



JOINT VALIDATION AND VERIFICATION REPORT OF SHANXI XIYANG CMM POWER GENERATION PROJECT



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Summary:

CTI Certification Co., Ltd. (hereafter referred to as "CTI") has been commissioned by Baineng New Energy (Shenzhen) Co., Ltd. to perform the validation and verification of "Shanxi Xiyang CMM Power Generation Project" (VCS Project ID: 5011) (hereafter referred to as the project) in P. R. China and reported in the joint Validation & Verification Report.

Description of the project

The purpose of the project developed by Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant is to utilize the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine which is a working coal mine for power generation to supply electricity to the coal mine where the project is located and to North China Power Grid(NCPG) if there is any electricity surplus. The project is located in Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R. China. The project design capacity is 24MW, destroying 42.14 million Nm³ of methane annually. After the full operation of the project, the expected annual exported electricity will be 163,990 MWh which will be supplied to the coal mine through the electricity distribution network in Xiyang Fenghui coal mine area, and to NCPG if there is any electricity surplus, replacing the electricity that would otherwise have been purchased from the NCPG and displace part of the electricity generated by NCPG dominated by fossil fuel-fired power plants. The waste heat from the generators will be recovered by waste heat boilers for hot water heating. However, to be conservative, emission reductions generated by replacement of heat will not be claimed.

The emissions reduction of the project comes from two sources: 1) Methane (CH₄) emissions as a result of the previously vented gas that will be captured and destroyed in the project scenario; 2) CO₂ emissions from the production of the equivalent amount of electricity replaced by the project that would otherwise have been purchased from the NCPG. It's estimated that the project could achieve total GHG emission reductions of 8,132,420 tCO₂e during the fixed 10-year crediting period 01/12/2022-30/11/2032.

The purpose and scope of validation and verification

The validation objective is an independent assessment by a Third Party of a proposed project activity against all defined criteria set for the registration under the VCS. In order to confirm that the project activity, as documented, is sound reasonable and meets the identified criteria, the validation involves the assessment of: project conformance to VCS standards/programs, project conformance to the applied methodology and tools, including the procedure for the demonstration of additionality specified in the methodology; and likelihood that methods and procedures set out in the project description will generate verifiable GHG data and information when implemented. Validation is a requirement and is seen as necessary to provide assurance to stakeholders of the quality of project and its intended generation of VCUs. Validation is part of the VCS project cycle and will finally result in a conclusion by the executing VVB whether a project activity is valid to be submitted for registration to Verra registry.

The verification scope is defined as a periodic independent review and ex-post determination by the VVB of the monitored reductions in GHG emissions during defined verification period.

The method and criteria used for validation and verification

Validation and verification are conducted using CTI standard auditing techniques in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques including but not limited to: document review, follow-up interviews and site visits, and the resolution of outstanding issues.

The validation and verification criteria followed the guidance documents provided by VCS and the selected CDM methodology and tool includes:

- VCS Standard, version 4.7
- VCS Program Guide, version 4.4
- VCS Validation Verification Manual, version 3.2
- CDM Validation and Verification Standard for project activities version 03.0
- CDM Project Standard for project activities version 03.0
- CDM project cycle procedure for project activities version 03.0
- Program Definitions, version 4.5
- ACM0008: Abatement of methane from coal mines, Version 08.0
- Tool 02: Combined tool to identify the baseline scenario and demonstrate additionality, Version 07.0
- Tool 05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, Version 03.0
- Tool 07: Tool to calculate the emission factor for an electricity system, Version 07.0
- Tool 24: Common practice, Version 03.1
- Tool 27: Investment analysis, Version 14.0

The number of findings raised during validation and verification

In the course of the validation and verification, 4 Corrective Action Requests (CARs) and 4 Clarification Requests (CLs) were raised and successfully closed. No Forwarded Action Requests (FARs) was raised. The assessment is included in Appendix 4 of this report.

Any uncertainties associated with the validation

There are no restrictions of uncertainty.

Summary of the validation and verification conclusions

CTI has performed the validation and verification of the project: Shanxi Xiyang CMM Power Generation Project (ID.5011) with regard to the relevant requirements of VCS Standard Version 4.7. CTI confirms all validation and verification activities including objectives, scope and criteria, level of assurance, project description, monitoring and monitoring report adhere to VCS Standard Version 4.7 and all associated updated as documented in this report, are complete.

In CTI's opinion, the GHG emission reductions reported for the project in the Joint project description and monitoring report (Version 02 dated 15/11/2024) are fairly stated. The GHG emission reductions were calculated correctly on the basis of approved methodology ACM0008: Abatement of methane from coal mines, version 08.0 and the monitoring plan contained in the joint PD & MR (Version 02 dated 15/11/2024).

CTI does not assume any responsibility towards the issuance and utilization of the VCUs hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to CTI and the engagement conditions detailed in this report. CTI cannot be held liable by any party for decisions made or not made based on this report. Hence, CTI is able to certify that the emission reductions from the "Shanxi Xiyang CMM Power Generation Project" during the monitoring period of 01/12/2022-31/08/2024 amount to 1,071,207 tCO₂e.

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1 INTRODUCTION

1.1 Objective

Baineng New Energy (Shenzhen) Co., Ltd. has commissioned CTI Certification Co., Ltd. (hereafter referred to as CTI) to carry out the Verified Carbon Standard (VCS) validation and verification of the project “Shanxi Xiyang CMM Power Generation Project” (VCS Project ID: 5011) (hereafter referred to as the project) in P. R. China.

The objective of validation is an independent assessment by a Third Party of a proposed project activity against all defined criteria set for the registration under the VCS. In order to confirm that the project activity, as documented, is sound reasonable and meets the identified criteria, the validation involves the assessment of: project conformance to VCS standards/programs, project conformance to the applied methodology, including the procedure for the demonstration of additionality specified in the methodology; and likelihood that methods and procedures set out in the project description will generate verifiable GHG data and information when implemented. Validation is a requirement and is seen as necessary to provide assurance to stakeholders of the quality of project and its intended generation of VCU. Validation is part of the VCS project cycle and will finally result in a conclusion by the executing VVB whether a project activity is valid to be submitted for registration to Verra registry.

The objective of verification is the periodic independent review and ex-post determination by an accredited Third Party of the monitored reductions in GHG emissions that have occurred as a result of the VCS project activity during a defined verification period. A verification statement is the written assurance that, during a specific period in time, a project activity achieved the emission reductions as verified. For the project activity, the verification was to verify and provide a verification statement of emission reductions reported for the period 01/12/2022-31/08/2024.

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the Joint Project Description and Monitoring Report to validate that (a) the project design is actual, (b) the baseline scenario is correctly defined as per the applied methodology and relate tools, (c) the project is additional, (d) the monitoring plan can be implemented and is transparent and adequate and (e) all data and information used for ex-ante calculation of emission reductions is of projected and/or hypothetical nature. The joint PD & MR is reviewed against the criteria stated in VCS Standards Version 4.7 and the approved baseline and monitoring methodology ACM0008, Version 08.0. The validation was based on the requirements of VCS Validation and Verification Manual version 3.2, VCS Program Guide version 4.4, VCS

standard version 4.7, applying auditing techniques. The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

The scope of the verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emissions reduction data is free from material misstatement; verify that reported GHG emissions data is sufficiently supported by evidence. The verification is conducted as per VCS Standards Version 4.7, VCS Program Guide, version 4.4, other relevant requirements defined by Verra and the approved methodology ACM0008, Version 08.0 applied by the project. The verification shall ensure that reported emission reductions are complete and accurate in order to be verified.

1.3 Reasonableness of Assumptions and Level of Assurance

CTI has assessed the claims and assumptions made in the joint PD&MR, i.e., assumptions regarding the determination of baseline scenario, the investment analysis and additionality assessment, as well as validated the assumptions, limitations, and methods used for determining parameters and calculation of baseline emission, project emission and leakage against the VCS Standard Version 4.7 /55/, applied methodology ACM0008 (version 08.0) /64/, Tool for the Combined tool to identify the baseline scenario and demonstrate additionality (Version 7.0) /65/ and other VCS rules /56/-/63/. It is confirmed that the assumptions made in the joint PD&MR are reasonable which are in line with the applied methodology and tools as well as the requirement of VCS. The project is expected to generated average GHG emission reduction of 813,242 tCO₂e per year during the fixed crediting period and it is confirmed that outcome of future activities will be achieved as the assumptions and limitations are reasonable.

The joint validation and verification report expresses a conclusion with a reasonable level of assurance about whether the reported GHG emissions reduction data is free from material misstatement. CTI applied a materiality threshold of 1% (for large projects with ER greater than 300,000 tCO₂e per year) with respect to emission or misstatements concerning reported quantities as per para 3.9.1 and 4.1.8 (4) of VCS Standard Version 4.7.

1.4 Summary Description of the Project

The project is implemented by Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant, which aims to utilize the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine which is a working coal mine for power generation to supply electricity to the coal mine where the project is located and to North China Power Grid (NCPG) if there is any

electricity surplus. It is located in Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R. China and the geographical coordinates of the project are east longitude 113°37'23"~113°40'43 " and north latitude 37°30'53"~37°32'34". The project design capacity is 24MW (12*2MW), destroying 42.14 million Nm³ of methane annually. After the full operation of the project, the expected annual exported electricity will be 163,990MWh, which will be supplied to the coal mine through the electricity distribution network in Xiyang Fenghui coal mine area, and to NCPG if there is any electricity surplus, replacing the electricity that would otherwise have been purchased from the NCPG and displace part of the electricity generated by NCPG dominated by fossil fuel-fired power plants. The waste heat from the generators will be recovered by waste heat boilers for hot water heating. However, to be conservative, emission reductions will not be claimed for this part.

The project started construction on 23/11/2021 /17//18/ and started operation since 01/12/2022 /18//19/. At present, 12 sets of CMM power generators with the total capacity of 24 MW has been installed.

The emissions reduction of the project comes from two sources: 1) Methane (CH₄) emissions as a result of the previously vented gas that will be captured and destroyed in the project scenario; 2) CO₂ emissions from the production of the equivalent amount of electricity replaced by the project that would otherwise have been purchased from the NCPG. It was verified by on-site inspection, and checking the related documentations, interviewing with the project implementer. The project is expected to achieve GHG emission reductions of 813,242 tCO₂e annually and 8,132,420 tCO₂e in total in the fixed 10-year crediting period.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

A project specific validation and verification plan was developed to guide the validation and verification auditing process to ensure efficiency and effectiveness.

The purpose of the validation and verification is to present a risk assessment for determining the nature and extent of validation and verification procedures necessary to ensure the risk of auditing error is reduces 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. The validation and verification were performed through means of the following three phases in accordance with the requirement of the applied methodology, and VCS Standard (version 4.7) and other relevant VCS requirements.

- A desk review of the joint PD & MR and all support documents;
- Follow-up interviews with project stakeholders and site inspection;
- The resolution of outstanding issues and the issuance of the joint validation and verification report and statement.

CTI completed a strategic review and risk assessment of the project activity and processes in order to gain a full understanding of:

- Project Details;
- Application of Methodology;
- Estimated GHG Emission Reductions and Removals;
- Monitoring;
- Safeguards etc.

CTI also verified the emission reductions through assessing all factors and issues that constitute the basis for emission reductions from the project, including:

- The emission reduction calculations and the relevant data records;
- The calibration and maintenance records for the monitoring instruments;
- The management systems to support the project operation and monitoring.

CTI assessed that the reported information in the joint PD & MR are complete and accurate in question. This joint validation and verification report describes the findings of this assessment. The information of the assessment team has been included in below of this report.

2.2 Document Review

The joint PD & MR and supporting background documents related to the project implementation were reviewed. Documents review was conducted to ensure consistency with and identify any deviation from VCS program requirements. Desk review included an examination of the project design details, baseline scenario, additionality, ex ante and monitoring data and parameters, and ex ante quantification of GHG emission reductions. The assessment team also used additional documentation by third parties like host party legislation, technical reports referring to the project design details, baseline scenario, additionality, monitoring or to the basic conditions and technical data.

Furthermore, the joint PD & MR and emission reduction calculation spreadsheet of monitoring period from 01/12/2022-31/08/2024, relevant decisions, clarifications and guidance from the Verra, other information and references relevant to the project activity

have also been assessed. During the desk review, CTI has applied standard auditing techniques to assess the quality of information provided, including a review of the data and information presented to verify their completeness; a review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures; and an evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The references used in the course of this validation and verification are summarized in Appendix 2. The validation and verification were performed basing on the documents check and site visit, refer to the section 3 of this report for the validation process detail, section 3 of this report for the verification process detail, and Appendix 2 for corresponding documents review.

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

Function	Name	Technical competence	Task Performance*
Team Leader	Tong Dezheng	1.2, 8.1, 10.1	☒ DR ☒ SV ☒ RP ☐ TR
Technical Reviewer	Lin Shunrong	1.2, 3.1, 13.1, 13.2, 14.1, 15.1	☒ DR ☐ SV ☐ RP ☒ TR
TR Expert	JIANG Shu'e	6.1, 8.1, 10.1	☒ DR ☐ SV ☐ RP ☒ TR

*DR=Document review; SV=Site visit; RP=Reporting; TR=Technical review

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the validation and verification process. Onsite interviews and information discussions were conducted on 25/09/2024-26/09/2024 with project owner, local stakeholders and the consultant, and the following is a list of the main interviewees and subject.

Interviewed personnel	Role	Organization	Subject	Team Member
Qin Jianchun	General Manager	Shanxi Xiyang Fenghui coal industry Co., Ltd. Power	Project background information; Project approval status (incl. Feasibility Study Report (FSR) approval,	Tong Dezheng

Interviewed personnel	Role	Organization	Subject	Team Member
Fang Liang	O&M Staff	Plant	Environment Impact Assessment (EIA) approval); Chronological description of the project activity with documents of key steps of the implementation; Financial aspects; Technical details of the project realization, project feasibility, designing, operational life time; Baseline and Additionality; Project Boundary; Eligibility criteria; Monitoring plan and arrangements; Crediting period; Project activity starting date; Ownership; Local stakeholder consultation; No-net impact, SDGs; Project implementation status; Data collection and data achievement; Calibration of meters and equipment maintenance; Data collection and ER calculation.	
Li Lingrui	Financial supervisor			
Wang Xiaohu	O&M Staff	Xiyang Fenghui coal mine		
Zhang Wei	O&M Staff			
Lai Yawen	Project Manager	Baineng New Energy (Shenzhen) Co., Ltd.	Applicability of selected methodology; Editorial issues of the joint PD&MR Data collection and ER calculation.	Tong Dezheng
Li Xin	Officer	Local Ecology and Environment Bureau	Local stakeholder consultation; Impact to local residents; Impact to local environment. Impact to social-economic	Tong Dezheng
Zhang Lu	Local Resident	Local village		
Zhang Guizhen				
Zhang Guiving				

2.4 Site Visits

On 25/09/2024-26/09/2024, CTI assessment team visited Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant and performed the on-site validation and verification at the project location. The interviewed personnel and objective are listed in above table. During

the site inspection, the project was inspected and documents evidence were checked, details as following table.

Duration of on-site inspection: 25/09/2024-26/09/2024				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening meeting Interview with PP Representative, local officers, local residents and Operation Staff	Project Owner's office in the Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China	25/09/2024	Tong Dezheng
2	On-site inspection	Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China	25/09/2024-26/09/2024	Tong Dezheng
3	Documents check	Project Owner's office in the Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China	25/09/2024-26/09/2024	Tong Dezheng
4	Finding Summary	Project Owner's office in the Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China	25/09/2024-26/09/2024	Tong Dezheng
5	Close Meeting	Project Owner's office in the Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China	26/09/2024	Tong Dezheng

Opening meeting of the validation and verification process started on 25/09/2024 at project owner's office in the Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China, as confirmed by the assessment team the project is listed on the project pipeline with a status of under validation before the opening meeting representing the beginning of the validation and verification process.

Furthermore, the validation and verification took place after the 30-day public comment period has begun from on 02/04/2024, and CTI Certification completed the validation and verification until after the 30-day public comment period has ended.

During the on-site validation, CTI Certification has applied standard auditing techniques to assess the quality of information provided, the implementation and current situation of the project activity, evaluate data management, QA/QC system, project technology and equipment, training provided, and monitoring etc.

2.5 Resolution of Findings

As an outcome of the validation and verification process, the team can raise different types of findings.

The assessment team shall raise a Corrective Action Request (CAR) where reported information is not in line with the applicable CDM/VCS requirements.

The assessment team shall raise a Clarification Request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM/VCS requirements have been met.

There are 4 CARs and 4 CLs raised for the project, and all CARs and CL are successfully closed. Refer to Appendix 4 for detail assessment.

2.5.1 Forward Action Requests.

None FAR was raised during the validation and verification process.

3 VALIDATION FINDINGS

3.1 Project Details

The project is implemented by Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant, which aims to utilize the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity to the coal mine where the project is located and to NCPG if there is any electricity surplus. It is located in Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R. China and the geographical coordinates of the project are east longitude 113°37'23"~113°40'43" and north latitude 37°30'53"~37°32'34". The project design capacity is 24MW (12*2MW), destroying 42.14 million Nm³ of methane annually. After the full operation of the project, the expected annual exported electricity will be 163,990MWh, which will be supplied to the coal mine first through the electricity distribution network in Xiyang Fenghui coal mine area, and then to NCPG if there is any electricity surplus, replacing the electricity that would otherwise have been purchased from the NCPG and displace part of the electricity generated by NCPG dominated by fossil fuel-fired power plants. The waste heat from the generators will be recovered by waste heat boilers for hot water heating. However, to be conservative, emission reductions will not be claimed for this part. The project started construction on 23/11/2021 /17//18/ and started operation since 01/12/2022 /18//19/. At present, 12 sets of CMM power generators with the total capacity of 24 MW has been installed.

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Audit history	Via checking web platform, the project was listed on the project pipeline with a status of under validation on 02/04/2024 for 30-day public comment period. https://registry.verra.org/app/projectDetail/VCS/5011 CTI held the opening meeting on 25/09/2024 and undertook the on-site assessment on from 25/09/2024 to 26/09/2024, and completed the validation on 25/11/2024.
Sectoral scope	By interviewing with the project owner and document review, it is verified by the assessment team that the project is a newly-built CMM power generation project. Therefore, it is confirmed that the sectoral scope of the project falls into sectoral scope 01: Energy industries (renewable -/ non-renewable sources) and sectoral scope 08: Mining/mineral production, as per the UNFCCC Standard "Applicability of sectoral scopes" version 01.0 /90/.

AFOLU project category, if applicable	The project is not a AFOLU project, therefore, this section is not applicable.
Project activity type	The purpose of the project is to utilize the extracted low concentration coal mine methane (CMM) to generate and supply electricity for the coal mine where the project located and to NCPG if there is any electricity surplus. Via site investigation, it was validated twelve sets of CMM power generators have been installed. By checking the Feasibility Study Report /4/ and on-site inspection against the applied technology by the project, the assessment team can confirm that the project activity type is CMM utilization and abatement. The project is not a AFOLU project and a grouped project.
General eligibility of the project to participate in the VCS Program	For the registration validation, the PD & MR has described and provided the justification on the project's eligibility under the scope of the VCS Program as per VCS Standard Version 4.7. The assessment is provided as below: • The project activity generates GHG emission reductions including CO₂ and methane, which belong to the seven Kyoto Protocol greenhouse gases attributed to scope 1 of section 2.1.1 of VCS Standard Version 4.7. • The project activity adopted CDM methodology ACM0008 (version 08.0) which is approved under a VCS approved GHG program, attributed to scope 4 of section 2.1.1 of VCS Standard Version 4.7. • Via checking the FSR Approval /4/, EIA Approval/6/, Power supply agreement/7/ and Electricity purchase and sale contract/8/, it is verified that the project is implemented to utilize the extracted CMM with low concentration methane concentration to produce electricity. It avoids the methane emissions from the previously vented CMM and reduces GHG emissions by the fossil-fuel based power plant connected to the NCPG, and the additionality is verified as actual, thus there is no assumption of having generated GHG emissions primarily for the purpose of their subsequent reductions, removals or destructions for this

project. Meanwhile, the project is not belonged to the projects excluded in Table 1 of VCS Standard 4.7.

- The project start date is 01/12/2022 when the project starts operation, it is also the date on which the project began generating GHG emission reductions. By checking the operation record/19/, Project acceptance report /18/ and onsite visit interview with project owner, it is verified that the start date is correct and in line with the VCS Standard Version 4.7. Hence the project meets requirements of VCS Standard 4.7: “Non-AFOLU projects shall initiate the project pipeline listing process and complete validation within two years of the project start date.

- The applied methodology ACM0008 version 08.0 is eligible under the VCS Program, and the methodology does not have scale and/or capacity limits.

- No other relevant eligibility information.

PP has also described and justified how the project is eligible under the scope of the VCS Program in PD & MR as per the section 3.1 of VCS Standard version 4.7/55/. The assessment is provided as below,

1. Via checking the PD & MR and on-site inspection of the project, CTI confirmed that the project meets all applicable rules and requirements set out under the VCS Program, including this document.

2. The project applies the CDM methodology ACM0008: Abatement of methane from coal mines, Version 08.0/64/, along with tools or modules as applicable developed under the United Nations Clean Development Mechanism, which can be used for projects and programs registering with VCS as per requirements available on the Verra website.

3. The project applies the CDM methodology ACM0008: Abatement of methane from coal mines, Version 08.0/64/, which is the latest version.

