.

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1. INTRODUCTION

1.1 Objective

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project for the monitoring period from 26-August-2021 to 25-May-2022. The objective of verification is to have an independent review ex-post determination by a VVB of the monitored GHG emission reductions that have occurred as a result of the project activity implemented during a defined monitoring period. The evaluation is done against the requirements of the VCS Version 4.3 based on the monitoring report. In order to confirm that the GHG emission reductions sound reasonable and meet the identified criteria, the verification involves the assessment of monitoring plan conformance to VCS rules and applied methodology. Verification is requirement and is seen as necessary to provide assurance on the generation of VCU.

1.2 Scope and Criteria

The scope of the verification is to verify that: (a) the actual monitoring system and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; (b) the GHG emission reductions data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reductions data are free from material misstatement; (c) the reported GHG emissions data is sufficiently supported by evidence. Verification shall ensure that the reported GHG emission reductions are complete and accurate in accordance with the applicable VCS criteria in order to be certified. Verification is conducted using CTI procedures in line with the requirements specified in the VCS Program and ISO14064-3 requirements and applying auditing techniques. Verification team assessed and determines that the implementation and operation of the project activity, and steps to report GHG emission reductions comply with the VCS rules. The verification involved a document review of relevant documentation and interview with the project participants. Verification is not meant to provide any consultancy towards the project participants; however, stated request for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

All GHG sinks, sources and GHG emissions equal to or greater than 2% of the total GHG assertions are considered. The project as generated estimated average of 103,297 GHG emission reductions per year, and therefore can be considered as a normal project per the VCS rules, in regards to its GHG emission reduction values, subject to a 1% materiality threshold.

The assessment was conducted to provide a reasonable level of assurance of compliance against the defined audit criteria and materiality threshold within the audit scope. Based on the audit findings the verification statement reasonably assures that the GHG assertion is materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the Project

The project is implemented by Guizhou Shuikuang Orion Clean Energy Co., Ltd., the main purpose of this project activity is to utilize the coal mine methane (CMM) with low methane concentration extracted from Wenjiaba coal mine to generate electricity for captive use by coal mines and surplus supply electricity to China Southern Power Grid (CSPG). The Project involves only one coalmine (Wenjiaba). The CMM power generation units will be installed with a total installed capacity of 3.5MW (2*0.75MW & 2*1MW), destroying estimated 5.645 million m³ of methane annually. No coal bed methane (CBM) or ventilation air methane (VAM) utilization is involved in the project/6/ and it is located inside the Pingzai Village, Zhijin County, Bijie City, Guizhou Province, China.

The project can reduce GHG emissions by avoiding release of methane into the atmosphere and replacing the equivalent amount of electricity that would have been purchased from the CSPG and the captive power plants. Waste heat from the generators has been recovered to provide heat to the coal mine. Emission reductions due to surplus electricity delivered to CSPG and heat replacement are not claimed, it is confirmed as conservative.

In the monitoring period from 26-August-2021 to 25-May-2022, 3 of the 4 sets with 2.75MW generators have been operated to utilized the methane for generation of electricity, total 2,187.26 tCH₄ from CMM was captured and utilized and the project exported 9,991.8 MWh to Wenjiaba coal mine. The total verified carbon units (VCUs) achieved in the monitoring period are 60,032 tCO_{2e}, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer.

The project activity generates GHG emission reductions by utilizing the low concentration coal mine methane (CMM), that otherwise would be vented into the atmosphere directly and generate electricity to supply to the coal mines displace part of the electricity generated by the grid which is dominated by fossil fuel-fired power plants thus the project generates GHG emission reductions and produces financial, social and environmental benefits. The project has resulted in the local sustainable development as described in Section 1 of the Monitoring Report. The project was registered as a VCS project (joint validation and 1st verification approved together) with VCS Ref. No. 2383/47/ and the emission reductions of 60,032 tCO_{2e} are certified as verified carbon units (VCUs) for this monitoring period.

2. VERIFICATION PROCESS

2.1 Method and Criteria

A project specific Verification and monitoring plan was developed to guide the verification auditing process to ensure efficiency and effectiveness. The purpose of the verification is to present a risk assessment for determining the nature and extent of validation procedures necessary to ensure the risk of auditing error is reduced to a reasonable level. According to the ISO14064-3, the criteria are the policy, procedure or requirement used as reference against which evidence is compared. Therefore, verification of the monitoring plan and the reported project results were measured for compliance against the following criteria:

- VCS Standard, v4.3/39/
- VCS Program Guide, v4.2/38/
- VCS Program Definitions, v4.2/37/
- VCS- Monitoring-Report -Template-v4.1/35/
- CDM methodology ACM0008 "Abatement of methane from coal mines" (Version 08.0)/31/

The verification process derived from all items in the verification criteria stated above. Field sampling and techniques based on the project parameters, scope and best professional judgement of the verification team in order to meet a reasonable level of assurance. The verification method of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- A desk review of the VCS Monitoring Report/1/ submitted by the client and additional supporting documents with the use of customized verification documents checklist
- Verification planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and related farmers, technicians
- Draft verification reporting
- Resolution of Corrective Action Requests (CARs) and Clarification Requests (CLs)
- Final verification reporting
- Technical review
- Final approval of the verification.

The verification process derived from all items in the verification criteria stated above. Field sampling and techniques based on the project parameters, scope and best professional judgement of the verification team in order to meet a reasonable level of assurance.

2.2 Document Review

The VCS MR/1/ and supporting background documents related to the project implementation were reviewed. Document review was conducted to ensure consistency with and identify any deviation from VCS program requirements. Desk review included an examination of the project details, data and parameters, and quantification of GHG emission reductions.

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the monitoring or to the basic conditions and technical data.

The references used in the course of this verification are summarized in Appendix 3.

The verification was performed basing on the documents check and site inspection/measurements, refer to the section 4 of this report for the verification process detail and corresponding documents review.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the verification process. Onsite interviews and information discussions were conducted with representatives from project implementer, operation staffs, local officers, residents and Project VCS development consultant. The interviews were performed by the verification team on-site (within the project area, in Pingzai Village, Zhijin County, Bijie City, Guizhou Province, P. R. China) and the following is a list of the main interviewees and subject.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Li	Peihai	Guizhou Shuikuang Orion Clean Energy Co., Ltd. /Vice Director	29-July-2022	- General aspects of the project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification	Dezheng Tong

					- Maintenance - Environmental aspects - Project ownership	
2.	Ye	Wennian	Guizhou Shuikuang Orion Clean Energy Co., Ltd. / Weijiaba CMM Power Plant Chief	29-July-2022	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Dezheng Tong
3.	Jin	Xia	Guizhou Shuikuang Orion Clean Energy Co., Ltd. / Dongyijing CMM Power Plant Duty Staff	29-July-2022		
4	Sha	Jiawen	Bijie City Environment Protection Bureau/Cheif	29-July-2022	- Local stakeholder communication - Stakeholder comments - Environmental aspects - Environmental protection Measurements - Local stakeholder communication - Stakeholder comments	Dezheng Tong
5.	Zhang	Youzhong	Local residents	29-July-2022		
6.	Yi	Muxiu	Local residents	29-July-2022		
7.	Ye	Juan	Local residents	29-July-2022		
8	Ding	Wenjun	Climate Bridge (Shanghai) Ltd./Project Manager	29-July-2022	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	Dezheng Tong

2.4 Site Inspections

The verification site inspection was conducted on 29-July-2022. A ground inspection of the project was conducted during the site visit and the verification team interviewed representatives from project implementer, operation staffs, local officers, residents and Project VCS development consultant

During the site inspection, the project location, main equipment, monitoring equipment and project implementation were inspected and document evidence were checked, details as following table,

Duration of on-site inspection: 29-July-2022				
No.	Activity performed on-site	Site location	Date	Team member

1.	Opening meeting Interview with representatives from PP	Office in Guizhou Shuikuang Orion Clean Energy Co., Ltd. in Pingzai Village, Zhijin County, Bijie City, Guizhou Province, P.R. China	29-July-2022	Dezheng Tong
2	On-site inspection of project	Wenjiaba CMM station in Pingzai Village, Panjiang County, Liupanshui City, Guizhou Province, P.R. China	29-July-2022	Dezheng Tong
3	Documents check	Office in Guizhou Shuikuang Orion Clean Energy Co., Ltd. in Pingzai Village, Zhijin County, Bijie City, Guizhou Province, P.R. China	29-July-2022	Dezheng Tong
4	Finding Summary	Office in Guizhou Shuikuang Orion Clean Energy Co., Ltd. in Pingzai Village, Zhijin County, Bijie City, Guizhou Province, P.R. China	29-July-2022	Dezheng Tong
5	Close Meeting	Office in Guizhou Shuikuang Orion Clean Energy Co., Ltd. in Pingzai Village, Zhijin County, Bijie City, Guizhou Province, P.R. China	29-July-2022	Dezheng Tong

2.5 Resolution of Findings

Material discrepancies identified in the course of the validation are addressed either as CARs, CLs or FARs.

A Corrective Action Request (CAR) is established where:

The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;

The VCS Version 4.3 requirements have not been met;

There is a risk that the emission reductions cannot be monitored or calculated.

A Clarification Request (CL) will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A Forward Action Request (FAR) will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in Appendix 4 of this report.

In the course of the verification, 5 Corrective Action Requests (CARs), 2 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in Appendix 4 of the report.

2.5.1 Forward Action Requests

This is the 2nd periodical verification, and there is no FAR raised in the 1st periodical verification report/4/ and validation report/4/.

2.6 Eligibility for Validation Activities

The VVB Shenzhen CTI International Certification Co., Ltd holds accreditation for both validation and verification for the relevant sectoral scope 8.

3. VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project only sought the registration with the VCS Program and validation was conducted by VVB and has been successfully registered in VCS Program with the Ref. No. 2383/47/.

