GANSU GANZHOU BIOGAS RECOVERY AND UTILIZATION PROJECT

Document Prepared by CTI Certification Co., Ltd

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Summary:

- *A description of the project*

  The project activity developed in Mingyong Town, Ganzhou District, Zhangye City, Gansu Province, P. R. China, is a Biogas recovery and utilization project. It collects manure waste of dairy cow and market swine from surrounding livestock farms located in Ganzhou District by built a centralized anaerobic animal manure treatment system. The project uses animal manure waste as ferment material to produce biogas in the Completely Stirred Tank Reactor (CSTR) type anaerobic digesters. The recovered biogas is used for electricity generation at the project site or flared. The electricity generated by the project is for internal use first, the excess electricity will be delivered to Northwest China Power Grid (NWCPG). The project is expected to produce 20,000 m^3 biogas per day. The project is expected to achieve 33,220 tCO_2e of emission reduction annually. The project started construction on 01-December-2019 and started operation on 01-August-2021, it was allocated with VCS ID 3766.

- *A description of the validation and verification*

  The approved CDM methodologies AMS-III.D. "Methane recovery in animal manure management systems" (version 21.0) and AMS-I.D Grid connected renewable electricity generation (version 18.0) are applied to quantify the GHG removals achieved in this project. The calculation of the GHG emission reductions is carried out in a transparent and conservative manner. This project is being developed in conjunction with the validation and 1st periodic of verification.

- *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, including the procedure for the demonstration of additionality specified in the methodology; and likelihood that methods a 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 VCS registry.

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

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

  Validation and Verification is conducted using CTI Certification Co., Ltd (CTI) procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The validation/verification team assessed the project activity's compliance against the VCS Standard Version 4.4, the selected CDM methodologies and the joint project description and monitoring report. The project is eligible under Project Scope 1 and 13. The validation/verification criteria followed the guidance documents provided by VCS included the following:

  VCS Standard Version 4.4, VCS Program Guide Version 4.3 and the applied CDM methodologies AMS-III.D. "Methane recovery in animal manure management systems" (version 21.0) and AMS-I.D Grid connected renewable electricity generation (version 18.0).

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

  In the course of the validation and verification, 7 Corrective Action Requests (CARs), 6 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

- *Any uncertainties associated with the validation and verification*

  There are no restrictions of uncertainty for both validation and verification.

- *Summary of the validation and verification conclusions*

  Climate Bridge (Shanghai) Ltd. has commissioned the CTI Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) validation joint with 1st periodical verification of the project, "Gansu Ganzhou Biogas Recovery and Utilization Project" (VCS ID 3766) with regard to the relevant requirements of VCS standard Version 4.4. 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 4.4 and all associated updated as documented in this report, are complete.

  CTI concludes that the project activity "Gansu Ganzhou Biogas Recovery and Utilization Project" in China, as described in the final version of Joint-Project-Description-Monitoring-Report, meets all relevant requirements for VCS validation and verification activity and correctly applied the methodologies AMS-III.D. Version 21.0 and AMS-I.D. Version 18.0. Hence CTI is able to provide positive validation opinion as per the requirement of VCS and further certify that the GHG emission reduction from the project during the monitoring period from 01-August-2021 to 31-December-2022 amount to 10,156 tCO_2e VCUs.

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1 INTRODUCTION

1.1 Objective

Climate Bridge (Shanghai) Ltd. has commissioned the CTI Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) validation joint with 1st periodical verification of the project for the monitoring period from 01-August-2021 to 31-December-2022 (both days included).

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 a 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 VCS registry.

The objective of verification is to have an independent review ex-post determination by a VVB of the monitored GHG emission reductions that have occurred as a result of the project activity implemented during a defined monitoring period. The evaluation is done against the requirements of the VCS Standard Version 4.4 based on the monitoring report. In order to confirm that the GHG emission reductions sound reasonable and meet the identified criteria, the verification involves the assessment of monitoring plan conformance to VCS rules and applied methodology. Verification is a requirement and is seen as necessary to provide assurance on the generation of VCUs.

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the project design document (PD) 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 standard Version 4.4/47/ and the approved baseline and monitoring methodology AMS-III.D. version 21.0/27/ and AMS-I.D. Version 18.0/26/. The validation was based on the requirements VCS Validation and Verification Manual and VCS Standard Version 4.4 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: (a) the actual monitoring system and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; (b) the GHG emission reductions data and express a conclusion with a reasonable level of assurance about whether he reported GHG emission reductions data are free from material misstatement; (c) the reported GHG emissions data is sufficiently supported by evidence. Verification shall ensure that the reported GHG emission reductions are complete and accurate in accordance with the applicable VCS criteria in order to be certified. Verification is conducted using CTI procedures in line with the requirements specified in the VCS Program and ISO14064-3 requirements and applying auditing techniques. The verification team assessed and determined that the implementation and operation of the project activity, and steps to report GHG emission reductions comply with the VCS rules. The verification involved a document review of relevant documentation and interview with the project participants. Verification is not meant to provide any consultancy towards the project participants; however, stated request for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Reasonableness of Assumptions and Level of Assurance

Based on the validated assumptions, limitations, and methods used during the validation (see section 3.4.6 for ex ante ER calculation result), the project is expected to generated average GHG emission removal of 33,220 tCO_2e per year, and it is confirmed that outcome of future activities will be achieved as the assumptions and limitations are reasonable.

All GHG sinks, sources and GHG emissions equal to or greater than 5% of the total GHG assertions are considered. The project is expected to generated average of 33,220 VCUs per year, and therefore can be considered as a project per the VCS rules, in regards to its scale, subject to a 5% materiality threshold.

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

1.4 Summary Description of the Project

The project is implemented by Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd. and it collects manure waste of dairy cow and market swine from surrounding livestock farms located in Ganzhou District by built a centralized anaerobic animal manure treatment system. An organic fertilizer production plant which utilizes residual waste from the Completely Stirred Tank Reactor (CSTR) digesters as raw materials is built at the project site. The project uses animal manure waste as ferment material to produce biogas in the CSTR type anaerobic digesters. The project is expected to produce 20,000 m^3 biogas per day. The recovered biogas is used for electricity generation at the project site or flared in case biogas generators are not available or under maintenance. The electricity generated by the project is for internal use first, the excess electricity will be delivered to Northwest China Power Grid (NWCPG). The residual waste from the CSTR digesters is used to produce organic fertilizer at the project site which has

been confirmed by site inspection and checking the Feasibility Study Report of the project/3/ and it is located inside the Mingyong Town, Ganzhou District, Zhangye City, Gansu Province, China.

The project is expected to avoid GHG emission of methane through recovery and destruction of biogas. The project is expected to achieve an annual emission reduction of 33,220 tCO_2e and a total emission reduction of 232,540 tCO_2e during the first 7-year renewable crediting period.

The baseline scenario is the same to the status prior to the implementation of the project, i.e. the animal manure waste was left to decay in anaerobic manure management system (uncovered open lagoon) at the livestock farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. Equivalent amount of electricity was supplied from the NWCPG connected fossil fuel fired power plants.

In the monitoring period from 01-August-2021 to 31-December-2022, the total verified carbon units (VCUs) achieved in the monitoring period are 10,156 tCO_2e, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer.

The project activity generates GHG emission reductions by recovery and destruction of biogas, that otherwise would be vented into the atmosphere directly. Thus the project generates GHG emission reductions and produces financial, social and environmental benefits. The project has resulted in the local sustainable development as described in Section 1.17 of the Joint Joint-PD-MR/1/.

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. Therefore, validation of the project description and verification of the monitoring plan and the reported project results were measured for compliance against the following criteria:

- VCS Standard, v4.4/47/
- VCS Program Guide, v4.3/46/
- VCS Program Definitions, v4.3/45/
- VCS-Joint-Project-Description-Monitoring-Report-Template-v4.2/35/

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

- Document review
- On-site assessment
- The resolution of outstanding issues and the issuance of the final joint validation and verification report and certification.

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

There is no sampling approach utilized by PP and VVB during validation and verification.

2.2 Document Review

The VCS Joint-PD-MR/1/ of the project 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 quantification of GHG emission reductions.

Furthermore, the validation and verification team 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.

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

The validation and verification were performed basing on the documents check and site inspection/measurements, refer to the section 3 and 4 of this report for the validation and verification process detail and corresponding documents review.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the validation and verification process. Onsite interviews and information discussions were conducted with project implementer and workers of surrounding livestock farms, local officer from government (EPB and environment supervision team), local residents and Project VCS development consultant. The interviews were performed by the validation and verification team on-site (within the project area, in Mingyong Town, Ganzhou District, Zhangye City, Gansu Province, P.R. China) and the following is a list of the main interviewees and subject.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Du	Tianji	Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd./ Project Manager	06-June-2023 ~ 07-June-2023	- General aspects of the project - Monitoring devices - Calibration procedures - Manure treatment system situation - Biogas production - Manure transportation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Local Stakeholder consultation process - Project ownership	Lin Shunrong Zhang Lei
2.	Yu	Ying	Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd./ Plant Chief			
3.	Wang	Yongping	Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd./ Operation staff			
3.	Li	Qi	Livestock Farms/Staff		- Baseline Scenario - livestock population	

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
4.	Sun	Guangyu		06-June-2023	- Manure Production - On-farm record keeping - Working environment	
5.	Yang	Rui				
6.	Li	Hang				
7.	Guo	Jia				
8.	Dai	Rongxin	Ganzhou District Environmental Supervision Station/Staff	06-June-2023	- Local stakeholder communication - Stakeholder comments - Environmental aspects - Environmental protection Measurements	
9.	Zhang	Jie	Ganzhou District Development and Reform Commission/ Staff			
10.	An	Xueying	Ganzhou District Ecology and Environment Bureau/Staff			
11.	Zhang	Yong	Local residents	06-June-2023	- Local stakeholder communication - Stakeholder comments	
12.	Xu	Liangmin				
13.	Li	Jingwen				
14.	Wang	Feng				
15.	Lin	Keming	Climate Bridge (Shanghai) Ltd./Project Manager	06-June-2023 ~ 07-June-2023	- Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS Joint-PD-MR	

2.4 Site Visits

The validation and verification site inspection was conducted on 06~07-June-2023. A ground inspection of the project was conducted during the site visit and the validation and verification team interviewed project implementer representative and operation staffs.

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

Duration of on-site inspection: 06-June-2023 ~07-June-2023				
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 Ganzhou District, Zhangye City, Gansu Province, P.R. China	06-June-2023	Lin Shunrong Zhang Lei
2	On-site inspection Project site and some livestock farms	Mingyong Town, Ganzhou District, Zhangye City, Gansu Province, P.R. China	06-June-2023 ~ 07-June-2023	
3	Documents check	Project Owner's office in Ganzhou District, Zhangye City, Gansu Province, P.R. China	07-June-2023	
4	Finding Summary	Project Owner's office in Ganzhou District, Zhangye City, Gansu Province, P.R. China	07-June-2023	
5	Close Meeting	Project Owner's office in Ganzhou District, Zhangye City, Gansu Province, P.R. China	07-June-2023	

2.5 Resolution of Findings

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

A Corrective Action Request (CAR) is established where:

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

The VCS Standard Version 4.4 requirements have not been met;

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

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

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

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

In the course of the validation 7 Corrective Action Requests (CARs), 6 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

2.5.1 Forward Action Requests

This is the joint validation and 1st VCS verification, thus there is no FAR raised previously.

3 VALIDATION FINDINGS

3.1 Project Details

- Project type, technologies and measures implemented, and eligibility of the project

Type:

Through the onsite visit, interviewing the project owner and reviewing the project design/3/, it was confirmed that the project collects manure waste of dairy cow and market swine from surrounding livestock farms located in Ganzhou District by built a centralized anaerobic animal manure treatment system. An organic fertilizer production plant which utilizes residual waste from the Completely Stirred Tank Reactor (CSTR) digesters as raw materials is built at the project site. The project uses animal manure waste as ferment material to produce biogas in the CSTR type anaerobic digesters. The project is expected to produce 20,000 m^3 biogas per day. The recovered biogas is used for electricity generation at the project site or flared in case biogas generators are not available or under maintenance. The electricity generated by the project is for internal use first, the excess electricity will be delivered to Northwest China Power Grid (NWCPG). The residual waste from the CSTR digesters is used to produce organic fertilizer at the project site. Therefore, it was confirmed that the sectoral scope is as below,

Scope 01: Energy industries (renewable - / non-renewable sources)

Scope 13: Waste handling and disposal

which have been confirmed as per the UNFCCC Standard "Applicability of sectoral scopes version 01.0"/38/. It was confirmed that the project is not a grouped project.

Technologies and measures implemented:

The information and descriptions reported in section 1.1 of the Joint-PD-MR/1/ have been checked.

Gansu Ganzhou Biogas Recovery and Utilization Project (hereinafter referred to as the Project) is a Biogas recovery and utilization project, collects manure waste of dairy cow and market swine from surrounding livestock farms by built a centralized anaerobic animal manure treatment system and utilizes animal manure waste as ferment material to produce biogas/3/.

The Project is located in Mingyong Town, Ganzhou District, Zhangye City, Gansu Province, China. In accordance with the Joint-PD-MR/1/, the project is expected to produce 20,000 m^3 biogas per day. The recovered biogas is used for electricity generation at the project site or flared in case biogas generators are not available or under maintenance. The electricity generated by the project is for internal use first, the excess electricity will be delivered to Northwest China Power Grid (NWCPG). The residual waste from the CSTR digesters is used to produce organic fertilizer at the project site/3/.

Via checking the Joint-PD-MR/1/, it is confirmed that the scenario existing prior to the implementation of the project is the animal manure waste was left to decay in anaerobic manure management system (uncovered open lagoon) at the livestock farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. The baseline scenario is the same as the scenario existing prior to the implementation of the project activity, which has been confirmed during the site interview with

PP and on-site checking the baseline uncovered open lagoon (not used in project scenario but not removed) and photo of baseline using/20/ to prove the uncovered open lagoon was used during the baseline scenario. Thus it is verified that the baseline scenario is reasonable and correct.

The project activity generates GHG emission reductions through recovery and destruction of biogas that otherwise would be vented into the atmosphere directly, and the electricity generated from the biogas will be delivered to NWCPG to replace equivalent electricity generated by the fossil fuel fired power plants, thus the project can produce financial, social and environmental benefits.

The expected total emission reduction of the Project in the first 7-year renewable crediting period (from 01-August-2021 to 31-July-2028) is 232,540 tCO_2e, and the annual emission reduction is estimated to be 33,220 tCO_2e.

In conclusion, it is verified that the summary description of the project in section 1.1 is in line with the Joint-PD-MR template requirements and all the information has been provided and verified as correct.

Eligibility of the project:

The PP has described and justified how the project is eligible under the scope of the VCS Program in Joint-PD-MR as per the section 2.1.1 of VCS standard Version 4.4. The assessment is provided as below,

1. The project activity generates GHG emission reductions including Methane (CH_4) which belong to the seven Kyoto Protocol greenhouse gases.
2. "The scope of the VCS Program excludes projects that can reasonably be assumed to have generated GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction." Via checking the Joint-PD-MR of the project/1/, it is verified that the project is implemented to collects manure waste of dairy cow and market swine from surrounding livestock farms by built a centralized anaerobic animal manure treatment system and utilizes animal manure waste as ferment material to produce biogas, and the additionality is verified as actual, thus there is no assumption of having generated GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction for this project.
3. The VCS Program also excludes the following project activities under the circumstances indicated in Table 1 of section 2.1.1 of VCS standard Version 4.4, via checking all the excluded project activities in the table, it is verified that this project type is not excluded by the scope of VCS program.

PP has also described and justified how the project is eligible under the scope of the VCS Program in Joint-PD-MR as per the section 3.1 of VCS Standard Version 4.4. The assessment is provided as below,

1. Via checking the Joint-PD-MR and on-site inspection of the project, CTI confirmed that the project meets all applicable rules and requirements as set out under the VCS Program which has been demonstrated in the whole report, thus the project activities adhere to section 3.1.1 of the VCS Standard.
2. The project applies the CDM approved methodology AMS-III.D. version 21.0/27/ and AMS-I.D. Version 18.0/26/ which is an eligible VCS methodology along with tool or modules, hence the project activities adhere to section 3.1.2 of the VCS Standard.

3. The project applies the CDM approved methodology AMS-III.D. version 21.0/27/ and AMS-I.D. Version 18.0/26/ which are verified as the latest version available by checking the UNFCCC website, hence the project activities adhere to section 3.1.3 of the VCS Standard.
4. The project complies with all relevant local, regional and national laws, statutes and regulatory frameworks in China which has been assessed in detail as below, hence the project activities adhere to section 3.1.4 of the VCS Standard.
5. Section 3.1.5 of the VCS Standard is not applicable as no model needs to be chosen by the project proponent as per the applied methodology AMS-III.D. version 21.0/27/ and AMS-I.D. Version 18.0/26/.
6. The project proponent applies the CDM approved methodology AMS-III.D. version 21.0/27/ and AMS-I.D. Version 18.0/26/ for baseline scenario analysis and additionality demonstration which has been assessed in section 3.4.4 and 3.4.5 of this report, and the project does not apply any third-party default factor or standard to ascertain GHG emission data and any supporting data for establishing baseline scenarios and demonstrating additionality chosen by the project proponent, hence section 3.1.6 of the VCS Standard is not applicable.
7. Section 3.1.7 of the VCS Standard is not applicable as the project is developed under VCS program by using CDM methodologies which are allowed by VCS program.
8. There is capacity limit from the Small-scale methodology AMS-III.D. version 21.0/27/ and AMS-I.D. Version 18.0/26/ which has been applied by the project. The annual emission reductions of the project meet the limits set out in the methodologies, hence section 3.1.8 of the VCS Standard is not applicable.
9. Section 3.1.9 of the VCS Standard is applicable as PP will apply new VCS program rules in the project according to the effective dates set out in appendix 3 document history of the new VCS standard and other VCS program rules.

In conclusion, the project is eligible to the scope of the VCS Program.

•Project design, including eligibility criteria for grouped projects

The project has been designed to include a single installation of an activity, not multiple project activity instances, or not as a grouped project.

•Project proponent and other entities involved in the project

The project proponent (Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd.) and the contact information reported in section 1.5 of the VCS Joint-PD-MR have been confirmed to be correct through checking the business license of the company/7/, the project approval/4/ and interviewing with the PP representative through the on-site visit.

The other entities involved in the Project (Climate Bridge (Shanghai) Ltd.) and the contact information reported in section 1.6 of the VCS Joint-PD-MR have been confirmed to be correct through checking the business license of the Climate Bridge (Shanghai) Ltd./7/ and interviewing the representative of this company during the on-site visit

•Ownership

The section 1.7 of the Joint-PD-MR has been checked, it is confirmed that the Project Proponent demonstrates that they have the legal right to control and operate project activity.