4. Via checking the FSAApproval/4/, EIAApproval/6/ and Project acceptance report /18/, CTI confirmed the project complies with all Chinese relevant laws and regulations.

	5. By checking the PD & MR/1/, it is verified there is no model needs to be chosen by the project proponent as per the applied the CDM methodology ACM0008: Abatement of methane from coal mines, Version 08.0/64/. 6. By checking the PD & MR/1/, it is verified that both IPCC AR5 and 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories data were used. It is compliance with the VCS requirements. 7. By checking the PD & MR/1/, it is verified the rules and requirements of the VCS standard has prioritized. 8. There is no specified capacity limits or any other relevant requirements set out as per the applied methodology/64/ and tools/65/-/69/. 9. The project will refer to new VCS Program rules when VERRA issue, and following the effective dates of these requirements which in line with the Section 3.1.9 of the VCS Standard 4.7. At present, the project has followed the latest requirements of Verra. In conclusion, the project is eligible to the scope of the VCS Program.
AFOLU project eligibility, if applicable	The project activity is not an AFOLU project.
Transfer project eligibility, if applicable	The project has neither been registered nor seeking registration under any other GHG programs which has been confirmed via checking the UNFCCC, GS, VCS and other GHG schemes' website. It is verified that the project is seeking registration only in VCS program. Therefore, this section is not applicable.
Project design	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the assessment team confirmed that the project has been designed to include a single installation of an activity, not multiple project activity instances or as a grouped project.

	This project is not a grouped Project. Therefore, eligibility criteria for grouped projects is not applicable.
Project ownership	By checking the Business License /9/, approvals of the FSR and EIA /4//6/, Power supply agreement/7/ and Electricity purchase and sale contract/8/, the purchase contracts of the equipment /13//14/, the assessment team confirmed that the project proponent Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant has the legal right to control and operate the project activity, and has full legal and beneficial title to all of the GHG reductions generated by the project.
Project start date	The project start date is 01/12/2022 when the project starts operation, it is also the date on which the project began generating GHG emission reductions. By checking the operation record/19/, Project acceptance report /18/ and onsite visit interview with project owner, it is verified that the start date is correct and in line with the VCS Standard Version 4.7.
Project crediting period	The project adopts a 10-year fixed crediting period. CTI assessment team confirms that the starting and ending dates of the crediting period is as below: Crediting Period Start date: 01/12/2022 Crediting Period End date: 30/11/2032
Project scale	As the estimated annual average GHG emission reductions per year is 813,242 tCO ₂ e, which are greater than 300,000 tCO ₂ e, the project classified as "large project" under VCS standard version 4.7.

Likelihood of achieving estimated GHG emission reduction or removals

Through checking emission reductions calculation spreadsheet /2/ provided by PP, CTI Certification assessment team was able to confirm that the total estimated GHG emission reductions during the 10 years of VCS fixed crediting period (01/12/2022-30/11/2032) are 8,132,420 tCO₂e. The assessment team was able to confirm that the estimated GHG emission reductions of the project activity are calculated correctly and conservatively, which are shown as follows:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/12/2022-31/12/2022	69,070
Year 2023	813,242
Year 2024	813,242
Year 2025	813,242
Year 2026	813,242
Year 2027	813,242
Year 2028	813,242
Year 2029	813,242
Year 2030	813,242
Year 2031	813,242
01/01/2032-30/11/2032	744,172
Total estimated ERs	8,132,420
Total number of crediting years	10
Average annual ERs	813,242

Technologies and measures implemented by the project activity

The project is implemented by Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant, which aims to utilize the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity

to the coal mine where the project is located and to NCPG if there is any electricity surplus.

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the technical process of the project is as follows: The low concentration CMM is delivered through methane extraction pumps to pre-treatment system for safety treatment, and then goes into the gas engines for power generation. Part of the generated electricity is for self-consumption of the project and the rest generated electricity will be supplied to the coal mine through the electricity distribution network in Xiyang Fenghui coal mine area for internal coal mine consumption and supplied to NCPG if there is any electricity surplus. And electricity will be imported from NCPG if the project is in regular maintenance or stop operation. The waste heat from the generators will be recovered by the waste heat boilers to provide hot water to coal mines.

The working mining capacity of the Xiyang Fenghui coal mine is 1.2 million tonnes per year, and went into operation in July-2012, which is designed to service life of 30 years.

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project design capacity is 24MW, destroying 42.14 million Nm³ of methane per year, and the total generated electricity is 172,800 MWh per year, of which 5.1% is used in the power plant, the annual exported electricity is 163,990 MWh. According to the FSR/4/, the annual operating hours was determined to be 7,200 hours, and thus the plant load factor (PLF) is 0.8219.

By checking the nameplates of the CMM power generators/16/, CMM generator purchasing contract/13/ and through site visit, the assessment team confirmed that the current actual installed capacity is 24MW, consistent with the FSR, consisting of twelve sets of 2MW CMM power generators in type of G3520C, all manufactured by Caterpillar Inc.

By checking the FSR /4/, nameplates of the CMM power generators/16/, CMM generator purchasing contract/13/ and through site visit, the assessment team confirmed that the technical parameters of CMM generators were:

Type	G3520C
Supplier	Caterpillar Inc.
Quantity	12
Rated power (kW)	2,000
Rated current (A)	138
Rated voltage(V)	10,500
Rated speed (r/min)	1,500
Frequency (Hz)	50
Power factor	0.8
Lifetime (year)	10

The project installs gas analyzers and flow meters to monitor the methane concentration and CMM volume sent to the Project. Electricity meters (M1) is installed to monitor the electricity exported to NCPG and the electricity imported from NCPG. Electricity meters (M2, M3) are installed to monitor the electricity exported to coal mines.

The operation lifetime of this project is 10 years. The installed technologies and equipment (i.e. CMM power generators) have been verified by CTI Certification through checking purchase contracts /13/ and nameplates/16/ during the on-site inspection.

In conclusion, it is verified that the description of the project in section 1.12 of the PD & MR is in line with the PD & MR template requirements and all the information has been provided and verified as correct, and reflects the real condition of the project implementation.

Implementation schedule of the project activity or activities

CTI Certification has further verified the project implementation by interviewing and checking the Project

	commencement report/17/, operation and maintenance records/19/, Power supply agreement/7/ and Electricity purchase and sale contract/8/, as well as the connection diagram. It was confirmed that the project started construction on 23/11/2021 and was put into operation on 01/12/2022, and the electricity generated by the project is supplied to the coal mine through the electricity distribution network in Xiyang Fenghui coal mine area for internal consumption, and then to NCPG if there is any electricity surplus. The emissions reduction of the project comes from two sources: 1) Methane (CH₄) emissions as a result of the previously vented gas that will be captured and destroyed in the project scenario; 2) CO₂ emissions from the production of the equivalent amount of electricity replaced by the project that would otherwise have been purchased from the NCPG. It's estimated that the project could achieve average GHG emission reductions of 813,242 tCO₂e annually and 8,132,420 tCO₂e in total in the fixed 10-year crediting period.
Project location	The project is located at Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R. China. During on-site visit, the assessment team checked the geographical coordinates by the GPS against the map. Via on-site interview and checking FSR /4/, the assessment team confirmed that the geographical coordinates of the project are east longitude 113°37'23"~113°40'43" and north latitude 37°30'53"~37°32'34".
Conditions prior to project initiation	Via on-site interview and checking FSR /4/, extraction station operation record/15/, the assessment team confirmed that before the implementation of the project activity, all the low concentration CMM extracted from Xiyang Fenghui coal mine would be vented into the atmosphere, the NCPG provided the equivalent amount of electricity produced by the project, and the heat was provided by waste coal boilers (emission reductions due to heat replacement will not be claimed).
Project compliance with applicable laws, statutes and other regulatory frameworks	CTI assessment team confirms that the project has been approved by Chinese government by checking the Project approval and EIA approval.

	By checking laws and regulations, i.e. Renewable Energy Law of the People's Republic of China, Guidance Catalogue for the Development of Renewable Energy Industry, Opinions of the General Office of the State Council on Further Accelerating the Extraction and Utilization of Coal bed Methane (Coal Mine Gas), Chinese National Coalmine Safety Regulation, Notice of the National Development and Reform Commission on the issuance of the twelfth Five-Year Plan for The Development and Utilization of Coal bed Methane (Coal Mine Gas)/47/, it is confirmed that the project is in compliance with all laws and regulations in China program(s).
Double counting and participation under other GHG programs	The project has neither been registered nor seeking registration under any other GHG programs, and hasn't been rejected by any other GHG project, which has been confirmed via checking the website of UNFCCC, GS, VCS, GCC, and CCER.
No double claiming with emissions trading programs or binding emission limits	Although the national emission trading scheme (ETS) has been launched since 16/07/2021 in China, it only covers the high-emission and energy intensive industries that emit at least 26,000 tons of CO₂e/year as per the Measures for the Administration of Carbon Emission Trading /91//92/ including thermal power generation, petrochemical, chemical, building materials, iron and steel, etc. By checking the business license/9/of the PP, it is confirmed the PP is not included the mandatory emission control scheme and there is no emission cap enforced for the PP via further checking the enforced company list under China ETS in public information /46/. Moreover, it is verified by the assessment team the project activity has not been registered as CCER. Hence, the emission reductions generated by the project activity are not eligible to be used for compliance with emission trading programs or to meet binding limits on GHG emissions as stipulated in the regulation /91/. To be concluded, the project activity is not involved on other emissions trading programs and other binding limits. As a completely voluntary VCS project, its GHG emission reductions will not be enforced to exchange for the compliance in the national ETS.

	Furthermore, the assessment team confirms by checking the Statement /26/ issued by the project proponent that the net GHG emission reductions generated by the project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions. Thus, it is concluded that the project activity is not involved on other emissions trading programs and other binding limits.
No double claiming with other forms of environmental credit	Via the on-site inspection and by checking the statement/27/ provided by PP, the assessment team confirms that that PP does not and will not apply for other forms of environmental credit, including but not limited to energy attribute certificates (EAC); renewable energy certificates (REC); Guarantee of Origin (GO); or renewable thermal certificates (RTC). Via interview with the project proponent and based on above assessment, it is confirmed that the project has not created any other form of environmental credit.
Supply chain (Scope 3) emissions double claiming	The purpose of the project is to utilize the extracted low concentration coal mine methane (CMM) to produce electricity, replacing same amount of electricity that will be supplied by NCPG dominated by fossil fuel-fired power plants. For this project activity, GHG emission reductions come from avoiding CO₂ emissions from those fossil fuel-based power plants connected to the grid and avoiding GHG emissions from releasing low concentration coal mine methane (CMM) into atmosphere at Xiyang Fenghui coal mine, and does not happen in a supply chain. Therefore, it is confirmed that the Supply Chain (Scope 3) Emissions are not applicable for the project activity.
Sustainable development contributions	Via the on-site inspection and by checking the evidence provided, CTI verified that the project contributes the sustainable development through the following aspects: - SDG7 “Ensure access to affordable, reliable, sustainable and modern energy” The project will utilize the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for electricity generation, displacing the equivalent electricity

supplied by NCPG dominated by fossil-fuel fired power plant. This contributes to one of China's actions for promoting sustainable developing: "By 2030, increase the share of non-fossil fuels in primary energy consumption to about 25 percent". During this monitoring period, 184,341.61 MWh of electricity generated by utilizing the low CMM, 70,750.65MWh of which was supplied to the coal mine and 113,590.96 MWh was supplied to the NCPG. It is verified by checking the monthly reading records/20/ and via on-site inspection.

- SDG8 "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"

The project can provide employment opportunities for local villagers. This contributes to one of China's actions for promoting sustainable developing: "by 2030, achieve full and productive employment and decent work for all women and men, including young people and persons with disabilities, and equal pay for work of equal value". By checking Staff roster and the payroll of employees /25/, it is confirmed that the project activity provided 68 long term employment opportunities during 01/12/2022-31/08/2024 (from the operation start date till the end of this monitoring period).

- SDG13 "Take urgent action to combat climate change and its impacts"

The project is to capture and utilize low concentration CMM gas for power generation to avoid methane emissions and CO₂ emissions. The project will achieve a GHG emission reduction of 813,242 tCO₂e/yr during the crediting period. This contributes to achieve China's stated sustainable development priorities " China's carbon dioxide emissions would strive to peak by 2030 and strive to achieve carbon neutrality by 2060 ". As verified by on-site inspection, and via checking the emission reduction calculation sheet /2/, 1,071,207 tCO₂e GHG emission reductions are generated by the project activity during this monitoring period.

Additional information relevant to the project	• Leakage management for AFOLU projects As the project is not a grouped project, the eligibility criteria for grouped project is not applicable; No leakage management as the project activity is not an AFOLU project. • Commercially sensitive information No commercially sensitive information has been excluded from the public version of the project description. The details are presented transparently to assessment team for analysis which lead to positive conclusion for this validation and verification. • No additional relevant information that may have a bearing on the eligibility of the project, the reductions or removals, or the quantification of the project's reductions or removals.
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3.2 Project Activity Instances in Grouped Projects

N.A. The project is not a grouped project.

3.3 Safeguards

3.3.1 Stakeholder Engagement and Consultation

3.3.1.1 Stakeholder Identification

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Stakeholder identification	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, Power supply agreement/7/, Electricity purchase and sale contract/8/, Local Stakeholder Consultation Records/31/, Labor contracts/24/, Staff roster and staff salary/25/ and through site visit, the assessment team confirmed that the stakeholder identification has been conducted as per the VCS standard version 4.7 and that the identified stakeholders are reasonable. People or groups who might be impacted by a project, including the residents near the power plant and coal mine, workers of power plant, workers of coal mine and government servants.
Legal or customary tenure/access rights	By checking the Power supply agreement/7/, Electricity purchase and sale contract/8/ and through site visit, the assessment team

	confirmed that the project is situated within the boundaries of an existing coal mine site. By checking Land use certificate/11/ issued by the Xiyang County People's Government and through site visit, CTI confirmed that the land use type in the project area is industrial, and period of the land use is between 11/03/2016 to 13/02/2066. As such, the land use and access rights are governed by applicable legal framework and existing agreements/7/. The project activities do not involve alterations to the existing legal or customary tenure/access rights of stakeholders, indigenous people (IPs), local communities (LCs), or customary rights holders, as the land is already designated for industrial purposes.
Stakeholder diversity and changes over time	Stakeholder diversity and changes overtime described in the PD&MR in the aspects including culture, society, economy, and etc. has been checked and confirmed by the assessment team by onsite interview and with expertise of the assessment team. Therefore, CTI Certification has checked that it is reasonable to conclude that members of each group have diversity, but that their groups will not change much socially, economically, culturally, etc.
Expected changes in well-being	PP states that the implementation of the project will have a positive impact on the well-being and other characteristics of stakeholders. The project will result in the following changes compared to the baseline scenario: Environmental Impact: By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project utilize the extracted CMM with low concentration methane concentration to produce electricity, which replaces the electricity from the NCPG, and the project will destroy 42.14 million Nm³ of methane annually, which reduces the emission of methane vented into the atmosphere. Community Engagement and Social Responsibility: By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, Power supply agreement/7/, Electricity purchase and sale contract/8/, Local Stakeholder Consultation Records/31/, Labor contracts/24/, Staff roster and staff salary/25/ and through site visit, the assessment team confirmed that the project will promote communication among the project proponent, the surrounding government and residents, and enhance social cohesion.

		Economic Benefits: By checking the Power supply agreement/7/, Electricity purchase and sale contract/8/, Local Stakeholder Consultation Records/31/, Labor contracts/24/, Staff roster and staff salary/25/, the assessment team confirmed that the Project implementation will promote local economic development, provide employment opportunities and and generating tax revenues for local governments. Therefore, the project is expected to improve local environment, increase clean electricity supply and provide work opportunities.
Location stakeholders	of	The assessment team confirm that it is appropriate that stakeholders (including residents near the power plant and coal mine, workers of power plant, workers of coal mine and government servants) are lived in Mahui Village, Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R. China).
Location of resources		It is confirmed that territories and resources occupied by the project is within the range of Xiyang Fenghui coal mine, where no identified stakeholders legally own or use.

3.3.1.2 Stakeholder Consultation and Ongoing Communication

Item	Evidence gathering activities, evidence checked, and assessment conclusion		
Stakeholder engagement process	As per the VCS requirements, it is necessary to invite the relevant stakeholders, prior of the validation process. CTI Certification assessment team checked the relevance of the date during the site visit. By checking the Notice about Stakeholders Consultation/29/, Minutes of stakeholder meetings/30/, Local Stakeholder Consultation Records/31/, CTI Certification assessment team confirmed that a local stakeholder consultation meeting before project construction was held for the project.		
	Project instance	activity	Meeting date
	Shanxi CMM Generation Project	Xiyang Power Project	29/10/2021
			Meeting Location
			Company office of Shanxi Xiyang Fenghui coal industry Co., Ltd Power Plant

	One week prior to the stakeholder consultation meeting, the project proponent posted notices, sent emails, made calls, and online notifications to convene stakeholders to ensure broad community participation. Through interviewing with local stakeholders and checking Notice on the stakeholder meeting of the project activity /29/, CTI Certification assessment team confirmed that the project owner invited the local stakeholders to get to know their opinions and/or suggestions about the implementation and design of the project. The project information with contact information was sent to participants or publicly posted at the project. Through interviewing with the project owner and local stakeholders, CTI Certification assessment team confirmed that the project owner explained the purpose and procedure of the meeting to the attendees at the beginning of the stakeholder meeting. Subsequently, the project information and the continuous input / grievance mechanism have been introduced to the local stakeholders. During the meeting, a survey was carried out to collect comments from local residents. The survey was conducted through distributing and collecting responses to a questionnaire, through checking questionnaires/31/, as well as interviewing with the project owner and local stakeholder, CTI Certification assessment team confirmed that the questionnaire includes a brief summary of the project activity, including the project design and other relevant key information. In total 50 out of 50 questionnaires (with 42% women and 58% men) were returned with a 100% response rate.
Consultation outcome	50 questionnaires has been distributed to collect the relevant comments and suggestions on 29/10/2021, which have been checked by the assessment team. The survey had a 100% response rate (50 questionnaires returned out of 50). By checking the questionnaires, CTI assessment team confirm that the local stakeholders are supportive of the project construction. The survey shows that a majority of local stakeholders think the project will help improve the life of local people and promote local economic development without much adverse environmental impact. See “Stakeholder input” below for the means to mitigate the impacts.

Ongoing communication	As confirmed with PP and through site inspection, it is confirmed that the project owner has set up mechanism and department for on-going communication with local stakeholders. A continuous Input / Grievance Expression Process Book is prepared at the guard of the project site, and any stakeholders can express their opinions and views on the project. Later after the project was put into operation, the project owner keeps communicating and consulting with local stakeholders actively. Depending on the types of inputs received from the stakeholders, actions will be taken to address their comments and the project has not received any negative comments. Therefore, CTI Certification assessment team was able to confirm that the ongoing communication is adequate and appropriate.
Stakeholder input	Via site inspection and checking all the questionnaires /31/, CTI Certification confirmed that no grievances or comments have been received from the project since its commencement of operation.

3.3.1.3 Free, Prior, and Informed Consent

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Obtaining consent	By checking the the Notice about Stakeholders Consultation/29/, Minutes of stakeholder meetings/30/, Local Stakeholder Consultation Records/31/ prior to the construction on the start date, CTI Certification confirmed that a stakeholder consultation meeting was held with 29/10/2021. According to the minutes/30/, CTI Certification confirmed that PP disclosed to stakeholders detailed information about the project, including the nature, scale, reversibility and scope of the proposed project activity, the reason or purpose of the project activity, duration of project activities, locations that will be affected, and a preliminary assessment of economic, social, cultural and environmental impacts, including potential risks and fair and equitable benefit sharing, respecting the precautionary principle. In addition, PP stated that it will actively listen to concerns and feedback from stakeholders, and address any questions or concerns raised. By reviewing Local Stakeholder Consultation Records/31/, CTI Certification confirmed before project

	construction and implementation, all stakeholders expressed their approval for the construction and implementation of the project. In addition, PP have been monitoring the situation in the community to identify any ongoing or unresolved conflicts that may be affected by this project. PP take active steps to ensure that project do not exacerbate or influence the outcome of these conflicts. It is verified by Local Stakeholder Consultation Records/31/ that the Free Prior and Informed Consent is true and reasonable.
Outcome of FPIC discussion	By checking the evidence /4//6/ and interviewing the local stakeholders, the assessment team can confirm that the project obtained the approval letters from governmental authorities and there do not exist any ongoing or unresolved conflicts.

3.3.1.4 Grievance Redress Procedure

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Development process	In order to resolve complaints relating to the project, the project has established a complaint resolution process with stakeholders to ensure fair, transparent and timely processing. Through interviews with project managers and via checking Grievance redress procedure/100/, Local Stakeholder Consultation Records/31/, comment book/101/, CTI Certification confirmed that the steps PP has developed in collaboration with stakeholders to resolve grievances are fair and reasonable: 1. Receiving Complaints: Any complaints relating to the project will be received and recorded. The Project owner has placed a comment book/101/ at the guard of the project site and posted contacts and posted the contact person and contact information for stakeholders to submit complaints either in writing or through a designated contact person. 2. Hearing: Upon receipt of a complaint, PP will schedule a hearing or meeting for stakeholders to express their views and concerns. This will provide an open platform to ensure that all relevant information is fully considered. 3. Response: Following the hearing or meeting, PP will provide a written response confirming that the stakeholder's complaint has been understood and documented, and explaining the action we

	will take. This will ensure transparency and continuity of communication.
	4. Complaint resolution: PP will use its best efforts to resolve the complaint within a reasonable time. This may include adopting appropriate conflict resolution methods such as mediation, negotiation or other appropriate solutions. PP will work with stakeholders to ensure they are satisfied with the solution.
Grievance redress procedure	The Grievance redress procedure/100/ established by PP consists of 3 stages, 1.PP shall attempt to resolve the complaint amicably and shall provide a written reply; 2. Complaints that cannot be settled through friendly negotiation shall be mediated by a third party 3. Complaints that cannot be resolved by mediation shall be submitted to a) arbitration to the extent permitted by the law of the relevant jurisdiction, or b) to the competent court of the relevant jurisdiction, without prejudice to the ability of a party to submit a complaint to a competent supranational adjudicatory body, if any. Through interviews with Grievance redress procedure/100/, Local Stakeholder Consultation Records/31/, comment book/101/, CTI Certification confirmed that the Grievance redress procedure established by PP is fair and reasonable.