The project proponent is not part of any emission trading program which has been confirmed via checking the UNFCCC/46/, GS/44/, VCS/47/ and other GHG schemes' website. The net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions. The project activity has not participated under any other GHG programs which has been confirmed via checking the UNFCCC/46/, GS/44/, VCS/47/ and other GHG schemes' website, it is verified that the implementation of the project is consistent with the description in the Joint-PD-MR and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 26-August-2021 to 25-May-2022 which has been confirmed by checking the Declaration of no double counting and not involved in other GHG scheme/15/.

Besides, based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO₂e/year which has been verified in the public website/41/, and it is confirmed that the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/42/. Hence, it is confirmed that the project is only participated in VCS program/47/ and emission reductions will not be double counted.

3.2 Methodology Deviations

There is no methodology deviation applied to this monitoring period.

3.3 Project Description Deviations

There is no project description deviation applied to this monitoring period.

3.4 Grouped Project

This section is not applicable as the project is not a grouped project.

4. VERIFICATION FINDINGS

4.1 Project Implementation Status

Through the onsite visit, interviewing the project developer and reviewing the project operation, CTI confirmed that the project was implemented to utilize the coal mine methane (CMM) with methane concentration less than 30% extracted from Wenjiaba coal mine located in Pingzai Village, Zhijin County, Bijie City, Guizhou Province to generate electricity for captive use (if surplus supplied to CSPG). The CMM power generation units will be installed with a total installed capacity of 3.5MW (2*0.75MW & 2*1MW), destroying estimated 5.645 million m³ of methane annually. No coal bed methane (CBM) or ventilation air methane (VAM) utilization is involved in the project/4/.

The project supplies electricity to the coal mines for captive use (if surplus supplied to CSPG)/17/, replacing the equivalent amount of electricity that would have been purchased from the CSPG and the captive power plants. Waste heat from the generators have been recovered to provide heat to the coal mines. Emission reductions due to surplus electricity delivered to CSPG and heat replacement are not claimed, it is confirmed as conservative.

In accordance with the registered JPM/3/, there are total 4 sets of CMM power generators with the total installed capacity of 3.5 MW have been designed to be installed to utilize CMM for power generation, however, via on-site investigation, it is confirmed that during this monitoring period, only 3 sets with 2.75MW (2*1MW+1*0.75MW) CMM generators have been operated to generate the electricity due to the gas source for extraction is insufficient caused by coal mine has temporarily stopped mining which has been confirmed by checking the statement of unit operation for this monitoring period/24/. And via site inspection and checking the operation log/14/, it is confirmed that for the operation of 2.75MW units, there were no events for the normal operation occurred.

Via checking the MR/1/ and by site inspection, CTI verified that there are no changes on the key equipment and technology since the last periodical verification of the project.

On the basis of site visit and the reviewed project monitoring report and other supporting docs, it can be confirmed that the realized technology, as well as the monitoring and metering equipment, the project has been implemented and operated as applied methodology/31/ and monitoring plan described in the registered JPM/3/.

This verification covers the period from 26-August-2021 to 25-May-2022 (including both days). The total 2,187.26 tCH₄ from CMM was captured and the project exported 9,991.8 MWh to Wenjiaba coal mine. The emission reduction due to surplus electricity delivered to CSPG is not claimed which is conservative. The total verified carbon units (VCUs) achieved in the monitoring period are 60,032 tCO₂e/2/.

The construction and commenced electricity generation date of each set of the plant is as below table, which has been confirmed in the record of started construction/9/, daily operational log/14/, Record of unit started operation/10/ against the previous verification report/4/.

Table 4-1 Construction and commissioning date of each set of project plant

Milestone	Commissioning Date
Start date of construction	15-July-2018/9/

Start date of commissioning	24-September-2020/10/
Start date of the crediting period	24-September-2020/10/

As part of the site visit the Verification Team was able to confirm that the project implementation is in accordance with the project description contained in the registered JPM/3/. There are no any material discrepancies between project implementation and the project description.

The project has neither been registered and rejected nor seeking registration under any other GHG programs which has been confirmed via checking the UNFCCC/46/, GS/44/, VCS/47/ and other GHG schemes' website. It is verified that the project is seeking registration only in VCS program/47/.

The project activity is not part of any emission trading program which has been confirmed via checking the UNFCCC/46/, GS/44/, VCS/47/ and other GHG schemes' website. The net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions. The project activity has not participated under any other GHG programs which has been confirmed via checking the UNFCCC/46/, GS/44/, VCS/47/ and other GHG schemes' website.

Besides, based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO₂e/year which has been verified in the public website/41/, and it is confirmed that the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/42/. Hence, it is confirmed that the emission reductions without any double counting for this monitoring period from 26-August-2021 to 25-May-2022 which has been confirmed by checking the Declaration of no double counting and not involved in other GHG scheme/15/.

The project was registered as a VCS project activity with the VCS Ref. No. 2383/47/, with 10 years fixed crediting period started from 24-September-2020 to 23-September-2030 under VCS Program.

This monitoring period (26-August-2021 to 25-May-2022) is the 2nd monitoring period in the 10-years fixed crediting period.

Details of the project location are given in table 4-2 below:

Table 4-2: Project Location

No.	Project Location
Host Country	China
Region:	Guizhou Province
Project location address:	Pingzai Village, Zhijin County, Bijie City
Latitude:	26 ° 39'24.99"
Longitude:	105 ° 40'53.93"

The location of the project site is verified with on-site investigation by GPS devices and confirmed by checking the map/43/.

Details of the project equipment technical parameters are given in table 4-3 below:

Table 4-3 Project equipment technical parameters

Parameter	Unit	Value	
CMM generators			
Type:	-	P750GF	P1000GF
Quantity	-	2	2
Rated Power	kW	750	1,000
Rated Current	A	48	82
Rated voltage	V	10,500	10,500
Rated speed	r/min	1,000	1,500
Frequency	Hz	50	50
Power factor	-	0.8	0.8
Lifetime	year	10	10
Manufacturer	-	Henan Diesel Engine Industry Co., Ltd.	

Via site inspection of the nameplate of the equipment/30/, CTI verified that the technical parameters listed in above table are correct and actual and consistent with PD.

The approved consolidated methodology applied in the project activity is ACM0008 “Abatement of methane from coal mines” (Version 08.0)/31/. Also refers to the latest approved version of the following tools and guidelines:

- TOOL07: “Tool to calculate the emission factor for an electricity system” (version 07.0)/32/;
- TOOL05: “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0)/33/

Via on-site inspection and interview with the project implementer, checking the evidence provided as below, CTI verified that the project contributes the sustainable development goal through the following aspects in this monitoring period:

- The project activity *creates new job opportunities and contributing to local economic prosperity* (Goal 8 of UN SDG) – verified by interview with staffs and checking the Employment Contracts/22/ and monthly payroll/23/, it is confirmed that 22 long-term job opportunities have been provided during this monitoring period and totally offers 22 long-term employment opportunities since the project started operation, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;
- The project *reduces the CO₂ emission per ton of produced coal* (Goal 9 of UN SDG) – verified by checking the coal production records for Wenjiaba coal mine/25/ and Emission Reduction Calculation sheet/2/, it is confirmed that 180,819 tons of coal were produced during this monitoring period, achieving GHG emission reductions of 60,032 tCO₂e, hence the Project decreased 0.332 tCO₂e emissions for each ton of produced coal compared with the baseline scenario during this monitoring period, and totally decreased 0.332 tCO₂e emission per tonne of coal produced for 330,891 tonnes of coal since the project started operation/25/. Hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;

- Sequester greenhouse gas and mitigate climate changes (Goal 13 of UN SDG) – verified by checking the Emission Reduction Calculation sheet/2/, CTI confirmed that the project achieved GHG emission reductions of 60,032 tCO₂e during the reporting period, and accumulated 109,914 tCO₂e of GHG emission reduction have been achieved since the project started operation, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable.

Via checking the validation report/4/ and previous verification report/4/, CTI verified that there were no any previously validated methodology deviations.

In conclusion, Verification Team was able to confirm that the project implementation is in accordance with the project description contained in the registered JPM/3/.

CAR 01, CAR 02 and CL 01 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.2 Safeguards

4.2.1 No Net Harm

In China, an Environmental Impacts Assessment is required according to Chinese legislation. The EIA was designed by Chongqing Jiutian Environmental Impact Assessment Co., Ltd./7/ and approved by Zhijin County Environmental Protection Bureau on 20-March-2017/8/. The analysis of the environmental impacts of the project activity is sufficiently described according to EIA/7/. The assessment is as below,

It is considered that the environmental impacts and the relevant mitigation methods have been comprehensively described in Section 2.1 of MR including the air pollution and wastewater, noise, solid waste and impact on the ecosystem according to the EIA report/7/.

The environmental impacts of the project were sufficiently assessed by means of an Environmental Impact Assessment (EIA) study report according to the Chinese laws & regulations such as “Environmental Protection Law of P.R. China” and “Law of the People's Republic of China on the Environmental Impact Assessment”. The environmental impact assessment was completed in March 2017 by Chongqing Jiutian Environmental Impact Assessment Co., Ltd. The EIA report/7/, which was approved by the Zhijin County Environmental Protection Bureau (EPB) on 20-March-2017, was inspected by the VVB to be valid/8/. Every aspect of environmental impact has been considered in the EIA report with corresponding measures during project development.

During the site inspection, the project was implemented normally. The verifier revealed that noise during operation is generated by the low-concentration CMM generators, circulating cooling tower and pumps and the Noise emission from the project operation is confirmed during site inspection, PP has taken some mitigation measures including the generator and engine are installed in a semi-enclosed workshop which adopts brick and concrete structure, the inner wall is equipped with sound absorbing materials, and the inlet and outlet are equipped with mufflers which has been verified by VVB during the site inspection, and via interview with local officer from EPB, it is verified that the noise in the project site complies with the standard requirements of Category 2 of national standard “Emission standard for industrial enterprise noise at boundary”(GB12348-2008)/48/.