Via checking the National legal approval to the Environmental Impact Assessment (EIA)/6/, project approval/4/, and the business license of the Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd./7/, it is verified that the PP has the legal right to control and operate the project activity. Furthermore, by cross checking the equipment purchasing contracts/11/, construction contract/9/ and Grid-connection Agreement signed with the grid company/17/, it is verified that the ownership of the plant and equipment is with Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd.

Thus, it is confirmed that the project owner has the ownership of the project and ownership of carbon credits generated from this project.

•Project start date

The project start date is 01-August-2021 which is verified as the date on which the project began generating GHG emission reductions or removals as per the concept in VCS standard Version 4.4.

Via checking the monthly production summary table/14/ and interview with operation staff, it is verified that the start date is correct and in line with the VCS standard.

•Project crediting period

For the VCS crediting period, PP has chosen 21 years renewable crediting period, and first 7-year started from 01-August-2021 to 31-July-2028 which is in line with the concept for crediting period in section 3.9.2 of the VCS standard version 4.4.

•Project scale and estimated GHG emission reductions or removals

The average annual ERs of the project are 33,220 tCO_2e, which is lower than the threshold of large-projects (300,000 tCO_2e per year). Therefore the project falls in the category of “Project” as per definition in VCS standard. And the estimated total Estimated GHG Emission Reductions or Removals during the VCS crediting period (01-August-2021 to 31-July-2028) is 232,540 tCO_2e.

•Project description

Through the onsite visit, interviewing the project developer and reviewing the project description in Joint-PD-MR/1/, it was confirmed that the project collects manure waste of dairy cow and market swine from surrounding livestock farms located in Ganzhou District by built a centralized anaerobic animal manure treatment system.

By means of an in-depth review of the Joint-PD-MR and the checks carried out during the on-site visit, an assessment has been carried out whether the project has been implemented and operated in line with the Joint-PD-MR and whether all physical features of the project are in place. The following has been checked: implemented technology, project equipment as well as monitoring equipment.

The verifier has performed a site visit to check the project equipment and interview with staffs from animal manure management system and surrounding livestock farms, in addition by all the provided evidence, it

is found that an organic fertilizer production plant which utilizes residual waste from the Completely Stirred Tank Reactor (CSTR) digesters as raw materials is built at the project site by cross checking the equipment purchasing contracts/11/, construction contract/9/. The project uses animal manure waste as ferment material to produce biogas in the CSTR type anaerobic digesters. Three CSTR digesters with effective volume of 5,000m³ each and one dry anaerobic digester with effective volume of 5,000m³ was installed/3/. The project is expected to produce 20,000 m³ biogas per day/3/. The recovered biogas is used for electricity generation at the project site or flared in case biogas generators are not available or under maintenance. Waste heat recovery boiler is installed at the biogas power plant to recover and supply heat to the auxiliary equipment of the project. The emission reductions from waste heat recovery will not be claimed for conservativeness.

The installed capacity of the biogas power plant is 2MW, electricity generated by the biogas generators is for internal use first and then supplied to Northwest China Power Grid. The biogas power plant of the project is expected to supply 9,310 MWh of electricity to the Northwest China Power Grid annually/17/. The residual waste from the CSTR digesters is used to produce organic fertilizer at the project site.

The project is designed to be implemented in two phases as per the FSR/3/. Phase I included the construction of the centralized anaerobic animal manure treatment system. Three CSTR digesters with effective volume of 5,000m³ each and one dry anaerobic digester with effective volume of 5,000m³ will be installed at the project site. Phase II included the installation of the biogas power plant, whose installed capacity is 2MW.

The factors and parameters of all the installed equipment and utilized technology have been transparently described in the Joint-PD-MR/1/ and verified as correct and actual by site inspection of the nameplate of the biogas generators/18/ and checking the FSR/3/, project approval/4/, equipment purchasing contracts/11/, construction contract/9/.

•Project location

The project site is located in Mingyong Town, Ganzhou District, Zhangye City, Gansu Province P. R. China. The geographical coordinates for the project site are east longitude 100°21′43″ and north latitude 39°0′12″. The location of the project site is verified as consistent with on-site investigation by GPS devices.

Besides, there are 9 livestock farms involved in the project that supply the manure waste to project site, and via site inspection of these farms, it is verified that the coordinates and the distance to the project site provided in JPM are correct that verified by using the GPS devices and checked from online map system and information has been listed as below table,

No.	Livestock farms	Location	Geo-coordinates	Distance (km)
1.	Gansu Qilianmuge Dariy Farm	No. 19 km, Zhangsu Rd. Ganzhou District	E 100°15'21.09", N 38°57'19.47"	16
2.	Ganzhou Muyuan Dariy Farm	Xiliu Village, Shajing Town, Ganzhou District	E 100°11'7.53", N 39°6'42.83"	25
3.	Ganzhou Wanlin Swine Farm	Siergou Village, Shajing Town, Ganzhou District	E 100°14'45.60", N 39°2'53.87"	14
4.	Zhangye Shengfeng Swine Farm	Xiaya Village, Mingyong Twon, Ganzhou District	E 100°21'19.73", N 39°0'2.53"	1
5.	Ganzhou Xingliang Dairy Farm	Chenguang Village, Ganjun Town, Ganzhou District	E 100°12'13.65", N 38°54'29.55"	25

6.	Ganzhou Yongxing Dairy Farm	Guangming Village, Ganjun Town, Ganzhou District	E 100°13'57.03", N 38°58'54.64"	17
7.	Ganzhou Zixing Swine Farm	Pujiazhuang Village, Jiantan Town, Ganzhou District	E 100°35'0.57", N 38°51'16.19"	32
8.	Ganzhou Wujinquan Swine Farm	Suijiasi Village, Xindun Town, Ganzhou District	E 100°24'52.51", N 38°54'46.21"	14
9.	Wanglong Dariy Swine Farm	Pingyuan Village, Wujiang Town, Ganzhou District	E 100°23'0.89", N 39°4'14.85"	15

•Conditions prior to project initiation

There is no centralized anaerobic animal manure treatment system existing prior to the project at the project site, and the manure waste of dairy cow and market swine from surrounding livestock farms is not utilized which had been left to decay. Equivalent amount of electricity was supplied from the NWCPG connected fossil fuel fired power plants.

The conditions prior to project initiation has been validated in the Joint-PD-MR to be the same as the baseline scenario identified, i.e., the animal manure waste was left to decay in anaerobic manure management system (uncovered open lagoon) at the livestock farms and methane is emitted to the atmosphere directly without any methane recovery and destruction facility. Equivalent amount of electricity was supplied from the NWCPG connected fossil fuel fired power plants.

The baseline scenario is the same as the scenario existing prior to the implementation of the project activity, which has been confirmed during the site interview with PP and on-site checking the baseline uncovered open lagoon (not used in project scenario but not removed) and photo of baseline using/20/ to prove the uncovered open lagoon was used during the baseline scenario. Thus it is verified that the baseline scenario is reasonable and correct.

Therefore, the project is confirmed not to be implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction.

•Project compliance with applicable laws, statutes and other regulatory frameworks

The Joint-PD-MR has stated that the project is in line with the national and local laws and regulations. Via searching the laws and regulations as listed in the joint PD&MR and all the related contents, CTI confirmed that the project is in compliance which has been stated in the joint PD&MR as detail and assessed by CTI as reasonable based on the local expertise of the VVB.

Besides, the Joint-PD-MR has stated that the project is in line with the Environmental Protection Law of People's Republic of China/56/, Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution/56/, Regulations on prevention and control of pollution from large scale livestock and poultry breeding /56/, Renewable Energy Law of the People's Republic of China/56/ and Catalogue for the Guidance of Industrial Structure Adjustment (2013 revision)/56/.

Also the project is legally approved by Local government by checking the project approval/4/ and EIA approval/6/, which means that the project is in line with the national and local laws and regulations based on the local expertise of the VVB.

In conclusion, the project complies with all relevant local, regional and national laws, statutes and regulatory frameworks in China.

• Participation under other GHG programs:

-Projects registered (or seeking registration) under other GHG program(s)

The project has neither been registered nor seeking registration under any other GHG programs which has been confirmed via checking the UNFCCC/53/, GS/52/, VCS/54/, China CCER/51/ and other GHG schemes' website. It is verified that the project is seeking registration only in VCS program/54/.

-Rejection by other GHG programs

The project has neither been rejected by any other GHG programs which has been confirmed via checking the UNFCCC/53/, GS/52/, VCS/54/, China CCER/51/ and other GHG schemes' website.

• Other forms of credit:

-Emissions trading programs and other binding limits

The project proponent is not part of any emission trading program which has been confirmed via checking the UNFCCC/53/, GS/52/, VCS/54/, China CCER/51/ and other GHG schemes' website. The net GHG emission reductions from the project will not be used for compliance with emission trading programs or to meet binding limits on GHG emissions. The project activity has not participated under any other GHG programs which has been confirmed via checking the UNFCCC/53/, GS/52/, VCS/54/, China CCER/51/ and other GHG schemes' website and has been confirmed by checking the Declaration of no double counting and not involved in other GHG scheme/19/.

Besides, based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as eight emission-intensive industries including power generation, petrochemicals, chemicals, building materials, non-ferrous metals, papermaking, steel and aviation that emitted at least 26,000 tons of CO_2e/year which has been verified in the public website/49/, and it is confirmed that the project activity belongs to agriculture sector is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/50/. On contrary, the project activity can reduce of GHG in the atmosphere through avoiding methane emissions from anaerobic treatment of swine manure and wastewater. Therefore, it can be concluded that the PP will not be included in the national ETS. Hence, it is confirmed that the emission reductions will not be double counted.

-Other forms of environmental credit sought or received and eligible to be sought or received

Via interview with the project owner and based on above assessment, it is confirmed that the project has not created any other form of environmental credit.

-Issuance of public statement(s) to help prevent Scope 3 emissions double claiming

N/A

-Email notification of the potential risk of Scope 3 emissions double claiming

N/A

• Sustainable development contributions

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

1. The project generated renewable electricity and supplied to the power grid (Goal 7 of UN SDG) – verified by checking the monthly production summary table/14/ and Emission Reduction Calculation sheet/2/, it is confirmed that 736.56 MWh of power were produced by biogas for internal use, no electricity was supplied to the power grid during this monitoring period and since project started operation, which confirmed as renewable electricity generation, hence the contribution to this SDG is deemed as 0 for this monitoring period;
2. The project activity creates job opportunities to local residents (Goal 8 of UN SDG) – verified by interview with staffs and checking the Staff roster/31/, it is confirmed that 10 job opportunities have been provided during this monitoring period and since project started operation, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;
3. The project treated animal manure waste (Goal 12 of UN SDG) – verified by checking the monthly production summary table/14/ and Emission Reduction Calculation sheet/2/, it is confirmed that 55,875 tonnes of animal manure waste (wet basis) have been treated by the project during this monitoring period and since project started operation, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;
4. Sequester greenhouse gas and mitigate climate changes (Goal 13 of UN SDG) – 10,156 tCO_2e GHG emission reductions have been achieved during this monitoring period and since project started operation, which is verified by checking the Emission Reduction Calculation sheet/2/, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable.

•Additional information relevant to the project, including:

-Leakage management for AFOLU projects

N/A

-Commercially sensitive information

No commercially sensitive information has been excluded from the public version of the project description.

Based on above assessment and demonstration, it is concluded that the description in the project description is accurate, complete, and the nature of the project is actual and understandable, and it is confirmed that the project has been implemented as described in the project description via site inspection.

CL 01, CL 02, CAR 01, CAR 02, CAR 03 and CAR 04 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

3.2 Participation under Other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs which has been confirmed via checking the UNFCCC/53/, GS/52/, VCS/54/, China CCER/51/and other GHG schemes' website. It is verified that the project is seeking registration only in VCS program/54/.

3.3 Safeguards

3.3.1 No Net Harm

In China, an Environmental Impacts Assessment is required according to Chinese legislation. The EIA was designed by Henan Jinhuan Environmental Impact Assessment Co., Ltd./5/ and approved by Environmental Protection Bureau (EPB) of Zhangye City on 12-July-2019/6/. The analysis of the environmental impacts of the project activity is sufficiently described according to EIA. The assessment is as below,

It is considered that the environmental impacts and the relevant mitigation methods have been comprehensively described in Section 2.3 of Joint-PD-MR including the air pollution and wastewater, noise, and solid waste impact on the ecosystem and environment of local area in project site according to the EIA report/5/.

Associated with the review of EIA/5/, there was no adverse effect on the ecology, air, water and solid waste, for the project subject to the implementation of pollution mitigation measures according to the EIA report/5/. There was also no any endangered species found in the project location.

As per the approval of EIA/6/, it stated that the inspectors from the EPB have to carry out monitoring work for the environmental impact arisen from the project activity during project commissioning periodically. Via interview with the local officer from EPB and environment supervision team, it is confirmed that they are satisfactory with the environmental protection and recovery work carried out by the project owner. The EPB also did not receive any public comment on the project activity during this monitoring period.

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

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

In conclusion, there were some impacts on environment during the construction and operation periods which has been demonstrated in the Joint-PD-MR/1/ and EIA/5/, also the proper measurements have been carried out by project implementer to mitigate such impacts.

3.3.2 Local Stakeholder Consultation

Local stakeholder consultation prior the project started construction

A stakeholder survey was carried out by the project developer during November 2019 which was prior to the start date of the construction.

Survey questionnaires were distributed to relevant personnel of livestock farms, local villagers and government officials by the Project owner on 17-November-2019, totally 30 copies of questionnaires were issued to relevant personnel with 30 pieces of reply received. The stakeholders' background information and comments from questionnaires were summarized and recorded in the Joint-PD-MR/1/, Section 2.2.

Via checking the 30 filled questionnaires/21/, it is verified that all respondents knew or heard about the Project. Most of them are supportive of the project construction, and think the Project will bring more benefit than loss. 87% of the respondents hold the supportive attitude to the operation of the Project.

Finally, it is verified that there is no one thinks that the Project will have a negative impact on the local life, local stakeholders are supportive of the project construction by checking the questionnaires/21/, and thus no need to change the project design based on the stakeholder inputs.

Mechanism for on-going communication and consultation

During the implementation stage of this monitoring period, via checking the local communication survey records/22/ and interview with the local officer and local residents during site visit, it is confirmed that the local authority has conducted follow-up interviews and ongoing communication with local stakeholders to collect any comments or inputs to the project implementation in December 2021 and October 2022 through distribution questionnaires to local stakeholders. Total of 61 questionnaires have been distributed and collected, via checking the filled questionnaires/22/, it is verified that no negative comments were received during these two LSC process

Besides, based on the VVB's local expertise, it is confirmed that the local government agencies and competent authorities conducted spot checks on the implementation of the project from time to time as per the request from the local government's regulations.

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

Furthermore, via site inspection, CTI confirmed that a grievance register set at the project site so that to collect the grievances or comments from local stakeholders anytime, and via checking all the books, CTI verified that there was no any grievances or comments received during this monitoring period.

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

3.3.3 Environmental Impact

In China, an Environmental Impacts Assessment is required according to Chinese legislation. The EIA was designed by Henan Jinhuan Environmental Impact Assessment Co., Ltd./5/ and approved by Environmental Protection Bureau of Zhangye City on 12-July-2019/6/. The analysis of the environmental impacts of the project activity is sufficiently described according to EIA. The assessment is as below,

It is considered that the environmental impacts and the relevant mitigation methods have been comprehensively described in Section 2.3 of Joint-PD-MR including the air pollution and wastewater, noise, solid waste and impact on the ecosystem in local area of project site according to the EIA report/5/.

The environmental impacts of the project were sufficiently assessed by means of an Environmental Impact Assessment (EIA) Form/5/ according to the Chinese laws & regulations such as "Environmental Protection Law of P.R. China"/56/ and "Law of the People's Republic of China on the Environmental Impact Assessment"/56/. The environmental impact assessment was completed in June 2019 by Henan Jinhuan Environmental Impact Assessment Co., Ltd./5/. It was approved by Environmental Protection Bureau of

Zhangye City (EPB) on 12-July-2019/6/, was inspected by the VVB to be valid. Every aspect of environmental impact has been considered in the EIA report with corresponding measures during project development.

During the construction period, via interview with the local officer from EPB, it is confirmed that the potential environmental impacts have been sufficiently identified for the construction period, such as air pollution, wastewater, noise and solid waste etc. The conclusion of the analysis has been described in the Joint-PD-MR as per the EIA report/5/ and the related mitigation measures have been listed as per the approval of EIA report/6/. Due to the project has been implemented during the site inspection, it is confirmed that the impact during the construction period has been solved and no significant environmental impacts are expected from the project activity.

During the site inspection, the project was implemented normally. The validator revealed that wastewater during operation is generated by domestic sewage and biogas slurry from anaerobic digesters from the project operation is confirmed during site inspection, PP has taken some mitigation measures including the domestic sewage of the project is pretreated in a septic tank and reused in anaerobic digesters. Most biogas slurry are recycled in anaerobic digesters, surplus biogas slurry are used as material for organic fertilizer production, which has been verified by VVB during the site inspection, and via interview with local officer from EPB, it is verified that the no wastewater is discharged to the environment.

Associated with the review of EIA, there was no adverse effect on the ecology, air, water and solid waste, for the project subject to the implementation of pollution mitigation measures according to the EIA report/5/. There was also no any endangered species found in the project location.

As per the approval of EIA/6/, it stated that the inspectors from the EPB have to carry out monitoring work for the environmental impact arisen from the project activity during commissioning periodically. Via interview with the local officer from EPB, it is confirmed that they are satisfactory with the environmental protection and recovery work carried out by the project owner. The EPB also did not receive any public comment on the project activity after the implementation of the project.

3.3.4 Public Comments

The project sought the registration with the VCS Program, according to VCS requirements the Project Description was submitted for public comment period. The project was allocated with VCS ID 3766. The public comment period started on 09-February-2023 and ended on 11-March-2023 (https://registry.verra.org/app/projectDetail/VCS/3766).
No comments were received during this period which has been verified by checking the dedicated website as above.

3.3.5 AFOLU-Specific Safeguards

N/A

3.4 Application of Methodology

3.4.1 Title and Reference

The approved consolidated methodologies applied in the project activity are
AMS-III.D–"Methane recovery in animal manure management systems" (version 21.0)/27/.
AMS-I.D–"Grid connected renewable electricity generation" (version 18.0)/26/.