3.3.1.5 Public Comments

Comments received	Actions taken by the project proponent	Evidence gathering activities, checked, and assessment conclusion
CTI Certification assessment team noted that this project was open for public comment from 02/04/2024 to 02/05/2024. The detail was checked by CTI Certification assessment team in the	/	/

following web platform: https://registry.verra.org/app/projectDetail/VCS/5011 During the period, no public comments were received.		
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3.3.2 Risks to Local Stakeholders and the Environment

3.3.2.1 Management Experience

The project management team has experience and expertise in the effective implementation of similar project activities. By checking the labour contract /24/ and on-site interview, CTI Certification confirmed that the main person in charge of the project implementation has many years of experience in the CMM power generation, and has the relevant skills and expertise in project planning, implementation and supervision, and is able to effectively manage and drive the project's implementation.

3.3.2.2 Risk Assessment

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Natural and human-induced risks to stakeholders' wellbeing	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project uses the low concentration coal mine methane to generate electricity and is a clean energy project. By checking Land use certificate/11/ issued by the Xiyang County People's Government and through site visit, the assessment team confirmed that the land within the project boundaries has already been designated for industrial use and poses no natural and human-induced risks to the well-being of stakeholders.
Risks to stakeholder participation	By checking EIA Approval /6/ and Project Approval /4/ issued by government, it is confirmed the project has been approved by Chinese government, in this sense, the project meets all the requirement of regulation and laws set up by Chinese government in aspect of environment, health and safety. Local stakeholders have no negative comments for the construction and operation of the project. The same has been confirmed when interviewing stakeholders during site visit. Therefore, it was validated no risks has been identified to stakeholder participation.

Working conditions	By checking EIA Approval /6/ and Project Approval /4/ issued by government, it is confirmed the project has been approved by Chinese government, in this sense, the project meets all the requirement of regulation and laws set up by Chinese government in aspect of environment, health and safety. By checking EIA Report /6/, it was validated the project owner has established and improved the safety production responsibility system; formulated safety production rules and regulations and operating procedures; formulated and implemented the safety production education and training plan. These measures ensure the effective implementation of safety production investment, eliminate safety hazards in time. The same has been confirmed during site visit. Therefore, the assessment team deemed the staff from the project are working in safety working environment. And no risks identified for working conditions.
Safety of women and girls	No risk identified, By checking Project Employee Management Manual/102/, CTI confirmed that in the design phase of the project, the safety of women was taken into account and corresponding preventive measures were taken. During the implementation of the project, verified by checking Technical Training Records/103/, all personnel involved in the project are regularly trained on gender sensitivity, including awareness of gender discrimination and gender-based violence, and how to prevent and respond to these issues. The project has established effective monitoring and reporting mechanisms as verified by checking Employee Management Manual/102/ and Complaint record/104/, CTI confirmed that women can report any safety issues or acts of gender discrimination, ensuring that their voices are adequately addressed and protected. Therefore, it is confirmed no risks has been exposed to safety of women and girls.
Safety of minority and marginalized groups, including children	By checking EIA Approval /6/ and Project Approval /4/ issued by government, it is confirmed the project has been approved by Chinese government, in this sense, the project meets all the requirement of regulation and laws set up by Chinese government in aspect of minor protection. The country have strict prohibition for child labour. Thus project does not involve child labour neither in construction nor at operation of project

	activity. In the HR policy is also mentioned that no child labour will be entertained. The same was confirmed by the assessment team through checking Employee List /25/ and site interview. Besides, in order to protect the physical and mental health of minors, the State Council promulgated the "Prohibition of Child Labor Regulations" /105/, prohibiting employers from recruiting minors under the age of 16. By checking Employee List /25/ and site interview, the assessment team was able to confirmed that no minors under the age of 16 were employed.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials, and chemical pesticides and fertilizers)	An Environmental Impact Assessment has been conducted by the PP. CTI assessment team has reviewed the documentation of the presented information, i.e., EIA Report and EIA Approval. The EIA Approval confirms the correctness of the approach used by the PP. By checking the EIA, EIA Approval/6/ and site interview with PP and stakeholders, the assessment team confirmed that the PP has followed the requirements of the host country with regards to addressing environmental impacts as below: 1.Construction phase a. The construction company set up a temporary sedimentation tank to precipitate and treat the construction wastewater for reuse. Meanwhile, rainwater drainage ditches were set up in the construction area to prevent the accumulation of water inside the plant, reduce the area of rainwater runoff in the plant, and reduce the impact of soil erosion; b. Construction waste conduct fixed-point stacking, part of the back for construction, the rest as fill or road construction materials timely clearance; Household waste were timely cleared by the sanitation department, which sent to landfill; c. Select construction machinery and operation vehicles with low noise intensity, Set up temporary sound barriers, Arrange construction time, and strengthen management of construction personnel and environmental protection education; d. Construction dust: build physical closed enclosure, clean road regular, spray water, low speed or speed limit of vehicles, avoid windy weather operations, use tarpaulin while material transportation, stacking; The pollution generated in construction phase was very small after taking reasonable measures, and disappeared with completion of construction.

According to the completion of environmental acceptance comments/106/, the measures for the treatment of relevant pollutants during the construction period have been implemented, and all the requirements and indicators of the EIA have met the standards.

2.Operation phase

a. Domestic sewage is discharged into its own sewage treatment station for treatment, and is not discharged, and the drainage of circulating cooling system and soft water system is clean drainage, which will not affect the surrounding environment. According to the Technical Guidelines for Environmental Impact Assessment Surface Water Environment (HJ2.3-2018), the wastewater of the project is not discharged into the external environment, and the impact on the surface water environment is small.

b. Air pollution comes from NO_x produced by the operation of internal combustion engines. This project filters the combustion-supporting air, adjusts the working parameters of the internal combustion engine, installs a set of automatic ignition device, and exhausts the treated waste directly into the atmosphere through a 10m high chimney. The exhaust gas has met the performance value of atmospheric pollutant emission stage V control requirements in the Emission Limits and Measurement Methods in the Vehicle Emission System (GB17691-2005).

c. Domestic garbage and gas filter dust is timely cleared by the sanitation department, which sent to landfill. Waste oil, waste oil drum and waste coolant is temporarily stored in the hazardous waste temporary storage room, which will be timely handed over to the qualified unit for disposal ;

d. Low-noise equipment is applied in the project, the equipment is equipped with vibration damping mats and the equipment are placed uniformly in the workshop to reduce the impact of its noise on the surrounding environment by the blocking of the wall. On the basis of reasonable layout, the noise at the boundary of the plant can meet the requirements of category 2 standard of the "Environmental Noise Emission Standard for Industrial Enterprise Plant Boundary" (GB12348-2008).

In conclusion, after the above measurements are performed, the negative impacts on environment will be minimized to comply with the

requirements of laws and regulations during the construction and operational period.

3.3.3 Respect for Human Rights and Equity

3.3.3.1 Labor and Work

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Discrimination	By checking the Human resource management regulations/107/, Labor contracts/24/, Staff roster and staff salary/25/ and through site visit, the assessment team confirmed that project proponent strictly obeys the anti-discrimination rules set out in the law. No discrimination has occurred or will occur. By checking the Human resource management regulations /107/, Labor contracts/24/ and through site visit, the assessment team confirmed that the project owner signs contracts with employees, the labor contracts specify working hours, tasks and payments, all employees have benefits based on social security, pregnancy, maternity/paternity leave, or marital status according to the labor laws of China/108//109//110/.
Sexual harassment	It has been confirmed during onsite inspection and interviews that the project has strict work and management systems to regulate employee behavior. For violations of company policies, strict punishment measures will be taken. There have been no complaints of sexual harassment since the project began. And the project has established a monitoring mechanism in Human resource management regulations /107/ for complaints about sexual harassment to ensure that sexual harassment will not happen in the future.
Equal pay for equal work	It has been confirmed during onsite inspect and interviews that project proponent strictly obeys the law, i.e. "Law of the People's Republic of China on the Protection of Women's Rights and Interests" /108/, "Labor Contract Law of the People's Republic of China" /109/ and "the Special Provisions on Labor Protection for Women Workers" /110/. By checking Labor Contracts/24/ and interviewing staff from the project owner during site visit, it was validated male and female employees enjoy equal pay for equal work.

Gender equity in labor and work	It has been confirmed during onsite inspect and interviews that project proponent strictly obeys the law, i.e. "Law of the People's Republic of China on the Protection of Women's Rights and Interests" /108/, "Labor Contract Law of the People's Republic of China" /109/ and "the Special Provisions on Labor Protection for Women Workers" /110/. Through site visits and inspection of the Labor Contracts/24/, CTI Certification confirms that the Project has male and female employees of different genders and that there are female employees in management positions. It is verified by Pay Roll/25/ that there is no significant gender difference between female and male employees in terms of compensation, promotion opportunities and benefits, and that employees of different genders have equal access to training and development resources as confirmed by reviewing the Technical Training Records/103/. Through interviews with Project employee representatives, CTI confirmed that employees believe that Project is treated equally in terms of gender and pay.
Forced labor	It has been confirmed during onsite inspect and interviews that project proponent strictly obeys the law, i.e. Labor Law of the People's Republic of China/111/, and there is no forced labor.
Child labor	It has been confirmed during onsite inspect and interviews that project proponent strictly obeys the law, i.e. Labor Law of the People's Republic of China /111/, "Law of the People's Republic of China on the Protection of Minors" /112/and "Prohibition of Child Labor Regulations"/105/. Besides, no child labor was identified from the Employee List /25/.
Human trafficking	It has been confirmed during onsite inspect and interviews that project proponent strictly obeys the law, i.e. Labor Law of the People's Republic of China /111/, and there is no human trafficking.

3.3.3.2 Human Rights

Risks identified	Evidence gathering activities, evidence checked, and assessment conclusion
N.A.	It has been confirmed during onsite inspect and interviews that project proponent strictly obeys the law, i.e. Labour Law of in line with People's Republic of China and the legal rights and interests

	of all employees are protected. No indigenous peoples or tribal peoples are treated differently from the majority of local people.
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3.3.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Evidence gathering activities, evidence checked, and assessment conclusion
N.A.	It has been confirmed during onsite inspect and interviews that there are no indigenous peoples in the project region and the project activities are not related to cultural heritage to be safeguarded in the project site or its surroundings.

3.3.3.4 Property Rights

Risks identified	Evidence gathering activities, evidence checked, and assessment conclusion
N.A.	It has been confirmed during onsite inspect and interviews that there does not exist no identified stakeholders legally own or use Xiyang Fenghui coal mine. Therefore, the project activity does not violate rights to territories and resources and respect property rights.

3.3.3.5 Benefit Sharing

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Process used to design the benefit sharing plan	Not applicable as the no benefit sharing event is involved in the project, which has been confirmed during onsite interviews.
Summary of the benefit sharing plan	Not applicable as the no benefit sharing event is involved in the project, which has been confirmed during onsite interviews.
Approval and dissemination of benefit sharing plan	Not applicable as the no benefit sharing event is involved in the project, which has been confirmed during onsite interviews.
Benefit sharing during the monitoring period	Not applicable as the no benefit sharing event is involved in the project, which has been confirmed during onsite interviews.

3.3.4 Ecosystem Health

Item	Evidence gathering activities, evidence checked, and assessment conclusion
Impacts on biodiversity and ecosystems	By checking EIA Report /6/ approved by government and via on site investigation, it is confirmed that the project does not alter biodiversity and is not located in high conservation value areas, and there are no rare and valuable plant and animal species. Therefore, it is confirmed the project activity does not adversely impacted habitats for rare, threatened, or endangered species.
Soil degradation and soil erosion	The project utilizes the extracted low concentration coal mine methane (CMM) to produce electricity. The waste heat from the generators will be recovered by waste heat boilers to provide free hot water to the coal mine. By checking EIA Report /6/ approved by government and via onsite investigation, it is confirmed that the project will not cause soil degradation and soil erosion during its lifetime. Therefore, it is confirmed the project does not adversely impacted soil.
Water consumption and stress	The project utilizes the extracted low concentration coal mine methane (CMM) to produce electricity. The waste heat from the generators will be recovered by waste heat boilers to provide free hot water to the coal mine. By checking EIA Report /6/ approved by government and via onsite investigation, it is confirmed that the project meets all the requirement of regulation and laws set up by Chinese government in aspect of industrial water usage and wastewater treatment. By checking EIA Report /6/ and via site investigation, it is confirmed that small amount of water will be used in cooling system. These water will be recycled. Therefore, the audit team deemed that the project activity would not cause water consumption and stress.

3.3.4.1 Rare, Threatened, and Endangered species

By checking the official websites of national and local environmental protection authorities and nature conservation agencies/113/, the approved EIA /6/, and via interviewing with local residents, local officials, CTI confirmed that the Project is not in or near the habitat of rare, threatened or endangered animals.

3.3.4.2 Introduction of Species

Not applicable. No planting or introduction of species is involved in the Project implementation.

3.3.4.3 Ecosystem conversion

Not applicable. The project is not an ARR, ALM, WRC or ACoGS project.

3.4 Application of Methodology

3.4.1 Title and Reference

CTI assessment team checked that following methodology and tools are applicable for the project as below:

The approved consolidated methodology applied in the project is ACM0008 “Abatement of methane from coal mines” (version 08.0).

Related tools are:

Tool 02: Combined tool to identify the baseline scenario and demonstrate additionality (Version 07.0)

Tool 05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)

Tool 07: Tool to calculate the emission factor for an electricity system (Version 07.0)

Tool24: Common practice (Version 03.1)

Tool27: Investment analysis (Version 14.0)

3.4.2 Applicability

Methodology ID	Applicability condition	Assessment and conclusion
ACM0008 (Version 08.0)	This methodology applies to project activities that aim for the use and/or destruction of the methane extracted/obtained from a working or abandoned coal mine(s). The project activities include any of the following methods to treat the methane captured:	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project uses the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity to the coal mines where the project is located, and then to North

Methodology ID	Applicability condition	Assessment and conclusion
	(a) The methane is destroyed without energy production, for example through flaring; (b) The methane is used to produce energy. This may include electricity, heat, vehicle fuel, etc.	China Power Grid(NCPG) if there is any electricity surplus. By checking the FSR /4/, operating records of Xiyang Fenghui coal mine /49/, mining permit/50/ and through site visit, the assessment team confirmed that the Xiyang Fenghui coal mine is a working coal mine, which started operation in July-2012, which is designed to service life of 30 years. Therefore, the project is applicable to condition (b).
	Emission reductions can be claimed for displacing or avoiding energy from other sources.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the emissions reduction of the project comes from two sources: 1) Methane (CH₄) emissions as a result of the previously vented gas that will be captured and destroyed in the project scenario; 2) CO₂ emissions from the production of the equivalent amount of electricity replaced by the Project that would otherwise have been purchased from the NCPG. Therefore, this criteria is applicable.
	Methane used in the project activities shall be extracted using the following techniques: (a) Surface drainage boreholes to capture coal bed methane (CBM) or methane from open cast mines; (b) Underground boreholes in the mine, surface goaf wells, underground boreholes, gas	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project uses CMM from 'Underground boreholes in the mine to capture pre mining CMM' and 'surface goaf well, underground boreholes, gas drainage galleries or other goaf gas capture techniques, including gas from sealed areas, to

Methodology ID	Applicability condition	Assessment and conclusion
	drainage galleries or other goaf gas capture techniques, including gas from sealed areas, to capture coal mine methane (CMM); (c) Mine ventilation system to dilute and remove ventilation air methane (VAM); (d) Surface drainage boreholes in the case of sealed abandoned mines or ventilation system in the case of ventilated mines to capture abandoned mine methane (AMM).	capture coal mine methane (CMM)'. Through on-site inspection, the project does not involve CBM and VAM related extraction, utilization and combustion equipment. Thus, the project does not involve the extraction or utilization of CBM, VAM or AMM. Therefore, the project is applicable to condition (b).
	The remaining share of the methane, to be diluted for safety reason, may still be vented.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project involves the capture and utilization of CMM for power generation at the operational Xiyang Fenghui coal mine where the baseline is the total atmospheric release of the methane. The remaining unused share of the methane is vented for safety reasons. Therefore, this criteria is applicable.
	In the case of open cast mines, in addition to the conditions listed above, project activities should meet the following requirements: (a) The mines should have had a working mining concession for at least three years prior to the start of project; (b) Only pre-mining drainage from wells placed within the area to be mined are eligible for crediting;	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the Xiyang Fenghui coal mine of the project involved is not a case of open cast mine. Therefore, this criteria is irrelative.

Methodology ID	Applicability condition	Assessment and conclusion
	For the calculation of emission reductions, all provisions for CBM should be followed for the open cast mine methane.	
	The methodology does not apply to project activities with any of the following features: (a) Capture/use of virgin coal bed methane, e.g. methane extracted from coal seams for which there is no valid coal mining concession; (b) Use CO₂ or any other fluid/gas to enhance CBM drainage before mining takes place; (c) Methane extraction from abandoned mines that are flooded due to regulation.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, mining permit/50/ and through site visit, the assessment team confirmed that the project does not involve the extraction or utilization of virgin coal bed methane, CBM and the project does not use CMM from open cast mining, or abandoned mines. Therefore, the project does not fall under features (a), (b) and (c).
	The methodology does not apply to project activities that involve use and/or destruction of CBM or OCM if the baseline scenario identification resulted in partial use and/or destruction of CBM or OCM.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project does not involve use and/or destruction of CBM or OCM.
	Emission reductions due to the use and/or destruction of CBM or OCM cannot be claimed if surface drainage to capture CBM or methane from open cast mine(s) is used within the project boundaries prior to the implementation of the project activity.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project does not involve use and/or destruction of CBM or OCM.
Tool 02: Combined tool to identify the baseline	The tool is applicable to all types of proposed project activities. However, in some cases, methodologies referring to this tool may require	Baseline scenario and additionality of this project activity will be justified based on this tool.

Methodology ID	Applicability condition	Assessment and conclusion
scenario and demonstrate additionality (Version 07.0)	adjustments or additional explanations as per the guidance in the respective methodologies. This could include, inter alia, a listing of relevant alternative scenarios that should be considered in Step 1, any relevant types of barriers other than those presented in this tool and guidance on how common practice should be established.	Refer to section 3.3.4 and 3.3.5 of this report for details.
Tool 05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)	If emissions are calculated for electricity consumption, the tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption: (a) Scenario A: Electricity consumption from the grid. The electricity is purchased from the grid only, and either no captive power plant(s) is/are installed at the site of electricity consumption or, if any captive power plant exists on site, it is either not operating or it is not physically able to provide electricity to the electricity consumer; (b) Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants are installed at the site of the electricity consumer and supply the consumer with electricity. The captive power plant(s) is/are not connected to the electricity grid; or (c) Scenario C: Electricity consumption from the grid and (a)	By checking the FSR and FSR Approval /4/, and through site visit, the assessment team confirmed that only when the project is out of operation or abnormal operation, there is a small amount of electricity consumed by the project from the coal mine which is supplied by NCPG, which falls under scenario A. Therefore, emissions related to electricity consumption need to be calculated.

Methodology ID	Applicability condition	Assessment and conclusion
	fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants operate at the site of the electricity consumer. The captive power plant(s) can provide electricity to the electricity consumer. The captive power plant(s) is/are also connected to the electricity grid. Hence, the electricity consumer can be provided with electricity from the captive power plant(s) and the grid.	
	This tool can be referred to in methodologies to provide procedures to monitor amount of electricity generated in the project scenario, only if one out of the following three project scenarios applies to the recipient of the electricity generated: (a) Scenario I: Electricity is supplied to the grid; (b) Scenario II: Electricity is supplied to consumers/electricity consuming facilities; or (c) Scenario III: Electricity is supplied to the grid and consumers/electricity consuming facilities.	By checking the FSR and FSR Approval /4/, Xiyang Fenghui coal mine low concentration gas power generation project contract/7/ and through site visit, the assessment team confirmed that the electricity generated by the project is supplied to the coal mine and the surplus electricity is delivered to NCPG. Therefore, Scenario III is applicable.
	This tool is not applicable in cases where captive renewable power generation technologies are installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage. The tool only accounts for CO ₂ emissions.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that no captive renewable power generation technologies are installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage.