Associated with the review of EIA/7/, there was no adverse effect on the ecology, air, water and solid waste, for the project subject to the implementation of pollution mitigation measures according to the EIA report. There was also no any endangered species found in the project location.

As per the approval of EIA, it stated that the inspectors from the EPB have to carry out monitoring work for the environmental impact arisen from the project activity during CMM power plant commissioning periodically. Via interview with the local officer from EPB, it is confirmed that they are satisfactory with the environmental protection and recovery work carried out by the project owner. The EPB also did not receive any public comment on the project activity during this monitoring period.

During the on-site interview, the local residents were interviewed if there was critical impact to their living environment. It is verified that the project activity does not cause adverse effect to their daily life.

Furthermore, via interview with local officer and stakeholders, it is confirmed that the implementation of the project will improve local socio-economic development through creating career opportunities and contributing to local economic prosperity.

In conclusion, there were some impacts on environment during the construction and operation periods, which has been demonstrated in the JPM/3/, MR/1/ and EIA/7/, also the proper measurements have been carried out by project implementer to mitigate such impacts.

4.2.2 Local Stakeholder Consultation

A stakeholder survey was carried out by the project developer during February 2017 which was prior to the start date of the construction.

Survey questionnaires were distributed to relevant personnel of Wenjiaba coal Mine, local villagers and government officials by the Project owner on 23-February-2017, totally 50 copies of questionnaires were issued to relevant personnel of Wenjiaba coal Mine, local villagers and government officials with 50 pieces of reply received. The stakeholders' background information and comments from questionnaires were summarized and recorded in the JPM, Section 2.2/3/ and has been assessed during the validation process/4/.

During the implementation stage of this monitoring period, via checking the local communication survey records/21/ and interview with the local officer and local residents during site visit, it is confirmed that the local authority has conducted follow-up interviews and ongoing communication with local stakeholders to collect any comments or inputs to the project implementation. Based on the verification team's expertise, it is confirmed that the local government agencies and competent authorities will conduct spot checks on the implementation of the project from time to time as per the request from the local government's regulations.

Moreover, the project owner carried out a questionnaire survey for the local stakeholder to collect the relevant comments and suggestions in April 2022 during this monitoring period. Via checking the filled 30 questionnaires/21/, interview with the local officer and local resident during site visit, it is verified that majority of them believed that the project had positive impact on local employment, economy, power supply and underground mining safety. And by interview with the local officer and local resident during site visit, it is verified that 100% of the respondents believe that the Project will not have any negative environmental impact.

In addition, during the operation process, there were a few respondents who ask the project owner to pay attention and solve these issues caused by the Project including environmental pollution and ensure the security of the power station. Project Owner has brought up with corresponding approaches to minimize the impact of the Project on the environment and related mitigative actions have been carried out by Project owner and assessed as above, furthermore, via checking the training records/16/, it is verified that all the workers received the safety training regularly, hence, it is concluded that the Project Owner has taken necessary measures and the issues are all tackled for this monitoring period.

All the mitigation actions have been verified by interview with local officer, the local officer has confirmed that the project was under supervised and the implementation of the project is in line with the local environment protection regulations and EIA/7/. And via checking the filled 30 questionnaires/21/, it is confirmed that no one thinks that the Project will have a negative impact on the local life.

Furthermore, the mechanism for on-going communication with local stakeholder has been established by PP and confirmed as effective by site interview with local stakeholders, the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals which verified in line with the VCS requirements.

Via interview with the local officer/12/ and local residents/13/ during site visit, it is verified that there were no comments and issues from the local stakeholders during the implementation period and the project passed all the periodic spot checks by local government. Hence there is no need to change the project design based on the stakeholder inputs.

CL 02 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.3 AFOLU-Specific Safeguards

Not applicable as the project is not an AFOLU project.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Assessment of implementation Status of the Project Activity

In accordance with the registered JPM/3/, there are total 4 sets of CMM power generators with the total installed capacity of 3.5 MW have been designed to be installed to utilize CMM for power generation, however, via on-site investigation, it is confirmed that during this monitoring period, only 3 sets with 2.75MW (2*1MW+1*0.75MW) CMM generators have been operated to generate the electricity due to the gas source for extraction is insufficient caused by coal mine has temporarily stopped mining which has been confirmed by checking the statement of unit operation for this monitoring period/24/. And via site inspection and checking the operation log/14/, it is confirmed that for the operation of 2.75MW units, there were no events for the normal operation occurred.

Via checking the MR/1/ and by site inspection, CTI verified that there are no changes on the key equipment and technology since the last periodical verification of the project.

On the basis of site visit and the reviewed project monitoring report and other supporting docs, it can be confirmed that the realized technology, as well as the monitoring and metering equipment, the project has

been implemented and operated as applied methodology/31/ and monitoring plan described in the registered JPM/3/.

This verification covers the period from 26-August-2021 to 25-May-2022 (including both days). The total 2,187.26 tCH₄ from CMM was captured and the project exported 9,991.8 MWh to Wenjiaba coal mine. The emission reduction due to surplus electricity delivered to CSPG is not claimed which is conservative. The total verified carbon units (VCUs) achieved in the monitoring period are 60,032 tCO₂e/2/.

CAR 03 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.2 Assessment of Data and parameters Available at Validation

By means of comparison of the MR/1/ and the ER calculation/2/ with the registered JPM/3/, the verification team has checked whether all parameters fixed ex-ante have been applied correctly.

The parameters that are fixed ex ante are following:

Parameters	Source of data	Values applied	Demonstration by Verification team
$MT_{BL,s,i,y}$ - Methane from source s that would have been captured and destroyed by use i in the baseline scenario in the year y	Data was provided by the project owner, which has been verified and determined in the registered JPM, validation report.	0	This is an ex-ante fixed value during the crediting period, the value is verified as consistent among the registered JPM/3/ and the validation report/4/.
CEF_{CH_4} - Carbon emission factor for combusted methane	Data source is ACM0008 (Version 08.0) which is appropriate, which has been verified and determined in the registered JPM, validation report.	2.75 tCO ₂ e/tCH ₄	This is an ex-ante fixed value during the crediting period, the value is verified as consistent among the applied methodology/31/, registered JPM/3/ and the validation report/4/.
$EF_{k,y}$, $EF_{EF,i,y}$ ($EF_{grid,CM,y}$) - Combined margin emission factor for the grid in year y (CSPG)	Data source is "2019 Baseline Emission Factors for Regional Power Grids in China" published by DNA of China which is appropriate, which has been verified and determined in the registered JPM, validation report.	0.5088 tCO ₂ e/MWh	This is an ex-ante fixed value during the crediting period, the value is verified as consistent among the "2019 Baseline Emission Factors for Regional Power Grids in China" published by DNA of China/28/, registered JPM/3/ and the validation report/4/.
$TDL_{j,y}$ - Average technical transmission and distribution losses for providing electricity to source j in year y	Data source is methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"	3%	This is an ex-ante fixed value during the crediting period, the value is verified as consistent among the methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"

	(Ver 03.0) which is appropriate, which has been verified and determined in the registered JPM, validation report.		(Ver 03.0)/33/, registered JPM/3/ and the validation report/4/.
<i>D_{CH4}</i> - Efficiency of methane destruction in power plant	Data source is 2006 IPCC Guidelines for National Greenhouse Gas Inventories from registered JPM, validation report, applied methodology and IPCC	0.67 kg/m ³	This is an ex-ante fixed value during the crediting period, the value is verified as consistent among the registered JPM/3/, the validation report/4/, applied methodology and IPCC/45/.

In conclusion, the parameter fixed ex ante has been indicated in the registered JPM/3/. And the MR is checked as in line with the JPM/3/.

CAR 04 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.3 Assessment of Data and parameters Monitored

During the verification all relevant monitoring parameters as listed in JPM/3/ have been verified and summarized in the below table.

$MT_{PJ,s,i,y}$	Methane from source s captured and destroyed by use i in the project activity in year y									
Title in line with Methodology?	Yes									
Data unit correctly expressed?	Yes – t CH ₄									
Appropriate description?	Yes									
Monitored Value?	<table><tr><th>Year</th><th>MM_{ELEC}</th></tr><tr><td>26-August-2021~31-December-2021</td><td>897.42</td></tr><tr><td>01-January-2022~25-May-2022</td><td>1,289.84</td></tr><tr><td>Total</td><td>2,187.26</td></tr></table>	Year	MM _{ELEC}	26-August-2021~31-December-2021	897.42	01-January-2022~25-May-2022	1,289.84	Total	2,187.26	
Year	MM _{ELEC}									
26-August-2021~31-December-2021	897.42									
01-January-2022~25-May-2022	1,289.84									
Total	2,187.26									
Correct value provided?	Yes									
Source clearly referenced? (appropriate?)	Yes– it is measured continuously by a Flow meter (with temperature and pressure transmitter) and a gas analyser. A Flow meter (with temperature and pressure transmitter) and gas analyser are installed at the CMM power plant. $MT_{PJ,s,i,y}$ is continuously measured and daily recorded. $MT_{PJ,s,i,y}$ is calculated based on the value of gas flow rate, pressure, temperature measured by flow meters and CH₄ concentration of CMM measured by gas analyser. The meter readings and calculation result are recorded by the operation staff of CMM power plant daily and aggregated monthly and delivers them to the project owner/13/.									
Choice of data correctly justified?	Yes –monitored by a Flow meter (with temperature and pressure transmitter) and gas analyser installed in the CMM project plant.									