This methodology also refers to the latest approved version of the following tools:
"Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (version 03.0)/39/;
"Tool to calculate the emission factor for an electricity system" (version 07.0)/40/;
Project emissions from flaring (version 04.0)/41/;
Project and leakage emissions from anaerobic digesters (version 02.0)/42/;
Project and leakage emissions from transportation of freight (version 01.1.0)/44/;
Reference to the following link for detail information about the methodology and tools:
https://cdm.unfccc.int/methodologies/DB/H9DVSB24O7GEZQYLYNWUX23YS6G4RC
https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

3.4.2 Applicability

Demonstration regarding the applicability of the methodologies, and any tools selected by the project proponent as provided in below table.

Table 3-1 Assessment of Applicability conditions of AMS-III.D (version 21.0).

No.	Applicability conditions	Validation Assessment	Conclusion
1	This methodology covers project activities involving the replacement or modification of anaerobic animal manure management systems in livestock farms to achieve methane recovery and destruction by flaring/combustion or gainful use of the recovered methane. It also covers treatment of manure collected from several farms in a centralized plant	The project collects manure waste of dairy cow and market swine from surrounding livestock farms by built a centralized anaerobic animal manure treatment system to achieve methane recovery and destruction by flaring or power generation of the recovered methane. This is verified by site inspection.	Applicable
2	This methodology is only applicable under the following conditions: a) The livestock population in the farm is managed under confined conditions	It is confirmed that all the livestock population in the farms within the project boundary is managed under confined conditions. This is verified by site inspection and interview with the staff from farms.	Applicable
3	b) Manure or the streams obtained after treatment are not discharged into natural water resources (e.g river or estuaries), otherwise "AMS-III.H Methane recovery in wastewater treatment" shall be applied	Manure or the streams obtained after treatment are not discharged into natural water resources. This is verified by site inspection and checking the EIA/5/ form and approval of EIA/6/.	Applicable
4	c) The annual average temperature of baseline site where anaerobic manure	The annual average temperature of baseline site where anaerobic manure	Applicable

No.	Applicability conditions	Validation Assessment	Conclusion
	treatment facility is located is higher than 5°C	treatment facility is located is 7°C which is higher than 5°C. This is verified by checking the public information of local temperature/49/.	
5	d) In the baseline scenario the retention time of manure waste in the anaerobic treatment system is greater than one month, and if anaerobic lagoons are used in the baseline, their depths are at least 1 m	In the baseline scenario the retention time of manure waste in the anaerobic lagoons is 3 to 6 months which is greater than one month, and their depths are 1.5m which is higher than 1 m. The depth is verified by site inspection of anaerobic lagoons and measuring the depth, and verified by checking the national standard "Design code for wastewater stabilization ponds (GJJ/T54-93)"/25/. The retention time of manure waste in the anaerobic lagoons is verified by checking the latest Notice on the Issuance of Technical Guidelines for the Construction of Manure Treatment Facilities for Livestock and Poultry Farms (Households) (Nongbanmu [2022] No. 19) issued by General Office of the Ministry of Agriculture and Rural Affairs and General Office of the Ministry of Ecology and Environment on 24-June-2022/24/, VVB confirmed that the minimum retention time of manure waste in the open anaerobic lagoons should be up to 90 days in China. Therefore, it is confirmed that in the baseline scenario, the minimum retention time of manure waste in the anaerobic treatment system must greater than one month.	Applicable
6	e) No methane recovery and destruction by flaring or combustion for gainful use takes place in the baseline scenario	No methane recovery and destruction by flaring or combustion for gainful use takes place in the baseline scenario as the project is a newly built case with no any baseline equipment. This is verified by site inspection and checking the FSR/3/ and its approval/4/ and interview with owners and staffs of the farms.	Applicable
7	The project activity shall satisfy the following conditions: (a) The residual waste from the animal manure management system shall be handled aerobically, otherwise the	The residual wastes from the animal manure management system of the project are used to produce organic fertilizer, which is handled aerobically	Applicable

No.	Applicability conditions	Validation Assessment	Conclusion
	related emissions shall be taken into account as per relevant procedures of "AMS-III.AO Methane recovery through controlled anaerobic digestion". In the case of soil application, proper conditions and procedures (not resulting in methane emissions) must be ensured;	and will not result in methane emissions. This is verified by site inspection of the project implementation and checking the FSR/3/.	
8	(b) Technical measures shall be used (including a flare for exigencies) to ensure that all biogas produced by the digester is used or flared;	Biogas recovered by the project are used directly to produce electricity, the emergency flare ensure biogas would be destroyed while exigencies happened. This is verified by site inspection of the biogas generators, flare and checking the FSR/3/.	Applicable
9	(c) The storage time of the manure after removal from the animal barns, including transportation, should not exceed 45 days before being fed into the anaerobic digester. If the project proponent can demonstrate that the dry matter content of the manure when removed from the animal barns is larger than 20%, this time constraint will not apply.	Via checking the project design and by onsite inspection, it is confirmed that the storage time of the manure after removal from the animal barns, including transportation, does not exceed 24 hours before being fed into the anaerobic digesters, which is much less than 45 days. This is verified by site inspection, interview with owners of farms and project implementer and checking the FSR/3/.	Applicable
10	Projects that recover methane from landfills shall use "AMS-III.G Landfill methane recovery" and projects for wastewater treatment shall use AMS-III.H. Projects for composting of animal manure shall use "AMS-III.F Avoidance of methane emissions through composting". Project activities involving co-digestion of animal manure and other organic matters shall use the methodology "AMS-III.AO Methane recovery through controlled anaerobic digestion".	The project does not involve landfill methane recovery, wastewater treatment, composting animal manure, or co-digestion of animal manure and other organic matters. This is verified by site inspection of the project implementation and checking the FSR/3/.	Not involved
11	Utilization of the recovered biogas in one of the options detailed in AMS-III.H is also eligible under this methodology. The respective procedures in AMS-III.H shall be followed in this regard. If the recovered biogas is used to power auxiliary equipment of the project activity, it should be taken into account	The biogas recovered is used to generate power or flared, the electricity generated by the project is for internal use first, excess electricity will be delivered to the power grid, and part of biogas which recovered for power generation for internal use is not eligible as an SSC CDM Type I project	Applicable

No.	Applicability conditions	Validation Assessment	Conclusion
	accordingly, using zero as its emission factor; however, energy used for such purposes is not eligible as an SSC CDM Type I project component.	component, which means no emission reductions will be claimed for biogas utilization. Via site inspection of the project, CTI confirmed that the biogas recovered used to power internal equipment of the project activity will not claim emission reductions for biogas utilization as per the methodology (i.e. using zero as its emission factor).	
12	New facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the "General guidelines for SSC CDM methodologies".	The project is a greenfield project is verified by site inspection and checking the FSR/3/. The expected emission reduction sourced from methane recovery is 33,220 tCO_2e/yr/2/, which is lower than the threshold of 60,000 tCO_2e/yr. Furthermore, the installed capacity of the biogas generators in project is 2.0MW, which is lower than the threshold of 15MW. Therefore, the Project is in line with "General Guidelines to SSC CDM methodologies"/37/.	Applicable
13	The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the "General guidelines for SSC CDM methodologies".	The project is a greenfield project is verified by site inspection and checking the FSR/3/, no replaced equipment involved.	Not involved
14	Measures are limited to those that result in aggregate emission reductions of less than or equal to 60 kt CO_2 equivalent annually from all Type III components of the project activity.	The expected emission reductions from the recovery and destruction of methane (viz. Type III components of the project) are 33,220 tCO_2e/yr /2/, which is less than 60 kt CO_2 equivalent.	Applicable
Conclusion: Methodology AMS-III.D. (Version 21.0) is applicable to the project activity.			

Table 3-2 Assessment of Applicability conditions of AMS-I.D (version 18.0).

No.	Applicability conditions	Validation Assessment	Conclusion
1	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional	The project collects manure waste of dairy cow and market swine from surrounding livestock farms by built a centralized anaerobic animal manure treatment system to achieve methane recovery. And part of the biogas is recovered to generate electricity and	Applicable

No.	Applicability conditions	Validation Assessment	Conclusion
	grid through a contractual arrangement such as wheeling.	supply to Northwest China Power Grid (NWCPG). This is verified by site inspection and checking the FSR/3/, Grid-connection Agreement signed with the grid company/17/.	
2	Illustration of respective situations under which each of the methodology (i.e. "AMS-I.D.: Grid connected renewable electricity generation", "AMS-I.F.: Renewable electricity generation for captive use and mini-grid" and "AMS-I.A.: Electricity generation by the user) applies is included in the appendix.	Via checking the illustrations of respective situations for AMS-I.D stated in the appendix, it is confirmed that illustrations are the same as applicability condition No. 1 above. No need for further justification.	Applicable
3	This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The project is a greenfield project is verified by site inspection and checking the FSR/3/ and equipment purchasing contracts/11/.	Applicable
4	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; (b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m2; (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2.	The project is not a hydro power plant.	Not involved
5	If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable	The project does not involve non-renewable components.	Not involved

No.	Applicability conditions	Validation Assessment	Conclusion
	component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.		
6	Combined heat and power (co-generation) systems are not eligible under this category.	The project does not involve co-generation system.	Not involved
7	In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct1 from the existing units.	The project does not involve capacity addition.	Not involved
8	In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	The project does not involve retrofit, rehabilitation or replacement.	Not involved
9	In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	The project does not involve landfill gas, waste gas, wastewater treatment and agro-industries projects.	Not involved
10	In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	The project does not involve biomass.	Not involved
Conclusion: Methodology AMS-I.D. (Version 18.0) is applicable to the project activity.			

In addition, the project meets the applicability conditions of the applied tools as follow table,

Tool	Criteria	Validation Assessment	Conclusion
"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)	The project utilizes biogas for power generation and supply electricity to NWCPG that dominated by fossil-fuel plants. Therefore, the tool is applied to estimate the OM, BM and/or CM when calculating baseline emissions for the project. This is confirmed by site inspection and checking the FSR/3/ and Grid-connection Agreement signed with the grid company/17/.	Not involved
	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 the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	Emission factor for the project electricity system is calculated only for the grid power plants in China. Thus, this applicability criterion is satisfied.	Applicable
	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.	The project electricity system is located in a non-Annex I country.	Applicable
	Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	The project is not involved in biofuels.	Not involved

Tool	Criteria	Validation Assessment	Conclusion
"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) 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.	For the project, emissions are calculated for electricity consumption, and the sources of electricity consumption belongs to (a) Scenario A: Electricity consumption from the grid. This is confirmed by site inspection and checking the Power Purchase Invoices/13/.	Applicable
	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	The project utilizes biogas for power generation and supply electricity to NWCPG which belongs to (a) Scenario I: Electricity is supplied to the grid. This is confirmed by site inspection and checking the FSR/3/ and Grid-connection Agreement signed with the grid company/17/.	Irrelevant.

Tool	Criteria	Validation Assessment	Conclusion
	(c) Scenario III: Electricity is supplied to the grid and consumers/electricity consuming facilities.		
	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.	There are no captive renewable power generation technologies installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage. This is confirmed by site inspection.	Not involved
Project emissions from flaring (version 04.0)	This tool provides procedures to calculate project emissions from flaring of a residual gas. The tool is applicable to enclosed or open flares and project participants should document in the PD the type of flare used in the project activity.	The project uses enclosed flare system which has been confirmed by site inspection of the flare.	Applicable
	This tool is applicable to the flaring of flammable greenhouse gases where: (a) Methane is the component with the highest concentration in the flammable residual gas; and (b) The source of the residual gas is coal mine methane or a gas from a biogenic source (e.g. biogas, landfill gas or wastewater treatment gas).	Methane is the component with the highest concentration in the biogas flared in the project which has been confirmed by site inspection and checking the FSR/3/.	Applicable
	The tool is not applicable to the use of auxiliary fuels and therefore the residual gas must have sufficient flammable gas present to sustain combustion. For the case of an enclosed flare, there shall be operating specifications provided by the manufacturer of the flare.	The project does not use auxiliary fuels which has been confirmed by site inspection of the project implementation and checking the FSR/3/.	Applicable
Project and leakage emissions from anaerobic digesters (version 02.0)	The following sources of project emissions are accounted for in this tool: (a) CO_2 emissions from consumption of electricity associated with the operation of the anaerobic digester; (b) CO_2 emissions from consumption of fossil fuels associated with the operation of the anaerobic digester; (c) CH_4 emissions from the digester (emissions during maintenance of the digester, physical leaks through the roof and side walls, and release	All sources of project emissions have been accounted by checking the ER calculation sheet/2/.	Applicable

Tool	Criteria	Validation Assessment	Conclusion
	through safety valves due to excess pressure in the digester); and (d) CH_4 emissions from flaring of biogas.		
	The following sources of leakage emissions are accounted for in this tool: (a) CH_4 and N_2O emission from composting of digestate; (b) CH_4 emissions from the anaerobic decay of digestate disposed in a SWDS or subjected to anaerobic storage, such as in a stabilization pond.	The project does not involve composting or anaerobic storage which has been confirmed by site inspection of the project implementation and checking the FSR/3/.	Not involved
	Emission sources associated with N_2O emissions from physical leakages from the digester, transportation of feed material and digestate or any other on-site transportation, piped distribution of the biogas, aerobic treatment of liquid digestate and land application of the digestate are neglected because these are minor emission sources or because they are accounted in the methodologies referring to this tool.	N_2O emissions are neglected because these are minor emission sources via checking the applied methodology.	Applicable
Project and leakage emissions from transportation of freight (version 01.1.0)	This tool is applicable to project activities which involve freight transportation by road and where transportation is not the main project activity. This tool is not applicable to project activities where transportation is the main source of greenhouse gases emissions. This tool does not provide procedures to estimate baseline emissions from road transportation of freight. The tool only provides to determine CO_2 emissions. CH_4 and N_2O emissions are excluded for simplification as they are small compared to CO_2 emissions.	The project involves freight transportation by road via checking the Manure Transport Vehicle Information Sheet/16/ and transportation is not the main project activity which has been confirmed by site inspection of the project implementation and checking the FSR/3/.	Applicable
	In addition, the tool is applicable for the determination of project or leakage emissions from freight transportation by rail in project activities where transportation is not the main project activity.	The project does not involve rail transportation via checking the Manure Transport Vehicle Information Sheet/16/ and by site inspection.	Not involved
Conclusion: All the relevant methodological tools are applicable to the project activity.			

3.4.3 Project Boundary

Based on AMS-III.D. (version 21.0), the project boundary includes the physical, geographical site(s) of (a) The livestock; (b) Animal manure management systems (including centralised manure treatment plant where applicable); (c) Facilities which recover and flare/combust or use methane.

Based on y AMS-I.D (version 18.0), the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

Hence, based on the actual situation of the project, the project boundary includes the physical and geographical sites of the livestock, the centralized animal manure management system and the emergency flare system, and all the power plants connected into the NWCPG.

It is confirmed via site inspection and checking the FSR/3/, Approval of FSR/4/ and Grid-connection Agreement/17/.

The main GHG emission sources and gases included in the project boundary are determined as per the applied methodology, GHG sources included and excluded from the project boundary is defined as correct and corresponding to the actual status of the project, which determined as:

CH_4 emissions due to emissions from the manure treatment processes and CO_2 emissions from electricity consumption are covered for baseline scenario and the project scenario has emissions due to CO_2 Emissions from on-site electricity use, CO_2 Emissions from incremental transportation distances and CH_4 emissions from the manure management systems, CH_4 emissions from flaring or combustion of the gas stream.

Via on-site inspection and checking the project design/3/, Grid-connection Agreement/17/, Manure Transport Vehicle Information Sheet/16/ and Power Purchase Invoices/13/, it is verified that all the relevant sources have been selected.

It is concluded that the project boundary and selected sources are correctly justified for the project.

3.4.4 Baseline Scenario

The Joint-PD-MR applies the baseline scenario given by para. 17 of the AMS-III.D/27/ and para. 19 of AMS-I.D/26/.

The baseline scenario is the situation where, in the absence of the project activity, animal manure is left to decay anaerobically within the project boundary and methane is emitted to the atmosphere, the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

Via on-site checking the baseline uncovered open lagoon (not used in project scenario but not removed) and photo of baseline using/20/ to prove the uncovered open lagoon was used during the baseline scenario and the project design in FSR/3/, Grid-connection Agreement/17/, CTI confirmed that the baseline scenario of the project is the animal manure waste was left to decay in anaerobic manure management system (uncovered open lagoon) at the livestock farms and methane is emitted to the

atmosphere directly without any methane recovery and destruction facility; equivalent amount of electricity was supplied from the NWCPG connected fossil fuel fired power plants.
Hence, the baseline scenario determined in the Joint-PD-MR is verified as correct and in line with applied methodologies/27/,/26/.

3.4.5 Additionality

The Joint-PD-MR applies the method of demonstration additionality given by section 4.2 of the AMS-III.D/27/. Project activities may demonstrate the additionality by showing that there is no regulation in the host country, applicable to the project site, that requires the collection and destruction of methane from livestock manure.
Furthermore, via checking the FSR/3/ and equipment purchasing contracts/11/ and site inspection of nameplate of the biogas generators/18/, it is confirmed that the project recovers biogas to generate electricity with a designed installed capacity of 2MW (and actual installed capacity for this monitoring period is 1.8MW), which is lower than 5MW. As per the AMS-III.D/27/, for project activities applying this methodology in combination with a Type I methodology, that has an energy component whose installed capacity is less than 5 MW, this procedure for additionality demonstration also applies to that component. And PP has applying this methodology in combination with a Type I methodology, i.e. AMS-I.D/26/, and installed capacity is less than 5 MW, then the additionality demonstration of the whole project only using the method from AMS-III.D/27/.

Hence, by searching and checking all the related laws and regulations related to the project type and project activity as listed below,

a) Law of the People's Republic of China on Environment Protection/56/;
b) Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution/56/;
c) Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution/56/;
d) Regulations on prevention and control of pollution from large scale livestock and poultry breeding/56/;
e) Discharge standard of pollutants for livestock and poultry breeding (GB/T 18596)/30/;
f) Technical standard of pollution prevention for livestock and poultry breeding (HJ/T 81)/31/.

Based on checking the above rules, regulations, laws and standards, CTI verified that there is no regulation in the host country China that requires the collection and destruction of methane from livestock manure applicable to the project site.
Therefore, the project is deemed automatically additional in compliance with the applied methodology AMS-III.D/27/.

3.4.6 Quantification of GHG Emission Reductions and Removals

For validation of the estimated GHG emission reductions in the Joint-PD-MR/1/ and ER calculation sheet/2/, CTI has downloaded from the UNFCCC website the applicable version of the CDM methodologies and all referenced methodological tools/53/.
Via verify the Joint-PD-MR/1/, CTI confirmed the ex-ante calculation of ERs is done as per the applied methodology (AMS-III.D. ver. 21.0 and AMS-I.D. ver. 18.0) and related methodological tools as listed in section 3.4.1 with follow steps listed below.
The calculation of ERs is done as per the applied methodology (AMS-III.D., ver. 21.0 and AMS-I.D. ver. 18.0)/27/,/26/.