Methodology ID	Applicability condition	Assessment and conclusion
Tool 07: Tool to calculate the emission factor for an electricity system (Version 07.0)	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	By checking the FSR and FSR Approval /4/, and through site visit, the assessment team confirmed that the project utilizes the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity to the coal mine and NCPG if there is any electricity surplus, which would otherwise be purchased from NCPG. Therefore the tool is applied to estimate the OM, BM and /or CM when calculating baseline emissions for the project. Therefore, this criteria is applicable.
	Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub- options under the step 2 of the tool are available to the project participants, i.e. option II a and option II b. If option II a is chosen, the conditions specified in “Appendix 1: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect	In the host country as off-grid power generation is not significant. And when the project is out of operation or abnormal operation, there is a small amount of electricity consumed by the project from NCPG. Therefore, emission factor for the project electricity system is calculated only for the grid power plants. Therefore, this criteria is applicable.

Methodology ID	Applicability condition	Assessment and conclusion
	the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project electricity system is located in the Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R. China, which is not an Annex I country. Therefore, this criteria is applicable.
	Under this tool, the value applied to the CO2 emission factor of biofuels is zero.	The grid is no involved with biofuels.
Tool24: Common practice (Version 03.1)	This methodological tool is applicable to project activities that apply the methodological tool “Tool for the demonstration and assessment of additionality”, the methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality”, or baseline and monitoring methodologies that use the common practice test for the demonstration of additionality.	The project applies the methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality” that use the common practice test for the demonstration of additionality. Therefore, this criteria is applicable.
	In case the applied approved baseline and monitoring methodology defines approaches for the conduction of the common practice test that are different from those described in this methodological tool, the	The baseline and monitoring methodology refers to “Combined tool to identify the baseline scenario and demonstrate additionality”. It required that the latest version of the “Methodological tool: Common practice” available on the UNFCCC website shall

Methodology ID	Applicability condition	Assessment and conclusion
	requirements contained in the methodology shall prevail.	be applied. Therefore, this tool is applicable.
Tool27: Investment analysis (Version 14.0)	This methodological tool is applicable to project activities that apply the methodological tool “Tool for the demonstration and assessment of additionality”, the methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality”, the guidelines “Non-binding best practice examples to demonstrate additionality for SSC project activities”, or baseline and monitoring methodologies that use the investment analysis for the demonstration of additionality and/or the identification of the baseline scenario.	Since the project is using “Combined tool to identify the baseline scenario and demonstrate additionality”. Therefore, this tool is applicable.
	In case the applied approved baseline and monitoring methodology contains requirements for the investment analysis that are different from those described in this methodological tool, the requirements contained in the methodology shall prevail.	The baseline and monitoring methodology refers to “Combined tool to identify the baseline scenario and demonstrate additionality”. Therefore, this tool is applicable.

CTI Certification assessment team confirmed that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. ACM0008 (version 08.0) is applicable to the project.

3.4.3 Project Boundary

According to ACM0008 (version 08.0), the spatial extent of the project boundary comprises:

(a) The coal mine from where the methane is extracted;

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, Power supply agreement/7/, Electricity purchase and sale contract/8/ and through site visit, the

assessment team confirmed that the Xiyang Fenghui coal mine is the coal mine from where the methane extracted for the project.

(b) All equipment installed and used for the extraction, purification, compression, and storage of methane and transport to an off-site user;

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, extraction station operation record/15/ and through site visit, the assessment team confirmed that there is no equipment for compression, CMM storage and transport to off-site user for the project. Facilities for CMM drainage and extraction included the project boundary were installed prior to the implementation of the project activity. They are owned by the coal mine and are used primarily to maintain underground mining safety. Since they are not installed and used as part of the project activity, they are not considered in both the investment analysis and baseline calculations.

(c) Facilities that are installed and used as part of the project activity for flaring, flameless oxidation, captive power and heat generation, gas production and transportation;

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, the nameplates of the CMM power generators/16/ and through site visit, the assessment team confirmed that CMM delivery system, power generation units and waste heat recovery units installed and used in the project.

(d) Power plants connected to the electricity grid, where the project activity exports power to the grid and emission reductions are claimed for the displacement of grid emissions, as per the definition of project electricity system and connected electricity system given in the latest version of the “Tool to calculate the emission factor for an electricity system”.

By checking the FSR and FSR Approval /4/, Power supply agreement/7/, Electricity purchase and sale contract/8/ and through site visit, the assessment team confirmed that the generated electricity of the project will be supplied to the coal mine through the electricity distribution network in Xiyang Fenghui coal mine for internal coal mine consumption, and then to NCPG if there is any electricity surplus. The generated electricity will replace the electricity that would otherwise have been purchased from the NCPG dominated by fossil fuel-fired power plants. And electricity will be imported from NCPG if the project is in regular maintenance or stop operation. Thus, the power plants connected to NCPG were included in the project boundary.

The project boundary and the selected sources and gases which are justified for the project are identified in Section 3.3 of the joint PD & MR.

Through observation of the physical site and the equipment used by the project activity, the assessment team confirmed that the definition of project boundary in the joint PD & MR is accordance with the requirement of methodology. It is also confirmed by the assessment

team by means of investigation during on-site visiting that all sources and GHGs included in the project boundary are as required in the applied methodology.

The sources and GHG gases involved for proposed project are as below:

Source	Gas	Included?	Justification/explanation
Baseline	Methane emissions as a result of venting	CH ₄ Yes	Main emission source. CMM captured and sent to electricity generators would be vented in the baseline scenario.
	Emissions from destruction of methane in the baseline	CO ₂ No	No flaring or energy use in the baseline scenario. In absent of the project, the CMM is released into the atmosphere directly.
		CH ₄ No	Excluded for simplification.
		N ₂ O No	Excluded for simplification.
	Electricity generation (electricity provided to the grid and/or to the captive user), heat and vehicle fuel use	CO ₂ Yes	Only included if the project is to replace electricity from the grid, and emission reductions are claimed for such displacement.
		CH ₄ No	Excluded for simplification.
		N ₂ O No	Excluded for simplification.
Project	Emissions of methane as a result of continued venting	CH ₄ No	The project will take into account only the change in CMM emissions in ex ante estimate of GHG emission reduction; this will be done through rigorous monitoring of the amount of methane utilized or destroyed by the project.
	On-site electricity and fuel consumption due to the project activity, including transport of the gas	CO ₂ Yes	Electricity consumed when the project is shutdown. During operation, all auxiliary demand can be met by electricity generated.
		CH ₄ No	Excluded for simplification. This emission source is assumed to be very small.
		N ₂ O No	Excluded for simplification. This emission source is assumed to be very small.
	Emissions from methane destruction	CO ₂ Yes	Emissions from the combustion of CMM in gas engines in the project will be considered.

	Emissions of unburned methane	CH ₄	Yes	Unburned methane from gas engines will be considered.
	Fugitive methane emissions from on-site equipment	CH ₄	No	Excluded for simplification. This emission source is assumed to be very small.

3.4.4 Baseline Scenario

The baseline identification for the proposed project uses step-wise approach and is in accordance with the approved consolidated baseline and monitoring methodology ACM0008 (version 08.0), "Abatement of methane from coal mines"/64/ and Tool 02 (Version 7.0), "Combined tool to identify the baseline scenario and demonstrate additionality"/65/.

As per Tool 02, version 7.0, PP shall apply the following four Steps:

- (a) STEP 0. Demonstration whether the proposed project activity is the first-of-its-kind;
- (b) STEP 1. Identification of alternative scenarios;
- (c) STEP 2. Barrier analysis;
- (d) STEP 3. Investment analysis (if applicable);
- (e) STEP 4. Common practice analysis

Step 0 Demonstration whether the proposed project activity is the first-of-its-kind

The project uses the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity. It is not a first-of-its-kind project activity in China. As per "TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality" (version 07.0), for the project activity, Outcome of Step 0 is Conclusion II: The proposed project activity is not the first-of-its-kind.

Step 1 Identification of alternative scenarios

As per Tool 02, for identifying relevant alternative scenarios, an overview of technologies or practices that provide the same output as the project activity and that have been implemented previously or are currently underway in the applicable geographical areas should be provided. Considering that the framework conditions vary significantly between provinces in China, Shanxi Province is selected as the relevant geographical area as defined in Tool 02.

It is validated that the identification of alternative scenarios for the proposed project in the joint PD & MR follows the “Combined tool to identify the baseline scenario and demonstrate additionality” using Step 1: Identification of alternatives to the project activity consistent with current laws and regulations and is in line with this requirement and properly justified.

Step 1a: Define alternative scenarios to the proposed VCS project activity

The project description identifies all alternative scenarios that provide the same output (service or product) as the proposed VCS project activity from following aspects.

- ✓ Options to handle methane;
- ✓ Options to deal with methane;
- ✓ Options for energy production

Options to handle methane

According to ACM0008 (version 08.0), the baseline scenario alternatives include all feasible options to handle methane to comply with safety regulations.

No.	Alternatives	Justification/explanation
A1	Extraction of methane prior to the mining (CBM/OCM)	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project doesn't involve the utilization of CBM/OCM. Therefore, A1 is excluded.
A2	Extraction of methane during and after the mining (CMM)	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project uses the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity to the coal mines where the project is located, and then to NCPG if there is any electricity surplus. Therefore, A2 is considered as an alternative scenario.
A3	Extraction of methane through ventilation during the mining	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the project doesn't involve the utilization of VAM. Therefore, A3 is excluded.

A4	Extraction of methane from the abandoned mine	By checking the FSR/4/ and through site visit, the assessment team confirmed that the coal mines involved in the project are not abandoned mines. Therefore, A4 is excluded.
A5	Possible combinations of options (A1) to (A4) with the relative shares of gas specified	As stated above, A1, A3 and A4 are excluded. Therefore, A5 (i.e. A2) is considered as an alternative scenario.

Options to deal with methane

The baseline scenario alternatives include all feasible options to deal with methane.

No.	Alternatives	Justification/explanation
B1	Venting of methane	According to "Chinese National Coalmine Safety Regulation (2016)" /70/, methane concentration in underground coal mine should be lower than 1% for safe operating conditions, and flaring of methane with direct combustion of methane concentration of below 30% is prohibited. By checking the FSR/4/ and through site visit, the assessment team confirmed that methane concentration range from Xiyang Fenghui coal mine of the project about 15%-26%. Thus, B1 (venting of methane) complies with mandatory applicable laws and regulations/70/. In fact, this is how methane was dealt with prior to the implementation of the project.
B2	Flaring of methane	By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, operation logbook/19/ and through site visit, the assessment team confirmed that the extracted CMM utilized in the project is low concentration methane, which is below 30%. According to Article 184 of the Chinese National Coalmine Safety Regulation (2016) /70/, flaring of methane with direct combustion of methane concentration of below 30% is prohibited. Therefore, B2 is excluded.
B3	Use of methane for energy production, e.g. electricity generation, heat generation, vehicle fuel, gas production, etc.	By checking the FSR /4/ and through site visit, the assessment team confirmed that the heat demand of the mining area has been able to be met by the boiler of the waste heat boiler of the unit, and there is no additional heat demand, no need for additional heating.

		Therefore, use of methane for heat generation is excluded. By checking the FSR /4/, extraction station operation record/15/ and through site visit, the assessment team confirmed that the concentration and flow of CMM in coal mines are unstable and methane concentration of the extracted CMM for the project activity is below 30%, which cannot be utilized i.e. according to “the Urban Gas Specification” (GB50028-93) /71/, as urban gas, methane concentration of CMM should reach 36.8%~78.9%. Moreover, the CMM gas sold to the high-pressure natural gas pipeline network should be purified to CH₄ concentration greater than 95% according to Article 497 of the Chinese National Coalmine Safety Regulation (2016) /70/. The project is located in Xiyang County, which is mainly composed of hills and mountains. The construction of pipeline project and investment are relatively large. Therefore, it is not suitable to transport to gas pipelines to be used as fuel for vehicles or gas production. Therefore, use of methane for energy generation, e.g. vehicle fuel, gas production is excluded. Therefore, use of methane for electricity generation is considered as an alternative scenario.
B4	Possible combinations of options B1 to B3 with the relative shares of gas specified.	B4 refers to possible combinations of options B1 to B3 with the relative shares of gas specified. Since B2 has been eliminated, only B1 and B3 are left available for combination. However, as venting of methane and use of methane for energy production contradict with each other, these two options should not be combined into a single option. Therefore, B4 is excluded.

Options for energy production

No.	Alternatives	Justification/explanation
P1	Equivalent quantity of electricity supply from NCPG	P1 is in compliance with legal and regulatory requirements.
P2	Energy generated by using CMM captured, but not	P2 is in compliance with legal and regulatory requirements.

	undertaken as VCS project	
P3	Construction of a coal-fired captive power plant with equivalent power supply; or construction of a captive power plant using other fossil fuels.	This project is to build a 24MW CMM power plant. According to “Notice of the General Office of the State Council on Strictly Prohibiting the Illegal Construction of 135MW and Below Thermal Power Units”/72/, the construction of Thermal Power Units with a capacity of 135MW or below is prohibited in the national grid coverage area. According to “Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators”/97/, fuel-fired (including oil and gas) power plants with an installed capacity of less than 100 MW are strictly restricted for construction and Fuel-fired (including oil and gas) power plants with an installed capacity of less than 25MW are strictly prohibited. Therefore, construction of a power plant with the same capacity as the Project using coal, diesel oil or natural gas as fuel would be prohibited. Therefore, P3 is excluded.
P4	Power generation using renewable energy resources e.g. hydro, solar or wind power.	P4 is in compliance with legal and regulatory requirements.

Step 1b: Consistency with mandatory applicable laws and regulations

As above, the baseline alternative options that are technically feasible and comply with all legal and regulatory requirements are listed below:

Scenario ID	CMM extraction	CMM treatment	Energy production
Scenario 1 (A2+B1+P1)	Extraction of methane during and after the mining (CMM)	Venting	Equivalent quantity of electricity supply from NCPG
Scenario 2 (A2+B1+P2)	Extraction of methane during and after the mining (CMM)	Venting	Energy generated by using CMM captured, but not undertaken as VCS project
Scenario 3 (A2+B1+P4)	Extraction of methane during and after the mining (CMM)	Venting	Power generation using renewable energy resources e.g. hydro, solar or wind power

Scenario 4 (A2+B3+P1)	Extraction of methane during and after the mining (CMM)	Use of methane for electricity production	Equivalent quantity of electricity supply from NCPG
Scenario 5 (A2+B3+P2)	Extraction of methane during and after the mining (CMM)	Use of methane for electricity production	Energy generated by using CMM captured, but not undertaken as VCS project .
Scenario 6 (A2+B3+P4)	Extraction of methane during and after the mining (CMM)	Use of methane for electricity production	Power generation using renewable energy resources e.g. hydro, solar or wind power

It is a conflicted scenario for the methane is venting conflicted with methane utilized for electricity generation. Scenario 2 is unrealistic, as the CMM treatment of venting means that methane is emitted directly to air without any use, it is definitely conflicted to the scenario that generates energy by using CMM captured. The scenario 2 (A2+B1+P2) is excluded.

It is a conflicted scenario for use of methane for electricity production conflicted with equivalent quantity of electricity supply from NCPG. The scenario 4 (A2+B3+P1) is excluded.

Step 2: Barrier analysis

Step 2a: Identify barriers that would prevent the implementation of alternative scenarios

Scenario 1: This is the continuation of business as usual and thus faces no barrier. It remains as a possible baseline scenario alternative.

Scenario 3: This scenario involves electricity generation using renewable energy sources. By checking the FSR /4/, Current situation and optimal allocation of water resources in Jinzhong City, Shanxi Province/73/, National wind energy resources detailed survey and evaluation report/74/, Discussion on geothermal resources and their exploitation and utilization mode in Shanxi Province/75/, Development status and trend of solar energy industry in Shanxi Province/76/ and through site visit, the assessment team confirmed that the Xiyang Fenghui coal mine is shortage of hydropower, wind power and geothermal resources. In addition, as to for solar resources, due to the complex terrain in the Shanxi province, the contour of the annual total radiation is irregular, and its distribution characteristics are gradually increasing from south to north, Xiyang County (project location) is located in the central of Shanxi Province, and its annual solar radiation is relatively low, which is not an ideal location for building solar power stations. Finally, the project site is located in coal mine area, no adequate rice, corn, cotton, peanut or any other biomass materials supplied for a biomass power.

Scenario 5: This is the project activity not implemented as a VCS project. This scenario faces investment barriers. Refer to investment analysis in 3.4.5 of this report.

Scenario 6: As shown scenario 3. The electricity generation using renewable energy sources in local area is facing kinds of barrier.

Step 2b: Eliminate alternative scenarios which are prevented by the identified barriers

Based on step 2a, scenarios 3 and 6 are excluded, the scenarios to form the baseline scenario alternative that do not face barriers are:

Scenario ID	CMM extraction	CMM treatment	Energy production
Scenario 1 (A2+B1+P1)	Extraction of methane during and after the mining (CMM)	Venting	Equivalent quantity of electricity supply from NCPG
Scenario 5 (A2+B3+P2)	Extraction of methane during and after the mining (CMM)	Use of methane for electricity production	Energy generated by using CMM captured, but not undertaken as VCS project

The project is not the first-of-its-kind project. The combined alternative scenario 1 and scenario 5 have no barriers to their implementation in terms of investment and technology.

As per TOOL02 "Combined tool to identify the baseline scenario and demonstrate additionality" (version 7.0), if more than one alternative scenario is not prevented by any barrier, and if the proposed project activity is not the first-of-its-kind, and the remaining alternative scenarios include the proposed project activity undertaken without being registered as a VCS project activity, then proceed to Step 3 (Investment Analysis).

3.4.5 Additionality

Regulatory surplus

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/, operation logbook/19/ and through site visit, the assessment team confirmed that the extracted CMM utilized in the project is low concentration methane, which is below 30%. According to Article 184 of the Chinese National Coalmine Safety Regulation (2016) /70/, methane concentration in underground coal mine should be lower than 1% for safety operation, CMM with methane concentration below 30% is prohibited to be combusted directly, but can be either vented or utilized for power generation by internal combustion engines. According to Emission standard of coalbed methane/coal mine gas (on trial) (GB21522-2008)/98/, only the CMM with the concentration higher than 30% should directly utilized. Besides, the assessment team checked relevant laws and regulations within the CMM industry, i.e. Renewable Energy Law of the People's Republic of China, Guidance Catalogue for the Development of

Renewable Energy Industry, Opinions of the General Office of the State Council on Further Accelerating the Extraction and Utilization of Coal bed Methane (Coal Mine Gas), Chinese National Coalmine Safety Regulation, Notice of the National Development and Reform Commission on the issuance of the twelfth Five-Year Plan for The Development and Utilization of Coal bed Methane (Coal Mine Gas)/47/, and confirmed there is no any mandatory law, statute, or other regulatory framework for utilization of coalmine methane with concentration under 30% in China which is a UNFCCC non-Annex I country. Thus, regulatory surplus has been achieved.

TOOL02: "Combined tool to identify the baseline scenario and demonstrate additionality" (version 07.0) is used to identify the baseline scenario and demonstrate additionality.

Step 3: Investment analysis

The objective of Step 3 is to compare the economic or financial attractiveness of the alternative scenarios remaining after Step 2 by conducting an investment analysis.

The parameters used in the financial calculations have been validated based on a review of the sources presented in the joint PD & MR, including: FSR /4/, Economic Evaluation of Construction Projects of Methods and Parameters" (Third Edition) /81/ etc. The FSR /4/ of the project was completed by a qualified third-party design institute. The time period between the finalization of the FSR /4/ (03/2021) and the investment decision (21/10/2021) /5/ is less than 1 year, therefore it's unlikely that the input values have significantly changed.

Choice of approach

Combination scenario 1 (A2+B1+P1) is the continuation of business as usual scenario, which does not involve an investment from the project participants and therefore no investment analysis is required for this scenario.

Combination scenario 5 (A2+B3+P2) is CMM used for electricity generation, i.e, implement the project without VCS. As the project generates financial benefits from electricity sales, the simple cost analysis is not applicable. The investment comparison is not applicable, either, because the only alternative (Scenario 1, the business-as-usual scenario) is not an investment project and cannot be applied in comparison. Benchmark analysis is considered as the appropriate analysis method for Scenario 5, and IRR is identified as the financial indicator for the benchmark analysis.

Benchmark selection

The PP has compared the project financial indicator against a benchmark (before tax Project IRR) of 8% according to "Economic Evaluation Method and Parameters for Construction

Projects" /81/ issued by National Development and Reform Commission (DRC) and Ministry of Construction in 2006/5/. Based on the CTI's financial expertise, the assessment team confirmed "Economic Evaluation Method and Parameters for Construction Projects" is still the most up-to-date official data source for the benchmark of project IRR applied different industrial sectors. Although, it was observed the "Notice on adjusting financial benchmark rate of return of construction projects in some industries" /99/ issued by the National Development and Reform Commission and the Ministry of Housing and Urban-Rural Development on 15/03/2013, the before tax benchmark IRR in Chinese electric power industry has not been updated and remained the same as 8% (before tax Project IRR). Therefore, it is substantiated the selected benchmark of 8% was available and valid both at the time of compiling the FSR in 03/2021 and at the time of the investment decision on 21/10/2021. Furthermore, as the benchmark approved by the national government it is widely used for financial appraisal in power industry by power enterprises in China. Thus, it is CTI's opinion that the chosen IRR of 8% is applicable to the project as in compliance with the CDM tool Investment Analysis /69/. CTI assessment team confirmed the before tax benchmark IRR of Chinese electric power industry has been widely used in the feasibility studies of new power plants, including the CMM power projects in China.

Crosscheck of input parameters

CTI assessment team has verified and crosschecked all the input values used for the IRR calculations in the joint PD & MR submitted for registration. The input parameters used in the financial analysis are sourced from the FSR /4/.