Measurement method and procedures correctly described?	Yes – measured continuously by a Flow meter (with temperature and pressure transmitter) and gas analyser of CMM power plant. Flow meter records gas volumes, pressure and temperature. Density of methane under normal conditions of temperature and pressure (defined as 1 atm, 293.15K) is 0.67kg/m ³ (2006 IPCC Guidelines for National Greenhouse Gas Inventories).
Calculation method?	Yes – Calculated from the monitored data and sum of monthly data/13/
Monitoring frequency correctly described?	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions - verified as per JPM and the applied methodology
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of each monitoring device. The model, serial No., accuracy class and calibration information of the flow meter (with temperature and pressure transmitter) and gas analyzer used has been provided, the flow meter was calibrated by Beijing Institute of Metrology/20/ and gas analyzer was calibrated by Hubei Institute of Measurement and Testing Technology/20/ in line with the frequency defined in JPM as annually, by checking the calibration report/19/, it is confirmed that the calibrations for the equipment were valid for this monitoring period.
QA/QC procedure correctly described?	Yes- QA/QC procedure for meter calibration maintenance and recording; procedure for monitoring staff training and competence were established and implemented. The data flow and protection process was observed during the on-site verification. The flow meter calibration is conducted according to the relevant standard “Verification regulation of different pressure type flow meter (JJG640-2016)"/27/ and gas analyzer calibration is conducted according to the relevant standard “Non-dispersive Infrared Methane Transmitters for Coal Mine (JJG1138-2017)"/26/. The monitored data will be kept for two years after the last issuance.
Purpose of data?	Calculation of baseline emissions
Comments?	N/A

$MM_{ELEC,y}$	Methane measured sent to use of power generation in year y									
Title in line with Methodology?	Yes									
Data unit correctly expressed?	Yes – tCH ₄									
Appropriate description?	Yes									
Monitored Value?	<table><tr><th>Year</th><th>MM_{ELEC}</th></tr><tr><td>26-August-2021~31-December-2021</td><td>897.42</td></tr><tr><td>01-January-2022~25-May-2022</td><td>1,289.84</td></tr><tr><td>Total</td><td>2,187.26</td></tr></table>	Year	MM_{ELEC}	26-August-2021~31-December-2021	897.42	01-January-2022~25-May-2022	1,289.84	Total	2,187.26	
Year	MM_{ELEC}									
26-August-2021~31-December-2021	897.42									
01-January-2022~25-May-2022	1,289.84									
Total	2,187.26									
Correct value provided?	Yes									
Source clearly referenced? (appropriate?)	Yes– it is measured continuously by a Flow meter (with temperature and pressure transmitter) and a gas analyser. A Flow meter (with temperature and pressure transmitter) and gas analyser are installed at the CMM power plant. $MM_{ELEC,y}$ is equal to $MT_{PJ,s,t,y}$ which is calculated based on the value of gas flow rate, pressure, temperature measured by flow meters and CH₄ concentration of CMM measured by gas analyser.									

	The meter readings and calculation result are recorded by the operation staff of CMM power plant daily and aggregated monthly and delivers them to the project owner/13/.
Choice of data correctly justified?	Yes – monitored by a Flow meter (with temperature and pressure transmitter) and gas analyser installed in the CMM project plant.
Measurement method and procedures correctly described?	Yes – measured continuously by a Flow meter (with temperature and pressure transmitter) and gas analyser of CMM power plant. Flow meter records gas volumes, pressure and temperature. Density of methane under normal conditions of temperature and pressure (defined as 1 atm, 293.15K) is 0.67kg/m ³ (2006 IPCC Guidelines for National Greenhouse Gas Inventories).
Calculation method?	Yes – Calculated from the monitored data and sum of monthly data/13/
Monitoring frequency correctly described?	Data monitored continuously and aggregated as appropriate, to calculate emissions reductions - verified as per JPM and the applied methodology
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of each monitoring device. The model, serial No., accuracy class and calibration information of the flow meter (with temperature and pressure transmitter) and gas analyzer used has been provided, the flow meter was calibrated by Beijing Institute of Metrology/20/ and gas analyzer was calibrated by Hubei Institute of Measurement and Testing Technology/20/ in line with the frequency defined in JPM as annually, by checking the calibration report/19/, it is confirmed that the calibrations for the equipment were valid for this monitoring period.
QA/QC procedure correctly described?	Yes- QA/QC procedure for meter calibration maintenance and recording; procedure for monitoring staff training and competence were established and implemented. The data flow and protection process was observed during the on-site verification. The flow meter calibration is conducted according to the relevant standard “Verification regulation of different pressure type flow meter (JJG640-2016)"/27/ and gas analyzer calibration is conducted according to the relevant standard “Non-dispersive Infrared Methane Transmitters for Coal Mine (JJG1138-2017)"/26/. The monitored data will be kept for two years after the last issuance.
Purpose of data?	Calculation of baseline emissions
Comments?	N/A

GWP_{CH4}	Global warming potential of methane
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes –tCO ₂ e/ tCH ₄
Appropriate description?	Yes
Monitored Value?	28 tCO ₂ e/ tCH ₄
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes–IPCC Fifth Assessment Report (AR5)/34/
Choice of data correctly justified?	Yes
Measurement method and procedures correctly described?	Yes – the value is derived from IPCC Fifth Assessment Report (AR5)/34/ according to VCS Standard v4.3/39/
Calculation method?	N/A

Monitoring frequency correctly described?	The parameter will be updated according to relevant documents
Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	N/A for default value
Purpose of data?	Calculation of baseline emission and project emissions
Comments?	N/A

$EG_{use,k,y}$ ($EG_{PJ,grid,y}$)	Energy of type k displaced by the project activity in year y									
Title in line with Methodology?	Yes									
Data unit correctly expressed?	Yes – MWh									
Appropriate description?	Yes									
Monitored Value?	<table><tr><th>Year</th><th>$EG_{use,k,y}$</th></tr><tr><td>26-August-2021~31-December-2021</td><td>4,144.135</td></tr><tr><td>01-January-2022~25-May-2022</td><td>5,847.665</td></tr><tr><td>Total</td><td>9,991.8</td></tr></table>	Year	$EG_{use,k,y}$	26-August-2021~31-December-2021	4,144.135	01-January-2022~25-May-2022	5,847.665	Total	9,991.8	
Year	$EG_{use,k,y}$									
26-August-2021~31-December-2021	4,144.135									
01-January-2022~25-May-2022	5,847.665									
Total	9,991.8									
Correct value provided?	Yes									
Source clearly referenced? (appropriate?)	Yes—it is monitored by a bidirectional electric meter installed at project site to monitor the electricity delivered to Wenjiaba coal mine with accuracy of 0.5s and recorded monthly.									
Choice of data correctly justified?	Yes –monitored by electricity meter									
Measurement method and procedures correctly described?	Yes –it is monitored by a bidirectional electric meter installed at project site with accuracy of 0.5s and recorded monthly as per the power purchase agreement/17/. The meter monitors the electricity generation by the project activity. The meter readings are recorded by the operators monthly/11/. Meanwhile, the automatic monitoring system will collect the data from the meters every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related transaction notes/12/ have been issued.									
Calculation method?	Yes –sum of monthly data/11/									
Monitoring frequency correctly described?	Measured continuously and recorded monthly /11/ - verified as per JPM/3/ and the applied methodology/31/									
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of monitoring device. The model, serial No., accuracy class and calibration information of the electricity meter used has been provided, the electricity meter was calibrated by Electric Power Research Institute of Guizhou Power Grid Co., Ltd./20/ annually, which are confirmed in line with the frequency defined in JPM as once in one year, by checking the calibration report/19/, it is confirmed that the calibration for this equipment was valid for this monitoring period.									
QA/QC procedure correctly described?	Yes- the electricity transaction notes/12/ have been used for cross-check and via comparing the total value of electricity transaction notes/12/ for this motoring period with the electricity meter reading records/11/, CTI verified that the values are consistent. The calibration frequency of electricity meter with accuracy of 0.5s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2016)/29/.									

Purpose of data?	Calculation of baseline emission from power generation replaced by the project.
Comments?	N/A

$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source j in year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes – MWh
Appropriate description?	Yes
Monitored Value?	0
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes—it is monitored by a bidirectional electric meter installed at project site with accuracy of 0.5s and recorded monthly.
Choice of data correctly justified?	Yes –monitored by electricity meter
Measurement method and procedures correctly described?	Yes –it is monitored by a bidirectional electric meter installed at project site with accuracy of 0.5s and recorded monthly as per the power purchase agreement/17/. The meter monitors the electricity consumed by the project activity imported from the grid through coal mine. The meter readings are recorded by the operators monthly/11/. Meanwhile, the automatic monitoring system will collect the data from the meters every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related transaction notes/12/ have been issued. During this monitoring period, all electricity consumed by the project is from the electricity generated by CMM and no import from the CSPG.
Calculation method?	Yes –sum of monthly data/11/
Monitoring frequency correctly described?	Measured continuously and recorded monthly /11/ - verified as per JPM/3/ and the applied methodology/31/
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of monitoring device. The model, serial No., accuracy class and calibration information of the equipment used has been provided, the electricity meter was calibrated by Electric Power Research Institute of Guizhou Power Grid Co., Ltd./20/ annually, which are confirmed in line with the frequency defined in JPM as once in one year, by checking the calibration report/19/, it is confirmed that the calibration for this equipment was valid for this monitoring period.
QA/QC procedure correctly described?	Yes- The electricity generated by this project can meet its own electricity demand, so this project does not require grid power supply during this monitoring period. The calibration frequency of electricity meter with accuracy of 0.5s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2016)/29/.
Purpose of data?	Calculation of project emissions
Comments?	N/A

$Eff_{i,y}$ ($Eff_{ELEC,y}$)	Efficiency of methane destruction in use i (for the project, i represents power generation)
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes –%

Appropriate description?	Yes
Monitored Value?	99.5
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes–Volume 2: Energy, 2006 IPCC Guidelines for National Greenhouse Gas Inventories/45/
Choice of data correctly justified?	Yes
Measurement method and procedures correctly described?	Yes – the value is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories/45/ as per the PD
Calculation method?	N/A
Monitoring frequency correctly described?	N/A
Monitoring equipment correctly described?	N/A
QA/QC procedure correctly described?	N/A for default value
Purpose of data?	Calculation of project emissions
Comments?	N/A

In conclusion, CTI confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with PD, applied methodology, all applicable standards and relevant requirements.