Baseline emissions:
According to the methodology, baseline emissions are determined according to equation (1) and comprise the following source

$$BE_y = BE_{CH4,y} + BE_{Elec,y} \quad (1)$$

Where:

BE_y	=	Baseline emissions in year *y* (t CO_2e/yr)
$BE_{CH4,y}$	=	Baseline emissions from the manure treatment processes in year *y* (t CO_2e/yr)
$BE_{Elec,y}$	=	Baseline emissions associated with electricity generation in year *y* (t CO_2e/yr)

For $BE_{CH4,y}$, as per AMS-III.D., ver. 21.0/27/, Baseline emissions ($BE_{CH4,y}$) are calculated by using two options as listed in the methodology, via checking the Joint-PD-MR/1/, CTI confirmed that the project applies option (b) to calculate baseline emissions from the manure treatment processes ($BE_{CH4,y}$).

$$BE_{CH4,y} = GWP_{CH4} \times D_{CH4} \times UF_b \times \sum_{j,LT} MCF_j \times B_{0,LT} \times Q_{manure,j,LT,y} \times SVS_{j,LT,y} \quad (2)$$

Where:

GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 applicable to the crediting period (t CO_2e/t CH_4)
D_{CH4}	=	CH_4 density (0.00067 t/m^3 at room temperature (20 ºC) and 1 atm pressure)
UF_b	=	Model correction factor to account for model uncertainties (0.94)
LT	=	Index for all types of livestock
j	=	Index for animal manure management system
$Q_{manure,j,LT,y}$	=	Quantity of manure treated from livestock type *LT* at animal manure management system *j* (tonnes/year, dry basis)
$SVS_{j,LT,y}$	=	Specific volatile solids content of animal manure from livestock type *LT* and animal manure management system *j* in year *y* (tonnes/tonnes, dry basis)
MCF_j	=	Annual methane conversion factor (MCF) for the baseline animal manure management system *j*, as per paragraph 18 of AMS-III.D
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated for animal type *LT* (m^3 CH_4/kg-VS), as per paragraph 18 of AMS-III.D

As per the methodology, below should be considered for above parameters used for calculation of $BE_{CH4,y}$

a) The maximum methane-producing capacity of the manure ($B_{o,LT}$) varies by species and diet. The preferred method to obtain $B_{o,LT}$ measurement values is to use data from country-specific published sources, measured with a standardised method ($B_{o,LT}$ shall be based on total as-excreted VS). These values shall be compared to IPCC default values and any significant differences shall be explained. If country specific B_0 values are not available, default values from 2006 IPCC Guidelines for National Greenhouse Gas Inventories can be used, provided that the project participants assess the suitability of those data to the specific situation of the treatment site.
For this project, country specific B_0 values are confirmed as not available based on the local expertise of VVB and search the public sources, so PP has applied the default value from 2019 Refinement to 2006 IPCC guideline, volume 4, chapter 10, Table 10.16/28/ which is verified as the latest IPCC version and thus verified as reasonable.
Via site inspection and interview with farm staffs, CTI confirmed that all farms involved in the project are high-performance systems which are 100% market oriented with high yielding and high level of overall herd (flock) performance confinement productions system, thus it is reasonable to use the default values for high-performance systems in other regions.
The maximum methane-producing capacity of the manure ($B_{o,LT}$) for dairy cow and market swine is 0.24 m^3 CH_4/kg VS and 0.45 m^3 CH_4/kg VS have been used respectively as per the 2019 Refinement to 2006 IPCC guideline/28/.

b) Methane Conversion Factors (MCF) values are determined for a specific manure management system and represent the degree to which Bo is achieved. Where available country-specific MCF values that reflect the specific management systems used in particular countries or regions shall be used. Alternatively, the IPCC default values provided in table 2006 IPCC Guidelines for National Greenhouse Gas Inventories can be used. The site annual average temperature is taken from official data at the nearest meteorological station, or from data available from historical on-site observations.
For this project, country specific MCF values are confirmed as not available based on the local expertise of VVB and search the public sources, so PP has applied the default value from 2019 Refinement to 2006 IPCC guideline, volume 4, chapter 10, Table 10.17/28/ which is verified as the latest IPCC version and thus verified as reasonable.
For the project location, the mean annual temperature (MAT) is confirmed as 7℃/49/, the mean annual precipitation to potential evapotranspiration ratio (MAP:PET) lower than 1/49/, Therefore, as per Annex 10A.2, 2019 Refinement to the 2006 IPCC Guidelines/28/, the climate zone of the project site can be determined to " Cool Temperate Dry Zone" and the value of 67% applied is verified as consistent with IPCC/28/.

For $BE_{Elec,y}$, as per AMS-I.D., ver. 18.0/26/, Baseline emissions associated with electricity generation in year y ($BE_{Elec,y}$) are calculated as

$$BE_{elec,y} = EG_{PJ,y} \times EF_{grid,y} \quad (3)$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh)

$EF_{grid,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

For $EF_{grid,y}$, calculate the combined margin emission factor of the applicable electricity system using "Tool to calculate the emission factor for an electricity system" (Version 07.0)/40/. $EF_{grid,y}=EF_{grid,CM,y}$. While based on the tool/34/, PP has listed the 6 steps in ex ante ER sheet for calculate of $EF_{grid,CM,y}$ which has been verified as in line with the tool and due to China DNA has issued the emission factor for electricity systems in China, PP has applied the related value from latest valid version, i.e. *2019 China regional power grid carbon dioxide baseline emission factor OM calculation instructions* published by Ministry of Ecology and Environment of the People's Republic of China on 29-December-2020/57/.

The $EF_{grid,CM,y}$ of year 2019 is confirmed as the latest valid available data at the time of the validation which is verified by VVB by checking the DNA website and based on the local expertise of CTI.

Baseline emission factor $EF_{grid,CM,y}$ is determined by follow sub-steps according to the "Tool to calculate the emission factor for an electricity system" (version 07.0/40/.

Sub-Step 1. - Identify the relevant electricity systems.

Northwest China Power Grid (NWCPG), which the project directly connected, is selected as the electric power system of the Project.

According to the Chinese DNA guidance, NWCPG is composed of Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang Provincial Power Grids

CTI verified the data sources of "2019 China regional power grid carbon dioxide baseline emission factor OM calculation instructions" published by China's DNA/57/, and confirms that the identified electric power system is appropriate.

Sub-Step 2. -Choose whether to include off-grid power plants in the project electricity system.

Option I: Only grid power plants are included in the calculation.

Sub-Step 3. -Select a method to determine the operating margin (OM).

For the calculation of the OM emission factor, the simple OM emission factor calculation method is selected because low cost/must-run projects constitute less than 50% of the total grid generation during the last 5 years (2013-2017). And the ex-ante option is selected for the calculation of the simple OM emission factor.

CTI has checked the calculation for low cost/must-run constitution of the total grid generation and confirmed the calculation is correct. Therefore, simple OM emission factor calculation method is selected reasonable. Data from China Electric Power Yearbook 2014-2018 has been applied correctly/57/&/58/.

Sub-Step 4. -Calculate the operating margin emission factor according to the selected method.

Since only on-grid power is included, and the necessary data for Option A is unavailable, while Option B can only be used if:

(a) The necessary data for Option A is not available; and

(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and

(c) Off-grid power plants are not included in the calculation.

Option B (44 a)) "Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system" is selected for the calculation of the simple OM emission factor due to those of Option B can be obtained from official sources, only nuclear and renewable power generation are considered as low-cost/must-run power sources and off-grid power plants are not included in the calculation.

The data on electricity generation and auxiliary electricity consumption are obtained from the China Electric Power Yearbook from 2016 to 2018/58/. The data on different fuel consumptions for power generation and the net caloric values of the fuels are obtained from the China Energy Statistical Yearbook from 2016 to 2018/59/. The emission factors of the fuels adopted are obtained from Table 1-2 and Table 1-4 of the" 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook."/28/

The renewable crediting period is adopted for the Project and the OM will be fixed for the first 7 years crediting period as the ex-ante option is selected for the calculation of the simple OM emission factor.

The data sources are checked as reasonable and CTI confirms that the calculation is able to be replicated using the data and parameter provided in the Joint-PD-MR.

Sub-Step 5.- Calculate the build margin (BM) emission factor.

Considering data availability, deviation accepted by EB was used in the Joint-PD-MR i.e.

1) Use of capacity additions during the last 1~3 years for estimating the build margin emission factor for grid electricity.

2) Use of weights estimated using installed capacity in place of annual electricity generation.

The BM emission factor of the power grid is calculated by multiplying the emission factor of the thermal power with the share of the thermal power in the most recently added approach to 20% of total installed capacity. The emission factor for thermal power is determined based on the most advanced and commercially available technology endorsed by China's DNA.

CTI hereby confirms that the data source and approaches taken are deemed reliable and the calculation is appropriate.

Sub-Step 6.-Calculate the combined margin (CM) emissions factor.

According to the "Tool to calculate the emission factor for an electricity system" (version 07.0)/40/, the default weights: ω_{OM}=0.5 for Operating Margin and ω_{BM}=0.5 for Build Margin in the first crediting period of biogas projects are adopted for the project first 7 years crediting period.

In accordance to the "Tool to calculate the emission factor for an electricity system" (version 07.0)/40/, $EF_{grid,CM,y}$ is calculated as below,

$$EF_{grid,CM,y}=EF_{grid,OM,y}\times\omega_{OM}+EF_{grid,BM,y}\times\omega_{BM} \quad (4)$$

Where:

$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y, tCO_2/MWh. As per *2019 China regional power grid carbon dioxide baseline emission factor OM calculation instructions* published by Ministry of Ecology and Environment of the People's Republic of China on 29-December-2020/57/ which is verified by VVB as the latest available version by searching the China DNA website, for NWCPG, $EF_{grid,OM,y}$=0.8922 tCO_2/MWh.

$EF_{grid,BM,y}$ = Building margin CO_2 emission factor in year y, tCO_2/MWh. As per *2019 China regional power grid carbon dioxide baseline emission factor BM cal*culation instructions published by Ministry of Ecology and Environment of the People's Republic of China on 29-December-2020/57/ which is verified by VVB as the latest available version by searching the China DNA website, for NWCPG, $EF_{grid,BM,y}$=0.4407 tCO_2/MWh.

ω_{OM} = Weighting of operating margin emissions factor. As per paragraph 86(b) of *Tool 07* (Version 07.0), ω_{OM}=0.5 is used for the 1st crediting period.

ω_{BM} = Weighting of build margin emissions factor. As per paragraph 86(b) of *Tool 07* (Version 07.0), ω_{BM}=0.5 is used for the 1st crediting period.

Based on above, $EF_{grid,y}$ *(*$EF_{grid,CM,y}$*)* can be calculated as 0.8922 tCO_2/MWh *0.5+0.4407 tCO_2/MWh *0.5 = 0.6665 tCO_2/MWh.

Project emissions:

As per the applied methodologies (AMS-III.D., ver. 21.0 and AMS-I.D., ver. 18.0)/27/,/26/, project emissions comprise the following sources:

(a) Physical leakage of biogas in the manure management systems which includes production, collection and transport of biogas to the point of flaring/combustion or gainful use ($PE_{PL,y}$);
(b) Emissions from flaring or combustion of the gas stream ($PE_{flare,y}$);
(c) CO_2 emissions from use of fossil fuels or electricity for the operation of all the installed facilities ($PE_{power,y}$);
(d) CO_2 emissions from incremental transportation distances ($PE_{transp,y}$);
(e) CO_2 emissions from the storage of manure before being fed into the anaerobic digester ($PE_{storage,y}$).

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{power,y} + PE_{transp,y} + PE_{storage,y} \quad (5)$$

Where:

PE_y = Project emissions in year *y* (t CO_2e)

$PE_{PL,y}$ = Emissions due to physical leakage of biogas in year *y* (t CO_2e)

$PE_{flare,y}$ = Emissions from flaring or combustion of the biogas stream in the year *y* (t CO_2e)

$PE_{power,y}$	=	Emissions from the use of fossil fuel or electricity for the operation of the installed facilities in the year *y* (t CO_2e)
$PE_{transp,y}$	=	Emissions from incremental transportation in the year *y* (t CO_2e), as per relevant paragraph in AMS-III.AO
$PE_{storage,y}$	=	Emissions from the storage of manure (t CO_2e)

Project emissions due to physical leakage of biogas in year y – *$PE_{PL,y}$*

As per the methodology, project emissions due to physical leakage of biogas from the animal manure management systems used to produce, collect and transport the biogas to the point of flaring or gainful use are estimated as:

$$PE_{PL,y} = 0.10 \times GWP_{CH4} \times D_{CH4} \times \sum_{i,LT} B_{0,LT} \times Q_{manure,LT,y} \times SVS_{LT,y} \times MS\%_{i,y} \quad (6)$$

Where:

GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 applicable to the crediting period (t CO_2e/t CH_4)
D_{CH4}	=	CH_4 density (0.00067 t/m^3 at room temperature (20 ºC) and 1 atm pressure)
LT	=	Index for all types of livestock
j	=	Index for animal manure management system
$Q_{manure,j,LT,y}$	=	Quantity of manure treated from livestock type *LT* at animal manure management system *j* (tonnes/year, dry basis)
$SVS_{j,LT,y}$	=	Specific volatile solids content of animal manure from livestock type *LT* and animal manure management system *j* in year *y* (tonnes/tonnes, dry basis)
$MS\%_{i,y}$	=	Fraction of manure handled in system i in year y. If the project activity involves sequential manure management systems, the procedure specified in paragraph 18(e) of AMS-III.D shall be used to estimate the project emissions due to physical leakage of biogas in each stage
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated for animal type *LT* (m^3 CH_4/kg-VS), as per paragraph 18 of AMS-III.D

Project emissions from flaring or combustion of the biogas stream in the year *y*– *$PE_{flare,y}$*

For the project, according to the methodology, emissions from flaring or combustion of the biogas stream should be determined using the latest version of the "Project emissions from flaring" (version 04.0)/41/. Via checking the FSR and by site inspection of the project implementation and checking the flare, CTI confirmed that part of the methane generated by the project has been used as energy supply and surplus are flared.

If the recovered biogas is combusted for electrical/thermal energy production or for other gainful use, the methane destruction efficiency can be considered as 100%. Therefore, the biogas flared by the project will be included in this calculation, while the biogas used for electricity will not be accounted for Emissions from flaring or combustion of the biogas stream in the year y since the methane destruction efficiency is 100%.

The project emissions from flaring of biogas ($PE_{flare,y}$) shall be estimated using the tool 06 " Project emissions from flaring" (version 04.0) as below,

$$PE_{flare,y} = GWP_{CH4} \times \sum_{m=1}^{525600} F_{CH4,RG,m} \times (1 - \eta_{flare,m}) \times 10^{-3} \quad (7)$$

Where:

$F_{CH4,RG,m}$	=	Mass flow of methane in the residual gas in the minute m (kg)
GWP_{CH4}	=	Global warming potential of methane valid for the commitment period (tCO_2e/tCH_4)
$\eta_{flare,m}$	=	Flare efficiency in minute m

For the Mass flow of methane in the residual gas ($FC_{H4,RG,m}$), $\sum_{m=1}^{525600} F_{CH4,RG,m}$ is determined as follows:

$$\sum_{m=1}^{525600} F_{CH4,RG,m} = BG_{flare,y} \times f_{CH4,default} \times \rho_{CH4} \quad (8)$$

Where:

$BG_{flare,y}$	=	Biogas flared in year y (Nm^3)
$f_{CH4,default}$	=	Fraction of methane in the biogas (m^3CH_4/m^3biogas), equals to parameter $w_{CH4,y}$
ρ_{CH4}	=	Density of methane at normal conditions ($kgCH_4/Nm^3CH_4$), equals to parameter D_{CH4} in equation (2) above, CH_4 density (0.00067 t/m^3 at room temperature (20 ºC) and 1 atm pressure)

Via checking the FSR/3/, it is confirmed that all the methane generated by the project will be used for power generation. In order to ensure no biogas is released under exigencies, an emergency flare system (Enclosed flare) is installed at the project site, this emergency flare system is used the biogas power plant is under maintenance or not available. Therefore, for ex-ante calculation, $PE_{flare,y}$ is considered as zero which is verified as reasonable.
And the actual biogas flared will be monitored during project operation and used for ex-post calculation.

Project emissions from the use of fossil fuel or electricity for the operation of the installed facilities in the year y – *$PE_{power,y}$*

For the project, according to the methodology, project emissions from electricity and fossil fuel consumption are determined by following the methodological tool "Project and leakage emissions from anaerobic digesters" (version 02.0)/42/.
As per the actual project implementation, CTI confirmed that the project does not use any fossil fuel, so project emissions from fossil fuel consumption $PE_{FC,y}$ is not included in the project emission.
Hence, as per the "Project and leakage emissions from anaerobic digesters" (version 02.0)/42/, project 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)/39/,

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y}) \quad (9)$$

Where:

$PE_{EC,y}$	=	Project emissions from electricity consumption in year y (t CO_2/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 (t CO_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 the Tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (version 03.0), the project belongs to the scenario A, the Electricity consumption from the grid. Thus, $TDL_{j,y}$ is determined as 20% which is the default value for project or leakage electricity consumption sources.

As stated above, according to the tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (version 03.0)/39/, for the project is in the case of Scenario A: Electricity consumption from the grid, the project participants choose 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) ($EF_{EL,j,y} = EF_{grid,CM,y}$).

Project emissions from incremental transportation in the year y – $PE_{transp,y}$

According to AMS-III.D, emission from transportation of animal manure between livestock farms and the project site is calculated using "Option B: Using conservative default values" of the methodological tool "Project and leakage emissions from transportation of freight" (version 01.1.0)/44/. Parameter $PE_{TR,m}$ in the tool corresponds to the parameter $PE_{transp,y}$ of the project, which is calculated as follows:

$$PE_{transp,y} = \sum_f D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6} \quad (10)$$

Where:

$PE_{transp,y}$	=	Emissions from incremental transportation in the year y (tCO_2)
$D_{f,m}$	=	Return trip distance between the origin and destination of freight transportation activity f in monitoring period m (km)
$FR_{f,m}$	=	Total mass of freight transported in freight transportation activity f in monitoring period m (t)
$EF_{CO2,f}$	=	Default CO_2 emission factor for freight transportation activity f (g CO_2/t km)
f	=	Freight transportation activities conducted in the project activity in monitoring period m

Project emissions from the storage of manure in the year y – $PE_{storage,y}$

According to AMS-III.D, project emissions on account of storage of manure before being fed into the anaerobic digester shall be accounted for if both condition (a) and condition (b) below are satisfied:

(a) The storage time of the manure after removal from the animal barns, including transportation, exceeds 24 hours before being fed into the anaerobic digester;

(b) The dry matter content of the manure when removed from the animal barns is less than 20%.