An approval letter of the FSR /4/ is issued by the government only after it passes the assessment of the sector experts designated by the government. Therefore, CTI assessment team deemed that a FSR /4/ can be regarded as a reliable and trustworthy source of information coming from a recognized entity once it has been approved by the government. The FSR /4/ for the project was developed by a qualified designing institute and approved by Shanxi Province Development and Reform Commission on 27/09/2021.

CTI assessment team compared the values stated in the joint PD & MR with values determined in the FSR /4/ and was able to confirm that the input values are applied correctly in the joint PD & MR.

Item		Unit	Value	Source
Installed capacity		MW	24	FSR /4/
Total Static Investment		CNY	193,980,000	FSR /4/
Annual O&M cost	Annual maintenance cost	CNY	9,699,000	FSR /4/
	Annual management cost	CNY	3,279,796	FSR /4/
	Annual staff salary and welfare	CNY	7,378,000	FSR /4/
	Annual insurance	CNY	2,909,700	FSR /4/

Item		Unit	Value	Source
	Annual pollutant discharge fee	CNY	500,000	FSR /4/
	Annual material fee	CNY	17,628,903	FSR /4/
	Annual other cost	CNY	6,559,592	FSR /4/
	Total	CNY	47,954,990	FSR /4/
Electricity Tariff	Electricity Tariff (NCPG) (including VAT)	CNY/kWh	0.332	FSR /4/
	Electricity Tariff (coal mine) (including VAT)	CNY/kWh	0.550	FSR /4/
	The share of electricity exported to coal mine	%	40	FSR /4/
	The share of electricity exported to NCPG	%	60	FSR /4/
	Weighted Average of Electricity Tariff	CNY/kWh	0.419	FSR /4/
Depreciation period		Year	10	FSR /4/
Scrap value of fixed assets		%	5	FSR /4/
VAT rate of electricity, repair, lubricant and maintenance cost		%	17	FSR /4/
VAT rate of water		%	3	FSR /4/
VAT rate for Insurance Cost		%	6	FSR /4/
VAT refunds proportion		%	100	FSR /4/
Income tax rate		%	25	FSR /4/
Municipal maintenance and construction tax		%	5	FSR /4/
Annual electricity generation		MWh	172,800	FSR /4/
Power self-consumption ratio		%	5.1	FSR /4/
Annual electricity supply		MWh	163,990	FSR /4/
Surcharge for education		%	5	FSR /4/
Project operational lifetime		Year	10	FSR /4/
Expected VER Price		CNY/tCO ₂ e	21	Assumption

The accuracy and suitability of the input values for the investment analysis were crosschecked as below:

Total Static Investment: 193,980,000 CNY

The total static investment estimated in FSR /4/ is 193,980,000 CNY. The same value is stated in the FSR Approval /4/.

By checking the Project acceptance report/18/ and CMM Generator Purchasing Contract/13/, the Civil engineering contract /14/ etc. of the project, it is confirmed the actual total cost of the contracts has reached 200,060,000 CNY and is 103.13% of the expected total static investment.

Therefore, CTI assessment team confirmed that the total static investment in the FSR, joint PD & MR and IRR calculation sheet are reasonable.

Annual O&M cost: 47,954,990 CNY

1) Payroll cost

Annual staff salary and welfare was estimated to be 68 persons* 7×10^4 CNY/person year, and the rate of welfare expense is 55%. According to 2023 Shanxi Provincial Statistical Yearbook /77/, the average wage of employees in energy production and supply industry in Shanxi Province is 106,644 CNY/year in 2022. Therefore, it is confirmed that the estimated wage of the employees is reasonable when FSR was compiled. As per FSR /4/, the estimation of wage and welfare of the employees is 10.85×10^4 CNY/person per year, which is $7 \times (1 + 55\%) \times 10^4$.

68 employees will be employed due to the implementation of the project. The number is appropriate by checking HR Records /48/, considering operators and technicians should be available for the newly installed project. Therefore it's considered that the wage and welfare is not over estimated.

2) Material fee

According to the FSR/4/, the amount and price of materials were analyzed by Hefei Design and Research Institute of coal industry based on the installed capacity of the project and the local prices, and approved by the Shanxi Province Development and Reform Commission. It is also confirmed that the price of different types of industrial goods indicates an overall increasing cost in recent five years and therefore will not cause significant decrease according to Industrial Producer Ex-factory Price Classification Index published by the National Bureau of Statistics /82/. Also, by checking Breakdown of operational management expenditure for 2023 /28/, it is validated that the actual material fee for 2023 is 18,135,900 CNY, which is 102.88% of the expected design value in the FSR. CTI assessment team therefore confirmed that the material costs in the FSR are reasonable and conservative.

3) Maintenance cost

The maintenance cost was estimated as 9,699,000 CNY in IRR calculation, which accounts for 5% of the fixed assets. CTI Certification assessment team did not find suitable guidelines for maintenance cost of the specific project. However, as per the publication issued by China Planning Press - Financial Evaluation Practice and Analysis of Difficult Problems-Feasibility

study and evaluation of Bank loan projects /114/, such rate is 3%~5% of fixed asset investment. Therefore, the maintenance cost is deemed as reasonable.

4) Insurance cost

As per FSR /4/, the insurance cost is calculated according to fixed assets and premium rate, and the premium rate is 1.5%. CTI assessment team did not find suitable guidelines for equipment insurance of the specific. However, by checking Breakdown of operational management expenditure for 2023 /28/, it is validated that the actual premium for 2023 is 3,055,400 CNY, which is 105.01% of the expected design value in the FSR. Therefore, CTI assessment team confirmed that the insurance cost is reasonable and conservative.

5) Management cost

As per FSR /4/, the management cost mainly include travel expenses, telephone charges, transportation expenses, office expenses, low-value consumable goods purchase expenses, business entertainment expenses, training expenses, etc. CTI assessment team did not find suitable guidelines for management cost of the specific. However, by checking Breakdown of operational management expenditure for 2023 /28/, it is validated that the actual management cost for 2023 is 3,917,500 CNY, which is 119.44% of the expected design value in the FSR. CTI assessment team confirmed that the management cost is reasonable and conservative.

6) Pollutant discharge fee and other cost

The annual pollutant discharge fee was estimated as 500,000 CNY and the other cost was estimated as 6,559,592 CNY in the FSR. CTI assessment team did not find suitable guidelines for other cost of the specific project activity. However, by checking Breakdown of operational management expenditure for 2023 /28/, it is validated that the actual pollutant discharge fee and other cost for 2023 are 534,500 CNY and 7,482,500 CNY, both of which are respectively 106.90% and 114.07% of the expected design value in the FSR. CTI assessment team confirmed that the pollutant discharge fee and other cost is reasonable and conservative.

Furthermore, through comparing with the similar VCS or CDM projects (i.e. VCS ref 4231, 5011, UNFCCC ref 3180, 7870, 3179), annual O&M cost /annual power supply (CNY/kWh) of the project (0.292 CNY/kWh) is within the range (0.101 CNY/kWh ~ 0.381 CNY/kWh) of the similar projects. Thus, the annual other cost applied in the FSR was reasonable and not overestimated.

Electricity tariff (with VAT)

As per FSR /4/, the electricity tariff to the coal mine and NCPG is 0.550 RMB/kWh (incl VAT) and 0.332 RMB/kWh (incl VAT) respectively, and the supply ratio is 40% and 60% respectively, so the weighted average electricity tariff is 0.419 RMB/kWh (incl VAT). By checking the Power supply agreement/7/, electricity sales invoices with coal mine /21/, Electricity purchase and sale contract/8/ and electricity sales invoices with NCPG/22/, CTI assessment team confirmed that in this monitoring period (01/12/2022-31/08/2024), the actual highest electricity tariff is 332 RMB/MWh (included VAT) and 550 RMB/MWh (included VAT) respectively, the share of electricity exported to NCPG and coal mine is 62% and 38%, weighted average of electricity price is 415 CNY/MWh, which is calculated by 332 CNY/MWh *62%+550CNY/MWh *38%. Also, by checking the Shanxi Provincial Development and Reform Commission on improving the policy of on-grid pricing of gas power generation in the province/115/, the assessment team confirmed that the electricity tariff (with VAT) specified in the contract is reasonable. Therefore, the electricity tariff (with VAT) is deemed as reasonable and conservative.

Tax

The taxes applied in the financial assessment are listed as:

Items	Value
VAT rate of electricity, repair, lubricant and maintenance cost	17%
VAT rate of water	3%
VAT rate for Insurance Cost	6%
Income tax rate	25%
Municipal maintenance and construction tax	5%
Surcharge for education	5%

VAT rate of electricity, repair, lubricant and maintenance cost is determined as 17%, VAT rate of water is determined as 3% and VAT rate for Insurance cost is determined as 6% in the FSR/4/, which is consistent with that in " Notice of the State Administration of Taxation of the Ministry of Finance on Comprehensively Promoting the pilot project of Replacing Business Tax with Value-added Tax (Finance and Taxation (2016) No. 36)" /51/. The project is entitled to a VAT refund of 100%, which are in compliance with the provisions of document issued by the Ministry of Finance and the State Administration of Taxation, namely, the Preferential Catalogue of VAT on Products and Services for Comprehensive Utilization of Resources (Cai Shui [2015] No. 78)/83/.

By cross checking with the national taxation regulations, sectoral regulations and other evidences, i.e. the "Interim Rules on Additional Tax for City Development" /84/ and the "Provisional Regulations of the People's Republic of China on Education tax" /85/, CTI assessment team was able to confirm that the Urban maintenance and construction tax and Surtax for education in the financial assessment are all in line with national regulations.

The 25% income tax is in compliance with the Enterprise Income Tax Law of the People's Republic of China /86/. According to the Notice of the Ministry of Finance, the State Administration of Taxation, the State Development and Reform Commission on the Promulgation of the Catalogue of Preferential Income Tax for Enterprises in Comprehensive Utilization of Resources (2008 Edition) (Finance and Taxation [2008] No. 117) /87/, when calculating the taxable income of the project, a deduction of 90% is included in the total income of the current year. CTI assessment team was able to confirm that the income tax rate and relevant preferential policies are all in line with national regulations.

The CTI assessment team reviewed the above policies/statutes/regulations and confirmed that these provisions are valid at the time of project design and investment decision.

Electricity output

The annual electricity generation is designed to be 172,800 MWh, and annual electricity exported is designed to be 163,990 MWh which are sourced from the FSR/4/ determined by a qualified third party, Hefei Design and Research Institute of coal industry based on 1) generator performance and 2) availability and stability of CMM supply. By checking the FSR /4/ and CMM generator purchasing contract/13/, the assessment team confirmed that the CMM concentration of a CMM power station should not be lower than 8% during normal operation. In addition, at times of low concentration of CMM or fluctuation of CMM volume, some of the generators will only run at partial loads, essentially reducing the effective operation hour assuming full load. Actually, because of instability in CMM power supply, some of generators also run at partial loads. According to the monthly reading records /20/ and electricity sales invoices /21//22/, the annual actual electricity exported of the project is 184,341.61MWh during this monitoring period(01/12/2022-31/08/2024), which is converted to an annual electricity exported of 105,132.32MWh (i.e., $105,132.32\text{MWh} = 184,341.61\text{MW} \times 365 \text{ days} / 640 \text{ days}$), 64.11% of the annual electricity exported in FSR. The main reason was that in the monitoring period, the CMM source of the project was insufficient while the project operated normally. Therefore, the electricity output is deemed as reasonable and conservative.

Depreciation period and residual rate

As per the FSR /4/, the residual rate is determined as 5% of the fix assets and the depreciation period is 10 years. As per Article 31 of the "Rules for the Provisional Regulations on Enterprise Income Tax of the People's Republic of China"/52/, the ratio of residual value shall be within 5% of the original value and shall be determined by the enterprise. Therefore, CTI assessment team was able to confirm that a rate of 5% is reasonable.

According to the Enforcement Regulation of Income Tax Law of the People's Republic of China for Enterprises /53/ issued by State Council on 06/12/2007, it stipulates that the depreciation period of production equipments should be at least 10 years. Thereby the 10 years of depreciation periods of the project is appropriate.

Lifetime

The lifetime of the project was estimated to be 10 years in the FSR /4/. The lifetime of the project has been crosschecked with Power supply agreement/7/ and Electricity purchase and sale contract/8/ in which it mentioned that the period of the project is 10 years. Therefore, CTI assessment team was able to confirm that the lifetime estimated in FSR is reasonable and the project operation period could cover the 10-year fixed crediting period without affecting the additionality of the project activity.

Conclusion

In conclusion, based on the information validated, CTI assessment team confirms that all the input values for investment analysis are in reasonable ranges. In addition, CTI assessment team was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project. Therefore, CTI assessment team confirms that the assumptions in investment analysis are appropriate and the financial calculations are correct.

Sensitivity analysis

To check the robustness of the financial analysis, a sensitivity analysis was performed on parameters that account for more than 20% of the costs and that would affect the total project revenues. Reasonable variations of total static investment, electricity tariff, annual power supply and annual O&M cost were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. The result of the sensitivity analysis is as follows:

Total Static Investment: If the total static investment decreased by 19.90%, the IRR would reach benchmark. However, by checking the Project acceptance report/18/ and CMM Generator Purchasing Contract/13/, the Civil engineering contract /14/ etc. of the project, it is confirmed the actual total cost of the contracts has reached 200,060,000 CNY and is 103.13% of the expected total static investment in the FSR /4/. Therefore, it's unlikely that the static total investment decreased by 19.90%.

Electricity Tariff: When the expected electricity tariff increases by 11.86%, the IRR of the project could reach the benchmark. As per FSR /4/, the electricity tariff to the coal mine and NCPG is 0.550 RMB/kWh (incl VAT) and 0.332 RMB/kWh (incl VAT) respectively, and the supply ratio is 40% and 60% respectively, so the weighted average electricity tariff is 0.419 RMB/kWh (incl VAT). By checking the Power supply agreement/7/, electricity sales invoices with coal mine /21/, Electricity purchase and sale contract/8/ and electricity sales invoices with NCPG/22/, CTI assessment team confirmed that in this monitoring period (01/12/2022-31/08/2024), the actual highest electricity tariff is 332 RMB/MWh (included VAT) and 550 RMB/MWh (included VAT) respectively, the share of electricity exported to NCPG and coal

mine is 62% and 38%, weighted average of electricity price is 415 CNY/MWh, which is calculated by $332 \text{ CNY/MWh} \times 62\% + 550 \text{ CNY/MWh} \times 38\%$. Therefore, it is unlikely that the electricity tariff increases by 11.86%.

Annual Power Supply: For the IRR to reach the benchmark, the annual electricity supply must be increased by 19.80%. By checking the FSR /4/, the assessment team confirmed that the annual electricity exported for the project is determined by a qualified third party, Hefei Design and Research Institute of coal industry based on 1) generator performance and 2) availability and stability of CMM supply. By checking the FSR /4/ and CMM generator purchasing contract/13/, it is confirmed that the CMM concentration of a CMM power station should not be lower than 8% during normal operation. In addition, by checking the plant operation record/19/, it is confirmed that at times of low concentration of CMM or fluctuation of CMM volume, some of the generators will only run at partial loads, essentially reducing the effective operation hour assuming full load. Actually, because of instability in CMM power supply, some of generators also run at partial loads. According to the monthly reading records /20/ and electricity sales invoices /21//22/, the annual actual electricity exported of the project is 184,341.61MWh during this monitoring period(01/12/2022-31/08/2024), which is converted to an annual electricity exported of 105,132.32MWh (i.e., $105,132.32 \text{ MWh} = 184,341.61 \text{ MW} \times 365 \text{ days} / 640 \text{ days}$), 64.11% of the annual electricity exported in FSR. Hence, there is a little possibility that the annual electricity exported can be increased 19.80% to make IRR to reach the benchmark.

Annual O&M cost: If the annual O&M cost is decreased by 16.75%, the IRR would reach benchmark. By checking Breakdown of operational management expenditure for 2023 /28/, it is validated that the actual annual O&M cost cost for 2023 is 50,898,400 CNY, which is 106.14% of the expected design value in the FSR. However, considering the increasing price index for material fee and increasing salary level /77//82/, CTI assessment team validated that the fluctuation of the variable will not make the IRR reach the benchmark.

It is assessment team's conclusion that sensitivity analysis used in joint PD & MR and IRR calculation sheet is appropriate and reasonable.

Outcome of step 3: scenario 5 (A2+B3+P2), which is the implementation of project without VCS, is not financially attractive to the project owner, and it is thus not a baseline scenario. Therefore, only one alternative scenario (scenario 1 (A2+B1+P1)) is left and is determined as baseline scenario of the project.

Step4: Common practice analysis

According to "Combined Tool to identify the baseline scenario and demonstrate additionalty" (Version 07.0) /65/ and Common Practice, (Version 03.1) /68/, the common practice analysis shall be conducted in the following four steps:

Step 4.1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The designed annual methane destruction capacity of the project is 42.14 million Nm³. The capacity range was selected to be +/-50% of the design capacity of annual methane destruction of the proposed project, i.e. 21.07 million Nm³ - 63.21 million Nm³ in Step 1, which is in line with the tool/65/.

Step 4.2: Identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

(a) The projects are located in the applicable geographical area;

Since CMM projects located in the same province/region have similar grid structure, geological and transportation conditions and economic development, thus, only the projects located in Shanxi Province, P. R. China are chosen.

(b) The projects apply the same measure as the proposed project activity;

The project aims to utilize the low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity. Thus, only the projects provided power generation based on CMM are chosen.

(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;

Thus, only the projects use CMM are chosen.

(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;

Thus, only the projects use CMM are chosen.

(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1

Thus, only projects have an annual methane destruction of 21.07 million Nm³ - 63.21 million Nm³ are chosen.

(f) The projects started commercial operation before the project design document is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the project.

The civil engineering contract of the project was signed on 23/11/2021 which is the first contract signed for construction of the project /14/ and before the publication date for project. Thus the projects started commercial operation before 23/11/2021 are applicable.

In conclusion, the CMM projects with an annual methane destruction of 21.07 million Nm³ - 63.21 million Nm³ and started commercial operation before 23/11/2021 in Shanxi Province are counted as similar projects to the project.

By checking the relevant statistic website (ie. Shanxi Provincial Statistics Bureau website) and China's DNA website, UNFCCC website, VCS website, GS website and GCC website/88/, the similar projects are listed in the following table.

No	Project Title	GHG Program	Ref No	capacity of methane destruction for CMM utilization (million Nm ³)	Start date
1	Yangquan Coal Mine Methane (CMM) Utilization for Power Generation Project, Shanxi Province, China	CDM	892	48.14	1-May-2006
2	Shanxi Yangcheng Coal Mine Methane Utilization Project	CDM	1250	22.69	23-Oct-2005
3	Shanxi Coal Transport Market Co., Ltd. Yangquan Branch CMM Utilization Project	CDM	1319	43.21	30-Nov-2005
4	Jincheng Fengrun CMM Utilisation from Nine Mines in Jincheng City Shanxi Province China	CDM	1928	57.88	2-Aug-2005
5	Jincheng Chengzhuang 18 MW coal mine methane power generation project	CDM	3179	45.81	30-Mar-2007
6	Shaqu 14 MW CMM Power Generation Project in Shanxi Province (Phase I)	CDM	3190	21.70	11-Feb-2006
7	SDIC Xiyang Baiyangling CMM to power generation project	CDM	3219	29.00	31-Dec-2009

8	Huineng Low Concentration Coal Mine Methane Utilization Project	CDM	8006	24.37	18-Sep-2012
9	Liyang 15 MW Low-concentration CMM Power Generation Project	VCS	4499	25.50	01-Mar-2021

Step 4.3: with the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}

As mentioned above, all similar projects have successfully registered CDM/VCS/CCER project activities, project activities submitted for registration, project activities undergoing validation existed in Shanxi Province. Therefore, $N_{all} = 0$.

Step 4.4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff} .

N_{all} is identified as 0 in step 3, therefore $N_{diff} = 0$.

Step 5: calculate factor $F = 1 - N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity

According to the result identified in step 4, $N_{all} = N_{diff} = 0$, so $F = 0$, which is less than 0.2, $N_{all} - N_{diff} = 0 < 3$.

Therefore, as per Common Practice, version 03.1 /69/, CTI assessment team confirmed the project is not a common practice.

Based on the analysis above, the CTI assessment team confirmed the project activity is additional.

3.4.6 Quantification of GHG Emission Reductions and Carbon Dioxide Removals

CTI assessment team checked the baseline, project and leakage calculation and confirm that the evaluation of baseline, project and leakage is as per the approved methodology and formula used to calculate the same is correct. The detail analysis is as below:

(1) Baseline emissions

As per the methodology ACM0008 (version 08.0), baseline emissions are determined in two steps:

Step A. Determination of methane eligible for crediting.

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that it involved no utilization of VAM, CBM and OCM for the project and it utilizes the captured CMM for power generation.

Thus, captured CMM is eligible for crediting.

Step B. Determination of baseline emissions.

Baseline emissions would have occurred due to methane destruction, methane venting and use of other fossil fuels that are displaced by methane under the project activity. Baseline emissions due to venting should be discounted in case host country has regulations in place that are restricting the release of methane into the atmosphere.

The baseline emissions are calculated by the following formula:

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

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 replaced by the project activity in year y (tCO₂e)

1. Methane destruction in the baseline ($BE_{MD,y}$)

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the baseline scenario does not involve any flaring or usage of CMM, therefore, there is no methane destruction in the baseline. So, destruction of methane in the baseline scenario ($BE_{MD,y}$) is 0.