CAR 05 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.4 Assessment of in Compliance with monitoring plan

By means of comparison of the MR with the applied CDM methodology and all VCS standards' requirements.

The verification team has checked whether the monitoring implementation during this monitoring period is in compliance with the monitoring plan in JPM and related requirements of the applied methodology/tools.

The verification team has checked the monitoring system in MR against the applied methodology and monitoring plan of the PD.

The monitoring system has been operated as per the monitoring plan in the JPM and monitoring manual/18/ as in compliance with the latest applicable version of the methodology (ACM0008 Version 08.0)/31/ and tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0)/33/.

Data and parameters to be monitored as above tables are confirmed in line with the JPM and applied methodology, also corresponding to the formula used for ER calculation.

Monitoring system

Data and parameters to be monitored as above tables are confirmed in line with the methodology and tool, also corresponding to the formula used for ER calculation.

For the monitoring system and points, via on-site investigation, it is confirmed that the methane monitoring system is installed between the pre-treatment system and gas engine, four parameters (concentration, measure flow, pressures and temperature) are measured on-time by the system. The electricity generated is supplied to the other coal mines under the Power Purchase Agreement/17/. And the meter(s) will be installed between the generator and substation to measure electricity exported and consumed.

All meters will be calibrated/19/ by qualified third parties/20/ in line with the national calibration standard.

Operational and management structure

The JPM contains a diagram illustrating the Management structure of VCS monitoring to be implemented by the PP in order to implement the project activity. The VCS manager takes the responsibility for the overall monitoring of the project, and there are monitoring officers for installation and maintenance of monitoring equipment, record and collect monitoring results and monitoring data. Besides, internal verifiers appointed by VCS manager is responsible for internal check of the measurement, collection of relevant receipts and invoices, and the calculation of the emission reductions. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

QA/QC procedure

Authorities and responsibilities regarding monitoring plan have been described in section 5.3 of the PD.

The accuracy of electricity meter should not be less than 0.5S. The installation of flow meter(s) and gas analyzer(s) will fulfill the national standard. Calibration of metering equipment should be implemented periodically by qualified party according to national standards and rules. All the records should be documented by the project owner.

The monitoring officers will collect the measured methane and electricity data regularly and complete the corresponding records.

Emergency Procedure

Project participant and meter supplier will take actions to maintains or will displace the broken meter(s) if any malfunction, and the monitoring data will be calculated conservatively for emission calculations during the meter troubleshooting period.

For this monitoring period, via checking the gas and electricity data, it is verified that there was no emergency occurred.

Data management

All data files, maps, forms and environment assessment reports, relevant gas data and electricity transaction notes will be collected by a designated monitoring officer, who will prepare backup in time and archive all documents properly.

All the relevant data records will be kept by the Project owner during the crediting period and two years after for VVB's verification.

Based on above assessment, CTI verified that the monitoring system complies with the applied methodology and the monitoring plan and all applied procedures are completely in compliance to the methodology ACM0008 (Version 08.0) and PD.

4.4.5 Compliance with the calibration frequency requirements for measuring instruments

During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the registered JPM/3/ and/or the applicable calibration standards.

The information of monitoring equipment used for monitoring in this monitoring period is listed in JPM and the calibration information/19/ has been assessed in above section 4.4.2 in each monitoring parameter table.

Furthermore, via checking the certificate of third party who conducted the calibration/20/, CTI confirmed that the third party get the related qualification.

In conclusion, the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan in JPM. Based on that CTI can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.

Refer to CAR 05.

4.4.6 Assessment of data and calculation of emission reductions or net removals

4.4.6.1 Calculation of baseline GHG emissions or removals

According to the methodology and registered JPM, BE is calculated as below

$$BE_y = BE_{MD,y} + BE_{MR,y} + BE_{Use,y} \quad (1)$$

Where:

- BE_y = Baseline emissions in year y (tCO₂e)
- $BE_{MD,y}$ = Baseline emissions from destruction of methane in the baseline scenario in year y (tCO₂e)
- $BE_{MR,y}$ = Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO₂e)
- $BE_{Use,y}$ = Baseline emissions from the production of power, heat or other forms of useful energy replaced by the project activity in year y (tCO₂e)

i. $BE_{MD,y}$

Via checking the PD, it is confirmed that the project contains only one source CMM, no CBM, VAM, AMM or OCM utilization is involved, and no methane is destructed in baseline scenario. So, destruction of methane in the baseline scenario $BE_{MD,y}$ is 0.

ii. $BE_{MR,y}$

$$BE_{MR,y} = \sum_i \sum_s (MT_{PJ,s,i,y} - MT_{BL,s,i,y}) \times GWP_{CH_4} \quad (2)$$

Where:

$MT_{PJ,s,i,y}$	=	Methane from source s captured and destroyed by use i in the project activity in year y (t CH ₄)
$MT_{BL,s,i,y}$	=	Methane from source s that would have been captured and destroyed by use i in the baseline scenario in the year y (t CH ₄)
i	=	Use of methane (flaring, power generation, etc.)
s	=	Source of methane that would have been captured, sent to and destroyed by use i in the baseline scenario in the year y. This may include eligible CBM, CMM, VAM, eligible AMM and eligible OCM
GWP_{CH_4}	=	Global warming potential of methane (t CO ₂ e/t CH ₄). As per VCS Standard v4.3, according to AR5, the 100-year GWP value of methane is 28 tCO ₂ e/CH ₄ .

Via on-site investigation against checking the registered JPM/3/, it is confirmed that for this project, no CMM is captured and destructed under the baseline scenario. Hence, $MT_{BL,s,i,y}$ is 0.

Hence Equation (2) is simplified as follows:

$$BE_{MR,y} = \sum_i \sum_s MT_{PJ,s,i,y} \times GWP_{CH_4} \quad (3)$$

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $BE_{MR,y}$ for this monitoring period as below table

Table 4-1 $BE_{MR,y}$ calculation during this monitoring period

Year	$MT_{PJ,s,i,y}$ (tCH ₄)	GWP_{CH_4} (tCO ₂ e/ tCH ₄)	$BE_{MR,y}$ (tCO ₂ e)
26-August-2021~31-December-2021	897.42	28	25,127
01-January-2022~25-May-2022	1,289.84	28	36,115
Total	2,187.26	-	61,242

iii. $BE_{Use,y}$

As per the JPM and applied methodology, it is calculated as below formular,

$$BE_{Use,y} = \sum_k (EG_{Use,k,y} \times EF_{k,y}) \quad (4)$$

Where:

$EG_{Use,k,y}$	=	Energy of type k displaced by the project activity in year y (energy unit)
$EF_{k,y}$	=	Baseline emissions factor for energy type k production in year y (t CO ₂ /energy unit)
k	=	Energy type displaced by the project activity

Via on-site investigation and checking the project design/6/ and actual implementation/14/, it is confirmed that for this project, no heat generation or vehicle fuel supply is involved, thus only the Baseline emissions from the production of power is considered.

hence Equation (4) is simplified as follows:

$$BE_{Use,y} = EG_{Use,k,y} \times EF_{ELEC} \quad (5)$$

According to the methodological tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0)/33/,

$EG_{Use,k,y} = EG_{PJ,grid,y}$, and $EF_{k,y} = EF_{grid,CM,y}$, thus

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $BE_{Use,y}$ for this monitoring period as below table

Table 4-2 $BE_{Use,y}$ calculation during this monitoring period

Year	$EG_{Use,k,y}$ ($EG_{PJ,grid,y}$) (MWh)	$EF_{k,y}$ ($EF_{grid,CM,y}$) (tCO _{2e} /MWh)	$BE_{Use,y}$ (tCO _{2e})
26-August-2021~31-December-2021	4,144.135	0.5088	2,108
01-January-2022~25-May-2022	5,847.665	0.5088	2,975
Total	9,991.8	-	5,083

Hence, based on the formular (1), the total baseline emission for this monitoring period is calculated as shown in below table

Table 4-3 Baseline Emission calculation during this monitoring period

Year	$BE_{MD,y}$ (tCO _{2e})	$BE_{MR,y}$ (tCO _{2e})	$BE_{Use,y}$ (tCO _{2e})	BE_y (tCO _{2e})
26-August-2021~31-December-2021	0	25,127	2,108	27,235
01-January-2022~25-May-2022	0	36,115	2,975	39,090
Total	0	61,242	5,083	66,325

In conclusion, the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in baseline GHG emissions have been justified. Appropriate GWP and emission factor values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified. It can be confirmed that the baseline emission calculation is overall correct.