Via site inspection and checking the FSR/3/, the uncovered open lagoon at the farms will stop operation since the project starts operation. All animal manure will be transported to the project site immediately after removal from the barns, then pre-treated and fed into the anaerobic digesters within the day, hence CTI confirmed that the storage time of the manure after removal from the animal barns, including transportation, is within 24 hours before being fed into the anaerobic digester, hence emissions from the storage of manure is not accounted for, $PE_{storage,y}$ = 0 tCO_2e.

Hence, for the project, the project emissions comprise the following sources:

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{EC,y} + PE_{transp,y} \quad (11)$$

Leakage

According to the methodology, Leakage is calculated based on "Project and leakage emissions from anaerobic digesters" (version 02.0)/42/, the leakage emissions associated with the anaerobic digester depend on how the digestate is managed. The leakage emissions include emissions associated with storage of digestate and composting of the digestate.

Via the Joint-PD-MR and site inspection, it is confirmed that digestate from the anaerobic digesters of the project will be used to produce organic fertilizer as soon as digestate is removed from the digesters. Digestate will not be stored under anaerobic conditions. And the project does not involve composting of digestate. Thus, there is no leakage associated with the anaerobic digester. Hence, for the project activity, LE_y = 0 tCO_2e

Emission reductions:

The emission reductions achieved by the project activity will be determined ex post through direct measurement of the amount of methane fuelled, flared or gainfully used. It is likely that the project activity involves manure treatment steps with higher methane conversion factors (MCF) than the MCF for the manure treatment systems used in the baseline situation, therefore the emission reductions achieved by the project activity are limited to the ex post calculated baseline emissions minus the project emissions using the actual monitored data for the project activity (i.e. $N_{LT,y}$, $MS\%_{i,y}$, $MS\%_{I}$, AI_I, as well as $VS_{LT,y}$ in cases where adjusted values for animal weight are used). The emission reductions achieved in any year are the lowest value of the following:

$$ER_{y,ex\ post} = min\left[\left(BE_{y,ex\ post} - PE_{y,ex\ post}\right), \left(MD_y - PE_{power,y,ex\ post}\right)\right] \quad (12)$$

Where:

$ER_{y,ex\ post}$ = Emission reductions achieved by the project activity based on monitored values for year *y* (t CO_2e)

$BE_{y,ex\ post}$ = Baseline emissions calculated using equation 1 (for projects using option in paragraph 17(a)) using ex post monitored values of $N_{LT,y}$ and if applicable $VS_{LT,y}$. For projects using option in paragraph 17(b), the ex post monitored values for $Q_{manure,j,LT,y}$ and $SVS_{j,LT,y}$ are used

$PE_{y,ex\ post}$	=	Project emissions calculated using equation 6 using ex post monitored values of $N_{LT,y}$,$MS\%_{\ i,y}$, $MS\%_{\ l}$, AI_l, $Q_{res\ waste,y}$ and if applicable $VS_{LT,y}$
MD_y	=	Methane captured and destroyed or used gainfully by the project activity in year *y* (t CO_2e)
$PE_{power,y,ex\ post}$	=	Emissions from the use of fossil fuel or electricity for the operation of the installed facilities based on monitored values in the year *y* (t CO_2e)

Biogas flared or combusted, (MD_y) shall be determined using the flare efficiency and methane content of biogas.

$$MD_y = BG_{burnt,y} \times w_{CH4,y} \times D_{CH4} \times FE \times GWP_{CH4} \quad (13)$$

Where:

$BG_{burnt,y}$	=	Biogas flared or combusted in year *y* (m^3)
$w_{CH4,y}$	=	Methane content in biogas in the year *y* (volume fraction)
FE	=	Flare efficiency in the year *y* (fraction)

Ex ante calculation of ER_y

Ex ante calculation of BE_y

$BE_y = BE_{CH4,y} + BE_{EC,y}$

The ex-ante parameters to calculate $BE_{CH4,y}$ and $BE_{EC,y}$ have been listed in the Joint-PD-MR/1/ have been checked as below section 3.4.8 for all the involved parameters, CTI confirmed the values are correctly derived from the source by checking the applied methodologies/27/,/26/, IPCC default values/28/, IPCC Fifth Assessment Report (AR5)/29/ and FSR/3/.

The ex-ante calculated baseline emissions of methane from the manure treatment processes of the project are

$$BE_{CH4,y} = GWP_{CH4} \times D_{CH4} \times UF_b \times \sum_{j,LT} MCF_j \times B_{0,LT} \times Q_{manure,j,LT,y} \times SVS_{j,LT,y}$$

= 28 tCO_2e/tCH_4×0.00067 t/m^3×0.94× (67%×0.24 m^3/kg VS×7,500,000 kg dm×0.7 kg VS/kg dm +67%×0.45 m^3/kg VS×6,000,000 kg dm×0.6 kg VS/kg dm)

= 34,027 tCO_2e

The ex-ante calculated baseline emissions associated with electricity generation of the project are

$BE_{elec,y} = EG_{PJ,y} \times EF_{grid,y}$

= 9,310 MWh× 0.6665 tCO_2/MWh = 6,205 tCO_2

Hence, the ex ante calculated baseline emission of the project is: $BE_y = BE_{CH4,y} + BE_{EC,y}$= 40,232 tCO_2

Ex ante calculation of PE_y

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{power,y} + PE_{transp,y}$$

1. $PE_{PL,y} = 0.10 \times GWP_{CH4} \times D_{CH4} \times \sum_{i,LT} B_{0,LT} \times Q_{manure,LT,y} \times SVS_{LT,y} \times MS\%_{i,y}$
= 0.1×28 tCO_2e/tCH_4×0.00067 t/m^3×(0.24 m^3/kg VS×7,500,000 kg dm×0.7 kg VS/kg dm×100%+0.45 m^3/kg VS×6,000,000 kg dm×0.6 kg VS/kg dm×100%)
= 5,403 tCO_2
2. For ex ante determination of $PE_{flare,y}$, as above estimation, it is assumed that all biogas recovered will be used for power generation, the methane destruction efficiency is considered as 100%, the values are ex ante determined as 0 and will be monitored during the verification process.
3. As per the FSR/3/, the annual electricity consumption from the power grid is expected to be 600 MWh,
$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$
= 600MWh × 0.6665 tCO_2/MWh × (1+20%) = 480 tCO_2
4. As per the FSR/3/, the project is expected to collect 87,500 tonnes of animal manure waste annually from surrounding dairy farm and market swine farm which are located within 50km radius by checking the map and transport to the project site by heavy vehicles, so ex ante calculation is listed as,

$$PE_{transp,y} = \sum_f D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$$

= 87,500 t × 100km × 129 g CO_2/t km × 10^{-6} = 1,129 tCO_2

Hence, ex-ante calculation is PE_y is total of above 4 parts, that is 7,012 tCO_2e.

Ex ante calculation of LE_y

As per the above analysis, the LE_y is 0 for this project.

Ex ante calculation of ER_y

For ex ante calculation, ER_y=BE_y-PE_y-LE_y=34,027 tCO_2e-7,012 tCO_2=**33,220 tCO_2e**

Hence, based on the ex-ante calculation as listed in the Joint-PD-MR, the estimated amount of GHG emission reduction of the project is **232,540 tCO_2e** during the renewable crediting period (21 years) from 01-August-2021 to 31-July-2028, resulting in estimated average annual emission reductions of **33,220 tCO_2e**.

The ER calculation/2/ has been duly checked. CTI has further checked the Joint-PD-MR against the latest version of the applicable methodology incl. the referenced methodological tools for consistency.

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

3.4.7 Methodology Deviations

There are no any methodology deviations applied to the project.

3.4.8 Monitoring Plan

1. Data and parameters available at validation

Please refer to the following tables for assessment of each parameter determined ex-ante:

GWP_{CH4}	Global Warming Potential (GWP) of CH_4 applicable to the crediting period
Title in line with Methodology?	Yes
Data unit correctly expressed?	tCO_2e/ tCH_4
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Yes
Correct value provided?	Default value from IPCC Fifth Assessment Report (AR5)/29/
Has this value been verified?	Yes - 28 tCO_2e/ tCH_4
Choice of data correctly justified?	Yes. The value has been verified by checking IPCC Fifth Assessment Report (AR5)/29/ against the VCS standard Version 4.4/47/.
Measurement method correctly described?	Yes
Purpose of data?	BE and PE calculation

D_{CH4} (ρ_{CH4})	CH_4 density
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes - t/m^3
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The source is AMS-III.D. (Version 21.0)/27/ which is appropriate
Correct value provided?	Yes –0.00067 (at 20 °C and 1 atm pressure)
Has this value been verified?	Yes. It is a default value. The value has been verified against the applied methodology
Choice of data correctly justified?	Yes
Measurement method correctly described?	N/A
Purpose of data?	BE and PE calculation

UF_b	Model correction factor to account for model uncertainties
Title in line with Methodology?	Yes
Data unit correctly expressed?	N/A
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The source is AMS-III.D. (Version 21.0)/27/ which is appropriate
Correct value provided?	Yes –0.94
Has this value been verified?	Yes. It is a default value. The value has been verified against the applied methodology
Choice of data correctly justified?	Yes
Measurement method correctly described?	N/A
Purpose of data?	BE calculation

MCF_j	Annual methane conversion factor (MCF) for the baseline animal manure management system j
Title in line with Methodology?	Yes
Data unit correctly expressed?	N/A
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The source is 2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories/28/

Correct value provided?	Yes –67%
Has this value been verified?	Yes. No country or regional specific value is available. Default value from table 10.17 of 2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10/28/ is applied as per the applied methodology AMS-III.D. (Version 21.0)/27/.
Choice of data correctly justified?	Yes - The annual average temperature is confirmed as 7˚C /49/, the mean annual precipitation to potential evapotranspiration ratio (MAP:PET) lower than 1/49/, Therefore, as per Annex 10A.2, 2019 Refinement to the 2006 IPCC Guidelines/28/, the climate zone of the project site can be determined to " Cool Temperate Dry Zone" and the value of 67% applied is verified as consistent with IPCC/28/. Therefore, MCFj value of 67% is applied.
Measurement method correctly described?	N/A
Purpose of data?	BE calculation

$B_{0,LT}$	**Maximum methane producing potential of the volatile solid generated for animal type LT**
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes - m^3 CH_4/kg-VS
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The source is 2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories/28/
Correct value provided?	Yes Animal type: $B_{0,LT}$ Dairy Cows: 0.24 Market Swine: 0.45
Has this value been verified?	Yes. No country or regional specific value is available. Default values from 2019 Refinement to 2006 IPCC guideline, volume 4, chapter 10, Table 10.16/28/ are applied as per the applied methodology AMS-III.D. (Version 21.0)/27/.
Choice of data correctly justified?	Yes – Via site inspection and interview with farm staffs, CTI confirmed that all farms involved in the project are high-performance systems which are 100% market oriented with high yielding and high level of overall herd (flock) performance confinement productions system, thus it is reasonable to use the default values for high-performance systems in other regions as per 2019 Refinement to 2006 IPCC guideline, volume 4, chapter 10, Table 10.16/28/.
Measurement method correctly described?	N/A
Purpose of data?	BE and PE calculation

$MS\%_{i,y}$	**Fraction of manure handled in system i in year y**
Title in line with Methodology?	Yes
Data unit correctly expressed?	N/A
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The source is AMS-III.D. (Version 21.0)/27/ which is appropriate
Correct value provided?	Yes –100%

Has this value been verified?	Yes. The project does not involve sequential manure management system, hence all manure would be handled in system *i*, 100% is applied for $MS\%_{i,y}$. This is verified by site inspection.
Choice of data correctly justified?	Yes
Measurement method correctly described?	N/A
Purpose of data?	PE calculation

$EF_{CO2,f}$	Default CO_2 emission factor for freight transportation activity f
Title in line with Methodology?	Yes
Data unit correctly expressed?	g CO_2/t km
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The source is Tool 12 Project and leakage emissions from transportation of freight (version 01.1.0)/44/ which is appropriate
Correct value provided?	Yes –129 g CO_2/t km
Has this value been verified?	Yes. The project vehicles used for animal manure transport have a Gross vehicle mass (GVM) of 31 tonnes which has been verified by site inspection of the vehicle and checking the Manure Transport Vehicle Information Sheet/16/, hence, the project vehicles fall under the category of Heavy Vehicles as per the Tool 12/44/. Therefore, the Default CO_2 emission factor for Heavy vehicles is chosen.
Choice of data correctly justified?	Yes
Measurement method correctly described?	N/A
Purpose of data?	PE calculation

$EF_{grid,OM,y}$	Operating margin CO_2 emission factor in year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	tCO_2e/MWh
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Yes - Data issued in 2019 China regional power grid carbon dioxide baseline emission factor OM calculation instructions published by Ministry of Ecology and Environment of the People's Republic of China on 29-December-2020/57/
Correct value provided?	Yes - 0.8922 tCO_2e/MWh for NWCPG
Has this value been verified?	Yes - The value is from China official and authoritative statistic data and issued by China DNA, and the calculation process of the EF is verified as in line with the method in the Tool to calculate the emission factor for an electricity system.
Choice of data correctly justified?	Yes. The ex ante option is selected to calculate $EF_{grid,OM,y}$ and fixed in the crediting period.
Measurement method correctly described?	Yes
Purpose of data?	BE and PE calculation

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	tCO_2e/MWh

Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Yes - Data issued in 2019 China regional power grid carbon dioxide baseline emission factor OM calculation instructions published by Ministry of Ecology and Environment of the People's Republic of China on 29-December-2020/57/
Correct value provided?	Yes - 0.4407 tCO_2e/MWh for NWCPG
Has this value been verified?	Yes - The value is from China official and authoritative statistic data and issued by China DNA, and the calculation process of the EF is verified as in line with the method in the Tool to calculate the emission factor for an electricity system.
Choice of data correctly justified?	Yes. The ex ante option is selected to calculate $EF_{grid,BM,y}$ and fixed in the crediting period.
Measurement method correctly described?	Yes
Purpose of data?	BE and PE calculation

$EF_{grid,CM,y}$ ($EF_{grid,y}$, $EF_{EL,j,y}$)	Combined margin emission factor for the grid in year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	tCO_2e/MWh
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Yes - Calculated based on Tool to calculate the emission factor for an electricity system (version 07.0)
Correct value provided?	Yes - 0.6665 tCO_2e/MWh
Has this value been verified?	Yes - $EF_{grid,CM,y}$ is calculated based on $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$, ω_{OM} and ω_{BM} as per the latest version of "Tool to calculate the emission factor for an electricity system"(version 07.0) 0.8922 tCO_2e/MWh *0.5+0.4407 tCO_2e/MWh *0.5 = 0.6665 tCO_2e/MWh
Choice of data correctly justified?	Yes. The ex ante option is selected to calculate $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ and fixed in the crediting period, thus the $EF_{grid,CM,y}$ is fixed during the crediting period.
Measurement method correctly described?	Yes
Purpose of data?	BE and PE calculation

$w_{OM,y}$, $w_{BM,y}$	Weighting of operating margin emissions factor (w_{OM}) Weighting of build margin emissions factor (w_{BM})
Title in line with Methodology?	Yes
Data unit correctly expressed?	-
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Yes – Derived from Tool to calculate the emission factor for an electricity system (version 07.0)
Correct value provided?	Yes – 0.5 for both parameters
Has this value been verified?	Yes - Default value of 0.5 for w_{OM} and w_{BM} for all projects other than wind and solar power projects for the 1st crediting period as per the Tool to calculate the emission factor for an electricity system (version 07.0)
Choice of data correctly justified?	Yes. The project is not a wind or solar power project, and this is the first crediting period of the project, therefore 0.5 applied for w_{OM} and w_{BM} is verified as in line with the tool.
Measurement method correctly described?	Yes

Purpose of data?	BE and PE calculation

2. Data and Parameters Monitored

The monitoring parameters required by the methodology and applicable tools for the project are summarized in the below table.

$Q_{manure,j,LT,y}$	**Quantity of manure treated from livestock type LT at animal manure management system j (dry basis)**
Title in line with Methodology?	Yes
Ex-ante Value	Dairy Cow: 7,500,000 Market Swine: 6,000,000
Data unit correctly expressed?	Yes - kg-dm/year
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The ex-ante source is FSR/3/
Correct value provided?	Yes
Has this value been verified?	Yes. The ex ante value has been verified against the FSR/3/
Choice of data correctly justified?	Yes
Measurement method correctly described?	Measured by electronic truck scale and electric scale. Quantity of manure (wet basis) is measured by electric truck scale. Dry matter content of manure (wet basis) is measured by electric scale as per GB/T25169 Technical specifications for monitoring of animal manure Quantity of manure (dry basis) = Quantity of manure (wet basis)×Dry matter content of manure (wet basis))
Monitoring frequency correctly described?	Annually, based on daily measurement and monthly aggregation verified as per the applied methodology
QA/QC procedure correctly described?	Yes Electronic truck scale and electric scale will be periodically checked and calibrated
Purpose of data?	BE_y calculation

$SVS_{j,LT,y}$	**Specific volatile solids content of animal manure from livestock type LT and animal manure management system j in year y**
Title in line with Methodology?	Yes
Ex-ante Value	Dairy Cow: 0.7 Market Swine: 0.6
Data unit correctly expressed?	Yes - Kg VS/kg-dm
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The ex-ante source is FSR/3/
Correct value provided?	Yes
Has this value been verified?	Yes. The ex ante value has been verified against the FSR/3/
Choice of data correctly justified?	Yes
Measurement method correctly described?	Measured by electric scale The method has been listed in the Joint-PD-MR which has been verified in line with the guideline in annex 2 of AM0073 requested by applied methodology/27/ as animal manure is treated in a centralized plant in project scenario.

	PP will follow this method for monitoring.
Monitoring frequency correctly described?	Annually, based on daily measurement and monthly aggregation verified as per the applied methodology
QA/QC procedure correctly described?	Yes Electric scale will be periodically checked and calibrated
Purpose of data?	BE_y and PE_y calculation

$EG_{PJ,y}$	Quantity of electricity generation supplied by the project to the grid in year y
Title in line with Methodology?	Yes
Ex-ante Value	9,310
Data unit correctly expressed?	Yes - MWh
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The ex-ante source is FSR/3/
Correct value provided?	Yes
Has this value been verified?	Yes. The ex ante value has been verified against the FSR/3/
Choice of data correctly justified?	Yes
Measurement method correctly described?	Continuously measured by electricity meter and at least monthly recorded
Monitoring frequency correctly described?	Continuously measured and at least monthly recorded
QA/QC procedure correctly described?	Yes Calibration will be carried out once a year to ensure normal operation. The data will be checked with electricity sales receipts.
Purpose of data?	BE_y calculation

$EC_{PJ,j,y}$	Quantity of electricity consumed by the project in year y
Title in line with Methodology?	Yes
Ex-ante Value	600
Data unit correctly expressed?	Yes - MWh
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The ex-ante source is FSR/3/
Correct value provided?	Yes
Has this value been verified?	Yes. The ex ante value has been verified against the FSR/3/
Choice of data correctly justified?	Yes
Measurement method correctly described?	Continuously measured by electricity meter and at least monthly recorded
Monitoring frequency correctly described?	Continuously measured and at least monthly recorded
QA/QC procedure correctly described?	Yes Calibration will be carried out once a year to ensure normal operation. The data will be checked with electricity invoices issued by the grid company.
Purpose of data?	PE_y calculation

$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y
Title in line with Methodology?	Yes
Ex-ante Value	20%
Data unit correctly expressed?	Yes
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (Version 03.0)/39/
Correct value provided?	Yes
Has this value been verified?	Yes. According to the tool, the project belongs to scenario A, and there's no available annual average value of technical transmission and distribution losses in China, thus the option 2 was chosen by PP: "Use as default values of 20% for project and leakage electricity consumption sources"
Choice of data correctly justified?	Yes
Measurement method correctly described?	From the tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (v03.0)/39/
Monitoring frequency correctly described?	Annually checking the value in the tool
QA/QC procedure correctly described?	N/A
Purpose of data?	PE_y calculation

$BG_{burnt,y}$	Biogas flared or combusted in year *y*
Title in line with Methodology?	Yes
Ex-ante Value	0
Data unit correctly expressed?	Yes – m^3
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	N.A for ex ante Monitored value will be derived from Records by project participants
Correct value provided?	Yes
Has this value been verified?	Yes. N.A for ex ante
Choice of data correctly justified?	Yes
Measurement method correctly described?	Continuously measured by flow meters. The meter readings will be automatically converted to value at room temperature (20 °C) and 1 atm pressure The biogas flared by the project ($BG_{flare,y}$) and the biogas used for power generation ($BG_{elec,y}$) will be monitored separately by different flow meters. The sum of the biogas flared by the project ($BG_{flare,y}$) and the biogas used for power generation ($BG_{elec,y}$) is the biogas flared or combusted in year y ($BG_{burnt,y}$)
Monitoring frequency correctly described?	Annually, based on continuous flow measurement with accumulated volume recording (e.g. daily accumulated reading)
QA/QC procedure correctly described?	Yes Calibration will be carried out biennially to ensure normal operation.
Purpose of data?	ER_y calculation

$D_{f,m}$	Return trip distance between the origin and destination of freight transportation activity f in monitoring period m
Title in line with Methodology?	Yes
Ex-ante Value	100
Data unit correctly expressed?	Yes - km
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The ex ante source is assumed as 100km as per the locations of all the involved farms shown in the map
Correct value provided?	Yes
Has this value been verified?	Yes. The ex ante value has been verified as reasonable.
Choice of data correctly justified?	Yes - Monitored value will be derived from Records by project participants.
Measurement method correctly described?	The distance will be determined once for each freight transportation activity for a reference trip using the vehicle odometer or any other appropriate sources (e.g. on-line sources) and will be recorded by project participants.
Monitoring frequency correctly described?	To be updated whenever the distance changes
QA/QC procedure correctly described?	N/A
Purpose of data?	PE_y calculation

$FR_{f.m}$	Total mass of freight transported in freight transportation activity f in monitoring period m
Title in line with Methodology?	Yes
Ex-ante Value	87,500
Data unit correctly expressed?	Yes - Tonnes
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	The ex ante source is assumed as 87,500t as per the FSR/3/.
Correct value provided?	Yes
Has this value been verified?	Yes. The ex ante value has been verified as reasonable.
Choice of data correctly justified?	Yes - Monitored value will be derived from Records by project participants.
Measurement method correctly described?	Total mass will be measured by electric truck scale and recorded by PP for each freight transportation activity.
Monitoring frequency correctly described?	Continuously
QA/QC procedure correctly described?	Yes - Electric truck scale will be periodically checked and calibrated
Purpose of data?	PE_y calculation

$w_{CH4,y}$	Methane content in biogas in the year y
Title in line with Methodology?	Yes
Ex-ante Value	60%
Data unit correctly expressed?	Yes - %
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Default value from applied methodology AMS-III.D (version 21.0)/27/
Correct value provided?	Yes
Has this value been verified?	Yes. Default value of 60% is applied

Choice of data correctly justified?	Yes
Measurement method correctly described?	Default value from applied methodology AMS-III.D (version 21.0)/27/
Monitoring frequency correctly described?	N/A
QA/QC procedure correctly described?	N/A for default value
Purpose of data?	ER_y and PE_y calculation

FE ($\eta_{flare,m}$)	**The flare efficiency**
Title in line with Methodology?	Yes
Ex-ante Value	90% for flaring (for FE and $\eta_{\mathrm{flare,m}}$) 100% for power generation
Data unit correctly expressed?	Yes - %
Appropriate description?	Yes
Source clearly referenced? (appropriate?)	Value from methodological tool "Project emissions from flaring (version 04.0)"/41/
Correct value provided?	Yes
Has this value been verified?	Yes. As per para. 22 of the applied methodology, if the recovered biogas is combusted for electrical/thermal energy production or for other gainful use, the methane destruction efficiency can be considered as 100%. Therefore, the methane destruction efficiency of biogas used for power generation is 100%. According to the tool, the project uses enclosed flares, and the project chose option A, the flare efficiency of the project is determined as 90% since the project meets the following two conditions when in operating: • The temperature of the flare and the flow rate of the residual gas to the flare is within the manufacturer's specification for the flare; and • The flame is detected in minute m. The project proponent chooses to apply 90% for all biogas combusted or flared, this is conservative.
Choice of data correctly justified?	Yes
Measurement method correctly described?	From the tool "Project emissions from flaring (version 04.0)"/41/
Monitoring frequency correctly described?	N/A
QA/QC procedure correctly described?	N/A for default value
Purpose of data?	ER_y and PE_y calculation

3. Monitoring plan

The validation team has checked the monitoring plan of the Joint-PD-MR against the applied methodology and methodological tools.

The monitoring plan in the Joint-PD-MR has been designed to comply with the latest applicable version of the monitoring methodology (AMS-III.D. version 21.0 and AMS-I.D. version 18.0) and all the relevant methodological tools.

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

Monitoring system
Data and parameters to be monitored as above tables are confirmed in line with the methodology and tool, also corresponding to the formula used for ER calculation.
For the monitoring system and points, via on-site investigation, it is confirmed that the related monitoring equipment have been installed and consistent with the table 5-1 and Figure 5-2 in Joint-PD-MR. Refer to above assessment to monitoring plan to each monitoring parameters and below section 4.1 for detail assessment of the actual monitoring system and points to each monitoring parameter which used in this monitoring period.
All devices will be calibrated in line with the national calibration standard.

Data collection
Monitoring officers are responsible for data collection. Designated teams will read and collect the monitored data regularly. The computer system will automatically monitor and record relevant meter data. All data files, relevant receipts will be collected by a designated monitoring officer, who will prepare backup in time and archive all documents properly.

QA/QC procedure and Emergency Procedure

Authorities and responsibilities regarding monitoring plan have been described in section 6.3 of the Joint-PD-MR.
The installation of the electricity metering equipment fulfills the requirements of “DL/T448–2016 Technical Administrative Code of Electric Energy Metering”/32/. The accuracy of electricity meter should not be less than 0.5. The installation of flow meters will fulfill the national standard “JJG1132-2017 Verification regulation of thermal gas mass flowmeter”/33/. All the meters will be checked and maintained periodically according to national standards and rules. All the calibration records should be documented by the project owner.
Error check routines will be established on site and at the point of data storage to detect data measuring/transmission failures as well as malfunctions. Project participant and meter supplier will take actions to maintains or will displace the broken meter(s) if any malfunction, and the monitoring data will be calculated conservatively for emission calculations during the meter troubleshooting period.

Data management

All data files will be collected by a designated monitoring officer, who will prepare backup in time and archive all documents properly.
All the relevant data records will be kept by the Project owner during the crediting period and two years after for VVB's verification.

Based on interview with site personnel and validation team's local and sectoral knowledge, the measurement methods, recording procedures, meter maintenance and QA/QC procedures described in the monitoring plan are feasible in China and can fully meet the requirements of the methodology. No difficulties are anticipated in implementing the operational and management structure nor the monitoring plan as a whole.

3.5 Non-Permanence Risk Analysis

N/A

4 VERIFICATION FINDINGS

4.1 Accuracy of GHG Emission Reduction and Removal Calculations

1. Assessment of Project implementation status during this monitoring period

By means of on-site inspection and documents review, CTI can ensure that during 1st monitoring period, the project was implemented in accordance with the Joint-PD-MR/1/.

This verification covers the period from 01-August-2021 to 31-December-2022 (including both days). 10,156 tCO_2e emission reductions are achieved during this monitoring period.

The main timeline of the project is as below table, which has been confirmed in the construction contract/9/, monthly production summary table/14/ against the on-site inspection.

Table 4-1 Milestone date of project

Milestone	Commissioning Date
Start date of construction of the centralized anaerobic animal manure treatment system of Phase I	01-December-2019/9/
Start date of commissioning of the centralized anaerobic animal manure treatment system of Phase I	01-August-2021/14/
Start date of the crediting period	01-August-2021
All the biogas recovered by the project was flared	01-August-2021 to 30-April-2022
Start date of commissioning of biogas power plant of Phase II	01-May-2022/14/
6 sets of biogas generators with unit capacity of 200kW and 2 sets of biogas generators with unit capacity of 300kW (total 1.8MW) have been installed at the project site	01-May-2022 to 31-December-2022 (end of 1st monitoring period)
Part of the biogas recovered was used for power generation, the rest biogas was still flared as the grid-connection switch cabinet has not been retrofitted and upgraded to meet the technical requirements of the power grid company	01-May-2022 to 31-December-2022 (end of 1st monitoring period)
Grid-connection switch cabinet will be retrofitted and upgraded to meet the technical requirements of the power grid company	Late 2023
Remaining 0.2MW will be installed	Expected earliest in 2024

Via on-site investigation, it is confirmed that during this monitoring period, the project run continuously/14/ as per the project descriptions and project design/3/.

Phase I: Three CSTR digesters with effective volume of 5,000m^3 each and one dry anaerobic digester with effective volume of 5,000m^3 have been installed for biogas generation. All the biogas recovered by the project was flared during the period from 01-August-2021 to 30-April-2022.

Phase II: the installation of the biogas power plant, whose installed capacity is 2MW.

While for phase II, in this monitoring period, 6 sets of biogas generators with unit capacity of 200kW and 2 sets of biogas generators with unit capacity of 300kW (total 1.8MW) have been installed at the project site from 01-May-2022 to 31-December-2022 (end of 1st monitoring period). Three CSTR digesters operated for biogas generation continuously. Part of the biogas recovered was used for power generation, the rest biogas was still flared, as the grid-connection switch cabinet has not been retrofitted and upgraded to meet the technical requirements of the power grid company.

No events or situations, which may impact the applicability of the applied methodology, occurred during this monitoring period. However, due to market reasons and the low availability of animal manures around the project site, the project kept operating at very low operating load. And during the period from 01-Oct-2022 to 31-Dec-2022, no animal manure waste was fed into the anaerobic digesters which has been verified by checking the monthly production summary table/14/.

On the basis of site visit and the reviewed project documentation it can be confirmed that the realized technology, the project equipment, as well as the monitoring and metering equipment, the project has been implemented and operated as applied monitoring methodology and monitoring plan described in the Joint-PD-MR and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 01-August-2021 to 31-December-2022.

Basic technical details of the project main equipment have been provided in the Joint-PD-MR which has been verified during site visit/34/.

There are no any methodology deviations relevant.

In conclusion, the verification team was able to confirm that the project implementation is in accordance with the project description contained in the Joint-PD-MR/1/ except the remaining 0.2MW biogas generator is expected to be purchased and installed in 2024.

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

2. Assessment of Data and parameters available at validation

Via checking the MR, it is confirmed that all the ex ante data and parameters are same to the Joint-PD-MR which is verified as correct. Refer to section 3.4.8 for the detail assessment of ex ante parameters.

3. Assessment of Data and parameters monitored

During the verification all relevant monitoring parameters (as listed in section 3.4.8 of this report) have been verified with regard to the

(i) appropriateness of the applied measurement / determination method,
(ii) the correctness of the values applied for ER calculation,
(iii) the accuracy, and applied QA/QC measures.

The monitoring results as well as the verification procedure are described parameter-wise in the below tables,

<table>
<tr><td>$Q_{manure,j,LT,y}$</td><td colspan="3">Quantity of manure treated from livestock type LT at animal manure management system j (dry basis)</td></tr>
<tr><td>Title in line with Methodology?</td><td colspan="3">Yes</td></tr>
<tr><td>Value applied</td><td colspan="3">2021
<table>
<tr><td>Animal Type</td><td>Dairy Cow</td><td>Market Swine</td></tr>
<tr><td>$Q_{manure,j,wet,LT,y}$ (tonne)</td><td>3,745</td><td>13,940</td></tr>
</table></td></tr>
</table>

	Dry matter content (%) | 15.78% | 9.45% $Q_{manure,j,LT,y}$ (kg-dm) | 591,078 | 1,317,343 2022 Animal Type | Dairy Cow | Market Swine $Q_{manure,j,wet,LT,y}$ (tonne) | 10,315 | 27,875 Dry matter content (%) | 15.54% | 8.82% $Q_{manure,j,LT,y}$ (kg-dm) | 1,603,320 | 2,459,310
Data unit correctly expressed?	Yes - kg-dm
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Yes. The monitoring data derived from the monthly production summary table/14/
Measurement equipment	Monitoring equipment | Electric truck scale | Electric scale Mode | SCS-30-QC | YP-B20002 Serial No. | 100816 | 22165028 Accuracy | Class III | Class I Calibration Date | 21-June-2021 02-June-2022 | 31-March-2021 31-March-2022 Calibration Validity | 20-June-2022 01-June-2023 | 30-March-2022 30-March-2023
Monitoring frequency	Annually, based on daily measurement and monthly aggregation
QA/QC procedure correctly applied?	Yes Electronic truck scale and electric scale have been periodically calibrated/8/ by qualified party/12/, the calibration validity cover this monitoring period. Data from monthly production summary table/14/ is cross checked with the monthly summary of manure into the factory/15/ and the values are for this monitoring period are confirmed as consistent thus verified as correct and reasonable.
Purpose of data?	BE_y calculation

$SVS_{j,LT,y}$	**Specific volatile solids content of animal manure from livestock type LT and animal manure management system j in year y**
Title in line with Methodology?	Yes
Value applied	Animal Type | Dairy Cow | Market Swine 2021 | 0.671 | 0.583 2022 | 0.681 | 0.580
Data unit correctly expressed?	Yes - Kg VS/kg-dm
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Measured by electric scale. The monitoring staff measured and recorded the value in monthly production summary table/14/. The method has been listed in the Joint-PD-MR, PP has followed this method for measurement for this monitoring period and recorded the results into the monthly production summary table/14/

<table>
<tr><td></td><td>For monitoring this parameter, samples test method has been used by PP following the applied methodology and sampling plan as assessed above.
a. Determination of take samples
During the monitoring period, the value of SVS was measured once daily, PP takes samples and measurements of cow manure and swine manure entering the project plant every day.
b. Testing Method: For testing, guideline in annex 2 of AM0073 should be followed - verified as in line with the applied methodology
1 - Evaporate free water on steam able and dry in oven at 103°C for 24 hours or until constant weight to obtain the Total Solids.
2 - Place Total Solids residue in furnace at 600ºC for at least 1 hour. Volatile Solids are determined from weight difference of total and Fixed Solids.
$$volatile\ matter(drybasis) = \frac{W2 - Wf}{W2 - W1}$$
Where W_1 is the weight of sample container, W_2 is combined weight of the sample container and oven dried sample, W_f is the combined constant weight of the sample container and sample after heating at 600ºC.

During the monitoring activities in this monitoring period, the Specific volatile solids content of cow and swine manure was recorded in the monthly production summary table/14/ which including both daily data and weighted average monthly data. Then calculated weighted average yearly data of specific volatile solids content from the weighted average monthly data used in the calculation of emission reductions. The implementation of monitoring including taking samples, data recording and collection, QA/QC procedure are stated by PP which is confirmed as actual and reasonable by site inspection and interview with the monitoring team.</td></tr>
<tr><td>Measurement equipment</td><td><table>
<tr><td>Monitoring equipment</td><td>Electric scale</td></tr>
<tr><td>Mode</td><td>YP-B20002</td></tr>
<tr><td>Serial No.</td><td>22165028</td></tr>
<tr><td>Accuracy</td><td>Class I</td></tr>
<tr><td>Calibration Date</td><td>31-March-2021
31-March-2022</td></tr>
<tr><td>Calibration Validity</td><td>30-March-2022
30-March-2023</td></tr>
</table></td></tr>
<tr><td>Monitoring frequency</td><td>Annually, based on daily measurement and monthly aggregation verified as per the applied methodology</td></tr>
<tr><td>QA/QC procedure correctly applied?</td><td>Yes
Electric scale has been periodically calibrated/8/ by qualified party/12/, the calibration validity covered this monitoring period.</td></tr>
<tr><td>Purpose of data?</td><td>BE_y calculation</td></tr>
</table>

$EG_{PJ,y}$	Quantity of electricity generation supplied by the project to the grid in year y

Title in line with Methodology?	Yes
Value applied	2021: 0 2022: 0
Data unit correctly expressed?	Yes - MWh
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	During this monitoring period, no electricity was supplied to the power grid as the grid-connection switch cabinet has not been retrofitted and upgraded to meet the technical requirements of the power grid company which has been verified by site inspection. Hence the value is 0.
Measurement equipment	As above assessment, no monitoring equipment is involved in this monitoring period
Monitoring frequency	Continuously measured and at least monthly recorded (in case the monitoring equipment is available in the future)
QA/QC procedure correctly applied?	N/A
Purpose of data?	BE_y calculation

$EC_{PJ,j,y}$	Quantity of electricity consumed by the project in year y
Title in line with Methodology?	Yes
Value applied	2021: 65.112 2022: 169.572
Data unit correctly expressed?	Yes - MWh
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Continuously measured by electricity meter and monitoring staff records the data from Power Purchase Invoices/13/
Measurement equipment	Monitoring equipment: Electricity meter Mode: DSZ110 Serial No.: 6230001000001189498426 Accuracy: 0.5S Calibration Date: 11-June-2021, 22-May-2022 Calibration Validity: 10-June-2022, 21-May-2023
Monitoring frequency	Continuously measured and at least monthly recorded
QA/QC procedure correctly applied?	Yes Electricity meter has been periodically calibrated/8/ by qualified party/12/, the calibration validity covered this monitoring period. The data from Power Purchase Invoices/13/ which has been confirmed and issued by grid company.
Purpose of data?	PE_y calculation

$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y
Title in line with Methodology?	Yes
Value applied	20%
Data unit correctly expressed?	Yes
Appropriate description?	Yes
Correct value provided?	Yes

Source of Data	Methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (version 03.0)/39/
Measurement equipment	N/A
Monitoring frequency	Annually checking the value in the tool
QA/QC procedure correctly applied?	N/A
Purpose of data?	PE_y calculation

$BG_{burnt,y}$	**Biogas flared or combusted in year *y***
Title in line with Methodology?	Yes
Value applied	Year: 2021 — $BG_{flare,y}$: 879,102 — $BG_{elec,y}$: 0 — $BG_{burnt,y}$: 879,102 Year: 2022 — $BG_{flare,y}$: 1,159,378 — $BG_{elec,y}$: 453,963 — $BG_{burnt,y}$: 1,613,341
Data unit correctly expressed?	Yes – m^3
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Continuously measured by flow meters. The meter readings will be automatically converted to value at room temperature (20 ºC) and 1 atm pressure The monitoring staff recorded the values from flow meters and created daily accumulated reading then into monthly production summary table/14/.
Measurement equipment	Monitoring equipment: Flow meter ($BG_{flare,y}$) — Flow meter ($BG_{elec,y}$) Mode: KZR/DC-1AL — KZR/DC-1AL Serial No.: 2020072020 — 2020072019 Accuracy: ±1.5% — ±1.5% Calibration Date: 21-July-2021 — 21-July-2021 Calibration Validity: 20-July-2023 — 20-July-2023
Monitoring frequency	Annually, based on continuous flow measurement with accumulated volume recording (e.g. daily accumulated reading)
QA/QC procedure correctly applied?	Yes Flow meter has been periodically calibrated/8/ by qualified party/12/, the calibration validity covered this monitoring period.
Purpose of data?	ER_y calculation

$D_{f,m}$	**Return trip distance between the origin and destination of freight transportation activity f in monitoring period m**
Title in line with Methodology?	Yes
Value applied	100
Data unit correctly expressed?	Yes - km
Appropriate description?	Yes
Correct value provided?	Yes - To simplify the ER calculation and monitoring, 100km is chosen for ER calculation for all transportation activities, which is conservative
Source of Data	Default value from online map system for each transportation activity which has been checked during site inspection of the vehicle. While the online map system showed that the return trip distance between the farthest animal farm and the project

	site is within 100 km, which is also confirmed by comparing the locations of all the involved farms shown in the map.
Measurement equipment	Online map system for each transportation
Monitoring frequency	To be updated whenever the distance changes
QA/QC procedure correctly applied?	The distance will be updated in case the distance changes in future.
Purpose of data?	PE_y calculation

$FR_{f,m}$	**Total mass of freight transported in freight transportation activity f in monitoring period m**
Title in line with Methodology?	Yes
Value applied	2021: 17,685 2022: 38,190
Data unit correctly expressed?	Yes - t
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Yes. The monitoring data derived from the monthly production summary table/14/
Measurement equipment	Monitoring equipment: Electric truck scale Mode: SCS-30-QC Serial No.: 100816 Accuracy: Class III Calibration Date: 21-June-2021, 02-June-2022 Calibration Validity: 20-June-2022, 01-June-2023
Monitoring frequency	Annually, based on daily measurement and monthly aggregation
QA/QC procedure correctly applied?	Yes Electronic truck scale has been periodically calibrated/8/ by qualified party/12/, the calibration validity cover this monitoring period. Data of manure treated from monthly production summary table/14/ is cross checked with the date of Total mass of freight transported in freight transportation in monthly summary of manure into the factory/15/ and the values are for this monitoring period are confirmed as consistent thus verified as correct and reasonable.
Purpose of data?	PE_y calculation

$w_{CH4,y}$ ($f_{CH4,default}$)	**Methane content in biogas in the year y**
Title in line with Methodology?	Yes
Value applied	60
Data unit correctly expressed?	Yes - %
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Default value from applied methodology AMS-III.D (version 21.0)/27/
Measurement equipment	N/A
Monitoring frequency	N/A
QA/QC procedure correctly applied?	N/A for default value

Purpose of data?	ER_y calculation

FE	The flare efficiency
Title in line with Methodology?	Yes
Value applied	90% for flaring (for FE and $\eta_{flare,m}$) 100% for power generation
Data unit correctly expressed?	Yes - %
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	Default value from methodological tool "Project emissions from flaring (version 04.0)"/41/ As per para. 22 of the applied methodology, if the recovered biogas is combusted for electrical/thermal energy production or for other gainful use, the methane destruction efficiency can be considered as 100%. Therefore, the methane destruction efficiency of biogas used for power generation is 100%. According to the tool, the project uses enclosed flares, and the project chose option A, the flare efficiency of the project is determined as 90% since the project meets the following two conditions when in operating: • The temperature of the flare and the flow rate of the residual gas to the flare is within the manufacturer's specification for the flare; and • The flame is detected in minute m.
Measurement equipment	N/A
Monitoring frequency	N/A
QA/QC procedure correctly applied?	N/A for default value
Purpose of data?	PE_y calculation

CAR 06 and CAR 07 were raised and successfully closed. Refer to Appendix 4 for detail assessment

4. Assessment of GHG emission reductions Quantity

During the verification the calculation of GHG emission reductions has been checked. In detail the following has been verified:

Baseline Emissions Calculation Assessment:

The formula used for the determination of baseline emissions is consistent with the Joint-PD-MR and methodologies AMS-III.D. (version 21.0) and AMS-I.D. (version 18.0):

Based on the above assessment of the values of ex-ante determined parameters in section 3.4.8 and assessment of the values of monitored parameters for this monitoring period in section 4.1, the baseline emissions for this monitoring period are calculated as below,

1. Baseline emissions from the manure treatment processes in year y ($BE_{CH4,y}$)

$$BE_{CH4,y} = GWP_{CH4} \times D_{CH4} \times UF_b \times \sum_{j,LT} MCF_j \times B_{0,LT} \times Q_{manure,j,LT,y} \times SVS_{j,LT,y}$$

= **15,887** tCO_2e

2. Baseline emissions associated with electricity generation in year y ($BE_{elec,y}$)
During this monitoring period, as assessment above in section 4.1, no electricity was supplied to the power grid due to the grid-connection switch cabinet has not been retrofitted and upgraded to meet the technical requirements of the power grid company during this monitoring period, hence baseline emissions associated with electricity generation in year y ($BE_{elec,y}$) for this monitoring period is 0.

Hence, for this monitoring period, $BE_{y,ex\ post}$=$BE_{CH4,y}$=**15,887** tCO_2e

Project Emissions Calculation Assessment:
Based on the above assessment of the values of ex-ante determined parameters and monitored parameters for this monitoring period, the project emissions for this monitoring period are calculated as below,

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{power,y} + PE_{transp,y}$$

1. Project emissions due to physical leakage of biogas in year y – $PE_{PL,y}$

$$PE_{PL,y} = 0.10 \times GWP_{CH4} \times D_{CH4} \times \sum_{i,LT} B_{0,LT} \times Q_{manure,LT,y} \times SVS_{LT,y} \times MS\%_{i,y}$$

= 2,525 tCO_2e

2. Project emissions from flaring or combustion of the biogas stream in the year y– $PE_{flare,y}$

$$PE_{flare,y} = GWP_{CH4} \times BG_{flare,y} \times f_{CH4,default} \times \rho_{CH4} \times (1 - \eta_{flare,m}) \times 10^{-3}$$

= 2,295 tCO_2e

3. Project emissions from the use of fossil fuel or electricity for the operation of the installed facilities in the year y – $PE_{power,y}$

$$PE_{power,y} = PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

=**189** tCO_2e

4. Project emissions from incremental transportation in the year y – $PE_{transp,y}$

$$PE_{transp,y} = \sum_f D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$$

=**722** tCO_2e

Hence, for this monitoring period, $PE_{y,ex\ post}$=$PE_{PL,y}$+ $PE_{flare,y}$ + $PE_{power,y}$+ $PE_{transp,y}$=**5,731** tCO_2e

Leakage Emission Calculation Assessment:
As per the methodology, and above demonstration, leakage (LE_y) during this monitoring period is zero.
LE_y = **0** tCO_2e

Emission Reduction Calculation Assessment:

As per the applied methodology and above assessment, the emission reductions achieved by the project activity are limited to the ex post calculated baseline emissions minus the project emissions using the actual monitored data for the project activity (i.e. $N_{LT,y}$, $MS\%_{i,y}$, $MS\%_{I}$, AI_{I}, as well as $VS_{LT,y}$ in cases where adjusted values for animal weight are used). The emission reductions achieved in any year are the lowest value of the following:

$$ER_{y,ex\ post} = min\left[\left(BE_{y,ex\ post} - PE_{y,ex\ post}\right), \left(MD_y - PE_{power,y,ex\ post}\right)\right]$$

where,

$MD_y = BG_{burnt,y} \times w_{CH4,y} \times D_{CH4} \times FE \times GWP_{CH4}$

$= BG_{flare,y} \times w_{CH4,y} \times D_{CH4} \times 90\% \times GWP_{CH4} + BG_{elec,y} \times w_{CH4,y} \times D_{CH4} \times 100\% \times GWP_{CH4}$

=**25,759** tCO_2e

Therefore, during this monitoring period, the emission reduction is calculated as below tables,

Period	$BE_{y,ex\ post}$ (tCO_2e)	$PE_{y,ex\ post}$ (tCO_2e)	$BE_{y,ex\ post}$ - $PE_{y,ex\ post}$ (tCO_2e)	MD_y (tCO_2e)	$PE_{power,y}$ (tCO_2e)	MD_y - $PE_{power,y}$ (tCO_2e)	Emission Reduction (tCO_2e)
	A	B	C=A-B	D	E	F=D-E	G=MIN(C,F)
01-August-2021~ 31-December-2021	5,205	2,100	3,105	8,905	53	8,852	3,105
01-January-2022~ 31-December-2022	10,682	3,631	7,051	16,854	136	16,718	7,051
Total	**15,887**	**5,731**	**10,156**	**25,759**	**189**	**25,570**	**10,156**

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01-August-2021~ 31-December-2021	5,205	2,100	0	3,105
01-January-2022~ 31-December-2022	10,682	3,631	0	7,051
Total	**15,887**	**5,731**	**0**	**10,156**

CL 06 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer to above sections 3.4.8 and 4.1 for the detail assessment of each monitoring parameters and Appendix 3 for the supporting evidence used to determine the GHG emission reductions.

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

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 reductions and removals for this monitoring period.

5 VALIDATION AND VERIFICATION CONCLUSION

Climate Bridge (Shanghai) Ltd. has commissioned the CTI to carry out the Verified Carbon Standard (VCS) joint validation and 1st periodic verification of the project activity Gansu Ganzhou Biogas Recovery and Utilization Project (VCS ID 3766), for the monitoring period from 01-August-2021 to 31-December-2022, with regard to the relevant requirements for VCS Standard Version 4.4.

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

- 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;
- the monitoring plan in the validated Joint-PD-MR is as per the applied baseline and monitoring methodology.
- the project has been implemented and operated as per the VCS Joint-PD-MR;
- the project complies with the validation and verification criteria for projects set out in VCS Standard Version 4.4;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirement and AMS-III.D. (version 21.0);
- the monitoring is in place as per the applied baseline and monitoring methodology AMS-III.D. (version 21.0);
- the monitoring complies with the monitoring plan in the validated PD;

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

Verification period: From 01-August-2021 to 31-December-2022

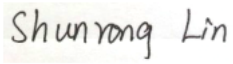
Verified GHG emission reductions and removals in the above verification period by vintage is

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01-August-2021~31-December-2021	5,205	2,100	0	3,105
01-January-2022~31-December-2022	10,682	3,631	0	7,051
Total	**15,887**	**5,731**	**0**	**10,156**

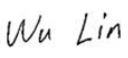
Comparison with ex ante GHG emission reductions and removals is

Year	Ex-ante emissions reductions/removals	Achieved emissions reductions/removals	Percent difference	Justification for the difference

01-August-2021~31-December-2021	13,925	3,105	-77.7%	The mainly difference between the ex-ante estimated value and actual value is due to the market reasons and lack of the availability of animal manures, no animal manure waste fed into the anairobic digesters during the period from 01-Oct-2022 to 31-Dec-2022, the biogas power plant only operated for a few months during this monitoring period at a very low output level, no electricity supplied to the power grid.
01-January-2022~31-December-2022	33,220	7,051	-78.77%	
Total	**47,145**	**10,156**	**-78.46%**	



Lin Shunrong
CTI Certification
Verification Team Leader
01-December-2023



Lin Wu
CTI Certification
Technical Reviewer
01-December-2023

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
AMS	Approved Small-scale Methodology
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CCER	China Certified Emission Reduction
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DCS	Distributed Control System
DverR	Draft Verification Report
EIA	Environmental Impact Assessement
ER	Emission Reduction
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
NWCPG	Northwest China Power Grid
PA	Project Activity
PDD	Project Design Document
PP	Project Participant
PRC	Post Registration Change
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
XLS	Emission Reduction Calculation Spread Sheet

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

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

Mr. Lei ZHANG

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 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 3: Energy demand	TA 3.1: Energy demand
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

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

Approved by: Wu Lin

Wu LIN

Technical Competent Manager

Shenzhen, 25/10/2022

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

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

Approved by:

Lu ZHOU

General Manager

Shenzhen, 01/01/2021

Mr. Qinghua DAI

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 13: Waste handling and disposal	TA 13.2: Manure
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, 01/01/2021

APPENDIX 3: DOCUMENTS REVIEWED OR REFERENCED

No	Author	Title	References to the document	Provider
1.	Climate Bridge (Shanghai) Ltd.	Joint-PD-MR	Monitoring Report of Gansu Ganzhou Biogas Recovery and Utilization Project • Draft Version 01, dated 25-May-2023 • Version 02, dated 28-June-2023 • Version 02.1, dated 24-November-2023 • Final Version 02.2, dated 01-December-2023	Climate Bridge (Shanghai) Ltd.
2.	Climate Bridge (Shanghai) Ltd.	Emission Reduction Calculation Sheets	Emission Reduction Calculation sheet (related to ex-ante) • Draft Version 01, dated 27-September-2022 • Final Version 02, dated 28-June-2023 • Final Version 02.1, dated 24-November-2023 Emission Reduction Calculation sheet (related to this monitoring period) • Draft Version 01, dated 25-May-2023 • Final Version 02, dated 28-June-2023	Climate Bridge (Shanghai) Ltd.
3.	Ministry of Agriculture Planning and Design Institute, Beijing Jinyu Blue Sky Ecological Energy Technology Development Co., LTD	Feasibility Study Report	Feasibility Study Report of the Project, dated in Aug. 2017	Project Owner
4.	Development and Reform Commission of Ganzhou District	Project approval	Project approval of Gansu Ganzhou Biogas Recovery and Utilization Project, dated 23-May-2018	Project Owner
5.	Henan Jinhuan Environmental Impact Assessment Co., Ltd.	EIA	Environmental Impact Assessment (EIA) issued in June 2019	Project Owner
6.	Environmental Protection Bureau of Zhangye City	EIA approval	EIA approval of Gansu Ganzhou Biogas Recovery and Utilization Project, dated 12-July-2019	Project Owner
7.	Gaitai County Market Supervision and Administration	Business License	Business License of Gansu Founder Energy Conservation	Project Owner

No	Author	Title	References to the document	Provider
	Shanghai industrial and commercial bureau		Sci&Tech Service Co., Ltd. and Climate Bridge (Shanghai) Ltd.	
8.	Gansu Electric Power Company Electric Energy Metering Center	Calibration certificates	Calibration Certificates for Electricity meter covering this monitoring period	Project Owner
	Zhangye Metrology and Testing Center		Calibration Certificates for Electric truck scale covering monitoring period	Project Owner
			Calibration Certificates for Electric scale covering monitoring period	
			Calibration Certificates for Flow meter covering monitoring period	Project Owner
9.	Gansu Yuyang Construction Engineering Co., Ltd. and Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd.	Construction Contract	Construction Contract signed on 19-October-2019 and mentioned started construction on 01-December-2019	Project Owner
10.	Ganzhou District Ministry of Housing and Urban-Rural Development	Construction permit	Construction permit issued in July 2020	Project Owner
11.	Fujian Quanzhou road and new energy technology Co., Ltd., Xi 'an Luhang Electrical Engineering Co., Ltd. and PP	Equipment purchasing contracts	Biogas generators purchasing contract signed on 30-March-2021 Flare contract signed in April 2021	Project Owner
12.	Gansu Provincial Quality Technology Supervision Bureau	Certificate of Metrological Authorization	Certificate of Metrological Authorization to Gansu Electric Power Company Electric Energy Metering Center valid from 29-Sep-2018 to 28-Sep-2022	Project Owner
	Gansu Provincial Quality Technology Supervision Bureau		Certificate of Metrological Authorization to Zhangye Metrology and Testing Center, valid from 17-Feb-2017 to 16-Feb-2021 and 17-Feb-2021 to 16-Feb-2025	
13.	Project Owner and State Grid Gansu Electric Power Company Zhangye Power Supply Company	Power Purchase Invoices	Monthly Power Purchase Invoices covering the monitoring period	Project Owner
14.	Project Owner	Monthly production summary table	Monthly production summary table including data of manure transported to plant, dry matter	Project Owner

No	Author	Title	References to the document	Provider
			content of the manure, electricity generation and gas production.	
15.	Project Owner	Monthly summary of manure	Monthly summary of manure into the factory	Project Owner
16.	Project Owner	Manure Transport	Manure Transport Vehicle Information Sheet	Project Owner
17.	Project Owner and State Grid Gansu Electric Power Company Zhangye Power Supply Company	Grid-connection Agreement	Grid-connection Agreement issued on 24-December-2021	Project Owner
18.	VVB	Nameplate of the biogas generators	Photo of Nameplate of the biogas generators taken by VVB during site inspection	VVB
19.	Project Owner	Declaration	Declaration of no double counting and not involved in other GHG scheme dated on 26-June-2023	Project Owner
20.	Project Owner	Photo	Photo of baseline open lagoon used	Project Owner
21.	Local stakeholders	Local stakeholder consultation records	30 filled questionnaires completed on 17-November-2019	Project Owner
22.	Project Owner and local authority	Local communication survey records	61 filled questionnaires completed in December 2021 and October 2022 during this monitoring period	Project Owner
23.	Gansu Founder Energy Conservation Sci&Tech Service Co., Ltd. and employments	Labor contract	Labor contracts of the staffs	Project Owner
24.	General Office of the Ministry of Agriculture and Rural Affairs and General Office of the Ministry of Ecology and Environment	Notice	Notice on the Issuance of Technical Guidelines for the Construction of Manure Treatment Facilities for Livestock and Poultry Farms (Households) (Nongbanmu [2022] No. 19) issued on 24-June-2022	Public website
25.	National Standard	GJJ/T54-93	Design code for wastewater stabilization ponds	Public website
26.	UNFCCC	Applied methodology	Approved CDM methodology AMS-I.D.: “Grid connected renewable electricity generation” (version 18.0)	UNFCCC Website
27.	UNFCCC	Applied methodology	Approved CDM methodology AMS-III.D.: “Methane recovery in animal manure management systems” (version 21.0)	UNFCCC Website

No	Author	Title	References to the document	Provider
28.	Intergovernmental Panel on Climate Change	IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook 2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas Inventories	www.ipcc-nggip.iges.or.jp
29.	Intergovernmental Panel on Climate Change	AR5	IPCC Fifth Assessment Report	www.ipcc-nggip.iges.or.jp
30.	National Standard	GB/T 18596	Discharge standard of pollutants for livestock and poultry breeding	Public website
31.	National Standard	HJ/T 81	Technical standard of pollution prevention for livestock and poultry breeding	Public website
32.	National standard	DL/T448–2016	Technical Administrative Code of Electric Energy Metering	Public website
33.	National standard	JJG1132-2017	Verification regulation of thermal gas mass flowmeter	Public website
34.	On-site Audit Team	Photographs of Project Site	Photographs of this Biogas plant site, all the monitoring devices and main equipment, farms and fuel stations taken by validation and verification team during the on-site validation and verification	On-site Audit Team
35.	VERRA	Template	VCS-Joint-Project-Description-Monitoring-Report-Template-v4.2	VERRA
36.	VERRA	Registration and Issuance Process	Registration and Issuance Process version 4.3	VERRA
37.	UNFCCC	Guidelines	“General Guidelines to SSC CDM methodologies”	UNFCCC
38.	UNFCCC	Standard	Standard “Applicability of sectoral scopes version 01.0”	UNFCCC
39.	UNFCCC	Methodological tool	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (version 03.0)	UNFCCC
40.	UNFCCC	Methodological tool	“Tool to calculate the emission factor for an electricity system” (version 07.0)	UNFCCC
41.	UNFCCC	Methodological tool	Project emissions from flaring (version 04.0)	UNFCCC
42.	UNFCCC	Methodological tool	Project and leakage emissions from anaerobic digesters (version 02.0)	UNFCCC
43.	UNFCCC	Methodological tool	Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (version 03.0)	UNFCCC
44.	UNFCCC	Methodological tool	Project and leakage emissions from transportation of freight (version 01.1.0)	UNFCCC

No	Author	Title	References to the document	Provider
45.	VERRA	VCS Program Definitions	VCS Program Definitions, v4.3	VCS website
46.	VERRA	VCS Program Guide	VCS Program Guide, v4.3	VCS website
47.	VERRA	VCS Standard	VCS Standard, v4.4	VCS website
48.	IPCC	IPCC publications	www.ipcc-nggip.iges.or.jp	Website
49.	Weather	Local weather information	Public information of local weather http://www.weather.com.cn/cityintro/101160701.shtml	Public Website
50.	Ministry of Ecology and Environment of China	China cap & trade scheme	http://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html	Public Website
51.	Ministry of Ecology and Environment of China	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
52.	China CER Exchange Info-platform	China CER	http://cdm.ccchina.org.cn/ccer.aspx	Website
53.	GS	Gold Standard	http://www.goldstandard.org/	Website
54.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Website
55.	VCS	VCS	https://verra.org/project/vcs-program/	Website
56.	National Government	Law and Regulations	1. Environmental Protection Law of People's Republic of China 2. Law of the People's Republic of China on the Environmental Impact Assessment 3. Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution 4. Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution 5. Regulations on prevention and control of pollution from large scale livestock and poultry breeding 6. Regulations on prevention and control of pollution from large scale livestock and poultry breeding 7. Renewable Energy Law of the People's Republic of China 8. Catalogue for the Guidance of Industrial Structure Adjustment (2013 revision)	Public website
57.	China DNA	Baseline Emission Factors	*"2019 China regional power grid carbon dioxide baseline emission factor OM calculation*	China DNA website

No	Author	Title	References to the document	Provider
			instructions" published by DNA of China https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/W020201229610353816665.pdf	
58.	National Energy Administration, China Electricity Council etc.	China Electric Power Yearbook	China Electric Power Yearbook from 2014 to 2018	China Website
59.	National Bureau of Statistics	China Energy Statistical Yearbook	China Energy Statistical Yearbook from 2016 to 2018	China Website

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

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

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

Table 2.CL from this verification

CL ID	01	Section no.	1.3	Date : 19/06/2023
Description of CL				
In section 1.3, 1. PP does not clarify how the project is in line with the requests from section 2.1.2 of the VCS standard version 4.4. 2. PP does not clarify how the project is in line with the requests from section 3.1 of the VCS standard version 4.4.				
Project participant response				Date: 28/06/2023
1. Section 1.3 of the JPM has been updated to demonstrate the compliance of section 2.1.2 of VCS standard. 2. Section 1.3 of the JPM has been updated to demonstrate the compliance of section 3.1 of VCS standard.				
Documentation provided by project participant				
/1/- version 2.0				
VVB assessment				Date: 30/06/2023
1. The revised Joint-PD-MR is checked, CTI confirmed that the clarification has been added. 2. The revised Joint-PD-MR is checked, CTI confirmed that the clarification has been added. Refer to section 3.1 of this report for the detail assessment. CL 01 is closed.				

CL ID	02	Section no.	1.8	Date : 19/06/2023
Description of CL				
The project start date is not justified in line with VCS standard and supporting evidence. Clarification is requested.				
Project participant response				Date : 28/06/2023
Justification of project start date has been added in section 1.8 of JPM				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				Date: 30/06/2023

The revised MR is checked, CTI confirmed that the clarification has been added. The project start date is 01-August-2021 which is verified as the date on which the project began generating GHG emission reductions or removals as per the concept in VCS standard Version 4.4. Via checking the monthly production summary table/14/ and interview with operation staff, it is verified that the start date is correct and in line with the VCS standard. CL 02 is closed.

CL ID	03	Section no.	2.2	Date : 19/06/2023
Description of CL				
PP stated "Local Stakeholder Consultation was done in December 2021 and October 2022", however, the actual detail Local Stakeholder Consultation process and results related to two consultations are not clarified.				
Project participant response				**Date :** 28/06/2023
The details of LSC during this monitoring period have been described in section 2.2 of JPM.				
Documentation provided by project participant				
/1/- version 02 /22/				
VVB assessment				**Date:** 30/06/2023
The revised MR is checked, CTI confirmed that actual Local Stakeholder Consultation process and results related to this monitoring period are clarified. During the implementation stage of this monitoring period, via checking the local communication survey records/22/ and interview with the local officer and local residents during site visit, it is confirmed that the local authority has conducted follow-up interviews and ongoing communication with local stakeholders to collect any comments or inputs to the project implementation in December 2021 and October 2022 through distribution questionnaires to local stakeholders. Total of 61 questionnaires have been distributed and collected, via checking the filled questionnaires/22/, it is verified that no negative comments were received during these two LSC process. CL 03 is closed.				

CL ID	04	Section no.	5.1	Date : 19/06/2023
Description of CL				
For determine the value of Methane Conversion Factors (MCF), how the project location is defined as under the Cool Temperate Dry Zone is not clarified.				
Project participant response				**Date :** 28/06/2023
The project location has a mean annual temperature (MAT) of 7 degree Celsius and mean annual precipitation to potential evapotranspiration ratio (MAP:PET) lower than 1, which falls under the Cool Temperate Dry Zone. The justification has been added in JPM				
Documentation provided by project participant				
/1/- version 02 /49/ /28/				
VVB assessment				**Date:** 30/06/2023
The revised MR is checked, CTI confirmed that clarification has been added. For the project location, the mean annual temperature (MAT) is confirmed as 7°C/49/, the mean annual precipitation to potential evapotranspiration ratio (MAP:PET) lower than 1/49/, Therefore, as per Annex 10A.2, 2019 Refinement to the 2006 IPCC Guidelines/28/, the climate zone of the project site can be determined to " Cool Temperate Dry Zone" and the value of 67% applied is verified as consistent with IPCC/28/. CL 04 is closed.				

CL ID	05	Section no.	5.2	Date : 19/06/2023
Description of CL				

PP has changed the equation for calculate the Emissions from incremental transportation in the year y in the Joint-PD-MR comparing with the published PD, clarification is requested.	
Project participant response	**Date :** 28/06/2023
The fuel consumption stated in the listed PD was not monitored by the PP, therefore the calculation method for the Emissions from incremental transportation was changed.	
Documentation provided by project participant	
/1/- version 02	
VVB assessment	**Date:** 30/06/2023
The revised MR is checked, CTI confirmed that the method was changed due to fuel consumption stated in the listed PD was not monitored, and it is confirmed that the new method is in line with the requirement of the tool which can be used for determination of Emissions from incremental transportation in the year y. CL 05 is closed.	

CL ID	06	**Section no.**	7.5	**Date :** 19/06/2023
Description of CL				
For the comparison of ex-ante estimated value of ER with the actual value achieved during this monitoring period, the actual emission reduction achieved during this period is 78.46% lower than the estimated ER which is much less than estimated, justification for the difference is not based on the actual situation of the project during this monitoring period comparing with project design.				
Project participant response				**Date :** 28/06/2023
The significant difference between the actual ER and estimated ER has been further clarified in the JPM.				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				**Date:** 30/06/2023
The revised MR is checked, CTI confirmed that more reason has been added. The mainly difference between the ex-ante estimated value and actual value is due to the market reasons and lack of the availability of animal manures, no animal manure waste fed into the anairobic digesters during the period from 01-Oct-2022 to 31-Dec-2022, the biogas power plant only operated for a few months during this monitoring period at a very low output level, no electricity supplied to the power grid, which has been assessed in the whole report of the project implementation for this monitoring period. Thus it is verified that the justification for the difference is reasonable. CL 06 is closed.				

Table 3.CAR from this verification

CAR ID	01	**Section no.**	1.1	**Date :** 19/06/2023
Description of CAR				
1. During site inspection and checking the supporting evidence, it is observed that the project was designed and implemented with 2 phases which is not described in section 1.1 clearly. 2. PP stated project collects manure waste from dairy cow and sheep which is not consistent with the actual collection of the project checked during site visit. 3. The combustion way of the biogas and usage of the electricity are not described completely in section 1.1 based on the actual implementation of the project.				
Project participant response				**Date :** 28/06/2023
1. Section 1.1 of JPM has been updated to report the phase implementation of the project. 2. The actual manure waste collected and treated by the project is from dairy farm and market swine farm, the JPM has been updated and the emission reductions calculation is also revised accordingly. 3. The combustion way of the biogas and usage of the electricity generated by the project has been updated in section 1.1 of JPM				
Documentation provided by project participant				
/1/- version 02				

VVB assessment	Date: 30/06/2023
1. The revised MR is checked, CTI confirmed that related information has been added. 2. The revised MR is checked, CTI confirmed that actual situation is specified which has been verified by site inspection of the farms. 3. The revised MR is checked, CTI confirmed that combustion way of the biogas and usage of the electricity are described completely in section 1.1 based on the actual implementation of the project Refer to section 3.1 of this report for detail assessment. CAR 01 is closed.	

CAR ID	02	Section no.	1.11	Date : 19/06/2023
Description of CAR				
The technical description in section 1.11 is not complete, the description of equipment of flare and related technical description and parameters are not provided.				
Project participant response				Date : 28/06/2023
The description of flare system and related technical description and parameters have been added in section 1.11 of JPM v2.0. The project adopts enclosed flare system and the flare does not belong to low height flare.				
Documentation provided by project participant				
/1/- version 02 /11/				
VVB assessment				Date: 30/06/2023
The revised MR is checked, CTI confirmed that description of equipment of flare and related technical description and parameters are provided which are verified in line with the actual nameplate of the equipment/34/ and the Equipment purchasing contracts/11/. CAR 02 is closed.				

CAR ID	03	Section no.	1.16.1	Date : 19/06/2023
Description of CAR				
1. PP stated that “The project is not included in an emissions trading program or any other mechanism”, however, China has own emission trading scheme which has not been analyzed by PP if the project will be double counted. 2. The no double counting declaration is not provided by PP.				
Project participant response				Date : 28/06/2023
1. The PP has further justified the reason for no double counting under China ETS. 2. And the no double counting declaration has been provided for validation.				
Documentation provided by project participant				
/1/- version 02 /19/				
VVB assessment				Date: 30/06/2023
1. The revised MR is checked, based on VVB’s local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as eight emission-intensive industries including power generation, petrochemicals, chemicals, building materials, non-ferrous metals, papermaking, steel and aviation that emitted at least 26,000 tons of CO_2e/year which has been verified in the public website/49/, and it is confirmed that the project activity belongs to agriculture sector is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/50/. On contrary, the project activity can reduce of GHG in the atmosphere through avoiding methane emissions from anaerobic treatment of swine manure and wastewater. Therefore, it can be concluded that the PP will not be included in the national ETS. Hence, it is confirmed that the emission reductions will not be double counted. 2. The Declaration of no double counting and not involved in other GHG scheme/19/ has been provided by PP. CAR 03 is closed.				

CAR ID	04	Section no.	1.17	Date : 19/06/2023
Description of CAR				
The evidence of the project's SD contributions is not provided in Appendix of JPM.				
Project participant response				Date : 28/06/2023
The appendix 1 of JPM has been revised to report the evidence for SDG contributions.				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				Date: 30/06/2023
The revised Joint-PD-MR is checked, CTI confirmed that evidence of the project's SD contributions is provided in Appendix of JPM. Refer to section 3.1 of this report for detail assessment of the SD contributions. CAR 04 is closed.				

CAR ID	05	Section no.	4.1	Date : 19/06/2023
Description of CAR				
In section 4.1, the implementation status of the project during this monitoring period is not described correctly as below findings, 1. If the project implemented in line with the project design during this monitoring period is not stated. 2. The technical parameters of the main equipment including biogas generator, flare etc. are missing. 3. The expected time for remaining 0.2MW will be installed and connection line to the power grid will be completed are missing. 4. Via site visit and checking the evidence, it is observed that the project stopped operation in October to December 2022, but it is not mentioned as the actual status of the project in this section.				
Project participant response				Date : 28/06/2023
The section 4.1 of JPM has been updated to report the actual implementation of the project: 1. the project is implemented in line with project design, i.e. phase implemented, please refer to updated JPM for details. 2. The technical specifications of installed project facilities such biogas generators, flare system have been added in the JPM. 3. The status of the remaining 0.2 MW of the biogas generator have been reported in the JPM, it is expected to be installed in 2024, depends on the availability of biogas. 4. The status of project stopped operation in October to December 2022 has been reported in the JPM.				
Documentation provided by project participant				
/1/- version 02 /11/ /14/				
VVB assessment				Date: 30/06/2023
1. The revised MR is checked, CTI confirmed that the project implemented in line with the project design during this monitoring period which has been stated clearly. 2. The revised MR is checked, CTI confirmed that the technical parameters of the main equipment including biogas generator, flare etc. are added which are verified in line with the actual nameplate of the equipment/34/ and the Equipment purchasing contracts/11/. 3. The revised MR is checked, CTI confirmed that the expected time has been added. 4. The revised MR is checked, CTI confirmed that the reason for stop has been added. Due to market reasons and the low availability of animal manures around the project site, the project kept operating at very low operating load. And during the period from 01-Oct-2022 to 31-Dec-2022, no animal manure waste was fed into the anaerobic digesters which has been verified by checking the monthly production summary table/14/. CAR 05 is closed.				

CAR ID	06	Section no.	7.1	Date : 19/06/2023

Description of CAR	
For all the monitored parameters listed in section 7.1, 1. The monitoring frequency is missing. 2. The location of the monitoring equipment is missing. 3. Data source is missing. 4. Data collection and recording process is missing. 5. How the calibration in line with the related national standard is not specified. 6. QA/QC procedure is missing for this monitoring period.	
Project participant response	**Date :** 28/06/2023
Section 7.1 of JPM has been revised to report the monitoring details of the project. 1. Monitoring frequency has been specified for every parameter monitored. 2. Installation location of monitoring equipment has been added. 3. Data source has been provided. 4. Data collection and recording process has been specified. 5. The calibration status of monitoring equipment has been detailed in the JPM. 6. QA/QC procedure of all monitoring parameters (if applicable) has been reported.	
Documentation provided by project participant	
/1/- version 02	
VVB assessment	**Date:** 30/06/2023
1. The revised MR is checked, CTI confirmed that monitoring frequency of all the monitored parameters are added. 2. The revised MR is checked, CTI confirmed that location of the monitoring equipment to all the related monitored parameters are added. 3. The revised MR is checked, CTI confirmed that Data source of all the monitored parameters are added. 4. The revised MR is checked, CTI confirmed that Data collection and recording process of all the monitored parameters are added. 5. The revised MR is checked, CTI confirmed that calibration compliance of all the monitored equipment are added. 6. The revised MR is checked, CTI confirmed that QA/QC procedure of all the monitored parameters are added. Refer to section 4.1 of this report for detail assessment. CAR 06 is closed.	

CAR ID	07	Section no.	7.1	Date : 19/06/2023
Description of CAR				
For the monitored parameter $D_{f,m}$, the monitoring method is not conducted as per the monitoring plan listed in section 6.3.				
Project participant response				**Date :** 28/06/2023
The return trip distance between the livestock farms and the project site have been determined as per online map system for each transportation activity. The outcome shows that the return trip distance between the farthest animal farm and the project site is within 100 km. To simplify the ER calculation and monitoring, 100km is chosen for ER calculation for all transportation activities, which is conservative. The distance will be updated in case the distance changes in future.				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				**Date:** 30/06/2023

The revised MR is checked, CTI confirmed that the monitoring method has been updated as per the monitoring plan listed in section 6.3. Default value from online map system for each transportation activity which has been checked during site inspection of the vehicle. While the online map system showed that the return trip distance between the farthest animal farm and the project site is within 100 km, which is also confirmed by comparing the locations of all the involved farms shown in the map. CAR 07 is closed.

Table 4.FAR from this verification

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