2. Methane venting in the baseline ($BE_{MR,y}$)

According to methodology ACM0008 (version 08.0), the amount of methane that would have been emitted to the atmosphere in the baseline scenario shall be determined as follows:

$$BE_{MR,y} = \sum_i \sum_s (MT_{PJ,s,i,y} - MT_{BL,s,i,y}) \times GWP_{CH4} \quad \text{Equation (2)}$$

Where:

$BE_{MR,y}$ = Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO₂e)

$MT_{PJ,s,i,y}$ = Methane from source s captured and destroyed by use i in the project activity in year y (t CH₄);

$MT_{BL,s,i,y}$ = Methane from source s that would have been captured and destroyed by use i in the baseline scenario in the year y (t CH₄) ;

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_{CH4} = Global warming potential of methane (t CO₂e/t CH₄)

In the baseline scenario, there is no CMM captured and destroyed, thus $MT_{BL,s,i,y}$ is 0; Thus,

$$BE_{MR,y} = \sum_i \sum_s MT_{PJ,s,i,y} \times GWP_{CH4} \quad \text{Equation (3)}$$

The parameters used to calculate $BE_{MR,y}$ ex-ante is determined and justified as below:

Parameter	Value	Data sources
$MT_{PJ,s,i,y}$	28,234 tCH ₄	According to the FSR/4/ of the project, the estimated annual CMM measured sent to power plant will be 42.14 million Nm ³ CMM per year when the project is fully operated. The volume of CMM utilized by the project is estimated under the temperature of 293.15K, so the density of methane is 0.67kg/m ³ (2019 Refinement to 2006 IPCC). Therefore, the $MT_{PJ,s,i,y}$ is calculated as follows: 42.14×10 ⁶ m ³ ×0.67kg/m ³ /1000 =28,234 tCH ₄ .
GWP_{CH4}	28 tCO ₂ e/tCH ₄	IPCC Fifth Assessment Report (AR5)
$BE_{MR,y}$	790,546 tCO₂e	Calculated using equation (3) of this report.

3. Baseline emissions from the production of power, heat or vehicle fuels ($BE_{Use,y}$)

According to methodology ACM0008 (version 08.0), the baseline emissions from displacement of power or heat generation, or supply of vehicle fuels are given by the following equation:

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

Where:

$BE_{use,y}$ = Baseline emissions from energy displaced by the project activity in year y (t CO₂);

$EG_{use,k,y}$ = 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 CO₂/energy unit);

k = Energy type displaced by the project activity

Through site visit, the assessment team confirmed that the waste heat from the generators of the project will be recovered by waste heat boilers to provide free hot water to the coal mines, which was provided by waste coal fired boilers before the implementation of the Project. However, to be conservative, emission reductions will not be claimed for this part. And for the project is not involved emission reduction from supply of vehicle fuels. Thus, in this part, the project is just involved the baseline emissions from the production of power.

Baseline emissions factor for power generation

According to methodology ACM0008 (version 08.0), the emission factor for displaced electricity is calculated as per the latest version of methodological tool “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0), the parameter $EG_{use,k,y}$ is equivalent to the quantity of electricity generated and supplied by the project power plant to the grid in year y ($EG_{PJ,grid,y}$) in the tool. According to this tool, for the project is in the case of Scenario A: Electricity consumption from the grid, the project participants choose Option A1: Calculate the combined margin emission factor of the applicable electricity system, using the procedures in the latest approved version of the “Tool to calculate the emission factor for an electricity system” (version 07.0) ($EF_{k,y} = EF_{grid,CM,y}$).

$EF_{grid,CM,y}$ is calculated as per the Tool 07: “Tool to calculate the emission factor for an electricity system” based on one of the following methods:

(a) Weighted average CM; or

(b) Simplified CM.

As per para 83 of Tool 07, the weighted average CM method (Option a) should be used as the preferred option. Therefore, the combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = \omega_{OM} \times EF_{grid,OM,y} + \omega_{BM} \times EF_{grid,BM,y} \quad \text{Equation (5)}$$

Where:

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)

ω_{OM} = Weighting of operating margin emission factor (percent)

ω_{BM} = Weighting of build margin emission factor (percent)

As per the latest published data from the 2023 Baseline Emission Factors for Regional Power Grids in China' published by China's DNA /88/, for NCPG, $EF_{grid,OM,y}$ is calculated to be 0.9652 tCO₂e/MWh and $EF_{grid,BM,y}$ is calculated to be 0.3020 tCO₂e/MWh. It is confirmed that the calculation is in accordance with the calculation process of the corresponding methodology and tools.

As per para 86 of Tool 07, the weights of OM and BM for all other projects except wind and solar power generation project activities, $\omega_{OM} = 0.5$ and $\omega_{BM} = 0.5$.

Therefore, $EF_{k,y} = EF_{grid,CM,y} = 0.9652 \times 0.5 + 0.3020 \times 0.5 = 0.6336$ tCO₂/MWh.

The parameters used to calculate $BE_{use,y}$ ex-ante is determined and justified as below:

Parameter	Value	Data sources
$EG_{use,k,y}$ ($EG_{PJ,grid,y}$)	163,990 MWh	According to the FSR/4/ of the project, the expected annual exported electricity will be 163,990MWh.
$EF_{k,y}$ ($EF_{grid,CM,y}$)	0.6336 tCO ₂ /MWh	2023 Baseline Emission Factors for Regional Power Grids in China and Tool 07: "Tool to calculate the emission factor for an electricity system"
$BE_{Use,y}$	103,904 tCO₂e	Calculated using equation (4) of this report.

In conclusion, $BE_y = BE_{MD,y} + BE_{MR,y} + BE_{Use,y} = 0 + 790,546 + 103,904 = 894,450$ tCO₂e

CTI assessment team confirmed the determination of BE_y is appropriate and reasonable.

(2) Project emissions

According to ACM0008 (version 08.0), project emissions comprise the following sources:

- (a) Emissions from the energy use to capture and use methane;
- (b) Emissions from destruction of captured methane through production of various energy types and/or flaring and/or flameless oxidation;
- (c) Emissions from the un-combusted methane.

Project emissions are calculated as follows:

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

Where:

- PE_y = Project emissions in year y (tCO₂e)
- $PE_{ME,y}$ = Project emissions from energy use to capture and use methane (tCO₂e)
- $PE_{MD,y}$ = Project emissions from destruction of captured methane (tCO₂e)
- $PE_{UM,y}$ = Project emissions from un-combusted methane in year y (tCO₂e)

1. Project emissions from the energy use to capture and to use methane ($PE_{ME,y}$)

By checking the FSR /4/ and through site visit, the assessment team confirmed that during the normal operation of the project activity, the additional electricity consumption required by the project activity to capture and utilize the CMM is supplied by the power generation of the project; Only when the project is out of operation or abnormal operation, there is a small amount of power consumed.

According to ACM0008 (version 08.0), 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) should be used.

The calculation formula is as follows:

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

Where:

- $PE_{EC,y}$ = Project emissions from electricity consumption in year y (tCO₂/yr)

$EC_{PJ,j,y}$	=	Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)
$EF_{EF,j,y}$	=	Emission factor for electricity generation for source j in year y (tCO ₂ /MWh)
$TDL_{j,y}$	=	Average technical transmission and distribution losses for providing electricity to source j in year y
j	=	Sources of electricity consumption in the project

According to “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0), $EF_{EF,j,y}=EF_{grid,CM,y}$.

The parameters used to calculate $PE_{ME,y}$ ex-ante is determined and justified as below:

Parameter	Value	Data sources
$EC_{PJ,j,y}$	0 MWh	This parameter is ex ante determined as 0 and will be monitored ex post.
$EF_{EF,j,y}$ ($EF_{grid,CM,y}$)	0.6336 tCO ₂ /MWh	2023 Baseline Emission Factors for Regional Power Grids in China and Tool 07: “Tool to calculate the emission factor for an electricity system”
$TDL_{j,y}$	20%	Data / Parameter table 3 of Tool 05 “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”. Use as default values of 20% for project or leakage electricity consumption sources.
$PE_{ME,y}$	0 tCO ₂ e	Calculated using equation (7) of this report.

2. Project emissions from destruction of captured methane ($PE_{MD,y}$)

The calculation formula is as follows:

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

Where:

$PE_{MD,y}$	=	Project emissions from methane destroyed (tCO ₂ e)
$MD_{i,y}$	=	Methane destroyed through use i (tCH ₄)

i	=	Use of methane (power generation, heat generation, supply to gas grid to various combustion end uses)
CEF _{CH4}	=	Carbon emission factor for combusted methane. Set as 2.75 (tCO ₂ /t CH ₄)

As mentioned above, since emission reductions will not be claimed in heat generation. And for the project is not involved emission reduction from supply of vehicle fuels. The project only involve in methane destroyed through power generation.

Thus,

$$PE_{MD,y} = MD_{ELEC,y} \times CEF_{CH4} \quad \text{Equation (9)}$$

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.

$$MD_{i,y} = MM_{i,y} \times Eff_{i,y} \quad \text{Equation (10)}$$

Where:

MD _{i,y}	=	Methane destroyed through use i in year y (t CH ₄)
MM _{i,y}	=	Methane measured sent to use i in year y (tCH ₄)
Eff _{i,y}	=	Efficiency of methane destruction in use I in year y (%)

Thus,

$$PE_{MD,y} = MD_{ELEC,y} \times CEF_{CH4} = MM_{ELEC,y} \times Eff_{ELEC,y} \times CEF_{CH4} \quad \text{Equation (11)}$$

Where:

MD _{ELEC,y}	=	Methane destroyed through use of power generation in year y (tCH ₄)
MM _{ELEC,y}	=	Methane measured sent to use of power generation in year y (tCH ₄)
Eff _{ELEC,y}	=	Efficiency of methane destruction in use of power generation in year y (%)

The parameters used to calculate PE_{MD,y} ex-ante is determined and justified as below:

Parameter	Value	Data sources
MD _{ELEC,y}	28,234 tCH ₄	The data comes from the same source as MT _{PJ,s,i,y} .

$Eff_{ELEC,y}$	99.5%	2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories
CEF_{CH_4}	2.75 tCO ₂ e/tCH ₄	ACM0008 (version 08.0)
$PE_{MD,y}$	77,255 tCO₂e	Calculated using equation (11) of this report.

3. Project emissions from un-combusted methane ($PE_{UM,y}$)

According to ACM0008 (version 08.0), not all of the methane sent to the flare, to the flameless oxidizer or used to generate power and heat will be combusted, so a small amount will be released to the atmosphere. These emissions are calculated as follows:

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

Where:

$PE_{UM,y}$ = Project emissions from un-combusted methane (tCO₂e)

GWP_{CH_4} = Global warming potential of methane (t CO₂e/t CH₄)

i = Use of methane (power generation, heat generation, supply to gas grid to various combustion end uses)

$MM_{i,y}$ = Methane measured sent to use i in year y (t CH₄), i is only for electricity, so $MM_{i,y} = MM_{ELEC,y}$

$Eff_{i,y}$ = Efficiency of methane destruction in use i in year y (%), i is only for electricity, so $Eff_{i,y} = Eff_{ELEC,y}$

Therefore, for the project the calculation formula is as follows:

$$PE_{UM,y} = GWP_{CH_4,y} \times MM_{ELEC,y} \times (1 - Eff_{ELEC,y}) \quad \text{Equation (13)}$$

The parameters used to calculate $PE_{UM,y}$ ex-ante is determined and justified as below:

Parameter	Value	Data sources
$MD_{ELEC,y}$	28,234 tCH ₄	The data comes from the same source as $MT_{PJ,s,i,y}$.
$Eff_{ELEC,y}$	99.5%	2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories
GWP_{CH_4}	28 tCO ₂ e/tCH ₄	IPCC Fifth Assessment Report (AR5)
$PE_{UM,y}$	3,953 tCO₂e	Calculated using equation (13) of this report.

In conclusion, $PE_y = PE_{ME,y} + PE_{MD,y} + PE_{UM,y} = 0 + 77,255 + 3,953 = 81,208 \text{ tCO}_2\text{e}$

CTI assessment team confirmed the determination of PE_y is appropriate and reasonable.

(3) Leakage

According to ACM0008 (version 08.0), 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.

By checking the FSR and FSR Approval /4/, EIA and EIA Approval /6/ and through site visit, the assessment team confirmed that the heat generated by the waste heat boilers are supplied for hot water for bathing for the workers in coal mine, it could fulfil this heat demand, and there is no new heat demand, resulting into the CMM consumption in this project.

Since the baseline scenario of the project does not include thermal energy use, the leakage (LE_y) is taken as zero.

(4) Emission reductions

According to ACM0008 (version 08.0), emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad \text{Equation (14)}$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂e/yr)

PE_y = Project emissions in year y (t CO₂e/yr)

LE_y = Leakage emissions in year y (t CO₂e/yr)

Therefore, for ex-ante estimation, $ER_y = BE_y - PE_y - LE_y = 894,450 - 81,208 - 0 = 813,242$.

In conclusion, the estimated amount of GHG emission reductions (ER_y) ex ante for the project activity is 8,132,420 tCO₂e during the crediting period from 01/12/2022 to 30/11/2032, resulting in estimated average annual emission reductions of 813,242 tCO₂e.

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCU (tCO ₂ e)	Estimated removal VCU (tCO ₂ e)	Estimated total VCU (tCO ₂ e)

01/12/2022 to 31/12/2022	75,967	6,897	0	69,070	0	69,070
01/01/2023 to 31/12/2023	894,450	81,208	0	813,242	0	813,242
01/01/2024 to 31/12/2024	894,450	81,208	0	813,242	0	813,242
01/01/2025 to 31/12/2025	894,450	81,208	0	813,242	0	813,242
01/01/2026 to 31/12/2026	894,450	81,208	0	813,242	0	813,242
01/01/2027 to 31/12/2027	894,450	81,208	0	813,242	0	813,242
01/01/2028 to 31/12/2028	894,450	81,208	0	813,242	0	813,242
01/01/2029 to 31/12/2029	894,450	81,208	0	813,242	0	813,242
01/01/2030 to 31/12/2030	894,450	81,208	0	813,242	0	813,242
01/01/2031 to 31/12/2031	894,450	81,208	0	813,242	0	813,242
01/01/2032 to 30/11/2032	818,483	74,311	0	744,172	0	744,172
Total	8,919,730	812,080	0	8,132,420	0	8,132,420

Note: 1. It is covering 31 days from 01/12/2022 to 31/12/2022, thus the estimated Baseline emissions, project emissions and ERs during 01/12/2022 to 31/12/2022 are calculated as the estimated annual values * 31 days/365 days.

2. The estimated Baseline emissions, project emissions and ERs during 01/01/2032 to 30/11/2032 are calculated as the estimated annual values - the estimated values from the first year (01/12/2022 to 31/12/2022).

CTI assessment team confirms that all data sources and assumptions are appropriate and calculations are correct, applicable to the project activity and will result in a conservative estimate of the emission reductions. In general, CTI Assessment team is able to confirm the following:

- All assumptions and data used by the project participants are listed in the VCS joint PD & MR (Version 02 dated 15/11/2024) and/or supporting documents, including their references and sources;
- All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the VCS joint PD & MR (Version 02 dated 15/11/2024);
- All values used in VCS joint PD & MR (Version 02 dated 15/11/2024) are considered reasonable in the context of the project;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, and leakage emissions;
- All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in VCS joint PD & MR (Version 02 dated 15/11/2024).

3.4.7 Methodology Deviations

There is no methodology deviation for the project.

3.4.8 Monitoring Plan

The project applies the approved monitoring methodology ACM0008 (version 08.0): Abatement of methane from coal mines. The selected monitoring methodology is applicable for the project. The monitoring plan is in accordance with the monitoring methodologies. The monitoring plan will give opportunity for real measurements of achieved emission reductions and contains principles and concepts on which it is based, operational and monitoring obligations of the project owner like resources involved in the monitoring process, training, support activities, calibration and data collection, quality assurance procedures, data management, electronic support tools.

Parameters determined ex-ante

Data / Parameter:	$MT_{BL,s,i,y}$
Data unit:	tCH ₄
Description:	Methane from source s that would have been captured and destroyed by use i in the baseline scenario in the year y
Source of data used:	The baseline scenario does not involve any flaring or usage of CMM, therefore, there is no methane destruction in the baseline. So, $MT_{BL,s,i,y}$ is 0.
Value applied:	0

Data / Parameter:	CEF _{CH4}
Data unit:	tCO ₂ e/ tCH ₄
Description:	Carbon emission factor for combusted methane
Source of data used:	ACM0008 (Version 08.0)
Value applied:	2.75

Data / Parameter:	EF _{grid,OM,y}
Data unit:	tCO ₂ e/ MWh
Description:	Operating margin emission factor of the grid connected (NCPG)
Source of data used:	“2023Baseline Emission Factors for Regional Power Grids in China” published by DNA of China
Value applied:	0.9652

Data / Parameter:	EF _{grid,BM,y}
Data unit:	tCO ₂ e/ MWh
Description:	Build margin emission factor of the grid connected (NCPG)
Source of data used:	“2023Baseline Emission Factors for Regional Power Grids in China” published by DNA of China
Value applied:	0.3020

Data / Parameter:	W _{OM}
Data unit:	/
Description:	Weighting of operating margin emission factor
Source of data used:	Tool 07: “Tool to calculate the emission factor for an electricity system”
Value applied:	50%

Data / Parameter:	W _{BM}
Data unit:	/

Description:	Weighting of build margin emission factor
Source of data used:	Tool 07: "Tool to calculate the emission factor for an electricity system"
Value applied:	50%

Data / Parameter:	$EF_{k,y}$, $EF_{EF,j,y}$ ($EF_{grid,CM,y}$)
Data unit:	tCO ₂ e/ MWh
Description:	Combined margin emission factor for the grid in year y
Source of data used:	2023 Baseline Emission Factors for Regional Power Grids in China and Tool 07: "Tool to calculate the emission factor for an electricity system"
Value applied:	0.6336

Data / Parameter:	D_{CH_4}
Data unit:	kg/m ³
Description:	Density of methane under normal conditions of temperature and pressure Applies at atmospheric pressure and 20°C
Source of data used:	2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0.67

Parameters determined ex-post

Parameters	Description	Monitoring procedure
$MT_{PJ,s,i,y}$	Methane from source s captured and destroyed by use i in the project activity in year y	For $MT_{PJ,s,i,y}$ is monitored by flow meter in volume unit installed at the inlet of the power generators, which will be converted to mass unit with the parameter of D_{CH_4} . Flow meter, pressure sensor, temperature sensor, and gas analyzer simultaneously measures the CMM flow, temperature and pressure, a gas analyzer measures the methane concentration. Flow meter, pressure sensor, temperature sensor, and gas analyzer are calibrated annually in compliance with Industry standard Vortex Flow

		Meter (JJG1029-2007), Pressure Transmitters (JJG 882-2019), Calibration Specification of the Temperature Transmitter (JJF1183-2007) and Non-dispersive Infrared Methane Transmitters for Coal Mine (JJG 1138-2017) respectively. The accuracy of the equipments also should meet these standards. All electronic data and paper documents must be archived and kept for at least two years after the end of the project crediting period.
MM _{ELEC,y}	Methane measured sent to use of power generation in year y	Monitoring procedure is consistent with MT _{PJ,s,i,y} .
GWP _{CH4}	Global warming potential of methane	This parameter is sourced from IPCC Fifth Assessment Report (AR5). The parameter will be updated according to the relevant documents.
EG _{use,k,y} (EG _{PJ,grid,y})	Energy of type k displaced by the project activity in year y	The parameter is measured continuously by electricity meter M1, M2, and M3, and monthly recorded. Monitoring: electricity meter (M1) is installed at the delivery side of Fenghui power plant to monitor the electricity delivered to NCPG if there is any electricity surplus. Electricity meter (M2, M3) is installed at side of Fenghui power plant to monitor the electricity delivered to Xiyang Fenghui coal mine. The data will be cross checked with Electricity transaction notes (ETNs). The Electricity meters is calibrated annually in compliance with the industry standard Technical administrative code of electric energy metering (DL/T448-2016), and the accuracy of the meters also should meet the standard. All electronic data and paper documents will be archived for two years following the end of the crediting period.
EC _{PJ,j,y}	Quantity of electricity consumed by the project electricity consumption source j in year y	The parameter is measured continuously by electricity meter M1, and monthly recorded. Electricity meter (M1) is installed at the delivery side of Fenghui power plant to monitor the electricity imported from the NCPG. The data will be cross checked with Electricity transaction notes (ETNs). The Electricity meters is calibrated annually in compliance with the industry standard Technical administrative code of electric energy

		metering (DL/T448-2016), and the accuracy of the meters also should meet the standard. All electronic data and paper documents will be archived for two years following the end of the crediting period.
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y.	This parameter is sourced from Data / Parameter table 3 of Tool 05 “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”. Use as default values of 20% for project or leakage electricity consumption sources. The parameter will be updated according to the relevant documents.
$Eff_{i,y}$ ($Eff_{ELEC,y}$)	Efficiency of methane destruction in use i (for the project, i represents power generation)	This parameter is sourced from 2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The parameter will be updated according to IPCC.

CTI confirms that the monitoring plan contains all necessary parameters which have been clearly described in updated joint PD & MR (Version 02 dated 15/11/2024) and that the means of monitoring described in the plan complies with the requirements of the methodology.

An organizational structure is provided in the joint PD & MR (Version 02 dated 15/11/2024). The functions such as data collection, aggregation, verification, calculation, archiving, as well as the maintenance of equipment etc. have been defined. Quality assurance and quality control procedures for recording, maintaining and data archiving etc. would be ensured according to VCS and CDM EB rules. The calibration of the measuring instruments will be implemented as per national standard. An emergency treatment process has been defined in the PD when the measuring instruments are in malfunction. Data management and quality control system are quoted in the joint PD & MR. The monitoring staffs will be trained based on the training program described in the joint PD & MR.

CTI confirmed that the monitoring plan in the updated joint PD & MR (Version 02 dated 15/11/2024) is in compliance with the requirements of ACM0008 (version 08.0). The monitoring plan will give opportunity for real measurements of achieved emission reductions. CTI considers the PP are capable to implement the monitoring plan.

3.5 Non-Permanence Risk Analysis

Not applicable for the present project activity.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The selected monitoring period 01/12/2022-31/08/2024 is the 1st monitoring period of the project, which is within the crediting period 01/12/2022-30/11/2032.

By checking the daily operation and maintenance records /19/ and interview with staff from PP during site visit, CTI can confirm that no serious malfunction happened and all the generators were under a normal operation as expected in this monitoring period.

On-site training for the related procedures including monitoring, recording and reporting was verified to be in place by checking the training records /33/ and their implementation was confirmed by interview with the key operators and observing the operation during site visit.

The assessment team has:

- Applied the GPS instruments to check the project location and geo-coordinates;
- Checked onsite installed equipments to confirm that the project equipment installation is consistent with the joint PD & MR.
- Onsite checked the monitoring equipments and confirmed the metering equipments are in place.
- Reviewed documents/7/- /40/ to confirm the Project has been operated as per the joint PD & MR.
- Interviewed relevant personnel for the project implementation information, and assessed the construction and implementation status with the documents /7/- /40/ to check the implementation status of the Project.

The project is located in Dazhai Town, Xiyang County, Jinzhong City, Shanxi Province, P.R.China and the geographical coordinates of the project are east longitude 113°37'23"~113°40'43" and north latitude 37°30'53"~37°32'34". The location of the project site was verified through on-site inspection and the coordinates were verified on-site by GPS devices.

The purpose of the project is to utilize the extracted low concentration coal mine methane (CMM) from Xiyang Fenghui coal mine for power generation to supply electricity to the coal mine where the project is located and to NCPG if there is any electricity surplus. The project installed 12 sets of CMM power generators, with unit capacity of 24MW (12*2MW), is able to destroy 42.14 million Nm³ of methane annually.

The technical process and specifications of the main equipment of the project is verified and shown in section 3.1 of this report. The project started construction on 23/11/2021 /17//18/

and started operation since 01/12/2022 /18//19/. In this joint PD & MR, the monitoring period is from 01/12/2022 to 31/08/2024 (both days included), with totally 640 days. Actual monitoring activities complied with the monitoring plan. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project reduces GHG emission.

The assessment team can confirm that:

-the project implementation is in accordance with the project description contained in the Joint PD & MR (Version 02 dated 15/11/2024) and monitoring plan.

-all physical features of the proposed project activity including data collection systems and storage systems have been implemented in accordance with the Joint PD & MR (Version 02 dated 15/11/2024) and monitoring plan.

-the monitoring plan in the Joint PD & MR (Version 02 dated 15/11/2024) is in accordance with the approved methodology applied by the project activity, i.e. ACM0008 (version 08.0).

-The monitoring has been carried out in accordance with the monitoring plan contained in the Joint PD & MR (Version 02 dated 15/11/2024).

-all parameters stated in the monitoring plan are monitored and reported appropriately.

Implementation Status	Assessment steps, evidence checked, & conclusion:
Project implementation	As described above including assessment steps and evidence, the audit team can confirm that there is not existence of any material misstatements between the project implementation and the Project Description.
Monitoring plan	PP has operated the Project as per the joint PD & MR /1/. The monitoring organization has been set up and all monitoring staffs have been trained. Monitoring and Management Manual /12/ and internal training records /33/, Operation Staff Accreditation /34/ have been provided and verified by the assessment team. The assessment team confirms that all the documents required by the monitoring plan have been stored. CTI has verified the documents and found the management and operations have been conducted by the PP in accordance with the monitoring plan. The assessment team has onsite interviewed the representatives from the PP on the actual monitoring activities, onsite witnessed the actual monitoring activities, and reviewed the documented evidence, i.e. Monitoring and Management Manual /12/, and confirmed that PP has conducted the monitoring activities in accordance with the monitoring plan contained in the joint PD & MR. The assessment team has verified the parameters in the joint PD & MR /1/ and the Emission Reductions Calculation Spreadsheet /2/ and found consistent with the relevant evidences, i.e. Monthly reading records /20/, Electricity sales

	invoices/21//22/, Electricity purchase receipts/23/, Operation Records/19/. Therefore the assessment team can confirm that: • The PP implemented the monitoring plan as per the project description and the actual monitoring activities are complete, and the implemented monitoring system (i.e. process and schedule for obtaining, recording, compiling and analyzing the monitored data and parameters) is suitable. • There is not any material misstatement between the actual monitoring system and the monitoring plan set out in the project description and the applied methodology.
AFOLU-specific implementation	project N/A

4.2 Accuracy of Reduction and Removal Calculations

All parameters required to be monitored by the monitoring plan as per the monitoring methodology ACM0008 (version 08.0) and the management system were assessed during the site visit. The joint PD & MR lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, recording, aggregation, calculation and reporting) for these parameters is provided. The information flow for each parameter is further verified in the following sections.

Data and Parameters Monitored

In this monitoring period, the data and parameters monitored were justified as follows:

1) $MT_{PJ,s,i,y}$: Methane from source s captured and destroyed by use i in the project activity in year y

For $MT_{PJ,s,i,y}$ is monitored by flow meter in volume unit installed at the inlet of the power generators, which will be converted to mass unit with the parameter of D_{CH_4} .

Flow meter, pressure sensor, temperature sensor measured gas volumes, pressure and temperature. Volumes of methane under normal conditions of temperature and pressure continuously and recorded hourly. Gas analyzer measured the concentration of CH_4 continuously and recorded hourly. All the above data are stored in the data acquisition system, and the CMM flow rate is automatically calculated as the data under standard conditions (Nm^3). The above monitoring devices are installed at the inlet of the power generators, and the monitoring data is all the CMM data entering the generator, excluding the amount of venting unused CMM that has vented for safety reasons.

By checking the data from CMM monitoring data monthly report /35/ and CMM invoice/36/, the assessment team confirmed that the value of $MT_{PJ,s,i,y}$ in this monitoring period is as follows:

Period	Confirmed value (unit: Nm ³)	Confirmed value (unit: tCH ₄)
01/12/2022-31/12/2022	1,625,344	1,088.98
01/01/2023-31/12/2023	29,546,176	19,795.94
01/01/2024-31/08/2024	25,528,627	17,104.18
Total (01/12/2022-31/08/2024)	56,700,147	37,989.10

2) **MM_{ELEC,y}: Methane measured sent to use of power generation in year y**

The monitoring procedure and data value of MM_{ELEC,y} are consistent with MT_{PJ,s,i,y}.

3) **EG_{use,k,y} (EG_{PJ,grid,y}): Energy of type k displaced by the project activity in year y**

The parameter is measured continuously by electricity meter M1, M2 and M3, and monthly recorded. Monitoring: electricity meter (M1) is installed at the delivery side of Fenghui power plant to monitor the electricity delivered to NCPG if there is any electricity surplus. Electricity meter (M2, M3) is installed at side of Fenghui power plant to monitor the electricity delivered to Xiyang Fenghui coal mine.

At last day of each month, the PP's monitoring team will record the electricity meter readings. After confirmed by Xiyang Fenghui coal mine and local power grid company, they will issue the electricity sales invoices/21//22/.

The value of EG_{use,k,y} (EG_{PJ,grid,y}) was sourced from Monthly reading records /20/ covering this monitoring period, which was crosschecked with the electricity sales invoices/21//22/ and verified by the assessment team to be consistent. Therefore, the assessment team confirmed that the value of EG_{use,k,y} (EG_{PJ,grid,y}) in this monitoring period were as follows:

Period	Confirmed value (unit: MWh)
01/12/2022-31/12/2022	5,122.88
01/01/2023-31/12/2023	94,432.74
01/01/2024-31/08/2024	84,785.99
Total (01/12/2022-31/08/2024)	184,341.61

4) **EC_{PJ,j,y}: Quantity of electricity consumed by the project electricity consumption source j in year y**

The parameter is measured continuously by electricity meter M1, and monthly recorded. Electricity meter (M1) is installed at the delivery side of Fenghui power plant to monitor the electricity imported from the NCPG.

At last day of each month, the PP's monitoring team will record the electricity meter readings. After confirmed by local power grid company, they will issue the electricity purchase receipts/23/.

The value of $EC_{PJ,j,y}$ was sourced from Monthly reading records /20/ covering this monitoring period, which was crosschecked with the electricity purchase receipts /23/ and verified by the assessment team to be consistent. Therefore, the assessment team confirmed that the value of $EC_{PJ,j,y}$ in this monitoring period were as follows:

Period	Confirmed value (unit: MWh)
01/12/2022-31/12/2022	0.28
01/01/2023-31/12/2023	9.52
01/01/2024-31/08/2024	6.72
Total (01/12/2022-31/08/2024)	16.52

5) GWP_{CH_4} : Global warming potential of methane

This parameter is sourced from IPCC Fifth Assessment Report (AR5). The assessment team confirmed that the value of GWP_{CH_4} in this monitoring period were 28 tCO₂e/ tCH₄.

6) $Eff_{i,y}$ ($Eff_{ELEC,y}$): Efficiency of methane destruction in use i (for the project, i represents power generation)

This parameter is sourced from 2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The assessment team confirmed that the value of $Eff_{i,y}$ ($Eff_{ELEC,y}$) in this monitoring period were 99.5%.

7) $TDL_{j,y}$: Average technical transmission and distribution losses for providing electricity to source j in year y

This parameter is sourced from Data / Parameter table 3 of Tool 05 "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation". Use as default values of 20% for project or leakage electricity consumption sources. The assessment team confirmed that this value is the maximum value as per Methodology tool 05 Version 03.0 and conservative.

Monitoring equipment and calibration

The monitoring equipments have been calibrated periodically as per the relevant industrial standard by the qualified third party to ensure the monitoring equipments' accuracy and in good conditions. The relevant information of monitoring equipments' calibration including the calibration reports /37/-/38/ and qualification of the calibration entities /39//40/ have been checked by the assessment team and the detailed information is listed as below:

Monitoring equipment	Model	Serial NO.	Accuracy	Calibration frequency	Calibration date	Validity date	Calibration entity
Flow meter	FFM61S700	F61-1607-0097	$\pm 0.5\%$	Annually	18/10/2022 18/10/2023	17/10/2023 17/10/2024	Fangyuan testing Certification Group Co., LTD
Pressure sensor	WT3000	12322010058	$\pm 0.075\%$	Annually	18/10/2022 18/10/2023	17/10/2023 17/10/2024	Jinzhong City comprehensive inspection and testing center
Temperature sensor	JWSM-6ATD	30311018	$\pm 0.5^{\circ}\text{C}$	Annually	18/10/2022 18/10/2023	17/10/2023 17/10/2024	
Gas analyzer	GTR 196(EX)	60244/15	$\pm 2\%$	Annually	18/10/2022 18/10/2023	17/10/2023 17/10/2024	Fangyuan testing Certification Group Co., LTD
Electricity meter(M1)	DSZ876	1703100022	0.2S	Annually	09/10/2022 09/10/2023	08/10/2023 08/10/2024	Fangyuan testing Certification Group Co., LTD
Electricity meter(M2)	DSZ876	1612100090	0.2S	Annually	09/10/2022 09/10/2023	08/10/2023 08/10/2024	
Electricity meter(M3)	DSZ876	1612100091	0.2S	Annually	09/10/2022 09/10/2023	08/10/2023 08/10/2024	

The flow meter, gas analyzer and the electricity meters (M1, M2 and M3) were calibrated by a qualified third party: Fangyuan testing Certification Group Co., LTD, and the pressure sensor and temperature sensor were calibrated by a qualified third party: Jinzhong City comprehensive inspection and testing center. Calibration reports /37//38/ and accreditation certificates on the qualification of the calibration entities /39//40/ have been verified by the assessment team. By checking the industrial metering configuration standard and calibration regulations for the monitoring equipment, i.e., Industry Standard Vortex Flow Meter (JJG1029-2007)/93/, Industry Standard Pressure Transmitters (JJG 882-2019)/94/, Calibration Specification of the Temperature Transmitter (JJF1183-2007)/95/ and Technical Administrative Code of Electric Energy Metering (DL/T 448-2016)/96/, CTI was able to confirm that the accuracy level of all monitoring equipments meets the requirement stipulated in the industrial standards. CTI can thus confirm that the accuracy of the monitoring equipment is in line with relevant industry standard.

By checking the calibration reports /37/-/38/, CTI found the calibration frequency of flow meter, pressure sensor, temperature sensor, gas analyzer and electricity meters are annual, which is in line with the relevant calibrating regulations /93/-/96/. Hence, CTI can confirm that all monitoring equipment's calibration frequency is in line with relevant industrial standards, and the calibrations of all monitoring equipment are verified to be valid for the whole reporting period.

Data management and control

Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant is responsible for operation and routine maintenance of power plant under the project activity. The quality assurance and quality control procedures have been addressed in the project management and monitoring manual /12/, including the organization structure with the responsibilities, personnel competencies, monitoring procedures and monitoring management. By interview with the staff and check records /19/ during on-site visit, it can be confirmed that the monitoring management system is implemented following the project management and monitoring manual.

All monitoring devices have been calibrated and maintained periodically to ensure the accuracy of measurement. Calibration records of instruments used in measurements were made available during the site visit and found to be valid for the entire period of the verification. Competence and training records of in-plant personnel engaged in measurement of plant parameters were presented during verification and found to be in order.

As the above and document review, assessment team considers that the project activity operated properly in the way complying with the project description and monitoring plan and the monitoring was performed in a transparent and comprehensive manner during this monitoring period.

Calculation of Emission Reductions

CTI confirms that appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.

Baseline emissions

By checking the calculation of the baseline emissions in the ER calculation spreadsheet /2/ based on the equations and parameters determined ex-ante justified in section 3.4.6 and 3.4.8 and the relevant monitoring data values verified above, CTI confirms that the baseline emissions for this project during this monitoring period are calculated correctly and the calculation results are as follows:

Calculation of $BE_{MD,y}$

As justified in section 3.4.6, the assessment team confirmed that the baseline scenario does not involve any flaring or usage of CMM, therefore, there is no methane destruction in the baseline. So, destruction of methane in the baseline scenario ($BE_{MD,y}$) is 0.

Calculation of $BE_{MR,y}$

Period	$MT_{PJ,s,i,y}$	GWP_{CH_4}	$BE_{MR,y}$
	tCH ₄	tCO ₂ /tCH ₄	tCO ₂
01/12/2022-31/12/2022	1,088.98	28	30,491
01/01/2023-31/12/2023	19,795.94	28	554,286
01/01/2024-31/08/2024	17,104.18	28	478,917
Total (01/12/2022-31/08/2024)	/	/	1,063,694

Calculation of $BE_{use,y}$

Period	$EG_{use,k,y}$ ($EG_{PJ,grid,y}$)	$EF_{k,y}$ ($EF_{grid,CM,y}$)	$BE_{use,y}$
	MWh	tCO ₂ /MWh	tCO ₂
01/12/2022-31/12/2022	5,122.88	0.6336	3,245
01/01/2023-31/12/2023	94,432.74	0.6336	59,832
01/01/2024-31/08/2024	84,785.99	0.6336	53,720
Total (01/12/2022-31/08/2024)	/	/	116,797

Calculation of BE_y

Period	$BE_{MD,y}$	$BE_{MR,y}$	$BE_{use,y}$	BE_y
	tCO ₂	tCO ₂	tCO ₂	tCO ₂
01/12/2022-31/12/2022	0	30,491	3,245	33,736
01/01/2023-31/12/2023	0	554,286	59,832	614,118
01/01/2024-31/08/2024	0	478,917	53,720	532,637
Total (01/12/2022-31/08/2024)	0	1,063,694	116,797	1,180,491

Project emissions

By checking the calculation of the project emissions in the ER calculation spreadsheet /2/ based on the equations and parameters determined ex-ante justified in section 3.4.6 and 3.4.8 and the relevant monitoring data values verified above, CTI confirms that the project

emissions for this project during this monitoring period are calculated correctly and the calculation results are as follows:

Calculation of $PE_{ME,y}$

Period	$EC_{PJ,j,y}$	$EF_{EF,j,y}$ ($EF_{grid,CM,y}$)	$TDL_{j,y}$	$PE_{ME,y}$
	MWh	tCO ₂ /MWh	%	tCO ₂
01/12/2022-31/12/2022	0.28	0.6336	20%	1
01/01/2023-31/12/2023	9.52	0.6336	20%	8
01/01/2024-31/08/2024	6.72	0.6336	20%	6
Total (01/12/2022-31/08/2024)	/	/	/	15

Calculation of $PE_{MD,y}$

Period	$MM_{ELEC,y}$	$Eff_{ELEC,y}$	$MD_{ELEC,y}$	CEF_{CH_4}	$PE_{MD,y}$
	tCH ₄	%	tCH ₄	tCO ₂ / tCH ₄	tCO ₂
01/12/2022-31/12/2022	1,088.98	99.5	1,083.54	2.75	2,980
01/01/2023-31/12/2023	19,795.94	99.5	19,696.96	2.75	54,167
01/01/2024-31/08/2024	17,104.18	99.5	17,018.66	2.75	46,802
Total (01/12/2022-31/08/2024)	/	/	/	/	103,949

Calculation of $PE_{UM,y}$

Period	$MM_{ELEC,y}$	$Eff_{ELEC,y}$	CEF_{CH_4}	$PE_{UM,y}$
	tCH ₄	%	tCO ₂ / tCH ₄	tCO ₂
01/12/2022-31/12/2022	1,088.98	99.5	2.75	153
01/01/2023-31/12/2023	19,795.94	99.5	2.75	2,772
01/01/2024-31/08/2024	17,104.18	99.5	2.75	2,395
Total (01/12/2022-31/08/2024)	/	/	/	5,320

Calculation of PE_y

Period	$PE_{ME,y}$	$PE_{MD,y}$	$PE_{UM,y}$	PE_y
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	tCO ₂	tCO ₂	tCO ₂	tCO ₂
01/12/2022-31/12/2022	1	2,980	153	3,134
01/01/2023-31/12/2023	8	54,167	2,772	56,947
01/01/2024-31/08/2024	6	46,802	2,395	49,203
Total (01/12/2022-31/08/2024)	15	103,949	5,320	109,284

Leakage

As justified in section 3.4.6, the assessment team confirmed that the heat generated by the waste heat boilers are supplied for hot water for bathing for the workers in coal mine, it could fulfil this heat demand, and there is no new heat demand, resulting into the CMM consumption in this project.

Since the baseline scenario of the project does not include thermal energy use, the leakage (LE_y) is taken as zero.

Emission reductions

The emission reductions achieved by the project activity during this monitoring period is calculated as:

$$ER_y = BE_y - PE_y - LE_y$$

Based on the calculation results of Baseline emissions, project emissions and Leakage, the emission reductions achieved by the project during this monitoring period are as follows:

Period	Baseline emissions removals (tCO ₂ e) or	Project emissions removals (tCO ₂ e) or	Leakage emissions (tCO ₂ e)	Net emission reductions or removals (tCO ₂ e) or GHG
01/12/2022-31/12/2022	33,736	3,134	0	30,602
01/01/2023-31/12/2023	614,118	56,947	0	557,171
01/01/2024-31/08/2024	532,637	49,203	0	483,434
Total (01/12/2022-31/08/2024)	1,180,491	109,284	0	1,071,207

4.3 Quality of Evidence to Determine Reductions and Removals

The assessment of each parameter related to calculate the GHG emission reductions is justified in Sections 3.4.8 and 4.1 above. Via the on-site inspection and desk review, the verification team verified the supporting evidence provided by the project proponent as listed in Appendix 2 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 the VVB in Section 4.1. Moreover, the calibration is verified as stated in Section 4.1 via on-site inspection with evidences to confirm the meters' location, accuracy and calibration frequency are in line with requirement of the monitoring plan.

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.

5 VALIDATION AND VERIFICATION OPINION

5.1 Validation and Verification Summary

CTI Certification Co., Ltd. (CTI Certification) has performed the joint validation and verification of the project activity "Shanxi Xiyang CMM Power Generation Project" in China (VCS Project ID: 5011) for the monitoring period 01/12/2022-31/08/2024 within the first crediting period 01/12/2022-30/11/2032.

The review of the project design documentation and the subsequent follow-up interviews have provided CTI with sufficient evidence to determine the fulfilment of stated criteria.

In the course of the validation and verification, 4 Corrective Action Requests (CARs), 4 Clarification Requests (CLs), no Forwarded Action Requests (FARs) was raised.

The review of the project design documentation and additional documents related to baseline and monitoring methodology and subsequent background investigation have provided the CTI with sufficient evidence to validate the fulfilment of the stated criteria.

5.2 Validation Conclusion

In detail the conclusions can be summarized as follows:

- the baseline scenario is correctly defined as per the applied methodology and relate tools;
- the project is additional;
- all data and information used for ex-ante calculation of emission reductions is of projected and/or hypothetical nature;
- a reasonable level of assurance has been applied.
- the monitoring plan in the validated PD is as per the applied methodology ACM0008 (version 08.0);
- the project has been implemented and operated as per the VCS PD;
- the project complies with the validation criteria for projects set out in VCS Standard version 4.7;
- the project is likely to achieve the estimated ERRs;
- The calculation of the ex-ante emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 8,132,420 tCO₂e are

most likely to be achieved within the 10-year fixed crediting period started from 01/12/2022.

The conclusions of this report show, that the project, as it was described in the project description, is in line with all criteria applicable for the validation against the VCS standard version 4.7 without any qualifications or limitations.

Crediting period: From 01/12/2022 to 30/11/2032

Validated estimated GHG emission reductions and carbon dioxide removals for the project crediting period:

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCUs (tCO ₂ e)	Estimated removal VCUs (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
01/12/2022 to 31/12/2022	75,967	6,897	0	69,070	0	69,070
01/01/2023 to 31/12/2023	894,450	81,208	0	813,242	0	813,242
01/01/2024 to 31/12/2024	894,450	81,208	0	813,242	0	813,242
01/01/2025 to 31/12/2025	894,450	81,208	0	813,242	0	813,242
01/01/2026 to 31/12/2026	894,450	81,208	0	813,242	0	813,242
01/01/2027 to 31/12/2027	894,450	81,208	0	813,242	0	813,242
01/01/2028 to 31/12/2028	894,450	81,208	0	813,242	0	813,242
01/01/2029 to 31/12/2029	894,450	81,208	0	813,242	0	813,242
01/01/2030 to 31/12/2030	894,450	81,208	0	813,242	0	813,242
01/01/2031 to 31/12/2031	894,450	81,208	0	813,242	0	813,242
01/01/2032 to 14/11/2032	818,483	74,311	0	744,172	0	744,172
Total	8,919,730	812,080	0	8,132,420	0	8,132,420

5.3 Verification conclusion

The verification is based on the baseline and monitoring methodology ACM0008 (version 08.0), and the joint PD & MR (Version 02 dated 15/11/2024). The project proponents are responsible for the collection, calculation and determination of the GHG data in accordance with the monitoring plan and the reporting of GHG emission reductions on the basis set out

within the joint PD & MR. Our verification approach was based on the requirements as defined under the applicable VCS Standard Version 4.7 and relevant UNFCCC requirements. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the monitoring plan in joint PD & MR is as per the applied methodology;
- the monitoring complies with the monitoring plan in the joint PD & MR;
- the joint PD & MR and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS Standard Version 4.7 and CDM requirements;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;

It is CTI's responsibility to provide an independent verification statement on the reported GHG emission reductions for the project. Based on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these, CTI planned and performed our work to obtain the information and explanations that we considered necessary to provide reasonable assurance that reported GHG emission reductions are fairly stated.

CTI does not assume any responsibility towards the issuance and utilization of the VCU's hereby verified and certified. Request for issuance of VCU's shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to CTI and the engagement conditions detailed in this report. CTI cannot be held liable by any party for decisions made or not made based on this report.

In CTI's opinion the GHG emissions reductions of the "Shanxi Xiyang CMM Power Generation Project" for the monitoring period 01/12/2022-31/08/2024 are fairly stated in the joint PD & MR (Version 02 dated 15/11/2024). The GHG emission reductions were calculated correctly on the basis of the approved methodology ACM0008 (version 08.0) and the monitoring plan contained in the joint PD & MR (Version 02 dated 15/11/2024).

CTI can confirm that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI confirms the following statement:

Verification Period: 01/12/2022-31/08/2024

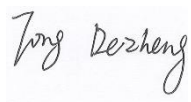
Verified GHG emission reductions and removals in the above verification period:

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCUs (tCO ₂ e)	Removal VCUs (tCO ₂ e)	Total VCUs (tCO ₂ e)
01/12/2022 to 31/12/2022	33,736	3,134	0	30,602	0	30,602
01/01/2023 to 31/12/2023	614,118	56,947	0	557,171	0	557,171
01/01/2024 to 31/08/2024	532,637	49,203	0	483,434	0	483,434
Total	1,180,491	109,284	0	1,071,207	0	1,071,207

5.4 Ex-ante vs Ex-post ERR Comparison

Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates ex-ante

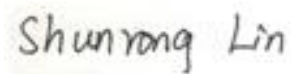
Vintage period	Ex-ante emissions reductions/removals	Achieved emissions reductions/removals	Percent difference	Explanation for the difference
01/12/2022 to 31/12/2022	69,070	30,602	-55.69%	By checking the daily operation and maintenance records /19/, FSR /4/ and interview with PP during site visit, it is confirmed that the lower achieved ER is mainly due to the CMM source of the project was insufficient while the project operated normally in this monitoring period. CTI considers it is reasonable, and the lower achieved ERs will not impact the additionality of the project.
01/01/2023 to 31/12/2023	813,242	557,171	-31.49%	
01/01/2024 to 31/08/2024	543,647	483,434	-11.08%	
Total	1,425,959	1,071,207	-24.88%	

A handwritten signature in black ink, reading 'Tong Dezheng' in a cursive style.

Mr. Tong Dezheng

Team Leader

25/11/2024

A handwritten signature in black ink, reading 'Shunrong Lin' in a cursive style.

Ms. Lin Shunrong

Technical Reviewer

25/11/2024

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
AFOLU	Agriculture, Forestry, and Other Land Use
AR5	IPCC Fifth Assessment Report
AMM	Abandoned mine methane
BM	Build Margin
CBM	Coal bed methane
CCER	China Certified Emission Reduction
CDM	Clean Development Mechanism
CM	Combined Margin
CMM	Coal mine methane
NCPG	North China Power Grid
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
EIA	Environmental Impact Assessment
ER	Emission Reduction
ETS	Emission Trading Scheme
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse gas(es)
GS	Gold Standard
IPCC	Intergovernmental Panel on Climate Change
OCM	Open cast methane
OM	Operating margin

Abbreviations	Full texts
PD	Project Description
PLF	Plant Load Factor
PP	Project Participant
UNFCCC	United Nations Framework Convention on Climate Change
VAM	Ventilation air methane
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
VVB	Validation/Verification Body
VVS	Validation and Verification Standard

APPENDIX 2: REFERENCE LIST

/1/	Project Description (version 01 dated 07/03/2024) listing for global stakeholder consultation Joint Project Description and Monitoring Report Version 01 dated 05/08/2024, Version 02 dated 15/11/2024
/2/	ER Calculation Spreadsheet
/3/	IRR Calculation Spreadsheet
/4/	The FSR of Shanxi Xiyang CMM Power Generation Project prepared by Hefei Design and Research Institute of coal industry dated 03/2021 Approval of FSR (No. JFGXNYF [2021] 690) issued by Shanxi Province Development and Reform Commission dated 27/09/2021
/5/	Conference resolution of deciding to apply the project for VCS, dated 21/10/2021
/6/	The EIA of Shanxi Xiyang CMM Power Generation Project prepared by Shanxi Qingze sunshine environmental protection technology Co., LTD dated 03/2021 Approval of EIA (No. SHP [2021] 126) issued by Environmental Protection Bureau of Jinzhong City dated 19/05/2021
/7/	Power supply agreement signed between the project owner and Shanxi Xiyang Fenghui coal industry Co., Ltd.
/8/	Electricity purchase and sale contract signed between the project owner and State grid Shanxi power Company Jinzhong power supply company
/9/	Business license of Shanxi Xiyang Fenghui coal industry Co., Ltd. Power Plant
/10/	Business license of Baineng New Energy (Shenzhen) Co., Ltd.
/11/	Land use certificate
/12/	VCS project management and monitoring manual
/13/	CMM Generator Purchasing Contract
/14/	Civil engineering contract
/15/	Extraction station operation record
/16/	Nameplates of the CMM power generators
/17/	Construction permit for building project
/18/	Project acceptance report
/19/	Daily operation and maintenance records

/20/	Monthly reading records
/21/	Electricity sales invoices with coal mine
/22/	Electricity sales invoices with NCPG
/23/	Electricity purchase receipts
/24/	Labor contracts
/25/	Staff roster and the payroll of employees
/26/	Declaration of non-participation in any emission trading or other binding limit program or mechanism and no desire to or receiving of another form of GHG-related environmental credit, including renewable energy certificates issued by the Project Proponents
/27/	A statement issued by the project owner that it will not involve and will not apply for other forms of environmental credit
/28/	Breakdown of operational management expenditure for 2023
/29/	Notice about Stakeholders Consultation
/30/	Minutes of stakeholder meetings
/31/	Questionnaires for stakeholder
/32/	Records of communication with stakeholders
/33/	Training records
/34/	Operation Staff Accreditation
/35/	CMM monitoring data monthly report
/36/	CMM invoice with coal mine
/37/	Fangyuan testing Certification Group Co., LTD: Calibration certificates for Flow meter, Gas analyzer, meters M1, M2 and M3 covering this monitoring period
/38/	Jinzhong City comprehensive inspection and testing center: Calibration certificates for Pressure sensor and Temperature sensor covering this monitoring period
/39/	CNAS: Accreditation certificate of Fangyuan testing Certification Group Co., LTD, issued on 28/08/2021 and valid to 27/08/2024
/40/	Shanxi Market Supervision Administration: Accreditation certificate of Jinzhong City comprehensive inspection and testing center, issued on 09/12/2021 and valid to 08/12/2027
/41/	China Energy Statistical Yearbook
/42/	2023 Baseline Emission Factors for Regional Power Grids in China

/43/	China Electric Power Yearbook
/44/	14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035
/45/	Action Plan for Carbon Dioxide Peaking Before 2030 published by the State Council on 24/10/2021
/46/	Enforced company list in China cap & trade scheme, issued by Ministry of Ecology and Environment of China
/47/	Laws and regulations: Renewable Energy Law of the People's Republic of China; Guidance Catalogue for the Development of Renewable Energy Industry; Opinions of the General Office of the State Council on Further Accelerating the Extraction and Utilization of Coal bed Methane (Coal Mine Gas); Chinese National Coalmine Safety Regulation; Notice of the National Development and Reform Commission on the issuance of the twelfth Five-Year Plan for The Development and Utilization of Coal bed Methane (Coal Mine Gas)
/48/	HR Records
/49/	Operating records of Xiyang Fenghui coal mine
/50/	Mining permit of Xiyang Fenghui coal mine
/51/	Notice of the State Administration of Taxation of the Ministry of Finance on Comprehensively Promoting the pilot project of Replacing Business Tax with Value-added Tax (Finance and Taxation (2016) No. 36)
/52/	Rules for the Provisional Regulations on Enterprise Income Tax of the People's Republic of China
/53/	Enforcement Regulation of Income Tax Law of the People's Republic of China for Enterprises
/54/	2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories
/55/	VCS Standard version 4.7
/56/	VCS Program Guide version 4.4
/57/	VCS Validation and Verification Manual version 3.2
/58/	VCS Joint Project Description & Monitoring Report Template, v4.4
/59/	CDM Validation and Verification Standard for project activities version 03.0
/60/	CDM Project Standard for project activities version 03.0
/61/	CDM project cycle procedure for project activities version 03.0

/62/	Guidelines for the reporting and validation of plant load factors, version 01 of 17/07/2009
/63/	Guidelines on the Assessment of Investment Analysis, version 05 of 15/07/2011
/64/	Approved methodology ACM0008 (version 08.0)
/65/	TOOL02 (Version 07.0) - Combined tool to identify the baseline scenario and demonstrate additionality
/66/	TOOL05 (Version 03.0) - Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation
/67/	Tool07 (Version 007.0) - Tool to calculate the emission factor for an electricity system
/68/	TOOL24 (version 03.1) - Common practice
/69/	TOOL27 (version 14.0) - Investment analysis
/70/	Chinese National Coalmine Safety Regulation (2016)
/71/	Urban Gas Specification (GB50028-93)
/72/	Notice of the General Office of the State Council on Strictly Prohibiting the Illegal Construction of 135MW and Below Thermal Power Units
/73/	Current situation and optimal allocation of water resources in Jinzhong City, Shanxi Province
/74/	National wind energy resources detailed survey and evaluation report
/75/	Discussion on geothermal resources and their exploitation and utilization mode in Shanxi Province
/76/	Development status and trend of solar energy industry in Shanxi Province
/77/	2023 Shanxi Provincial Statistic
/78/	China Energy Statistical Yearbook
/79/	Income Tax Law of the People's Republic of China or Enterprises issued by the Chairman of the People's Republic of China on 16/03/2007
/80/	Ministry of Construction of the People's Republic of China, "Measures for the Preparation of Investment Estimates for Municipal Projects" Jianbiao (2007) No. 164 and relevant national regulations
/81/	National Development and Reform Commission, Ministry of Construction (2006) Economic Evaluation Method and Parameters for Construction Projects (Third Edition)
/82/	Industrial Producer Ex-factory Price Classification Index published by the National Bureau of Statistics
/83/	The Preferential Catalogue of VAT on Products and Services for Comprehensive Utilization of Resources (Cai Shui [2015] No. 78)

/84/	Interim Rules on Additional Tax for City Development
/85/	Provisional Regulations of the People's Republic of China on Education tax
/86/	The Enterprise Income Tax Law of the People's Republic of China issued by the President of the People's Republic of China on 16/03/2007
/87/	Notice of the Ministry of Finance, the State Administration of Taxation, the State Development and Reform Commission on the Promulgation of the Catalogue of Preferential Income Tax for Enterprises in Comprehensive Utilization of Resources (2008 Edition) (Finance and Taxation [2008] No. 117)
/88/	China's DNA website ,UNFCCC website, VCS website, GS website and GCC website
/89/	IPCC Fifth Assessment Report (AR5)
/90/	Applicability of sectoral scopes version 01.0
/91/	Measures for the Administration of Carbon Emission Trading, issued by Ministry of Ecology and Environment of China, dated 31/12/2020
/92/	Ministry of Ecology and Environment of China: Notice on the report and verification of greenhouse gas emissions of enterprises in some key industries from 2023 to 2025
/93/	Industry Standard Vortex Flow Meter (JJG1029-2007)
/94/	Industry Standard Pressure Transmitters (JJG 882-2019)
/95/	Calibration Specification of the Temperature Transmitter (JJF1183-2007)
/96/	“Technical Administrative Code of Electric Energy Metering” (DL/T448-2016)
/97/	Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators
/98/	Emission standard of coalbed methane/coal mine gas (on trial)>(GB21522-2008)
/99/	Notice on adjusting financial benchmark rate of return of construction projects in some industries
/100/	Grievance redress procedure
/101/	Comment book
/102/	Project Employee Management Manual
/103/	Technical Training Records
/104/	Complaint record
/105/	Prohibition of Child Labor Regulations
/106/	Completion of environmental acceptance comments

/107/	Human resource management regulations
/108/	Law of the People's Republic of China on the Protection of Women's Rights and Interests
/109/	Labor Contract Law of the People's Republic of China
/110/	The Special Provisions on Labor Protection for Women Workers
/111/	Labor Law of the People's Republic of China
/112/	Law of the People's Republic of China on the Protection of Minors
/113/	Official website of Shanxi Forestry Bureau http://lcj.shanxi.gov.cn/ Official website of Shanxi Department of Ecology and Environment http://sthj.shanxi.gov.cn/ Official website of China Forestry and Grass Bureau https://www.forestry.gov.cn/
/114/	Financial Evaluation Practice and Analysis of Difficult Problems-Feasibility study and evaluation of Bank loan projects
/115/	Shanxi Provincial Development and Reform Commission on improving the policy of on-grid pricing of gas power generation in our province

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Mr. Dezheng TONG

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 of management system of the Certification Body of CTI.

Approved by:

Wu Lin

Wu LIN

Technical Competent Manager

Shenzhen, 01/07/2022

Ms. Shunrong Lin

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 3: Energy demand	TA 3.1: Energy demand
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure
SS 14: Afforestation and reforestation	TA 14.1: Afforestation and reforestation
SS 15: Agriculture	TA 15.1: Agriculture

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, 25/10/2022

Ms. JIANG Shu'e

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, 01/01/2024

APPENDIX 4: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS, FORWARD ACTION REQUESTS (CAR/CL/FAR)

CAR ID	01	Section no.	1.13	Date: 26/09/2024
Description of CAR				
The geographic coordinates of the project described in section 1.13 of joint PD & MR are inconsistent with those queried by GPS positioning software in the actual field.				
Project proponent response				Date: 15/11/2024
The geographic coordinates of the project has been revised in the updated joint PD & MR.				
Documentation provided by project proponent				
Joint PD & MR (Version 02 dated 15/11/2024)				
DOE assessment				Date: 25/11/2024
CTI confirms that the geographic coordinates of the project of updated Joint PD & MR is consistent with actual situation, therefore, CAR 01 is closed.				

CAR ID	02	Section no.	6.1	Date: 26/09/2024
Description of CAR				
The value source of parameter $EF_{k,y}$, $EF_{EF,j,y}$ ($EF_{grid,CM,y}$) in Joint PD & MR is not the latest.				
Project proponent response				Date: 15/11/2024
The value for $EF_{k,y}$, $EF_{EF,j,y}$ ($EF_{grid,CM,y}$) has been modified to the latest source of the updated joint PD & MR.				
Documentation provided by project proponent				
Joint PD & MR (Version 02 dated 15/11/2024)				
DOE assessment				Date: 25/11/2024
CTI confirms that the value for $EF_{k,y}$, $EF_{EF,j,y}$ ($EF_{grid,CM,y}$) has been modified to the latest source, therefore, CAR 02 is closed.				

CAR ID	03	Section no.	6.3	Date: 26/09/2024
Description of CAR				
The monitoring meters that monitors the electricity imported from NCPG described in Joint PD & MR are M2 and M3, which are inconsistent with the reality.				
Project proponent response				Date: 15/11/2024
The monitoring meters that monitors the electricity imported from NCPG is M1, which has been				

revised in the updated PD & MR.	
Documentation provided by project proponent	
Joint PD & MR (Version 02 dated 15/11/2024)	
DOE assessment	Date: 25/11/2024
CTI confirms that the monitoring meters that monitors the electricity imported from NCPG has been modified in the monitoring plan of updated Joint PD & MR is consistent with actual situation, therefore, CAR 04 is closed.	

CAR ID	04	Section no.	7.1	Date: 26/09/2024
Description of CAR				
The data of $EC_{PJ,j,y}$ in section 7.1 of joint PD & MR in this monitoring period are 0, which is inconsistent with the actual data.				
Project proponent response				Date: 15/11/2024
The data of $EC_{PJ,j,y}$ in this monitoring period has been modified in section 7.1 of the updated joint PD & MR, and reflects the cross-check process.				
Documentation provided by project proponent				
Joint PD & MR (Version 02 dated 15/11/2024)				
DOE assessment				Date: 17/07/2023
CTI confirms that the data of $EC_{PJ,j,y}$ in this monitoring period has been modified in section 7.1 of the updated joint PD & MR, and the data is consistent with the Monthly reading records and Electricity purchase receipts. Therefore, CAR 04 is closed.				

CL ID	01	Section no.	1.1	Date: 26/09/2024
Description of CL				
The section 1.11 of joint PD & MR lacks the description of the project construction start time.				
Project proponent response				Date: 15/11/2024
The relevant information about the project construction start time has been added in the updated joint PD & MR.				
Documentation provided by project proponent				
Joint PD & MR (Version 02 dated 15/11/2024)				
DOE assessment				Date: 25/11/2024
CTI confirms that the project construction start time has been added in the updated PD & MR, therefore, CL 01 is closed.				

CL ID	02	Section no.	2.3	Date: 26/09/2024
Description of CL				
The section 2.3.1 of joint PD & MR lacks the description of Equal pay for equal work.				
Project proponent response				Date: 15/11/2024

The relevant information about the Equal pay for equal work has been added in the updated joint PD & MR.	
Documentation provided by project proponent	
Joint PD & MR (Version 02 dated 15/11/2024)	
DOE assessment	Date: 25/11/2024
CTI confirms that the description of Equal pay for equal work has been added in the updated PD & MR, therefore, CL 02 is closed.	

CL ID	03	Section no.	3.2	Date: 26/09/2024
Description of CL				
The section 3.2 of PD & MR lacks relevant information about the Coal Mine where the project is located, such as Coal Production capacity, Coal Mine life time, Coal Operation time, etc.				
Project proponent response				Date: 15/11/2024
The relevant information about the Coal Mine where the project is located has been added in the updated PD & MR.				
Documentation provided by project proponent				
PD & MR (Version 02 dated 15/11/2024)				
DOE assessment				Date: 25/11/2024
CTI confirms that the relevant information about the Coal Mine where the project is located has been added in the updated PD & MR, therefore, CL 03 is closed.				

CL ID	04	Section no.	6.2&6.3	Date: 26/09/2024
Description of CL				
Calibration information for measuring instruments covering the current monitoring period is missing from the joint PD & MR.				
Project proponent response				Date: 15/11/2024
The calibration information for measuring instruments covering the current monitoring period has been added in the updated joint PD & MR.				
Documentation provided by project proponent				
PD & MR (Version 02 dated 15/11/2024)				
DOE assessment				Date: 25/11/2024
CTI confirms that the calibration information for measuring instruments covering the current monitoring period has been added in the updated joint PD & MR, therefore, CL 04 is closed.				

FAR ID	NA	Section no.	NA	Date: NA
Description of FAR				
NA				
Project proponent response				Date: NA
NA				
Documentation provided by project proponent				

NA	
DOE assessment	Date: NA
NA	