4.4.6.2 Calculation of project GHG emissions or actual net GHG removals by sinks

According to the JPM and methodology, the project emissions is calculated using the following formula:

$$PE_y = PE_{ME,y} + PE_{MD,y} + PE_{UM,y} \quad (6)$$

Where:

- PE_y = Project emissions in year y (tCO_{2e})
- $PE_{ME,y}$ = Project emissions from energy use to capture and use methane (tCO_{2e})
- $PE_{MD,y}$ = Project emissions from destruction of captured methane (tCO_{2e})

$$PE_{UM,y} = \text{Project emissions from un-combusted methane in year } y \text{ (tCO}_2\text{e)}$$

i. $PE_{ME,y}$

For the proposed project, according to the methodology, emissions due to electricity consumption should be determined using the latest version of the “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0)/33/,

$$PE_{ME,y} = PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EF,j,y} \times (1 + TDL_{j,y}) \quad (7)$$

Where:

$$\begin{aligned} PE_{EC,y} &= \text{Project emissions from electricity consumption in year } y \text{ (tCO}_2\text{e)} \\ EC_{PJ,j,y} &= \text{Quantity of electricity consumed by the project electricity consumption source } j \text{ in year } y \text{ (MWh)} \\ EF_{EF,j,y} &= \text{Emission factor for electricity generation for source } j \text{ in year } y \text{ (tCO}_2\text{/MWh)} \\ TDL_{j,y} &= \text{Average technical transmission and distribution losses for providing electricity to source } j \text{ in year } y \\ j &= \text{Sources of electricity consumption in the project} \end{aligned}$$

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $PE_{ME,y}$ for this monitoring period as below table

Table 4-4 $PE_{ME,y}$ calculation during this monitoring period

Year	$EC_{PJ,j,y}$ (MWh)	$EF_{EF,j,y}$ ($EF_{grid,CM,y}$) (tCO ₂ e/MWh)	$TDL_{j,y}$	$PE_{ME,y}$ (tCO ₂ e)
26-August-2021~31-December-2021	0	0.5088	3%	0
01-January-2022~25-May-2022	0	0.5088	3%	0
Total	0	-	-	0

ii. $PE_{MD,y}$

According to the JPM and methodology, it is confirmed that the $PE_{MD,y}$ is calculated as below formula

$$PE_{MD,y} = \sum_i MD_{i,y} \times CEF_{CH_4} \quad (8)$$

Where:

$$\begin{aligned} PE_{MD,y} &= \text{Project emissions from methane destroyed in year } y \text{ (tCO}_2\text{e)} \\ MD_{i,y} &= \text{Methane destroyed through use } i \text{ in year } y \text{ (tCH}_4\text{)} \\ i &= \text{Use of methane (power generation, heat generation, supply to gas grid to various combustion end uses)} \\ CEF_{CH_4} &= \text{Carbon emission factor for combusted methane. Set as 2.75 (tCO}_2\text{e/tCH}_4\text{)} \end{aligned}$$

In each end-use, the amount of methane destroyed depends on the efficiency of combustion of each end use and should be determined as follows.

$$MD_{i,y} = MM_{i,y} \times Eff_{i,y} \quad (9)$$

Where:

$$\begin{aligned} MD_{i,y} &= \text{Methane destroyed through use } i \text{ in year } y \text{ (tCH}_4\text{)}. \\ MM_{i,y} &= \text{Methane measured sent to use } i \text{ in year } y \text{ (tCH}_4\text{)}. \text{ For the project, } i \text{ is only} \\ &\text{for electricity, so } MM_{i,y} = MM_{ELEC,y}. \\ Eff_{i,y} &= \text{Efficiency of methane destruction in use } i \text{ in year } y \text{ (\%)}. \text{ For the project, } i \\ &\text{is only for electricity, so } Eff_{i,y} = Eff_{ELEC,y}. \end{aligned}$$

As per the registered VCS PD, the emission reductions for replacing heat supply will not be claimed. Also, the project does not involve supply to gas grid. The only use of methane to be considered is for power generation. Therefore, Equation (8) is simplified as follows:

$$PE_{MD,y} = MD_{ELEC,y} \times CEF_{CH_4} = MM_{ELEC,y} \times Eff_{ELEC,y} \times CEF_{CH_4} \quad (10)$$

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $PE_{ME,y}$ for this monitoring period as below table

Table 4-5 $PE_{ME,y}$ calculation during this monitoring period

Year	$MM_{ELEC,y}$ (tCH ₄)	$Eff_{ELEC,y}$	CEF_{CH_4} (tCO ₂ e/ tCH ₄)	$PE_{MD,y}$ (tCO ₂ e)
26-August-2021~31-December-2021	897.42	99.5%	2.75	2,456
01-January-2022~25-May-2022	1,289.84	99.5%	2.75	3,530
Total	2,187.26	-	-	5,986

iii. $PE_{UM,y}$

According to the JPM and on-site interview with the operation staff, it is confirmed that not all the methane used for power generation is combusted, a small percentage escaped to the atmosphere. Hence, it is calculated as below formular,

$$PE_{UM,y} = GWP_{CH_4} \times \sum_i MM_{i,y} \times (1 - Eff_{i,y}) \quad (11)$$

Where:

$$\begin{aligned} PE_{UM,y} &= \text{Project emissions from un-combusted methane in year } y \text{ (tCO}_2\text{e)}. \\ GWP_{CH_4} &= \text{Global warming potential of methane (tCO}_2\text{e/tCH}_4\text{)}. \\ i &= \text{Use of methane (power generation, heat generation, supply to gas grid to} \\ &\text{various combustion end uses)} \\ MM_{i,y} &= \text{Methane measured sent to use } i \text{ in year } y \text{ (tCH}_4\text{)}. \\ Eff_{i,y} &= \text{Efficiency of methane destruction in use } i \text{ in year } y \text{ (\%)}. \end{aligned}$$

Via on-site investigation and checking the project design/6/, it is confirmed that no heat generation or gas supply is involved in the project, thus the only use of methane is for power generation.

For the project, i is only for electricity, so $MM_{i,y} = MM_{ELEC,y}$ and $Eff_{i,y} = Eff_{ELEC,y}$.

Thus,

$$PE_{UM,y} = GWP_{CH_4} \times MM_{ELEC,y} \times (1 - Eff_{ELEC,y}) \quad (12)$$

During this monitoring period, based on the above assessment in section 4.4.2, 4.4.3 and 4.4.4, CTI verified that the $PE_{UM,y}$ for this monitoring period as below table

Table 4-6 $PE_{UM,y}$ calculation during this monitoring period

Year	MM_{ELEC} (tCH ₄)	Eff_{ELEC} (%)	GWP_{CH_4} (tCO ₂ e/ tCH ₄)	PE_{UM} (tCO ₂ e)
26-August-2021~31-December-2021	897.42	99.5%	28	126
01-January-2022~25-May-2022	1,289.84	99.5%	28	181
Total	2,187.26	-	-	307

Hence, based on the formular (6), the total project emission for this monitoring period is calculated as shown in below table

Table 4-7 PE_y calculation during this monitoring period

Year	$PE_{ME,y}$ (tCO ₂ e)	$PE_{MD,y}$ (tCO ₂ e)	$PE_{UM,y}$ (tCO ₂ e)	PE_y (tCO ₂ e)
26-August-2021~31-December-2021	0	2,456	126	2,582
01-January-2022~25-May-2022	0	3,530	181	3,711
Total	0	5,986	307	6,293

In conclusion, the calculations of project GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized project. Any assumptions used in project GHG emissions have been justified. Appropriate GWP and emission factor values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified. It can be confirmed that the project emission calculation is overall correct.

4.4.6.3 Calculation of leakage GHG emissions

According to the methodology, Leakage may occur if the project activity prevents methane from being used to meet baseline thermal energy demand, whether as a result of physical constraints on delivery, or price changes.

Via the JPM/3/ and site inspection, it is confirmed that extraction of CMM is conducted for the coal mine's safety purpose, hence the extracted amount under the project activity and the baseline activity are equal. Thus, there is no leakage occurred due to displacement of baseline thermal energy demand.

Therefore, there is no leakage caused by the project activity for this monitoring period, i.e. $LE_y = 0$.

4.4.6.4 Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

The verification team has checked the MR includes a summary table of the emission reductions calculation.

Summary of emission reductions during the monitoring period,

$$ER_y = BE_y - PE_y - LE_y \quad (10)$$

Hence, the emission reductions during this monitoring period are summarized in the table below

Table 4-8 Emission Reductions Calculation during this monitoring period

Parameters Period	Baseline Emissions BE_y	Project Emissions PE_y	Leakage Emissions LE_y	Net GHG emission reductions or removals ER
	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
26-August-2021~31-December-2021	27,235	2,582	0	24,653
01-January-2022~25-May-2022	39,090	3,711	0	35,379
Total	66,325	6,293	0	60,032

All the figures as per the monitoring report were cross-checked by the verification team against basic monitored data. Refer to section 4.4.1 and 4.4.2 of this report for assessment details.

Via checking the values in MR/1/ against the ER calculation sheet/2/, CTI confirmed that the emission reductions calculation is overall correct.

4.4.6.5 Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered JPM

The comparison of actual values of the monitoring period with the estimations in the registered JPM/3/ has been carried out by VVB.

As per the JPM/3/, VVB confirmed that the annual estimated emission reduction is 103,297 tCO₂e, the estimated emission reduction in this monitoring period is 77,260 tCO₂e ((103,297 tCO₂e / 365 days) × 273 days). The actual emission reductions in this monitoring period are 60,032 tCO₂e, which is 22.3% less than the estimation in the registered JPM/3/. The reason is identified as the operation capacity of the project during this monitoring period is 2.75MW which is not same to the designed value 3.5MW, hence if considering the actual capacity, the re-calculated estimated emission reductions for this monitoring period are 60,705 tCO₂e (=77,260 tCO₂e × 2.75MW / 3.5MW), which means that the actual emission reductions achieved in this monitoring period is only 1.11% lower than the re-calculated estimated emission reductions which is verified as reasonable.

PP has listed the comparison result in the MR/1/ and ER sheet/2/, and the fluctuation rate is verified by CTI as correct and reasonable for this kind of project based on VVB's expertise.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer to section 4.4 above for the detail assessment of each monitoring parameters and Appendix 3 for the supporting evidence used to determine the GHG emission reductions.

For each reported data, the evidence is provided and verified as sufficient and quality is appropriate. Also, the cross-checks have been performed on the reported data with different source of evidence. The information flow from data generation and aggregation, to recording, calculation and final transposition into the monitoring report has been assessed by VVB in section 4.4 for each parameter and the calibration have been conducted as per the frequency of monitoring equipment defined in the registered JPM.

Therefore, it is concluded that the evidence provided are verified as sufficient and quality is appropriate and thus the evidence can be used to determine the GHG emission reductions and removals for this monitoring period.

4.6 Non-Permanence Risk Analysis

N/A

5. VERIFICATION CONCLUSION

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 2nd periodic verification of the project activity Guizhou Wenjiaba CMM Power Generation Project, VCS Ref. No. 2383 for the period 26-August-2021 to 25-May-2022, with regard to the relevant requirements for VCS Version 4.3.

Based on the documented evidence and corroborated by an on-site assessment, CTI can confirm that:

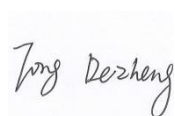
- the project has been implemented and operated as per the registered JPM;
- there is no project description deviation identified for this monitoring period;
- the project complies with the verification criteria for projects set out in VCS Version 4.3;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirement;
- the monitoring is in place as per the applied monitoring methodology;
- the monitoring complies with the monitoring plan in the validated PD;

It is certified that the GHG emission reductions from the project during the monitoring period amount as follows:

Verification period: From 26-August-2021 to 25-May-2022

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline Emissions BE_y	Project Emissions PE_y	Leakage Emissions LE_y	Net GHG emission reductions or removals ER
	(tCO _{2e})	(tCO _{2e})	(tCO _{2e})	(tCO _{2e})
26-August-2021~31-December-2021	27,235	2,582	0	24,653
01-January-2022~25-May-2022	39,090	3,711	0	35,379
Total	66,325	6,293	0	60,032



Dezheng Tong
CTI
Verification Team Leader
22-September-2022



Zhou Lu
CTI
Final Approval
22-September-2022

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CBM	Coal Bed Methane
CCER	China Certified Emission Reduction
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification Request
CMM	Coal Mine Methane
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Crediting Period
CSPG	China Southern Power Grid
DCS	Distributed Control System
DverR	Draft Verification Report
EIA	Environmental Impact Assessment
ER	Emission Reduction
ETS	Emission Trading Scheme
FAR	Forward Action Request
FverR	Final Verification Report
GHG	Greenhouse gas(es)
GS	Gold Standard
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
JPM	Joint-PD-MR
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PD	Project Description
PP	Project Participant
PPA	Power Purchase Agreement
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VAM	Ventilation Air Methane
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVB	Validation/Verification Body
VVS	Validation and Verification Standard

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Mr. Dezheng TONG

Team Leader(TL) and verifier

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	-	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 8: Mining/mineral production	TA 8.1: Mining/mineral production
SS 10: Fugitive emissions from fuels (solid, oil and gas)	TA 10.1: Fugitive emissions from oil and gas

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements f management system of the Certification Body of CTI.

Approved by:

Wu Lin

Wu LIN

Technical Competent Manager

Shenzhen, 01/07/2022__

Mr. Wu LIN

Technical Reviewer (TR)

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification					
GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
√	√	√	√	√	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 2: Energy distribution	TA 2.1: Electricity distribution
SS 3: Energy demand	TA 3.1: Energy demand
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
SS 10: Fugitive emissions from fuels (solid, oil and gas)	TA 10.1: Fugitive emissions from oil and gas
SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	TA 11.1: Emissions of fluorinated gases
	TA 11.2: Refrigerant gas production
SS 12: Solvents use	TA 12.1: Chemical industry
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:
Lu ZHOU



General Manager

Shenzhen, 01/01/2021

Ms. Shu'E JIANG

Technical Expert(TE) for Technical Reviewer (TR)

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	-	-	-	-	-	√

Scope	Technical Area
SS 6: Construction	TA 6.1: Construction
SS 8: Mining/mineral production	TA 8.1: Mining/mineral production
SS 10: Fugitive emissions from fuels (solid, oil and gas)	TA 10.1: Fugitive emissions from oil and gas

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by: *Wu Lin*

Wu LIN

Technical Competent Manager

Shenzhen, 01/01/2021

APPENDIX 3: DOCUMENTS REVIEWED OR REFERENCED

No	Author	Title	References to the document	Provider
1.	Climate Bridge (Shanghai) Ltd.	Monitoring Report	Monitoring Report for the 2 nd monitoring period Draft version 1.0, dated 27-June-2022 Final version 2.0, dated 17-September-2022	Project Owner
2.	Climate Bridge (Shanghai) Ltd.	Emission Reduction Calculation Sheet	Emission Reduction Calculation sheet (related to MR) Draft version 1.0, dated 27-June-2022	Project Owner
3.	Climate Bridge (Shanghai) Ltd.	Joint-Project Description-Monitoring report	Approved VCS Joint-Project Description-Monitoring report for project: “Guizhou Wenjiaba CMM Power Generation Project” version 1.1, dated 18-November-2021	Project Owner
4.	TUV NORD	Joint Validation and verification report	Joint Validation and verification report for VCS project “Guizhou Wenjiaba CMM Power Generation Project” version 01, dated 22-November-2021	VERRA website
5.	Pan County Market Supervision and Administration	Business License	Business License of Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Project Owner
6.	Shengli Oilfield Shengli Power Machinery Group Co., Ltd.	Feasibility Study Report	Feasibility Study Report of Guizhou Wenjiaba CMM Power Generation Project, dated in Nov. 2016	Project Owner
7.	Chongqing Jiutian Environmental Impact Assessment Co., Ltd.	Environmental Impact Assessment	EIA designed by Chongqing Jiutian Environmental Impact Assessment Co., Ltd. in May 2017	Project Owner
8.	Zhijin County Environmental Protection Bureau	Approval of Environmental Impact Assessment	Issued on 20-March-2017	Project Owner
9.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Record of started construction	Record of started construction dated on 15-July-2018	Project Owner
10.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Record of unit started operation	Record of unit started operation dated 24-September-2020	Project Owner

No	Author	Title	References to the document	Provider
11.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Meter Reading Records	Monthly Meter reading records of all the meters covering this monitoring period	Project Owner
12.	Guizhou Shuikuang Orion Clean Energy Co., Ltd. and Guizhou Wenjiaba Coal mine Co., Ltd	Electricity transaction notes	Monthly electricity transaction notes issued by project owner and Wenjiaba coal mine covering this monitoring period	PP
13.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Gas Monthly Data	Gas Monthly Data covering this monitoring period - Monthly gas flow reports via flow meter, pressure transmitter and temperature transmitter - Monthly methane concentration readings via gas analyzer meter	Project Owner
14.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Operation LOG	- Sample copy of project operation records - Equipment daily check log - Equipment mandatory maintenance records	Project Owner
15.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Declaration	Declaration of no double counting and not involved in other GHG scheme dated on 08-September-2022	Project Owner
16.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Training and Competence Records	Project Responsibilities, Training and Competence Records - Project Organization Chart and responsibilities - Staff Training Records of the CMM power plant - Operator Certificates of the CMM power plant - Internal audit record covering this monitoring period	Project Owner
17.	Guizhou Shuikuang Orion Clean Energy Co., Ltd. and Bijie Power Supply Bureau of Guizhou Power Grid Co., Ltd. & Guizhou Wenjiaba coal mine Co., Ltd.	Power Purchase and Sale Contract	- Power Purchase and Sale Contract signed by Guizhou Shuikuang Orion Clean Energy Co., Ltd. and Bijie Power Supply Bureau of Guizhou Power Grid Co., Ltd. valid for this monitoring period - Power Purchase and Sale Contract signed by Guizhou Shuikuang Orion Clean Energy Co., Ltd. and Wenjiaba coal mine Management Co., Ltd. valid for this monitoring period	Project Owner
18.	Guizhou Shuikuang Orion Clean Energy Co., Ltd.	Monitoring Manual	Monitoring Manual for the project activity and project site management rules and regulations for CMM power plant	Project Owner

No	Author	Title	References to the document	Provider
19.	Electric Power Research Institute of Guizhou Power Grid Co., Ltd.	Calibration certificates	Calibration Certificates for Electricity meter covering this monitoring period	PP
	Beijing Institute of Metrology		Calibration Certificates for gas flow meter, pressure transmitter and temperature transmitter covering monitoring period	
	Hubei Institute of Measurement and Testing Technology		Calibration Certificates for gas analyzer covering monitoring period	
20.	Beijing City Quality Technology Supervision Bureau	Certificate of Metrological Authorization	Certificate of Metrological Authorization to Beijing Institute of Metrology 1. issued on 08-January-2016 valid to 07-January-2022 2. issued on 22-December-2021 valid to 21-December-2027	PP
	Guiyang City Quality Technology Supervision Bureau		Certificate of Metrological Authorization to Electric Power Research Institute of Guizhou Power Grid Co., Ltd. issued on 17-May-2018 valid to 16-May-2024	
	General Administration of Quality Supervision, Inspection and Quarantine of China		Certificate of Metrological Authorization to Electric Power Research Institute of Guizhou Power Grid Co., Ltd. issued on 04-September-2017 valid to 03-September-2022	
21.	Project Owner and local stakeholder	Local stakeholder consultation records	local stakeholder communication survey questionnaires conducted in April 2022	Project Owner
22.	PP and staffs	Employment contracts	Employment contracts	PP
23.	PP	Payroll	Monthly payroll to the CMM plant staffs	PP
24.	PP	Statement	Statement of unit operation for this monitoring period dated 28-June-2022	PP
25.	PP	Coal production records	Coal production records for Wenjiaba coal mine issued on 11-September-2022	PP
26.	General Administration of Quality Supervision, Inspection and Quarantine	JJG1138-2017	Non-dispersive Infrared Methane Transmitters for Coal Mine	Public website
27.	National Standardization	JJG640-2016	Verification regulation of different pressure type flow meter	Public website

No	Author	Title	References to the document	Provider
	Management Committee			
28.	China DNA	Baseline Emission Factors	“2019 Baseline Emission Factors for Regional Power Grids in China” published by DNA of China https://www.mee.gov.cn/ywgz/ydghb/h/wsgtkz/202012/W020201229610353816665.pdf	China DNA website
29.	National Energy Bureau	DL/T 448-2016	Technical Administrative Code of Electric Energy Metering (DL/T 448-2016)	Public website
30.	On-site Validation team	Photographs of Project Site	Photographs of this CMM power plant site, Central Control Room, DCS System, all the meters and nameplate of the equipment taken by verification team during the on-site verification	On-site Verification team
31.	UNFCCC	Applied methodology	Approved CDM methodology ACM0008: “Abatement of methane from coal mines” (Version 08.0)	UNFCCC Website
32.	UNFCCC	TOOL07	“Tool to calculate the emission factor for an electricity system” (version 07.0)	UNFCCC Website
33.	UNFCCC	TOOL05	“Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0)	UNFCCC Website
34.	IPCC	AR5	IPCC Fifth Assessment Report (AR5)	IPCC website
35.	VERRA	Monitoring Report Template	VCS- Monitoring-Report -Template-v4.1	VERRA
36.	VERRA	Registration and Issuance Process version 4.0	Registration and Issuance Process version 4.1	VCS website
37.	VERRA	VCS Program Definitions	VCS Program Definitions, v4.2	VCS website
38.	VERRA	VCS Program Guide	VCS Program Guide, v4.2	VCS website
39.	VERRA	VCS Standard	VCS Standard, v4.3	VCS website
40.	China CER Exchange Info-platform	China CER	http://cdm.ccchina.org.cn/ccer.aspx	Website
41.	Ministry of Ecology and Environment of China	China cap & trade scheme	http://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html	Public Website
42.	Ministry of Ecology and Environment of China	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
43.	Google	Google Earth Map	earth.google.com	Website
44.	GS	Gold Standard	http://www.goldstandard.org/	Website

No	Author	Title	References to the document	Provider
45.	Intergovernmental Panel on Climate Change	IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	www.ipcc-nggip.iges.or.jp
46.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Website
47.	VCS	VCS	https://verra.org/project/vcs-program/ https://registry.verra.org/app/project/Detail/47/2383	Website
48.	National Standard	Emission standard	"Emission standard for industrial enterprise noise at boundary" (GB12348-2008)	National Standard

APPENDIX 4: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	N/A	Section no.		Date:
Description of FAR				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

Table 2. CL from this verification

CL ID	01	Section no.	1.1	Date : 05/08/2022
Description of CL				
In section 1.1, PP stated that during this monitoring period, three of the four sets (2*1MW+0.75*1MW) in the power station are actually in operation and one is for backup, however, how the one is backup is not clarified clearly.				
Project participant response				Date : 16/09/2022
The description has been changed into “three of the four sets(2*1MW+1*0.75MW) in the power station are actually in operation and one with the rated capacity of 0.75MW is not in operation due to the insufficient methane supply” and related evidence has been submitted to VVB.				
Documentation provided by project participant				
/1/- version 2.0				
VVB assessment				Date: 19/09/2022
The revised MR is checked, CTI confirmed that related information has been changed to be actual. In accordance with the registered JPM/3/, there are total 4 sets of CMM power generators with the total installed capacity of 3.5 MW have been designed to be installed to utilize CMM for power generation, however, via on-site investigation, it is confirmed that during this monitoring period, only 3 sets with 2.75MW (2*1MW+1*0.75MW) CMM generators have been operated to generate the electricity due to the gas source for extraction is insufficient caused by coal mine has temporarily stopped mining which has been confirmed by checking the statement of unit operation for this monitoring period/24/. And via site inspection and checking the operation log/14/, it is confirmed that for the operation of 2.75MW units, there were no events for the normal operation occurred. CL 01 is closed.				

CL ID	02	Section no.	2.2	Date : 05/08/2022
Description of CL				
In section 2.2, when the LSC conducted during this monitoring period is not clearly clarified.				
Project participant response				Date : 16/09/2022
The description has been changed into “The LSC during the first monitoring period was conducted on 15-January-2021 to introduce the implementation situation of project to local stakeholders. During this monitoring period, the opinions of the local stakeholders were recollected on 16-April-2022.” for a clear clarification.				
Documentation provided by project participant				

/1/- version 2.0	
VVB assessment	Date: 19/09/2022
The revised MR is checked, CTI confirmed that related information has been added. The project owner carried out a questionnaire survey for the local stakeholder to collect the relevant comments and suggestions on 16-April-2022 during this monitoring period. Via checking the filled 30 questionnaires/21/, interview with the local officer and local resident during site visit, it is verified that majority of them believed that the project had positive impact on local employment, economy, power supply and underground mining safety. And by interview with the local officer and local resident during site visit, it is verified that 100% of the respondents believe that the Project will not have any negative environmental impact. CL 02 is closed.	

Table 3. CAR from this verification

CAR ID	01	Section no.	1.10	Date : 05/08/2022
Description of CAR				
PP is not provided a declaration of if the project involved in other forms of credit and if any double counting occurred.				
Project participant response				Date : 16/09/2022
The statement of no double counting has been submitted to VVB.				
Documentation provided by project participant				
/1/- version 2.0				
/15/				
VVB assessment				Date: 19/09/2022
The revised MR is checked, CTI confirmed that the statement of no double counting has been provided. It is confirmed that the emission reductions without any double counting for this monitoring period from 26-August-2021 to 25-May-2022 which has been confirmed by checking the Declaration of no double counting and not involved in other GHG scheme/15/. CAR 01 is closed.				

CAR ID	02	Section no.	1.11	Date : 05/08/2022
Description of CAR				
PP is not provided the evidence of the project's SD contributions as appendices to this report as per the request of MR template.				
Project participant response				Date : 16/09/2022
The evidence of the project's SD contributions has been added as appendices to this report and related evidence has been submitted to VVB.				
Documentation provided by project participant				
/1/- version 2.0				
VVB assessment				Date: 19/09/2022
The revised MR is checked, CTI confirmed that the evidence of the project's SD contributions has been added as appendices and have been assessed by VVB as appropriate. Refer to section 4.1 of this report for detail assessment. CAR 02 is closed.				

CAR ID	03	Section no.	3.1	Date : 05/08/2022
Description of CAR				
- In section 3.1, PP stated that compared with the first monitoring period, the electricity generated by the project increased evidently, PP is requested to specify how the comparison conducted. - The value of how many biogas utilized during this monitoring period is missing.				
Project participant response				Date : 16/09/2022
- The comparison of the electricity generated by the project between the first and the second monitoring periods is not appropriate. Such descriptions have been deleted. - The value of biogas has been supplemented.				

Documentation provided by project participant	
/1/- version 2.0	
VVB assessment	Date: 19/09/2022
1. The revised MR is checked, CTI confirmed that the non-appropriate descriptions have been deleted accordingly. 2. The revised MR is checked, CTI confirmed that value of biogas utilized during this monitoring period is added which is verified as consistent with the value provided in section 4.2 and has been assessed by CTI in section 4.4.3 of this report.	
CAR 03 is closed.	

CAR ID	04	Section no.	4.1	Date : 05/08/2022
Description of CAR				
For the parameters GWP _{CH4} and Eff _{ELEC} , PP listed both as data and parameters available at validation, which is not in line with the registered JPM.				
Project participant response				Date : 16/09/2022
The parameters (GWP _{CH4} and Eff _{ELEC}) have been listed as data and parameters monitored in line with the registered JPM.				
Documentation provided by project participant				
/1/- version 2.0				
/12/				
VVB assessment				Date: 19/09/2022
The revised MR is checked, CTI confirmed that the parameters have been removed as monitored parameters which is verified in line with the registered JPM. Refer to section 4.4.3 of this report for detail assessment of each parameter. CAR 04 is closed.				

CAR ID	05	Section no.	4.2	Date : 05/08/2022
Description of CAR				
The calibration and validity information to all the monitoring devices does not covering this monitoring period. Revision is requested.				
Project participant response				Date : 16/09/2022
The description of calibration and validity information to all the monitoring devices has been revised for a clear clarification and the qualification of the calibration institution within the validity period covering this monitoring period has been submitted to VVB.				
Documentation provided by project participant				
/1/- version 2.0				
/19/				
VVB assessment				Date: 19/09/2022
The revised MR is checked, CTI confirmed that the calibration and validity information to all the monitoring devices has covered this monitoring period which is verified as in line with the calibration certificates/19/. Refer to Appendix 5 below for detail assessment of the calibration. CAR 05 is closed.				

APPENDIX 5: CALIBRATION DATES AND VALIDITY OF INSTALLED MONITORING EQUIPMENT

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Previous calibration (last calibration before start of this monitoring period)	Calibration date(s) during this monitoring period	Validity of calibration(s)	Delay in calibration : yes/no	Period of delayed calibration
Electricity meter	$EG_{use,k,y}$ ($EG_{PJ,grid,y}$) $EC_{PJ,j,y}$	1900030130	DSSD71	0.5s	31-May-2021	-	31-May-2021 ~30-May-2022	☒ No ☐ Yes	From: To:
Flow Meter	$MT_{PJ,s,i,y}$ $MM_{ELEC,y}$	R91003	TY-7030	$\pm 1\%$	25-May-2021	25-April-2022	25-May-2021 ~24-April-2023	☒ No ☐ Yes	From: To:
Pressure transmitter				0.5%FS				☒ No ☐ Yes	From: To:
Temperature transmitter				0.2%SF				☒ No ☐ Yes	From: To:
Gas analyzer	$MT_{PJ,s,i,y}$ $MM_{ELEC,y}$	TY6020EX1901 2501	TY-6020EX	methane: $\pm 2\%$ FS	08-June-2021	-	08-June-2021~ 07-June-2022	☒ No ☐ Yes	From: To: