



**Verified Carbon
Standard**


BAITANG AONONG SWINE FARM COMPOSTING PROJECT



Document Prepared by CTI Certification Co., Ltd.

Project Title	Baitang Aonong Swine Farm Composting Project
Version	02.0
Report ID	CTISC-NC-CBN-202302022

Report Title	Baitang Aonong Swine Farm Composting Project
Client	Baineng New Energy (Shen Zhen) Co., Ltd.
Date of Issue	20/11/2023
Prepared By	CTI Certification Co., Ltd.
Contact	Address: F8-A CTI Building, No.4 LiuXianSan Road, Xin'an Street, Bao'an District, 518101, Shen Zhen, China Tel: +86 10 65580012 Email: linshunrong@cti-cert.com

	Website: http://www.cti-cert.com/certification	
Approved by	Zhou Lu	
Work carried out by	Team Leader: Zhang Lei Team Expert: Dai Qinghua Technical Reviewer: Lin Wu	

Summary:

CTI Certification Co., Ltd. (hereafter referred to as "CTI Certification") has been commissioned by Baineng New Energy (Shen Zhen) Co., Ltd. to perform the validation of project activity "Baitang Aonong Swine Farm Composting Project" (hereafter referred to as "the project activity") and reported in the Project Description.

The project activity uses a new anaerobic animal manure management system to treat manure waste (swine) from Huangping Aonong Swine Breeding Farm, which is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, of which the main purpose is to use enclosed digester to treat animal manure, as well as collect and destroy the generated biogas to avoid methane emissions. The effective volume of the digester installed and utilized by the project activity is 2,639m³. The project activity is expected to produce 2,639 m³ biogas per day. The generated biogas will be captured and sent to flaring within the project site. The residual waste from the digester will be used for agriculture fertilization aerobically in the nearby farmlands. Wastewater from the animal manure treatment system will be used for irrigation and no wastewater will be discharged to the environment.

During the 10-year fixed crediting period, the project activity avoids the emission of methane that would be emitted to the atmosphere directly without any methane recovery and destruction facility. It's estimated that the project activity could achieve average annual GHG emission reductions of 28,075 tCO₂e and total GHG emission reductions of 280,750 tCO₂e during the 10-year fixed crediting period.

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 and procedures set out in the project description will generate verifiable GHG data and information when implemented. Validation is a requirement and is seen as necessary to provide assurance to stakeholders of the quality of project and its intended generation of VCU. Validation is part of the VCS project cycle and will finally result in a conclusion by the executing VVB whether a project activity is valid to be submitted for registration to Verra registry.

Validation is conducted using CTI Certification Co., Ltd. (CTI Certification) procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The validation team assessed the project activity's compliance against the VCS Standard Version 4.4, the selected CDM methodology and the project description. The project is eligible

under non-AFOLU project. The validation criteria followed the guidance documents provided by VCS and the selected CDM methodology and tool includes:

- CDM Validation and Verification Standard for project activities version 03.0
- CDM Project Standard for project activities version 03.0
- CDM project cycle procedure for project activities version 03.0
- VCS standard v4.4
- VCS programme guide v4.3
- AMS-III.D.: Methane recovery in animal manure management systems, Version 21.0
- Tool 06: Project emissions from flaring, Version 04.0
- Tool 14: Project and leakage emissions from anaerobic digesters, version 02.0

Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of estimated verified emission reductions (VERs).

A risk-based approach has been followed to perform this validation activity. In the course of Validation, 1 Clarification Requests (CLs), 2 Corrective Action requests (CARs) and no Forward action request (FARs) was raised. The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and project owners have provided CTI Certification Co., Ltd. (CTI) with sufficient evidence to verify the fulfillment of the stated criteria of VCS. Provide a brief summary of the following:

CONTENTS

1	INTRODUCTION	5
1.1	Objective	5
1.2	Scope and Criteria	5
1.3	Reasonableness of Assumptions	5
1.4	Summary Description of the Project	6
2	VALIDATION PROCESS	8
2.1	Method and Criteria	8
2.2	Document Review.....	8
2.3	Interviews	9
2.4	Site Visits	10
2.5	Resolution of Findings.....	11
3	VALIDATION FINDINGS	13
3.1	Project Details	13
3.2	Safeguards	22
3.3	Application of Methodology	26
3.4	Non-Permanence Risk Analysis.....	58
4	VALIDATION OPINION	59
	APPENDIX 1: ABBREVIATIONS	61
	APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS	63
	APPENDIX 3: <REFERENCE LIST>	67
	APPENDIX 4: <CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS, FORWARD ACTION REQUESTS (CAR/CL/FAR)>	71

1 INTRODUCTION

1.1 Objective

Baineng New Energy (Shen Zhen) Co., Ltd. has commissioned the CTI to carry out the Verified Carbon Standard (VCS) validation of the project "Baitang Aonong Swine Farm Composting Project" (VCS ID 4168).

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

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 PD is reviewed against the criteria stated in VCS standard version 4.4 and the approved baseline and monitoring methodology AMS-III.D.-Version 21.0. The validation was based on the requirements of VCS Validation and Verification Manual version 3.2, VCS Program Guide version 4.3, 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.

1.3 Reasonableness of Assumptions

CTI has assessed the claims and assumptions made in the Project Description, i.e., assumptions regarding the determination of baseline scenario and additionality assessment, as well as validated the assumptions, limitations, and methods used for determining parameters and calculation of baseline emission, project emission and leakage against the VCS Standard Version 4.4, applied methodology AMS-III.D and other VCS rules. It is confirmed that the assumptions made in the PD are reasonable which are in line with the applied methodology and tools as well as the requirement of VCS. The project is expected to generate average GHG emission reduction of 28,075 tCO_{2e} per year during the 10-year fixed period and it is confirmed that outcome of future activities will be achieved as the assumptions and limitations are reasonable.

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 VCS validation conducted, CTI is of the opinion that the project complies with the validation criteria for projects set out in VCS Standard Version 4. 5, including any qualifications or limitations.

1.4 Summary Description of the Project

Project title	Baitang Aonong Swine Farm Composting Project
Project Participants	Guizhou Aonong Qihuan Animal Husbandry Co., Ltd (Project Owner, host country, P. R. China) Beijing Huayuan Carbon and Environmental Protection Technology Co., Ltd. (Consultant) Baineng New Energy (Shen Zhen) Co., Ltd. (VCU Buyer)
Location of the project	Huangping Aonong Swine Breeding Farm, Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China Geographic coordinates: longitude of 107° 54'42.87"E and latitude of 26° 58'8.71"N
Project start date	01/08/2021, the operation start date
Applied Methodology/Version	AMS-III.D., Version 21.0
Scope/Technical Area	Sectoral scope 13: Waste handling and disposal Sectoral scope 15: livestock and manure management.

The project activity uses a new anaerobic animal manure management system to treat manure waste (swine) from Huangping Aonong Swine Breeding Farm, which is located at Huangping Aonong Swine Breeding Farm, Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, of which the main purpose is to use digester to treat animal manure, as well as collect and destroy the generated biogas to avoid methane emissions. The generated biogas will be captured and sent to flaring within the project site. The residual waste from the digester will be used for agriculture fertilization aerobically in the nearby farmlands. Wastewater from the animal manure treatment system will be used for irrigation and no wastewater will be discharged to the environment. During the 10-year fixed crediting period, the project activity avoids the emission of

methane that would be emitted to the atmosphere directly without any methane recovery and destruction facility. It's estimated that the project activity could achieve average annual GHG emission reductions of 28,075 tCO₂e and total GHG emission reductions of 280,750 tCO₂e during the 10-year crediting period.

2 VALIDATION PROCESS

2.1 Method and Criteria

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

The purpose of the validation is to present a risk assessment for determining the nature and extent of validation procedures necessary to ensure the risk of auditing error is reduced to a reasonable level. According to the ISO14064-3, the criteria are the policy, procedure or requirement used as reference against which evidence is compared. CTI completed a strategic review and risk assessment of the project's activities and processes in order to gain a full understanding of (if applicable):

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

CTI validate that the reported information in the Project Description are complete and accurate in question. This involved a site visit and a desk review of the Project Design. This Validation Report describes the findings of this assessment.

The information of CTI Validation Team is included in below of this report.

2.2 Document Review

The VCS PD and supporting background documents related to the project implementation were reviewed. Documents review was conducted to ensure consistency with and identify any deviation from VCS program requirements. Desk review included an examination of the project design details, baseline scenario, additionality, ex ante and monitoring data and parameters, and ex ante quantification of GHG emission reductions.

Furthermore, the validation 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 are summarized in Appendix 3.

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

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

Function	Name	Technical competence	Task Performance*
Team Leader	Zhang Lei	1, 4, 13	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input checked="" type="checkbox"/> RP <input type="checkbox"/> TR
Team Expert	Dai Qinghua	13, 15	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input checked="" type="checkbox"/> RP <input type="checkbox"/> TR
Technical Reviewer	Lin Wu	1, 2, 3, 4, 5, 10, 11, 12, 13	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RP <input checked="" type="checkbox"/> TR
TR Expert	Lin Shunrong	1, 3, 13, 14, 15	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RP <input checked="" type="checkbox"/> TR

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

The VCS project design version 1.0 dated 01/02/2023, version 2.0 dated 15/07/2023 and version 3.0 dated 10/11/2023 were assessed as part of the validation. Relevant documents were reviewed. A detailed documents reviewed are listed in Appendix 2 of the report.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the validation process. Onsite interviews and information discussions were conducted with PP. The key personnel interviewed are summarized in the table below:

Interviewed personnel	Role	Organization	Date	Subject	Team Member
Mr. Fu Xiaofa	Operation Manager	Guizhou Aonong Qihuan Animal Husbandry Co., Ltd.	12/07/2023	Project design and operation of the project activity; Status of the project (including PPs);	Zhang Lei Dai Qinghua
Mr. Ma Shangwei	Manager		12/07/2023	Project proponent and ownership; Applicability of selected methodology; Applicable laws, statutes and other regulatory frameworks and any change; Baseline of the project; Emission factors of the project;	

				Monitoring plan; Stakeholder consultation process and its outcomes; Sustainable development contributions.	
Mr. Long Wenfei	Director	Huangping County Environment Protection Bureau	13/07/2023	Approval procedure; Applicable local laws and regulations on manure management projects; Other similar projects in the region; Sustainable development.	Zhang Lei Dai Qinghua
Mr. Tang Minghui	Director		13/07/2023	EIA Approval; Environment Impact; Sustainable Development; Environment monitoring; Applicable local laws and regulations on manure management projects	Zhang Lei Dai Qinghua
Ms. Long Yun	Villager	Baitang Village	13/07/2023	The process and participation of the stakeholder consultation; The impact of the project activity; The complaint by local stakeholders and the implementation of the mitigation measures.	Zhang Lei Dai Qinghua
Ms. Xiao Renqian	Project Manager	Baineng New Energy (Shen Zhen) Co., Ltd.	12/07/2023 to	Data collection and ER calculation.	Zhang Lei
Mr. Zhou Zhiwu	Project Manager		13/07/2023	Data collection and ER calculation.	Dai Qinghua

2.4 Site Visits

On 12/07/2023 to 13/07/2023, CTI Validation Team visited Guizhou Aonong Qihuan Animal Husbandry Co., Ltd. and performed the on-site validation at the project location (Huangping Aonong Swine Breeding Farm, Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China). The interviewed personnel and objective are listed in above table. During the site inspection, the project was inspected and documents evidence were checked, details as following table,

Duration of on-site inspection: 12/07/2023 to 13/07/2023				
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 Xinzhou Town, Huangping County	12/07/2023	Zhang Lei Dai Qinghua
2	On-site inspection Project site, livestock farm, interview director of local Environment Protection Bureau and villager nearby	Huangping County Environment Protection Bureau, Baitang Village	13/07/2023	Zhang Lei Dai Qinghua
3	Documents check	Project Owner's office in Xinzhou Town, Huangping County	12/07/2023	Zhang Lei Dai Qinghua
4	Finding Summary	Project Owner's office in Xinzhou Town, Huangping County	13/07/2023	Zhang Lei Dai Qinghua
5	Close Meeting	Project Owner's office in Xinzhou Town, Huangping County	13/07/2023	Zhang Lei Dai Qinghua

By checking Verra Website, CTI is able to confirm that the project was open for public comment from 24/02/2023 to 26/03/2023. Opening meeting of the validation process started on 12/07/2023 at Project Owner's office in Xinzhou Town, Huangping County, which is after beginning of the 30-day public comment period and the validation was completed after ending of the 30-day public comment period as per project information from Verra website. During the on-site validation, CTI has applied standard auditing techniques to assess the quality of information provided, the implementation and current situation of the project activity, evaluate data management, QA/QC system, project technology and equipment, training provided, and monitoring etc.

2.5 Resolution of Findings

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

Where a non-conformance arises CTI Validation Team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- b) Modifications to the implementation, operation and monitoring of the project activity has not been sufficiently documented by the project participants;
- c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

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

All CARs and CLs raised during validation shall be resolved prior to submitting a request for issuance.

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for CTI Certification Co., Ltd. (CTI)' s positive conclusion on the project design. 1 Clarification Requests (CLs), 2 Corrective Action requests (CARs) and no Forward action request (FARs) was raised by CTI Certification Co., Ltd. (CTI). And communications were made between the Client and CTI Certification Co., Ltd. (CTI) to guarantee the transparency of the validation process, the concerns raised, and responses given are summarized below in the appendix 4.

The final VCS PD version 3.0 dated 10/11/2023 serves as the basis for the final assessment presented. Additional changes to the project during the validation process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Project Description	00	00	00
Description of project activity	1	1	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	1	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Demonstration of additionality	00	00	00
- Emission reductions	00	00	00
- Monitoring plan	0	00	00
- Stakeholders consultation process	00	00	00
- Public comments	00	00	00
Others (please specify)-Matter related to double counting- for validation	00	00	00

Total	1	2	00
-------	---	---	----

The list of findings and their resolution is presented in appendix 4 of this report.

2.5.1 Forward Action Requests

None FAR was raised during the validation process.

3 VALIDATION FINDINGS

3.1 Project Details

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

The project activity uses a new anaerobic animal manure management system to treat manure waste (swine) from Huangping Aonong Swine Breeding Farm, of which the main purpose is to use digester to treat animal manure, as well as collect and destroy the generated biogas to avoid methane emissions. The digester with effective volume of 2,639 m³. The project is expected to produce 2,639 m³ biogas per day. The applied digester is normal temperature fermentation digester and will operate stably under temperature above 10°C. The generated biogas will be captured and sent to flaring within the project site. The residual waste from the digester will be used for agriculture fertilization aerobically in the nearby farmlands. Wastewater from the animal manure treatment system will be used for irrigation and no wastewater will be discharged to the environment.

During the 10-year fixed crediting period, the project activity avoids the emission of methane that would be emitted to the atmosphere directly without any methane recovery and destruction facility. It's estimated that the project activity could achieve average annual GHG emission reductions of 28,075 tCO_{2e} and total GHG emission reductions of 280,750 tCO_{2e} during the 10-year crediting period.

The project activity is located at Huangping Aonong Swine Breeding Farm, Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China. The project activity has been developed by Guizhou Aonong Qihuan Animal Husbandry Co., Ltd. The geographic coordinates of the project activity is longitude of 107° 54'42.87"E and latitude of 26° 58'8.71"N which is confirmed by site visit.

By checking Environmental Impact Assessment (EIA) approval /13/, CTI Validation Team confirmed that the project activity has been approved by Environment Protection Bureau of Qiandongnan Miao and Dong Autonomous Prefecture on 17/11/2017. The project activity started construction on 20/02/2020 /20/ and part of the aerobic composting facilities have been constructed /31/. However, as the aerobic composting system needs to cover a big area of land which is bigger than the land allocated for the system and faces governmental approval risk, the PP decided to change the treatment method from aerobic composting to anaerobic digestion and biogas flaring on 05/03/2020 /31/. The anaerobic digestion system have been constructed and the installed aerobic composting facilities did not put into use.

As impacts of Corona Virus Disease 2019, the consultant team and PP could not work on-site and project information was collected by internet and Wechat, as a result, the project information was not provided completely. The FSR, EIA approvals and other information was provided while the Environment Check and Accept Report was not provided. The PD version 01 open for public comment was prepared based on the FSR and EIA approved by local government authorities and the manure was designed to be treated with aerobic composting, while the change was not reflected in the PD version 01.

By comparing with “Major Items Change List for Pollution Impact Construction Projects (Trial)(2020 Issuance)” issued by Ministry of Ecology and Environment of People's Republic of China on 13/12/2020, change of the project does not belong to major items change list and re-approval procedure from local government is not required while the environment impact of the change shall be assessed during the “Environment Check and Accept” procedure. Environment Check and Accept Report of the project (based on actually applied anaerobic digestion and biogas flaring, while the project name was not changed) was completed by Guizhou Longsheng Environmental Protection Technology Co., Ltd after operation of the project, which was examined by environment protection experts and government authorities and submitted to the official website. It was confirmed by experts and government authorities in the Environment Check and Accept Report that there is no significant environmental impacts or net harm caused by the project change. Therefore, it could be confirmed that the change of the project is in compliance with relative laws and regulations in China. The PD version 02 was prepared based on the Environment Check and Accept Report and information collected during site inspection.

By checking the construction contract signed between the project owner and Guangdong Shuiqing Environment Protection Science and Technology Co., Ltd. /20/, CTI Validation Team confirmed that the project started construction on 20/02/2020. By checking construction plan of the project activity /15/, as well as through site interview, CTI Validation Team confirmed that the project activity is started operation on 01/08/2021.

For the project activity, the applicability of VCS program as required in para 2.1.1 of VCS Standard (version 4.4) is justified as below:

Criteria	Justification
The scope of the VCS Program includes: 1) The seven Kyoto Protocol greenhouse gases.	During the 10-year fixed crediting period, the project activity avoids the emission of methane that would be emitted to the atmosphere directly without any methane recovery and destruction facility. Therefore, this criteria is applicable.
2) Ozone-depleting substances.	This criteria is not applicable for the project activity.
3) Project activities supported by a methodology approved under the VCS Program through the methodology approval process.	This criteria is not applicable for the project activity.
4) Project activities supported by a methodology approved under an approved GHG program, unless explicitly excluded (see the Verra website for exclusions).	The project activity applies methodology AMS-III.D (Version 21.0), a methodology approved under CDM Program, which is a VCS approved GHG program.

5) Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements.	This criteria is not applicable for the project activity.
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. The VCS Program also excludes the following project activities under the circumstances indicated in Table 1 of VCS Standard (version 4.4).	The project activity uses a new anaerobic animal manure management system to treat manure waste (swine), of which the main purpose is to use a digester to treat animal manure, as well as collect and destroy the generated biogas to avoid methane emissions. It is not to generate GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction. The project activity is not excluded under the circumstances indicated in Table 1 of VCS Standard (version 4.4).

Via checking the Environment Check and Accept Report /28/, it is verified that the project activity is implemented to treat animal manure with digester and destroy the generated biogas with flaring. It avoids the methane emissions from uncovered anaerobic lagoon in the baseline, 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.

Project design, including eligibility criteria for grouped projects

Through document review, i.e. Environment Check and Accept Report /28/, and on site inspection, the treatment process and Technical Specifications of digester /26/ are confirmed by CTI Validation Team, which are listed as follows:

Anaerobic animal manure management system	Enclosed digester with effective volume of 2,639m ³ was installed and utilized by the project activity. The project activity is expected to produce 2,639 m ³ biogas per day under temperature above 10 °C.
Biogas pre-treatment system	Before combustion, the biogas will be pre-treated to remove impurities and moisture to prevent the project facilities from corrosion. In addition, biogas is kept in a stable condition before it flows into the flaring system. The biogas pre-treatment system is consistent of pre-filtration, dehumidification, dewatering, cooling and fine filtration.
Flare combustion system	The project activity will install an enclosed flare combustion system, temperature of in the exhaust gas of the enclosed flare in the minute m is 800-1,000° C or above, and maximum flow rate of the residual gas to the flare is 300 m ³ /h. The recovered methane will be sent to flare combustion system instead of emitting to atmosphere.
The Residual waste treatment system	The residual waste from the anaerobic animal manure management system and wastewater from the animal manure treatment system will be used for irrigation.

Item	Unit	Data
Effective volume	m ³	2,639
Handling capacity	t/d	500
Lifetime	Year	20

By checking design scheme of the project activity /35/, CTI is able to confirm that project equipment's average lifetime is 20 years.

The project activity is not a grouped project activity. Therefore, this section is not applicable.

Project proponent and other entities involved in the project

Through document review and site interview, CTI Validation Team confirmed the details of the project proponent as:

Organization name	Guizhou Aonong Qihuan Animal Husbandry Co., Ltd
Contact person	Xiaomin Long
Title	Project Manager
Address	Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province ,China
Telephone	0855-2327977
Email	2327977@qq.com

Organization name	Beijing Huayuan Carbon and Environmental Protection Technology Co., Ltd.
Role in the project	Consultant
Contact person	Liangliang Wang
Title	Project Manager
Address	Room 2032, Floor 2, Building 1, No. 4, West Matou Village, Tongzhou District, Beijing,China
Telephone	+86 19943777575

Email	15911077662@163.com
-------	---------------------

Organization name	Baineng New Energy (Shenzhen) Co.,Ltd.
Role in the project	VCS buyer
Contact person	Zexu Zhang
Title	Project Manager
Address	Room 302, No.2815 Longteng Avenue, Shanghai
Telephone	+86 15623507976
Email	project@cypressenergy.cn

Project Ownership

By checking business license /14/, EIA Approval /13/ and Environment Check and Accept Report /28/, CTI Validation Team confirmed that Guizhou Aonong Qihuan Animal Husbandry Co., Ltd is the project owner and also project proponent (PP) of project activity. Therefore, Guizhou Aonong Qihuan Animal Husbandry Co., Ltd. has the legal right to control and operate the project activities.

Project Start Date

By checking construction plan /15/ and Operation Log /16/ of the project activity, CTI Validation Team confirmed that the project is started operation on 01/08/2021, which is the start date of the project activity.

Project crediting period Date

The project activity adopts 10-year fixed crediting period. CTI Validation Team confirms that the starting and ending dates of the 10-year crediting period is as below:

Crediting Period Start date: 01/08/2021

Crediting Period End date: 31/07/2031

Project Scale and Estimated GHG Emission Reductions or Removals

Enclosed digester with effective volume of 2,639m³ was installed and utilized by the project activity. The project activity is expected to produce 2,639 m³ biogas per day. As the estimated annual average GHG emission reductions or removal per year is 28,075 tCO_{2e} which is less than 300,000 tonnes of CO_{2e} per year, thus the project falls in the category of Project. Therefore, CTI Validation Team confirms that the project scale falls under Project.

Project Scale	
Project	✓
Large project	

Through checking emission reductions calculation spreadsheet provided by PP, CTI Validation Team was able to confirm that the estimated GHG Emission Reductions or Removals of the project activity is as follows:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/08/2021 - 31/12/2021	11,768
01/01/2022 - 31/12/2022	28,075
01/01/2023 - 31/12/2023	28,075
01/01/2024 - 31/12/2024	28,075
01/01/2025 - 31/12/2025	28,075
01/01/2026 - 31/12/2026	28,075
01/01/2027 - 31/12/2027	28,075
01/01/2028 - 31/12/2028	28,075
01/01/2029 - 31/12/2029	28,075
01/01/2030 - 31/12/2030	28,075
01/01/2031 - 31/07/2031	16,307
Total estimated ERs	280,750
Total number of crediting years	10
Average annual ERs	28,075

The above estimated emission reduction is confirmed by CTI Validation Team via checking emission reduction calculation spreadsheet. CTI Validation Team confirmed that the calculation is correct and conservative.

Project location

The project activity is located at Huangping Aonong Swine Breeding Farm, Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China. The project activity has been developed by Guizhou Aonong Qihuan Animal Husbandry Co., Ltd. The

project is located at longitude of 107° 54'42.87"E and latitude of 26° 58'8.71"N which is confirmed by site visit.

Conditions prior to project initiation

Before the implementation of the project activity, animal manure is left to decay anaerobically within the project boundary and methane is emitted to the atmosphere.

Project compliance with applicable laws, statutes and other regulatory frameworks

By comparing with “Major Items Change List for Pollution Impact Construction Projects (Trial)(2020 Issuance)” issued by Ministry of Ecology and Environment of People's Republic of China on 13/12/2020 /29/, change of the project does not belong to major items change list and re-approval procedure from local government is not required while the environment impact of the change shall be assessed during the “Environment Check and Accept” procedure required by Environmental Protection Law of the People's Republic of China. Environment Check and Accept Report /28/ of the project was completed by Guizhou Longsheng Environmental Protection Technology Co., Ltd. In 10/2021, which was examined by experts and government authorities and submitted to the official website. Therefore, it could be confirmed that the change of the project is in compliance with relative laws and regulations in China.

CTI Validation Team confirms that the project has been approved by Chinese government by checking the Project Approval and Environmental Impact Assessment (EIA) Approval.

By checking laws and regulations, i.e. Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution, Regulations on prevention and control of pollution from large scale livestock and poultry breeding, it is confirmed that the project activity is in compliance with all laws and regulations in China.

Participation under other GHG programs

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

The project activity has neither been registered nor seeking registration under any other GHG programs. The project activity is seeking registration only in VCS program. A declaration from PP has been provided and checked by CTI.

CTI Validation Team checked the REC Mechanism database and Chinese Emission Trading System (Chinese ETS) and found that the project activity is not accredited / registered under REC mechanism or Chinese ETS mechanism.

Also, CTI Validation Team checked the registries of CDM EB and Goldstandard through website <http://cdm.unfccc.int/> and <http://www.goldstandard.org/> to confirm the same.

- Rejection by other GHG programs

The project activity is not rejected by other GHG programs. A declaration for the same has been provided and checked by CTI.

Also, CTI Validation Team checked the registries of CDM EB, Goldstandard and Verra through website <http://cdm.unfccc.int/>, <http://www.goldstandard.org/> and <http://verra.org/> to confirm the same.

Other forms of credit and supply chain (Scope 3) emissions

- Emissions trading programs and other binding limits

The assessment team confirms that the net GHG emission reductions or removals generated by the project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits. The verification team checked the REC Mechanism database of China, Chinese Emission Trading System (Chinese ETS) and Chinese Certified Emission Reduction Mechanism, and found that the project activity is not accredited / registered under REC mechanism, Chinese ETS, or CCER mechanism. Also, CCER mechanism is currently suspended by Chinese government, the project activity will not and is not allowed to registered under CCER mechanism. Thus, the assessment team concluded that the project activity not involved on other Emissions trading programs and other binding limits.

Furthermore, as per "Notice on Strengthening Enterprise Greenhouse Gas Emission Report Management" /21/ issued by National Development and Reform Committee of P. R. China, China has a national emissions trading scheme only cover the high-emission industries, including thermal power generation, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, aviation and other key emission industries that emitted at least 26,000 tons of CO₂e/year. By checking "List of key emissions in the national carbon emissions transaction quota management in 2019-2020" /24/ issued by Ministry of Ecology and Environment of P.R.China, the project proponent is not included in the mandatory emission control scheme and thus no emission cap was enforced for the project proponent.

By checking shareholder information of Guizhou Aonong Qihuan Animal Husbandry Co., Ltd (PP of the project) /33/, statement of no double counting of GHG emission reductions obtained from the project signed by swine farm owner /38/ and contract signed between the PP and farm owner /34/, CTI is able to confirm that the farm owner is shareholder and parent company of PP and will not claim GHG emission reductions generated from the project activity. Therefore, it could be confirmed by CTI that no double counting occurs with the farm owner with the GHG emission reductions obtained from the treatment of their manure.

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

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

Renewable energy certificates are available for trading in the host country. However, the same is not availed by the project proponent. The undertaking regarding the same is submitted by PP which is acceptable to CTI Validation Team. CTI Validation Team also checked the REC website and found the declaration to be correct.

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

As purpose of the project activity is to treat swine manure and will not impact goods or services by the technologies and measures specified in the project description. The treated manure is from swine farm

owned by PP and the project activity is implemented by PP within the swine farm, and no supply chain is involved.

Thus, this criteria is not applicable.

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

As purpose of the project activity is to treat swine manure and will not impact goods or services by the technologies and measures specified in the project description. The treated manure is from swine farm owned by PP and the project activity is implemented by PP within the swine farm, and no supply chain is involved.

Thus, this criteria is not applicable.

Sustainable development contributions

By checking EIA Report, Staff roster, China's National Plan on Implementation of the 2030 Agenda for Sustainable Development and 17 SDGs defined by UNDP, also by interviewing stakeholders during site visit, CTI Validation Team confirmed that the project activity would contribute to sustainable development in local region and China's Sustainable Development Goals (SDG).

The employment opportunities created have been assessed through checking Staff roster /9/ and other relevant HR records. The validation process of monitoring of emission reduction related parameters have been included in section 4.1.1 of this report. The specific SDGs that the project activity could achieve have been listed as follows:

- **SDG13** "Take urgent action to combat climate change and its impacts": The project uses digester to treat animal manure, collect and destroy the generated biogas to avoid methane emissions. This contributes to achieve one of China's stated sustainable development priorities "Actively adapt to climate change and strengthen resistance capacity to climate risks in agriculture, forestry, water resources and other key fields, as well as cities, coastal regions and ecologically vulnerable areas".

- **SDG 12** "Responsible Consumption and Production": The residual waste from the digester will be used as organic fertilizer in the nearby farmland, which is benefit for improvement of farmland. This contributes to one of China's actions for promoting the resource utilization of livestock manure and environmental protection, promoting sustainable of livestock farms.

- **SDG 8** "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all": the project activity will increase employment opportunities for the operation of the project activity. This contributes to one of China's actions for promoting sustainable developing: "by 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value".

Additional information relevant to the project

- Leakage management for AFOLU projects

The project activity is not a AFOLU project, therefore, this section is not applicable.

- Commercially sensitive information

No commercially sensitive information has been excluded from the public version of the project description. The details are presented transparently to CTI Validation Team for analysis which lead to positive conclusion for this validation.

Therefore, CTI Validation Team confirmed that

- the PD is accurate, complete, and provides an understanding of the nature of the project;
- Project has been implemented as described in the project description;
- Project is likely to achieve estimated GHG emission reduction or removals, explaining that actual results may vary since the estimates are based on assumptions that are subject to change.

3.2 Safeguards

3.2.1 No Net Harm

The Environmental Impact Assessment (EIA) Report of the project activity was compiled by Guizhou Longsheng Environmental Protection Technology Co., Ltd. and approved by the Environment Protection Bureau of Qiandongnan Miao and Dong Autonomous Prefecture on 17/11/2017. Environment Check and Accept Report /28/ which assessed real environment impact of the project after operation was completed and assessed by experts and government authorities. The assessment team confirm all environmental impacts have been analyzed and no net harm was detected. Refer to section 3.2.3 of this report for detailed environmental impacts arising from the project construction and operation.

Through interview with local stakeholders, it is confirmed by the assessment team the implementation of the project activity will improve local socio-economic development and contribute to the sustainable development as described in section 3.1 of this report above. Therefore, CTI Validation Team confirmed that no potential negative environmental and socio-economic impacts were identified and no net harm was detected for the project activity.

3.2.2 Local Stakeholder Consultation

As per the VCS requirements, it is necessary to invite the relevant stakeholders, prior of the validation process. CTI Validation Team checked the relevance of the dates during the validation site visit.

By checking the attendance list, CTI validation team confirmed a local stakeholder consultation survey was conducted to collect comments from local residents through distributing questionnaires on 17/02/2020 by the project owner. Through checking questionnaires, as well as interviewing with the project owner and local stakeholder, CTI Validation Team confirmed that the questionnaire includes a brief summary of the project activity, including the project design and other relevant key information. In total 49 out of 49 questionnaires were returned with a 100% response rate.

By checking the questionnaires, as well as interviewing with the project owner and local stakeholder, CTI Validation Team confirm that the local stakeholder has no negative comments for the construction of the project activity. As confirmed with PP, stakeholder meetings will be held every year to keep on-going

communications with various stakeholders. Therefore, CTI Validation Team was able to confirm that the stakeholder meeting was adequate and appropriate.

As the project change during the construction, a stakeholder meeting was held on 23/03/2020 and 8 farmers in nearby villages attended the meeting. By checking meeting minutes /32/, it could be confirmed that stakeholders are supportive to change of the project.

3.2.3 Environmental Impact

An Environmental Impact Assessment has been conducted by the project participants. Environment Check and Accept Report /28/ which assessed real environment impact of the project after operation was completed and assessed by experts and government authorities. CTI Validation Team has reviewed the documentation of the presented information, eg. EIA Report and EIA Approval. The EIA Approval confirms the correctness of the approach used by PP. In conclusion, the PP have followed the requirements of the host country with regards to addressing environmental impacts as below:

Air Pollution

By checking EIA Report /12/, Environment Check and Accept Report /28/ and site interview with stakeholders, the assessment team confirmed during the construction period, construction dust and road dust has a certain effect to the surrounding areas of construction site. Effective measures are taken and the management is strengthened to limited the impacts only to the surrounding area of the construction site. The influence will disappear as long as the construction is finished.

During the operation period, the air pollution mainly includes the exhaust gas of the flaring system. The exhaust gas is to be treated through purification equipment before being discharged. The NO_x, sulfur dioxide, H₂S, NH₃ and particulate matter in the exhaust gas of the project meets relevant environment standard including Emission standard for pollutants from livestock and poultry breeding industry (GB18596-2001) and Emission standards for odor pollutants (GB14554-93) as per EIA /12/, EIA approval /13/ and Environment Check and Accept Report /28/.

.Therefore, the emission of exhaust gas has little impact on surrounding environment.

Wastewater

During the construction period, the wastewater is mainly domestic sewage and construction wastewater. By checking Environment Check and Accept Report /28/ and site interview with stakeholders, the assessment team confirmed that measures were taken, including reuse construction water for mixing cement; irrigate the trees around the construction site using construction water after precipitation. Temporary toilets are built on the construction site, and the domestic sewage is treated by the toilets and the compost is regularly pulled away by nearby farmers.

During the operation period, the wastewater is mainly domestic sewage and biogas slurry from anaerobic digester. By checking Environment Check and Accept Report /28/ and site interview with stakeholders, the assessment team confirmed that the domestic sewage of the project is reused in anaerobic digester. The biogas slurry will be reused in nearby farmland. No wastewater will be discharged to the environment.

Noise

By checking the Environment Check and Accept Report /28/, the assessment team confirmed that the noise generated by the project construction are mainly mechanical noise and has a slight impact on the surrounding sensitive points, and its pollution impact is localized and short-term. Reasonable measures have been taken to reduce the noises to acceptable range. Furthermore, the project is located in no residential areas.

During the operation period, the noise is mainly the sound of pumps and fans in the animal manure treatment area. As per the Environment Check and Accept Report /28/ and site visit, the assessment team confirmed that measures have been taken to effectively reduce the noises to standard values, i.e. Class 2 standard in the "Environmental Noise Emission Standard for Industrial Enterprise Plant Boundaries" (GB12348-2008).

Solid Waste

By checking the Environment Check and Accept Report /28/ and interview with stakeholder, the assessment team confirmed during the construction period, a certain amount of construction waste and domestic waste from construction workers will be generated, of which part of the construction waste will be recycled, and the unusable waste will be handed over to the sanitation department for disposal. After the above measures are taken, the solid waste of the project will not cause pollution to the surrounding environment.

During the operation period, the solid waste of the project is mainly biogas residue, and domestic garbage. By checking the Environment Check and Accept Report /28/ and site visit, the assessment team confirmed the biogas residue are sent outside of the project site for composting and returned to the nearby farmland for comprehensive utilization. The domestic garbage will be collected and sent to disposal by local sanitation department

In conclusion, after the above measures are performed, the negative impacts on environment will be minimized below the requirements of laws and regulations during the construction and operational period.

After the above measures are performed, the negative impacts on environment will be minimized below the requirements of laws and regulations during the construction and operational period.

3.2.4 Public Comments

CTI Validation Team noted that this project was open for public comment from 24/02/2023 to 26/03/2023. The detail was checked by CTI Validation Team in the following web platform: <https://registry.verra.org/app/projectDetail/VCS/4168>. During the period, one public comments were received:

Comment 1: In the PD, it said the biomass residue waste is treated in the solid waste disposal site. However, in China, there's no way the biomass residue waste is treated in SWDS. the SWDS in China is used to landfill domestic garbage only. The garbage collection system between the farm land and the SWDS is not exist at all in the project site. the PP shall clarify with solid evidence how they come to the conclusion that the biomass residue waste is treated in SWDS in the baseline. this issue lead to a significant over estimation of ER. Section 4.4 of the PD, the baseline emissions include the emissions from waste water treatment. However the wastewater does not exist at all in the baseline scenario, as

the wastewater is actually the water content in the animal manure which was separated from the dry matter content of the manure in the project scenario. the baseline emissions from the wastewater are actually a part of the baseline emissions from animal manure. Apparently this part of baseline emissions are double counted, which lead to a significant over estimation of ER.

Any updates to the project design or demonstrate the insignificance or irrelevance of comments:

By on-site inspection, it could be confirmed that the project does not involve biomass. However, as per EIA /12/ of the project, aerobic composting was planned to treat the swine manure with mixture of biomass during the project design, while the anaerobic digestion system is applied instead of aerobic composting in the project situation and biomass is not involved. Via on-site inspection and confirmation from PP, CTI is able to confirm that the stacking sites of the biomass before being used or disposed of were mistakenly regarded as SWDS, which lead to the conclusion that the biomass residue waste is treated in SWDS in the baseline. Also, Via on-site inspection and confirmation from PP, it could be confirmed by CTI that the “wastewater” mentioned in the PD version 01 is water content in the animal manure actually, which is animal manure. As per on-site inspection, confirmation from PP and operation log of the project /16/, the project situation does not involve biomass or wastewater treatment mentioned above as design change of the project:

By site inspection and confirmation from PP, it could be confirmed that the PP has changed the applied treatment technology from aerobic composting to anaerobic digestion and biogas flaring. The project activity started construction on 20/02/2020 /20/ and part of the aerobic composting facilities have been constructed /31/. However, as the aerobic composting system needs to cover a big area of land which is bigger than the land allocated for the system and faces governmental approval risk, the PP decided to change the treatment method from aerobic composting to anaerobic digestion and biogas flaring on 05/03/2020 /31/. The anaerobic digestion system have been constructed and the installed aerobic composting facilities did not put into use.

The change does not belong major items change list for pollution impact construction projects and re-approval procedure from local government is not required while the environment impact of the change shall be assessed during the “Environment Check and Accept” procedure. Environment Check and Accept Report of the project was completed by Guizhou Longsheng Environmental Protection Technology Co., Ltd after operation of the project, which was examined by experts and government authorities and submitted to the official website. It was confirmed by experts and government authorities in the Environment Check and Accept Report that there is no significant environmental impacts or net harm caused by the project change. Therefore, it could be confirmed that the change of the project is in compliance with relative laws and regulations in China.

As impacts of Corona Virus Disease 2019, the consultant team and PP could not work on-site and project information was collected through internet and Wechat, as a result, the project information was not provided completely. The FSR, EIA approvals and other information was provided while the Environment Check and Accept Report was not provided. The PD version 01 open for public comment was prepared based on the FSR and EIA approved by local government authorities and the manure was designed to be treated with aerobic composting. The PD version 02 was prepared based on the Environment Check and Accept Report and information collected during site inspection. Thus, the biomass residual is not involved in the project activity and no over estimation of ER would occur.

A CAR has been raised for change of the applied technology and the PD and ER spreadsheet have been modified according which has been checked by CTI. The CAR is closed.

By checking the ER spreadsheet, it could be confirmed that the emission reductions is calculated as per AMS-III.D and the baseline emissions are calculated as per equation 1 of AMS-III.D and there is no over estimation of ER.

3.2.5 AFOLU-Specific Safeguards

The project activity is not an AFOLU project.

For non-AFOLU projects, this section is not required.

3.3 Application of Methodology

3.3.1 Title and Reference

CTI Validation Team checked that following methodology and tools are applicable for the project activity as below:

Title	Methane recovery in animal manure management systems
Type III	The project activity meets the eligibility criteria of small scale project as the estimated annual average GHG emission reductions or removal per year is 28,075 tCO _{2e} which is less than 60,000 tonnes of CO _{2e} per year.
Methodology	Methane recovery in animal manure management systems, AMS-III.D., Version 21.0
Sectoral scope(s)	13, 15
Category	Approved Small Scale Methodology
Tools	Tools referred with above methodology and applicable for project activity are: - Tool 06: Project emissions from flaring, Version 04.0 - Tool 14: Project and leakage emissions from anaerobic digesters, version 02.0

3.3.2 Applicability

For the project activity, the applicability of baseline methodology and methodological tool is justified as below:

Applicability criteria	Justification of the project situation
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	By checking the Environment Check and Accept Report /28/ and through on-site interview, CTI Validation Team confirmed that the project activity uses a new anaerobic animal manure management system to treat manure waste

<p>use of the recovered methane. It also covers treatment of manure collected from several farms in a centralized plant.</p>	<p>(swine) from Huangping Aonong Swine Breeding Farm, which is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China. The project activity replaces existing anaerobic animal manure management system (open lagoon) in Huangping Aonong Swine Breeding Farm, of which the main purpose is to achieve methane recovery and destruction by flaring.</p> <p>Therefore, it is confirmed that this criteria is applicable.</p>
<p>This methodology is only applicable under the following conditions:</p> <p>(a)The livestock population in the farm is managed under confined conditions;</p> <p>(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;</p> <p>(c)The annual average temperature of baseline site where anaerobic manure treatment facility is located is higher than 5°C;</p> <p>(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;</p> <p>(e)No methane recovery and destruction by flaring or combustion for gainful use takes place in the baseline scenario.</p>	<p>By checking the Environment Check and Accept Report /28/ and through on-site inspection, it is confirmed that all the livestock population in the farm are captive breeding, which is managed under confined conditions. Therefore, condition (a) is applicable.</p> <p>By checking the Environment Check and Accept Report /28/, operation log /16/ and through on-site inspection, it is confirmed that manure or the streams obtained after treatment are not discharged into natural water resources, including river and estuaries. As per Regulations on Prevention and Control of Pollution from Livestock and Poultry Farming, it is prohibited to discharge waste water into natural water resources directly without treatment. Therefore, condition (b) is applicable.</p> <p>By checking public information /25/, it is confirmed the annual average temperature of baseline site where anaerobic manure treatment facility is located, i.e. the project location, is 15.4 °C , which is higher than 5°C. Therefore, condition (c) is applicable.</p> <p>By checking Environment Check and Accept Report /28/, photos of baseline open lagoons /27/, operation log /16/ and interviewing PP during site visit, it is confirmed that the baseline scenario the retention time of manure waste in the anaerobic treatment system (open lagoon) is greater than one month and the depth of the open lagoon is 3m and greater than 1m. As per Design code for wastewater stabilization ponds (GJJ/T54-93), the depth of anaerobic lagoons should be 3-5m. Therefore, condition (d) is applicable.</p> <p>By checking Environment Check and Accept Report /28/ and interview PP during site visit, it is confirmed that no methane recovery and destruction by flaring or combustion for gainful use</p>

	<p>takes place in the baseline scenario. Therefore, condition (e) is applicable.</p>
<p>The project activity shall satisfy the following conditions:</p> <p>(a)The residual waste from the animal manure management system shall be handled aerobically, otherwise the 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;</p> <p>(b)Technical measures shall be used (including a flare for exigencies) to ensure that all biogas produced by the digester is used or flared;</p> <p>(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.</p>	<p>By checking the Environment Check and Accept Report /28/, and interviewing with PP during site visit, and through site inspection, it is confirmed that the The residual waste from the digester will be used for agriculture fertilization aerobically in the nearby farmlands. Therefore, condition (a) is applicable.</p> <p>By checking Environment Check and Accept Report /28/, as well as site inspection, it is confirmed that a flaring system will be installed to ensure that all biogas produced by the digester is flared. Therefore, condition (b) is applicable.</p> <p>By checking Environment Check and Accept Report /28/ and operation log /16/, it is confirmed that the storage time of the manure after removal from the animal barns, including transportation, are 5-7 hours, not exceed 45 days before being fed into the anaerobic digester. Therefore, condition (c) is applicable.</p>
<p>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".</p>	<p>By checking Environment Check and Accept Report /28/, operation log /16/ and EIA Approval /13/, it is confirmed that the project activity recovers methane from a new anaerobic animal manure management system used by Huangping Aonong Swine Breeding Farm, not from landfills, or wastewater treatment, or composting of animal manure, or co-digestion of animal manure and other organic matters. Therefore, this criteria is irrelative.</p>
<p>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 accordingly, using zero as its emission factor; however, energy used for such purposes is not eligible as an SSC CDM Type I project component.</p>	<p>Irrelative as the project activity uses methodology AMS-III.D., not AMS-III.H.</p>

<p>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".</p>	<p>The project activity is a Greenfield project, which recovers methane from a new anaerobic animal manure management system used by Huangping Aonong Swine Breeding Farm.</p> <p>The project activity meets the eligibility criteria of small scale project, i.e. "General guidelines for SSC CDM methodologies", as the estimated annual average GHG emission reductions or removal per year is 28,075 tCO₂e which is less than 60,000 tonnes of CO₂e per year.</p> <p>Therefore, it is confirmed that this criteria is applicable.</p>
<p>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".</p>	<p>By checking the Environment Check and Accept Report /28/, and interviewing with PP during site visit and through site inspection, it is confirmed the project activity replaced existing anaerobic animal manure management system (open lagoon), and no equipment was replaced by the project activity. Therefore, this criteria is not applicable.</p>
<p>Measures are limited to those that result in aggregate emission reductions of less than or equal to 60 kt CO₂ equivalent annually from all Type III components of the project activity.</p>	<p>All Type III components of the project activity recovered and destroyed an estimated annual average GHG (methane) emission of 28,075 tCO₂e which is less than 60,000 tonnes of CO₂e per year. Therefore, this criteria is applicable.</p>

Applicability conditions of "Tool 06: Project emissions from flaring"

Applicability criteria	Justification of the project situation
<p>The tool is applicable to enclosed or open flares and project participants should document in the CDM-PDD the type of flare used in the project activity.</p>	<p>By site inspection, it is confirmed that enclosed flare system will be used by the project activity for combustion of biogas generated.</p> <p>Therefore, this criteria is applicable.</p>
<p>This tool is applicable to the flaring of flammable greenhouse gases where:</p> <p>(a) Methane is the component with the highest concentration in the flammable residual gas; and</p> <p>(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).</p>	<p>By onsite inspection, it is confirmed that the generated biogas with high methane concentration and the source of the residue gas is a gas from biogas.</p> <p>Therefore, this criteria is applicable.</p>
<p>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,</p>	<p>By checking Environment Check and Accept Report /28/ and on site inspection, it is confirmed that the project activity uses a new anaerobic animal manure management system to treat manure waste without utilization of auxiliary fuels. The</p>

<p>there shall be operating specifications provided by the manufacturer of the flare.</p>	<p>residual gas contains high concentration methane and therefore have sufficient flammable gas present to sustain combustion. The operation specifications have been provided by the manufacturer of the flare and has been validated by CTI.</p> <p>Therefore, this criteria is applicable.</p>
---	---

Applicability conditions of "Tool 14: Project and leakage emissions from anaerobic digesters"

Applicability criteria	Justification of the project situation
<p>The following sources of project emissions are accounted for in this tool:</p> <p>(a) CO₂ emissions from consumption of electricity associated with the operation of the anaerobic digester;</p> <p>(b) CO₂ emissions from consumption of fossil fuels associated with the operation of the anaerobic digester;</p> <p>(c) CH₄ emissions from the digester (emissions during maintenance of the digester, physical leaks through the roof and side walls, and release through safety valves due to excess pressure in the digester); and</p> <p>(d) CH₄ emissions from flaring of biogas.</p>	<p>By checking Environment Check and Accept Report /28/ and during on site inspection, it is confirmed that the project emissions include CO₂ emissions from consumption of electricity associated with the operation of the anaerobic digester (a); CH₄ emissions from the digester (c); and CH₄ emissions from flaring of biogas (d).</p> <p>By checking Environment Check and Accept Report /28/ and through on site inspection, it is confirmed the project does not involve fossil fuel consumption, and therefore the CO₂ emission from use of fossil fuels is not included (b).</p>
<p>The following sources of leakage emissions are accounted for in this tool:</p> <p>(a) CH₄ and N₂O emission from composting of digestate;</p> <p>(b) CH₄ emissions from the anaerobic decay of digestate disposed in a SWDS or subjected to anaerobic storage, such as in a stabilization pond.</p>	<p>Not applicable. By checking Environment Check and Accept Report /28/, it is confirmed that the project activity does not involve composting of digestate or anaerobic decay of digestate disposed in a SWDS or subjected to anaerobic storage, such as in a stabilization pond.</p>
<p>Emission sources associated with N₂O 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.</p>	<p>Applicable, as per AMSIII.D., N₂O are minor emission sources and therefore was neglected.</p>

The tool is not applicable to other systems where waste may be decomposed anaerobically, for instances stockpiles, SWDS or unaerated lagoons.	Applicable. The project activity will treat manure with anaerobic digester and does not involve systems where waste may be decomposed anaerobically, for instances stockpiles, SWDS or unaerated lagoons.
---	--

CTI Validation Team confirmed that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. AMS-III.D. Version 21.0 is applicable to the project activity.

The project activity is a Type III project with annual average GHG emission reductions or removal per year of the project activity is 28,075 tCO₂e, less than 60,000 tonnes of CO₂e per year, which is applicable as per small scale project activities methodology AMS-III.D. Version 21.0.

3.3.3 Project Boundary

As per AMS-III.D., the project boundary includes the physical, geographical site(s) of:

- (a) The livestock;
- (b) Animal manure management systems (including centralized manure treatment plant where applicable);
- (c) Facilities which recover and flare/combust or use methane.

Therefore, CTI Validation Team confirmed that the project boundary of the project activity includes the physical and geographical sites of the project activity, the animal manure management system and the enclosed flaring system which is used to flare biogas.

The sources and GHG gases involved for the Project activity are as below.

Source		Gas	Included?	Justification/Explanation
Baseline	Direct emissions from the manure treatment processes	CO ₂	No	Excluded for simplification. This is conservative.
		CH ₄	Yes	By checking EIA Report /12/, it is confirmed this is the major emission source.
		N ₂ O	No	Excluded for simplification. This is conservative.
Project	Physical leakage of biogas in the manure management systems	CO ₂	No	Excluded for simplification. This emission source is assumed to be very small.
		CH ₄	Yes	By checking EIA Report /12/, it is confirmed this is the major emission source.
		N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small.

Source	Gas	Included?	Justification/Explanation
Emissions from flaring or combustion of the gas stream	CO ₂	No	Excluded for simplification. This emission source is assumed to be very small.
	CH ₄	Yes	By checking EIA Report /12/, it is confirmed this is the major emission source.
	N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small.
Emissions from use of fossil fuels or electricity	CO ₂	Yes	By checking EIA Report /12/ and through on site inspection, it is confirmed the project consumes electricity during operation, and therefore CO ₂ emissions from use of electricity is the main emission source. By checking EIA Report /12/ and through on site inspection, it is confirmed the project does not involve fossil fuel consumption, and therefore the CO ₂ emission from use of fossil fuels is not included.
	CH ₄	No	Excluded for simplification. This emission source is assumed to be very small.
	N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small.
Emissions from incremental transportation distances	CO ₂	No	No incremental transportation involved.
	CH ₄	No	Through onsite inspection, it is confirmed that the digester is installed within the swine farm, and therefore no incremental transportation is involved in the project activity.
	N ₂ O	No	No incremental transportation involved.
Emissions from the storage of manure	CO ₂	No	Excluded for simplification. This emission source is assumed to be very small.
	CH ₄	No	By checking EIA Report /12/ and interviewed with PP during site visit, it is confirmed the storage time of the manure after removal from the animal barns is 5-7 hours, which is within 24 hours before being fed into the anaerobic digester, therefore emissions from the storage of manure is excluded.
	N ₂ O	No	Excluded for simplification. This emission source is assumed to be very small.

3.3.4 Baseline Scenario

By checking Environmental Impact Assessment (EIA) approval, CTI Validation Team confirms that the project activity has been approved by Chinese government. By checking laws and regulations, it is confirmed that the project activity is in complicate with all laws and regulations in China.

As per AMS-III.D., 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.

As per CDM Validation and Verification Standard for project activities version 03.0, "where the baseline scenario is not prescribed in the approved methodology, the DOE shall assess the list of identified credible alternatives to the project activity in the VCS PD selected to determine the most realistic baseline scenario." As the selected small scale methodology clearly mention the baseline scenario and the same has been opted in this project, therefore, no further analysis on baseline is required.

CTI Validation Team confirms that the VCS PD conforms to the guidance given by EB via CDM Validation and Verification Standard for project activities version 03.0 and VCS via VCS standard version 4.4.

Therefore, CTI Validation Team confirms that the baseline scenario of the project activity is:

The animal manure waste was left to decay in anaerobic manure management system (lagoon) at the livestock farm and methane is emitted to the atmosphere directly without any methane recovery and destruction facility.

CTI has validated the baseline scenario information by checking photos of baseline open lagoon at the farm /27/, relative records of local agricultural and rural bureau/39/ and operation record of the livestock farm /36/ and by interviewing with director of Huangping County Environment Protection Bureau.

3.3.5 Additionality

As per AMS-III.D, 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. If so, it is not required to apply the "Guidelines on the demonstration of additionality of small-scale project activities". This additionality condition also applies to Greenfield project activities.

CTI confirmed that there is no regulation in China, applicable to the project site, that requires the collection and destruction of methane from livestock manure through checking relevant laws and regulations, i.e.:

- a) Law of the People's Republic of China on Environment Protection;
- b) Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution;
- c) Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution;
- d) Regulations on prevention and control of pollution from large scale livestock and poultry breeding;

- e) Discharge standard of pollutants for livestock and poultry breeding (GB/T 18596);
- f) Technical standard of pollution prevention for livestock and poultry breeding (HJ/T 81).

Therefore, the project activity is deemed automatically additional, which is in line with AMS-III.D.

3.3.6 Quantification of GHG Emission Reductions and Removals

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

Baseline emissions

As per AMS-III.D., 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. Baseline emissions (BE_y) are calculated by using one of the following two options:

- (a) Using the amount of the waste or raw material that would decay anaerobically in the absence of the project activity, with the most recent IPCC Tier 2 approach (please refer to the chapter 'Emissions from Livestock and Manure Management' under the volume 'Agriculture, Forestry and other Land use' of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories). For this calculation, information about the characteristics of the manure and of the management systems in the baseline is required. Manure characteristics include the amount of volatile solids (VS) produced by the livestock and the maximum amount of methane that can be potentially produced from that manure (B_0);
- (b) Using the amount of manure that would decay anaerobically in the absence of the project activity based on direct measurement of the quantity of manure treated together with its specific volatile solids (SVS) content.

PP selected option (a) to calculate baseline emissions for the project activity. As per AMS-III.D., the baseline emissions are calculated as:

$$BE_y = GWP_{CH_4} \times D_{CH_4} \times UF_b \times \sum_{j,LT} MCF_j \times B_{0,LT} \times N_{LT,y} \times VS_{LT,y} \times MS\%_{BL,j} \quad \text{Equation (1)}$$

Where:

BE_y	=	Baseline emissions in year y (t CO ₂ e)
GWP_{CH_4}	=	Global Warming Potential (GWP) of CH ₄ applicable to the crediting period (t CO ₂ e/t CH ₄)
D_{CH_4}	=	CH ₄ density (0.00067 t/m ³ at room temperature (20 °C) and 1 atm pressure)
LT	=	Index for all types of livestock
j	=	Index for animal manure management system
MCF_j	=	Annual methane conversion factor (MCF) for the baseline animal manure management system j

$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated for animal type LT ($m^3 CH_4/kg\text{-dm}$)
$N_{LT,y}$	=	Annual average number of animals of type LT in year y (numbers)
$VS_{LT,y}$	=	Volatile solids production/excretion per animal of livestock LT in year y (on a dry matter weight basis, $kg\text{-dm}/animal/year$)
$MS\%_{BL,j}$	=	Fraction of manure handled in baseline animal manure management system j
UF_b	=	Model correction factor to account for model uncertainties (0.94)

(a) The maximum methane-producing capacity of the manure (B_0) varies by species and diet. The preferred method to obtain B_0 measurement values is to use data from country-specific published sources, measured with a standardized method (B_0 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 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10 table 10.16 can be used, provided that the project participants assess the suitability of those data to the specific situation of the treatment site;

(b) VS are the organic material in livestock manure and consist of both biodegradable and non-biodegradable fractions. For the calculations the total VS excreted by each animal species is required.

As there is no published country specific data available, so we could not use Option i. The energy intake of the swine is not available, so we could not use Option ii. As the average mass of market swine (61 kg) and breeding swine (190kg) at the project site is not similar to the default value (56 kg for market swine and 160 kg for breeding swine) in the 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, option iii could not be used.

As the site-specific average animal weight could be measured on-site, the PP selects to adjust default IPCC values for VS for a site-specific average animal weight and the following equation shall be used:

$$VS_{LT,y} = \left(\frac{W_{site}}{W_{default}} \right) \times VS_{default} \times nd_y \quad \text{Equation (2)}$$

Where:

W_{site}	Average animal weight of a defined livestock population at the project site (kg)
$W_{default}$	Default average animal weight of a defined population, this data is sourced from IPCC 2006 (kg)
$VS_{default}$	Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population ($kg\text{-dm}/animal/day$)
nd_y	Number of days treatment plant was operational in year y

The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, W_{default} value of 56 kg is applied for market swine and 160 kg for breeding swine.

VS_{default} is calculated with volatile solid excretion rate value and W_{default} ($VS_{\text{default}} = \text{volatile solid excretion rate value} \times W_{\text{default}} \div 1000$). The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass) $^{-1}\text{day}^{-1}$ is applied for market swine and 2.3 kg VS (1000 Kg animal mass) $^{-1}\text{day}^{-1}$ for breeding swine.

The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, Asia, and the involved swine farm is high productivity systems. According to 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, the maximum methane producing potential($B_{0,LT}$) for Market swine and Breeding swine in Asia region is 0.45 m³ CH₄/kg-dm.

(c) Methane Conversion Factors (MCF) values are determined for a specific manure management system and represent the degree to which B_0 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 10.17, chapter 10, volume 4, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories can be used. The site annual average temperature (15.4°C and a ratio of potential evapotranspiration (<960mm) to precipitation (1,307.9 mm) < 1 (Warm temperate dry)), which was confirmed to be taken from official data at the nearest meteorological station, or from data available from historical on site observations by checking information from official websites of Guizhou Province and Qiandongnan Miao and Dong Autonomous Prefecture /25/.

(d) The annual average number of animals ($N_{LT,y}$) is determined as follows:

$$N_{LT,y} = N_{da,y} \times \left(\frac{N_{p,y}}{365} \right) \quad \text{Equation (3)}$$

Where:

$N_{da,y}$ = Number of days animal is alive in the farm in the year y (numbers)

$N_{p,y}$ = Number of animals produced annually of type LT for the year y (numbers)

The parameters used to calculate BE_y ex-ante is determined and justified as below:

Parameter	Value	Data sources
GWP _{CH4}	28 tCO ₂ e/tCH ₄	IPCC Fifth Assessment Report (AR5)

D _{CH4}	0.00067 t/m ³	As per AMS-III.D, CH ₄ density is 0.00067 t/m ³ at room temperature (20 °C) and 1 atm pressure.
UF _b	0.94	As per AMS-III.D, the value of this parameter is 0.94, which is sourced from FCCC/SBSTA/2003/10/Add.2, page 25.
MCF _j	76%	The project activity is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, where the annual average temperature is 15.4°C and a ratio of potential evapotranspiration (<960mm) to precipitation (1,307.9 mm) < 1 (Warm temperate dry) through checking public information /25/. As per 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories Volume 4 chapter 10 table 10.17, 76% is applied for MCF _j , considering the baseline manure management system and specific annual average temperature in local area.
B _{0,LT}	Market swine: 0.45 m ³ CH ₄ /kg-VS Breeding swine: 0.45 m ³ CH ₄ /kg-VS	The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, Asia, and the involved swine farm is high productivity systems. According to 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, the maximum methane producing potential(B _{0,LT}) for Market swine and Breeding swine in Asia region is 0.45 m ³ CH ₄ /kg-dm.
Default VS excretion rate (VS _{rate})	Market swine: 5.1 kg VS (1000 kg animal mass) ⁻¹ day ⁻¹ Breeding swine:2.3 kg VS (1000 kg animal mass) ⁻¹ day ⁻¹	The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹ is applied for market swine and 2.3 kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹ for breeding swine.
W _{default}	Market swine: 56 kg Breeding swine: 160 kg	The project is located located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, W _{default} value of 56 kg is applied for market swine and 160 kg for breeding swine.
W _{site}	Market swine: 61 kg Breeding swine: 190 kg	As per EIA Report /12/, as well as interview with PP and stakeholders during site visit, it is confirmed that W _{site} of market swine and breeding swine is 61 kg and 190 kg separately.

VS _{default}	Market swine: 0.2856 kg/hd/day Breeding swine: 0.3680 kg/hd/day	The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹ is applied for market swine and 2.3 kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹ for breeding swine. VS default value is calculated with the default values for volatile solid excretion rate and W _{default} .
MS% _{BI,j}	100%	As per EIA Report /12/, as well as interview with PP and stakeholders during site visit, it is confirmed all manure were handled in baseline scenario, therefore, value of this parameter is 100%.
nd _y	365 days	As per EIA Report /12/, as well as interview with PP during site visit, it is confirmed that treatment plant was operational the whole year, which is 365 days.
N _{da,y}	Market swine: 150 days Breeding swine: 365 days	As per EIA Report /12/, as well as interview with PP during site visit, it is confirmed that breeding swine is alive in the farm the whole year, which is 365 days and the market swine is alive in the farm for 150 days..
N _{p,y}	Breeding swine: 6,000 Market swine: 100,000	By checking EIA Report /12/ and EIA Approval /13/, it is confirmed that the number of breeding swine produced annually is 6,000. and the number of market swine produced annually is 100,000.

As per equations and parameters justified above, the baseline emissions of methane from the manure treatment processes of the project activity is calculated as:

Index for all types of livestock (LT)	The annual average number of animals (N _{LT,y})	Volatile solids production of livestock LT in year y (VS _{LT,y}) (kg-dm/animal/year) $VS_{LT,y} = VS_{rate} * TAM / 1000 * 365$	Baseline Emissions (BE _y) tCO ₂ e
Market swine	41,096	113.55	28,143
Breeding Swine	6,000	159.51	5,711
Total	-	-	33,914

Project emissions

Project activity emissions consist of:

- (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) CO₂ emissions from use of fossil fuels or electricity for the operation of all the installed facilities ($PE_{power,y}$);
- (d) CO₂ emissions from incremental transportation distances;
- (e) Emissions from the storage of manure before being fed into the anaerobic digester ($PE_{storage,y}$).

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{power,y} + PE_{transp,y} + PE_{storage,y} \quad \text{Equation (4)}$$

Where:

- PE_y = Project emissions in year y (t CO₂e)
- $PE_{PL,y}$ = Emissions due to physical leakage of biogas in year y (t CO₂e)
- $PE_{flare,y}$ = Emissions from flaring or combustion of the biogas stream in the year y (t CO₂e)
- $PE_{power,y}$ = Emissions from the use of fossil fuel or electricity for the operation of the installed facilities in the year y (t CO₂e)
- $PE_{transp,y}$ = Emissions from incremental transportation in the year y (t CO₂e), as per relevant paragraph in AMS-III.AO
- $PE_{storage,y}$ = Emissions from the storage of manure (t CO₂e)

- Emissions due to physical leakage of biogas in year y

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:

(a) 10% of the maximum methane producing potential of the manure fed into the management systems implemented by the project activity:

PP selected para 17(a) from AMS-III.D., as per AMS-III.D., if the option in paragraph 0 is chosen, it is determined as:

$$PE_{PL,y} = 0.10 \times GWP_{CH_4} \times D_{CH_4} \times \sum_{i,LT} B_{0,LT} \times N_{LT,y} \times VS_{LT,y} \times MS\%_{i,y} \quad \text{Equation (5)}$$

Where:

$MS\%_{i,y}$ = Fraction of manure handled in system i in year y

As per equations justified above and parameters justified at this section, the project emissions due to physical leakage of biogas of the project activity is calculated as:

Index for all types of livestock (LT)	The annual average number of animals ($N_{LT,y}$)	Volatile solids production of livestock LT in year y ($VS_{LT,y}$) (kg-dm/animal/year)	Physical leakage of biogas ($PE_{PL,y}$) (tCO ₂ e)
Market swine	41,096	113.55	3,940
Breeding Swine	6,000	159.51	808
Total	-	-	4,748

- Emissions from flaring or combustion of the biogas stream in the year y

In the case of flaring of the recovered biogas, project emissions are estimated using the procedures described in the methodological tool "Project emissions from flaring" (version 04.0). As per this tool, project emissions from flaring ($PE_{flare,y}$) are calculated as the sum of emissions for each minute m in year y , based on the methane mass flow in the residual gas ($F_{CH_4,RG,m}$) and the flare efficiency ($\eta_{flare,m}$), as follows:

$$PE_{flare,y} = GWP_{CH_4} \times \sum_{m=1}^{525600} F_{CH_4,RG,m} \times (1 - \eta_{flare,m}) \times 10^{-3} \quad \text{Equation (6)}$$

Where:

GWP_{CH_4} = Global warming potential of methane valid for the commitment period (tCO₂e/tCH₄)

$F_{CH_4,RG,m}$ = Mass flow of methane in the residual gas in the minute m (kg)
 $\eta_{flare,m}$ = Flare efficiency in minute m. In ex-ante calculation, this parameter adopts 90%.

$F_{CH_4,RG,m}$ is mass flow of methane in the residual gas in the minute m (kg), which is calculated as follows:

$$\sum_{m=1}^{525600} F_{CH_4,RG,m} = Q_{CH_4,y}$$

As per the methodological tool “Project and leakage emissions from anaerobic digesters” (version 02.0), the quantity of methane produced in the anaerobic digester ($Q_{CH_4,y}$) is calculated as follows:

$$Q_{CH_4,y} = Q_{biogas,y} \times f_{CH_4,default} \times \rho_{CH_4} \quad \text{Equation (7)}$$

Where:

$Q_{biogas,y}$ = Amount of biogas collected at the digester outlet in year y (Nm³ biogas),
 $f_{CH_4,default}$ = Default value for the fraction of methane in the biogas (m³CH₄/ m³ biogas).
 ρ_{CH_4} = Density of methane at normal conditions (t CH₄ / Nm³ CH₄).

As per equations justified above and parameters justified at this section, the project emissions from flaring or combustion of the biogas stream of the project activity is calculated as:

Anaerobic animal manure management systems	Mass methane in the residual gas $\sum_{m=1}^{525600} F_{CH_4,RG,m}$ (tonnes)	Emissions from flaring or combustion of the biogas stream in the year y $PE_{flare,y}$ (tCO ₂ e)
-	$\sum_{m=1}^{525600} F_{CH_4,RG,m} = Q_{CH_4,y} = Q_{biogas,y} \times f_{CH_4,default} \times \rho_{CH_4}$	$PE_{flare,y} = GWP_{CH_4} \times \sum_{m=1}^{525600} F_{CH_4,RG,m} \times (1 - \eta_{flare,m}) \times 10^{-3}$
Anaerobic animal manure management systems	388	1,085
Total	-	1,085

- Emissions from the use of fossil fuel or electricity for the operation of the installed facilities in the year y

Project emissions from electricity and fossil fuel consumption are determined by following the methodological tool "Project and leakage emissions from anaerobic digesters", where $PE_{Power,y}$ is the sum of $PE_{EC,y}$ and $PE_{FC,y}$ in the tool.

$$PE_{power} = PE_{EC,y} + PE_{FC,y} \quad \text{Equation (8)}$$

Where:

$PE_{EC,y}$ = Project emissions from electricity consumption associated with the anaerobic digester in year y (tCO₂)

$PE_{FC,y}$ = Project emissions from fossil fuel consumption associated with the anaerobic digester in year y (tCO₂)

By checking EIA Report /12/ and through site inspection, it is confirmed that the project use electricity, not fossil fuel for operation of the installed facilities, therefore, the emissions from the use of fossil fuel are not considered. Therefore, $PE_{power} = PE_{EC,y}$

As per the methodological tool "Project and leakage emissions from anaerobic digesters" (version 02.0), project emissions from electricity consumption associated with the anaerobic digester are calculated as follows:

$$PE_{EC,y} = Q_{CH_4,y} \times F_{EC,default} \times EF_{EL,default} \quad \text{Equation (9)}$$

Where:

$Q_{CH_4,y}$ = Quantity of methane produced in the anaerobic digester in year y (tCH₄)

$F_{EC,default}$ = Default factor for the electricity consumption associated with the anaerobic digester per ton of methane generated (MWh/tCH₄). By checking EIA Report /12/ and onsite inspection, it is confirmed that the project activity uses conventional digester. Therefore, 0 is applied.

$EF_{EL,default}$ = Default emission factor for the electricity consumed in year y (tCO₂/MWh).

For $EF_{EL,default}$, the value of 1.3tCO₂/MWh is applied which is in line with "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" and conservative. This project uses upflow anaerobic sludge blanket reactor digester; So, the project shall use default value 0.01 MWh/tCH₄.

As per the methodological tool "Project and leakage emissions from anaerobic digesters" (version 02.0), the quantity of methane produced in the anaerobic digester ($Q_{CH_4,y}$) is calculated as equation (7).

As per equations justified above and parameters justified at this section, the project emissions from the use of fossil fuel or electricity for the operation of the installed facilities of the project activity is calculated as:

Anaerobic animal manure management systems	The quantity of methane produced in the anaerobic digester in year y $Q_{CH_4,y}$ (tonnes)	Emissions from electricity consumption associated with the anaerobic digester in year y $PE_{EC,y}$ (tCO _{2e})	Emissions from the use of fossil fuel or electricity for the operation of the installed facilities in year y $PE_{power,y}$ (tCO _{2e})
--	--	--	--

-	$Q_{CH_4,y} = Q_{biogas,y} \times f_{CH_4,default} \times \rho_{CH_4}$	$PE_{EC,y} = Q_{CH_4,y} \times F_{EC,default} \times EF_{EL,default}$	$PE_{power,y} = PE_{EC,y}$
Anaerobic animal manure management systems	388	6	6
Total			6

- Emissions from incremental transportation in the year y

By checking EIA Report /12/, EIA Approval /13/, as well as through site inspection, it is confirmed that the digester is installed within the geographic boundary of the swine farm (project site), therefore, the project activity does not involve incremental transportation and emissions from incremental transportation is 0.

- Emissions from the storage of manure

As per para 24 of 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:

- The storage time of the manure after removal from the animal barns, including transportation, exceeds 24 hours before being fed into the anaerobic digester;
- The dry matter content of the manure when removed from the animal barns is less than 20%.

By checking EIA Report /12/ of the project activity and interview with PP during site visit, it is confirmed that the storage of manure before being fed into the anaerobic digester is 5-7 hours. Therefore, condition(a) is not satisfied and project emissions of storage of manure are not considered.

The parameters used for calculation of project emissions are justified as follows:

Parameter	Value	Data sources
GWP_{CH_4}	28 tCO _{2e} /tCH ₄	IPCC Fifth Assessment Report (AR5)
$D_{CH_4} (\rho_{CH_4})$	0.00067 t/m ³	As per AMS-III.D., CH ₄ density (0.00067 t/m ³ at room temperature (20°C) and 1 atm pressure).
$B_{0,LT}$	Market swine: 0.45 m ³ CH ₄ /kg-VS Breeding swine: 0.45 m ³ CH ₄ /kg-VS	The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, Asia, and the involved swine farm is high productivity systems. According to 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, the maximum methane producing potential($B_{0,LT}$) for Market swine and Breeding swine in Asia region is 0.45 m ³ CH ₄ /kg-dm.
Default VS excretion rate	Market swine: 5.1 kg VS (1000 kg	The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved

	<p>animal mass)⁻¹day⁻¹ ₁</p> <p>Breeding swine: 2.3 kg VS (1000 kg animal mass)⁻¹day⁻¹ ₁</p>	<p>swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter 10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass)⁻¹day⁻¹ is applied for market swine and 2.3 kg VS (1000 Kg animal mass)⁻¹day⁻¹ for breeding swine.</p>
W _{default}	<p>Market swine: 56 kg</p> <p>Breeding swine: 160 kg</p>	<p>The project is located located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter 10, W_{default} value of 56 kg is applied for market swine and 160 kg for breeding swine.</p>
W _{site}	<p>Market swine: 61 kg</p> <p>Breeding swine: 190 kg</p>	<p>As per EIA Report /12/, as well as interview with PP and stakeholders during site visit, it is confirmed that W_{site} of market swine and breeding swine is 61 kg and 190 kg separately.</p>
VS _{default}	<p>Market swine: 0.2856 kg/hd/day</p> <p>Breeding swine: 0.3680 kg/hd/day</p>	<p>The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter 10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass)⁻¹day⁻¹ is applied for market swine and 2.3 kg VS (1000 Kg animal mass)⁻¹day⁻¹ for breeding swine. VS default value is calculated with the default values for volatile solid excretion rate and W_{default}.</p>
MS _{%i,y}	100%	<p>As per AMS-III.D, 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. By checking EIA Report /12/ and as confirmed during on site inspection, it is confirmed that the project activity does not involve sequential manure management systems and all manure are handled in system i, therefore, 100% is applied for MS_{%i,y}.</p>
N _{da,y}	Market swine: 150 days	<p>As per EIA Report /12/, as well as interview with PP during site visit, it is confirmed that breeding swine is alive in the farm the whole year, which is 365 days and the market swine is alive in the farm for 150 days..</p>

	Breeding swine: 365 days	
$N_{p,y}$	Breeding swine: 6,000 Market swine: 100,000	By checking EIA Report /12/ and EIA Approval /13/, it is confirmed that the number of breeding swine produced annually is 6,000. and the number of market swine produced annually is 100,000.
$Q_{biogas,d}$	Anaerobic Digester System: 2,639 m ³ /d	By checking EIA Report /12/ and EIA Approval /13/, it is confirmed that the amount of biogas collected at the anaerobic digester system outlet is 2,639 m ³ /d.
$f_{CH4,default}$	0.6	As per "Tool to Project and leakage emissions from anaerobic digesters", a default value is applied, which is based on reported values from registered projects and research papers (Davidsson, 2007).
$\eta_{flare,m}$	90%	<p>By checking Environment Check and Accept Report /28/ and through on site inspection, it is confirmed the project activity utilized an enclosed flare. As per "Project emissions from flaring (version 03.0)", in the case of enclosed flares, PP may choose between the following two options to determine the flare efficiency for minute m ($\eta_{flare,m}$):</p> <p>(a) Option A: Apply a default value for flare efficiency;</p> <p>(b) Option B: Measure the flare efficiency.</p> <p>PP selected option A and a default value was applied for the project activity. For this option, the flare efficiency for the minute m ($\eta_{flare,m}$) is 90% when the following two conditions are met to demonstrate that the flare is operating:</p> <p>(a) The temperature of the flare ($T_{EG,m}$, 600 °C or above) and the flow rate of the residual gas to the flare ($F_{RG,m}$, 150m³/h) is within the manufacturer's operating specification for the flare ($SPEC_{flare}$) in the minute m; and</p> <p>(b) The flame is detected in the minute m ($Flame_m$) with detection electrode.</p> <p>By checking Technical Specification of enclosed flaring system /18/, it is confirmed the above two conditions are met and the enclosed flaring system does not belong to low height flare, therefore, the default value for flare efficiency 90% can be applied. Furthermore, this parameter will be monitored ex post.</p>
$F_{EC,default}$	0.01	<p>As per Tool 14,</p> <p>0 - Covered anaerobic lagoons (gravity fed) / conventional digesters;</p> <p>0.01 - upflow anaerobic sludge blanket reactor (UASB) / filter bed reactor for wastewater / fluidized bed reactor;</p>

		<p>1.02 - Conventional digesters with continuously stirred tank reactor type for wastewater;</p> <p>1.54 - Any anaerobic digester for solid waste with preprocessing of wastes (e.g. pulverizing).</p> <p>For digesters other than those specified above, which are fed by gravity, and have no recirculation and therefore no electrical energy is required to operate, apply a value of 0.</p> <p>By checking EIA Report /12/ and onsite inspection, it is confirmed that The project uses upflow anaerobic sludge blanket reactor digester; So, the project shall use default value 0.01 MWh/tCH₄.</p>
EF _{EL,default}	1.3	<p>As per "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", a value of 1.3 t CO₂/MWh if Scenario A (Electricity consumption from the grid) applies only to project and/or leakage electricity consumption sources but not to baseline electricity consumption sources.</p>

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{EC,y} = 4,747tCO_2e + 1,085tCO_2e + 6tCO_2e = 5,839tCO_2e$$

Leakage

As per Tool 14 "Project and leakage emissions from anaerobic digesters" (version 02.0), the leakage emissions associated with the anaerobic digester depend on how the digestate is managed. They include emissions associated with storage and composting of the digestate.

As justified above, the digestate generated from anaerobic digesters of the project will be used for agriculture fertilization aerobically in the nearby farmlands. The project activity does not involve composting of digestate or anaerobic decay of digestate disposed in a SWDS or subjected to anaerobic storage, such as in a stabilization pond.

Therefore, leakage emissions of the project associated with the anaerobic digester is not accounted for.

Emission Reductions

For **ex ante estimation** of emission reductions, according to AMS-III.D., Version 21.0, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

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

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

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

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

For **ex post determination** of emission reductions, according to AMS-III.D., Version 21.0, 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. $N_{LT,y}$, $MS\%_{i,y}$, $MS\%_l$, Al_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:

$$ER_{y,ex\ post} = \min[(BE_{y,ex\ post} - PE_{y,ex\ post}), (MD_y - PE_{power,y,ex\ post})] \quad \text{Equation (10)}$$

Where:

$ER_{y,ex\ post}$ = Emission reductions achieved by the project activity based on monitored values for year y (t CO₂e)

$BE_{y,ex\ post}$ = Baseline emissions calculated using equation 1 (for projects using option in paragraph 0) using ex post monitored values of $N_{LT,y}$ and if applicable $VS_{LT,y}$. For projects using option in paragraph 0, 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 $N_{LT,y}$, $MS\%_{i,y}$, $MS\%_l$, Al_i , $Q_{res\ waste,y}$ and if applicable $VS_{LT,y}$

MD_y = Methane captured and destroyed or used gainfully by the project activity in year y (t CO₂e)

$PE_{power,y,ex\ post}$ = 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 CO₂e)

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

$$MD_y = BG_{burnt,y} \times w_{CH_4,y} \times D_{CH_4} \times FE \times GWP_{CH_4} \quad \text{Equation (11)}$$

Where:

$BG_{burnt,y}$ = Biogas flared or combusted in year y (m³)

$w_{CH_4,y}$ = Methane content in biogas in the year y (volume fraction)

FE = Flare efficiency in the year y (fraction)

Hence for the project activity, the estimated amount of GHG emission reductions (ER_y) ex ante is 280,750 tCO_{2e} during the crediting period from 01/08/2021 to 31/07/2031, resulting in estimated average annual emission reductions of 28,075 tCO_{2e}.

Year	BE _y (tCO _{2e})	PE _y (tCO _{2e})	LE _y (tCO _{2e})	ER _y (tCO _{2e})
01/08/2021 - 31/12/2021	14,216	2,448	0	11,768
01/01/2022 - 31/12/2022	33,914	5,839	0	28,075
01/01/2023 - 31/12/2023	33,914	5,839	0	28,075
01/01/2024 - 31/12/2024	33,914	5,839	0	28,075
01/01/2025 - 31/12/2025	33,914	5,839	0	28,075
01/01/2026 - 31/12/2026	33,914	5,839	0	28,075
01/01/2027 - 31/12/2027	33,914	5,839	0	28,075
01/01/2028 - 31/12/2028	33,914	5,839	0	28,075
01/01/2029 - 31/12/2029	33,914	5,839	0	28,075
01/01/2030 - 31/12/2030	33,914	5,839	0	28,075
01/01/2031 - 31/07/2031	19,698	3,391	0	16,307
Total	339,140	58,390	0	280,750

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

- All assumptions and data used by the project participants are listed in the VCS PD (version 3.0 dated 10/11/2023) and/or supporting documents, including their references and sources;
- All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the VCS PD (version 3.0 dated 10/11/2023);
- All values used in VCS PD (version 3.0 dated 10/11/2023) are considered reasonable in the context of the project activity;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, and leakage emissions;
- All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in VCS PD (version 3.0 dated 10/11/2023).

3.3.7 Methodology Deviations

No methodology deviation is applied in the project.

3.3.8 Monitoring Plan

The project applies the approved monitoring methodology AMS-III.D.: Methane recovery in animal manure management systems, Version 21.0. The selected monitoring methodology is applicable for the project. The monitoring plan is in accordance with the monitoring methodologies. The monitoring plan will give opportunity for real measurements of achieved emission reductions and contains principles and concepts on which it is based, operational and monitoring obligations of the project owner like resources involved in the monitoring process, training, support activities, calibration and data collection, quality assurance procedures, data management, electronic support tools.

Parameters determined ex-ante

Data / Parameter:	GWP_{CH4}
Data unit:	/
Description:	Global warming potential of CH ₄
Source of data used:	Default value from IPCC Fifth Assessment Report (AR5)
Value applied:	28

Data / Parameter:	D_{CH4}
Data unit:	kg/m ³
Description:	CH ₄ density
Source of data used:	AMS-III.D
Value applied:	0.67 (at 20 °C and 1 atm pressure)

Data / Parameter:	UF_b
Data unit:	/
Description:	Model correction factor to account for model uncertainties
Source of data used:	AMS-III.D
Value applied:	0.94

Data / Parameter:	MCF_j
Data unit:	/
Description:	Annual methane conversion factor (MCF) for the baseline animal manure management system j
Source of data used:	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories
Value applied:	<p>76%</p> <p>The project activity is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, where the annual average temperature is 15.4°C and a ratio of potential evapotranspiration (<960mm) to precipitation (1,307.9 mm) < 1 (Warm temperate dry) through checking public information /25/. As per 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories Volume 4 chapter 10 table 10.17, 76% is applied for MCF_j, considering the baseline manure management system and specific annual average temperature in local area</p>

Data / Parameter:	B_{0,LT}						
Data unit:	m ³ CH ₄ /kg-VS						
Description:	Maximum methane producing potential of the volatile solid generated for animal type LT						
Source of data used:	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories						
Value applied:	<table border="1" data-bbox="716 1371 1307 1556"> <thead> <tr> <th>Animal type</th> <th>B_{0,LT}</th> </tr> </thead> <tbody> <tr> <td>Market swine</td> <td>0.45</td> </tr> <tr> <td>Breeding Swine</td> <td>0.45</td> </tr> </tbody> </table> <p>The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R. China, Asia, and the involved swine farm is high productivity systems. According to 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, the maximum methane producing potential(B_{0,LT}) for Market swine and Breeding swine in Asia region is 0.45 m³ CH₄/kg-dm.</p>	Animal type	B _{0,LT}	Market swine	0.45	Breeding Swine	0.45
Animal type	B _{0,LT}						
Market swine	0.45						
Breeding Swine	0.45						

Data / Parameter:	MS%_{BL,j}
Data unit:	-
Description:	Fraction of manure handled in baseline animal manure management system j
Source of data used:	EIA Report /12/
Value applied:	100% By checking EIA Report /12/, it is confirmed that 100% of manure are handled in baseline animal manure management system, i.e. the anaerobic treatment system (open lagoon).

Data / Parameter:	f_{CH₄,default}
Data unit:	-
Description:	Default value for the fraction of methane in the biogas
Source of data used:	Tool 14: Project and leakage emissions from anaerobic digesters
Value applied:	0.6 As per Tool 14, use this value for Option 2 (Procedure using a default value) of the step "Determination of the quantity of methane produced in the digester".

Data / Parameter:	F_{EC,default}
Data unit:	MWh/tCH ₄
Description:	Default factor for the electricity consumption associated with the anaerobic digester per ton of methane generated.
Source of data used:	Tool 14: Project and leakage emissions from anaerobic digesters
Value applied:	0 As per Tool 14, 0 - Covered anaerobic lagoons (gravity fed) / conventional digesters; 0.01 - upflow anaerobic sludge blanket reactor (UASB) / filter bed reactor for wastewater / fluidized bed reactor; 1.02 - Conventional digesters with continuously stirred tank

	<p>reactor type for wastewater; 1.54 - Any anaerobic digester for solid waste with preprocessing of wastes (e.g. pulverizing).</p> <p>For digesters other than those specified above, which are fed by gravity, and have no recirculation and therefore no electrical energy is required to operate, apply a value of 0.</p> <p>By checking EIA Report /12/ and onsite inspection, it is confirmed that the project activity uses conventional digester. Therefore, 0 is applied.</p>
--	---

Data / Parameter:	EF_{EI,default}
Data unit:	tCO ₂ /MWh
Description:	Default emission factor for the electricity consumed in year y
Source of data used:	Tool 14: Project and leakage emissions from anaerobic digesters
Value applied:	<p>1.3</p> <p>PP chose option 2 (Procedure using a default value) of step 2 Determination of project emissions from electricity consumption (PE_{EC,y}) to determine project emissions from electricity consumption.</p>

Data / Parameter:	VS_{default}
Data unit:	kg/hd/day
Description:	Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population. The project activity breeds New Zealand Holstein Cows, the value of Oceanic Region is applied,
Source of data used:	Calculated as the default values for volatile solid excretion rate and W _{default} (Kg-dm/animal/day)
Value applied:	<p>Market swine: 0.2856</p> <p>Breeding swine: 0.3680</p> <p>The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019</p>

	<p>Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass)⁻¹day⁻¹ is applied for market swine and 2.3 kg VS (1000 Kg animal mass)⁻¹day⁻¹ for breeding swine. VS default value is calculated with the default values for volatile solid excretion rate and W_{default}.</p> <p>The volatile solid excretion per day on a dry-matter basis for market swine and breeding swine in Asia area is applied.</p>
--	--

Data / Parameter:	W_{default}
Data unit:	kg
Description:	Default average animal weight of a defined population
Source of data used:	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10 table 10A.5
Value applied:	<p>Market swine: 56</p> <p>Breeding Swine: 160</p> <p>The project is located in Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, W_{default} value of 56 kg is applied for market swine and 160 kg for breeding swine.</p>

Data / Parameter:	Default VS excretion rate
Data unit:	kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹
Description:	Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population
Source of data used:	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10 table 10.13(A)
Value applied:	<p>Market swine: 5.1</p> <p>Breeding Swine:2.3</p> <p>The project is located at Baitang Village, Xinzhou Town, Huangping County, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province, P.R.China, Asia, and the involved swine farms are high productivity systems. According to table 10A.5 of 2019</p>

	Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories volume 4, chapter10, volatile solid excretion rate value of 5.1 kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹ is applied for market swine and 2.3 kg VS (1000 Kg animal mass) ⁻¹ day ⁻¹ for breeding swine.
--	--

Data / Parameter:	WCH_{4,y}
Data unit:	%
Description:	Methane content in biogas in the year y
Source of data used:	AMS-III.D default value
Value applied:	60%

Data / Parameter:	SPEC_{flare}
Data unit:	Temperature - °C Flow rate or heat flux - kg/h or m ³ /h Maintenance schedule - number of days
Description:	Manufacturer's flare operating specifications for temperature, flow rate and maintenance schedule
Source of data used:	PP
Value applied:	Temperature 800-1,000 °C or above Flow rate - 300 m ³ /h Maintenance schedule - 100 days

Parameters determined ex-post

Parameter	Description	Monitoring procedure
MS _{oi,y}	Fraction of manure handled in system i in year y	By checking EIA Report /12/ and as confirmed during on site inspection, it is confirmed that the project activity does not involve sequential manure management systems and all manure are handled in system i. therefore, 100% is applied for MS _{oi,y} for ex-ante estimation. This parameter will be monitored during verification.

$N_{p,y}$	Number of animals produced annually of type LT for the year y	The number of swine produced by the project activity will be recorded manually by the project owner. Parameter $N_{p,y}$ will be monthly records and yearly aggregated.
$N_{da,y}$	Number of days animal is alive in the farm in the year y	The number of days that swine is alive on the farm will be recorded manually by the project owner. Parameter $N_{da,y}$ will be monthly records and yearly aggregated.
nd_y	The number of days the treatment plant was operational in year y.	The number of days the treatment plant was operational will be monitored and recorded by the project owner. nd_y will be daily recorded, monthly and yearly aggregated.
$FE (\eta_{flare,m})$	The flare efficiency	<p>The project activity utilized an enclosed flare. As per "Project emissions from flaring (version 03.0)", in the case of enclosed flares, PP may choose between the following two options to determine the flare efficiency for minute m ($\eta_{flare,m}$) and shall document which option is selected:</p> <ul style="list-style-type: none"> (a) Option A: Apply a default value for flare efficiency; (b) Option B: Measure the flare efficiency. <p>PP selected option A and a default value was applied for the project activity. For this option, the flare efficiency for the minute m ($\eta_{flare,m}$) is 90% when the following two conditions are met to demonstrate that the flare is operating:</p> <ul style="list-style-type: none"> (a) The temperature of the flare ($T_{EG,m}$) and the flow rate of the residual gas to the flare ($F_{RG,m}$) is within the manufacturer's operating specification for the flare ($SPEC_{flare}$) in the minute m; and (b) The flame is detected in the minute m ($Flame_m$). <p>The parameter will be monitored annually during verification.</p>
W_{site}	Average animal weight of a defined livestock population at the project site	<p>This parameter is used in equation 4 for estimating $VS_{LT,y}$ using option 3, and in equation 2 (appendix 2) for estimating $NEX_{LT,y}$ when using 2019 refinement to IPCC 2006 default values. Sampling procedures can be used to estimate this variable, taking into account the following guidance:</p> <ul style="list-style-type: none"> (a) To ensure representativeness, each defined livestock population will be classified into a minimum of three age categories; (b) For each defined livestock population, a minimum of one monthly sample per age category should be taken;

		<p>(c) When estimating baseline emissions and emissions released during baseline scenario from land application of the treated manure in the leakage section, the lower bound of the 95% confidence interval obtained from the sampling measurements should be used;</p> <p>(d) When estimating project emissions and emissions released during project activity from land application of the treated manure in the leakage section, the upper bound of the 95% confidence interval obtained from the sampling measurements should be used.</p> <p>Weight measurers were calibrated once a year by officially accredited entity in compliance with JJG539-2016 “Verification Regulation of Digital Indicating Weighting Instruments” in China.</p>
$VS_{LT,y}$	Volatile solids for livestock <i>LT</i> entering the animal manure management system in year <i>y</i>	Calculated as per 10.22 (a) from 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse gas Inventories
$T_{EG,m}$	Temperature in the exhaust gas of the enclosed flare in the minute <i>m</i>	<p>Measure the temperature of the exhaust gas in the flare by an appropriate temperature measurement equipment. Measurements outside the operational temperature specified by the manufacturer may indicate that the flare is not functioning correctly and may require maintenance.</p> <p>Flare manufacturers must provide suitable monitoring ports for the monitoring of the temperature of the flare. These would normally be expected to be in the middle third of the flare.</p> <p>Where more than one temperature port is fitted to the flare, the flare manufacturer must provide written instructions detailing the conditions under which each location shall be used and the port most suitable for monitoring the operation of the flare according to manufacturer’s operating specifications for temperature.</p> <p>Temperature measurement equipment should be replaced or calibrated once a year in accordance with their maintenance schedule</p>
$Flame_m$	Flame detection of flare in the minute <i>m</i>	Measure using a fixed installation optical flame detector: Ultra Violet detector or Infra-Red or both. Once per minute. Detection of flame recorded as a minute that the flame was on, otherwise recorded as a minute that the flame was off. Equipment shall be maintained and calibrated once a year in accordance with manufacturer’s recommendations.

$F_{RG,m}$	Flow rate of the residual gas to the flare	Measured by monitoring meters once per minute
$Q_{biogas,y}/BG_{burnt,y}$	Amount of biogas collected at the digester outlet in year y/ Biogas flared in year y	$Q_{biogas,y}/BG_{burnt,y}$ will be monitored continuously by flow meter installed between outlet of biogas pretreatment system and inlet of the flaring system. The monitoring values will be daily recorded and aggregated in the monthly operation records. The monitoring value also will be aggregated yearly based on accumulative readings. The flow meter will be calibrated once a year. The meter readings will be automatically converted to value at room temperature (20°C) and 1 atm pressure.
-	On-site inspections for livestock farm	On-site inspections for livestock farm will be conducted by PP daily to ensure proper operation of the farm
-	Proper soil application of the residual wastes	The monitoring of proper soil application of the residual wastes will be conducted by PP for every soil application of the residual waste to ensure not resulting in methane emissions

Based on the on-site visit and interviewed with staff from Guizhou Aonong Qihuan Animal Husbandry Co., Ltd., CTI validation team confirmed that monitoring parameter has been correctly described in the updated PD and in compliance with the methodology AMS-III.D. Version 21.0, CDM Validation and Verification Standard for project activities version 03.0, and VCS standard version 4.4.

Sample Plan:

Sample plan is designed by PP for monitoring the parameter W_{site} which is confirmed in line with the requirement for this parameter monitoring in the applied methodology. The sample plan is designed according to the Standard of “Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)”.

The sample plan including the below designs,

- a. To ensure representativeness, each defined livestock population should be classified into a minimum of three age categories - verified as in line with the applied methodology
- b. For each defined livestock population, a minimum of one monthly sample per age category should be taken - verified as in line with the applied methodology
- c. PP will use 95/10 confidence/precision as the criteria for the reliability of sampling efforts - verified as in line with the standard of “Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)” and applied methodology

Via site inspection and interview with chiefs of farms and PP, CTI confirmed that the monitoring activities of the W_{site} will be conducted in the three age groups of Nursery phase, Growing phase and Mature phase

(Marker swine: Nursery phase with 30-60days, Growing phase with 60-110days and Mature phase with 110-150days. Poultry: nursery phase with 0-50days, Growing phase with 50-140days and Mature phase with 141 days or more) in each farm at least one monthly which is verified as in line with the above requirements.

Via checking the request of applied methodology, it stated “The PD should describe the system of random sampling taking into account stratification of each livestock population into a minimum of three weight categories as described above” . Via site inspection, it is confirmed that for livestock farms involved, all the livestock farms including market swine and poultry in stock. Due to livestock farms have two types of livestock, and as per applied methodology, each defined livestock population should be classified into a minimum of three age categories, so the sampling method is chosen as Stratified random sampling which is confirmed as applicable to the project situation.

Hence, based on this, PP designed the sampling method as stratified random sampling in livestock farms and divide the swine and poultry from each into at least 3 age groups, which is verified by CTI as correct and reasonable and in line with the request of applied methodology.

The method of calculation of sample size is checked by CTI, it is confirmed that the calculation process is in compliance with the Appendix 6 of the Guideline of the “Sampling and surveys for CDM project activities and programmes of activities (Version 04.0)”/54/ and PP will use 95/10 confidence/precision as the criteria for the reliability of sampling efforts which is confirmed in line with Standard of “Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)” .

The implementation of sample plan including monitoring, data recording and collection, QA/QC procedure, emergency procedure is stated by PP which is confirmed as actual and reasonable by site inspection and interview with the chief of farms and monitoring team. The one monthly monitoring activity of the samples will be completed in the livestock farms during each monitoring periods. The monitoring forms will be filled out daily by the Breeders in the livestock farms to record the animal weight of the samples. All the samples will be changed at the beginning of next monitoring periods which is confirmed as conservative and more representative.

3.4 Non-Permanence Risk Analysis

Not applicable for the present project activity.

4 VALIDATION OPINION

Baineng New Energy (Shen Zhen) Co., Ltd. has commissioned the CTI to carry out the Verified Carbon Standard (VCS) validation of the project activity "Baitang Aonong Swine Farm Composting Project" (VCS 4168), with regard to the relevant requirements for VCS version 4.

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

In the course of the validation, 1 Clarification Requests (CLs), 2 Corrective Action requests (CARs) and no Forward action request (FARs) was raised.

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

In detail the conclusions can be summarized as follows:

- the baseline scenario is correctly defined as per the applied methodology and relate tools;
 - the project is additional;
 - all data and information used for ex-ante calculation of emission reductions is of projected and/or hypothetical nature;
 - a reasonable level of assurance has been applied.
 - the monitoring plan in the validated PD is as per the applied methodology AMS-III.D. Version 21.0;
 - the project has been implemented and operated as per the VCS PD;
 - the project complies with the validation criteria for projects set out in VCS Version 4;
 - The calculation of the ex ante emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 280,750 tCO₂e are most likely to be achieved within the 10-year fixed crediting period started from 01/08/2021.
- **Validated estimated GHG emission reductions and carbon dioxide removals for the project crediting period:**

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/08/2021-31/12/2021	11,768
2022	28,075
2023	28,075
2024	28,075
2025	28,075

2026	28,075
2027	28,075
2028	28,075
2029	28,075
2030	28,075
01/01/2031-31/07/2031	16,307
Total estimated ERs	280,750
Total number of crediting years	10
Average annual ERs	28.075

The conclusions of this report show, that the project, as it was described in the project description, is in line with all criteria applicable for the validation against the VCS standard version 4.4 without any qualifications or limitations.

Zhang Lei

Mr. Zhang Lei
Team Leader
20/11/2023

Wu Lin

Mr. Lin Wu
Technical Reviewer
20/11/2023

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
AFOLU	Agriculture, Forestry, and Other Land Use
BM	Build Margin
CDM	Clean Development Mechanism
CME	Coordinating/managing entity
CER	Certified Emission Reduction
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
EB	Executive Board
GHG	Greenhouse gas(es)
GS	Gold Standard
EIA	Environmental Impact Assessment
ER	Emission Reduction
ETS	Emission Trading Scheme
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
PA	Project Activity
PD	Project Description
PP	Project Participant
QA/QC	Quality Assurance / Quality Control

UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVB	Validation/Verification Body
XLS	Emission Reduction Calculation Spread Sheet
PP	Project Participant
UNFCCC	United Nations Framework Convention on Climate Change

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

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. 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

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

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

APPENDIX 3: <REFERENCE LIST>

1. VCS project design version 1.0 dated 01/02/2023, version 2.0 dated 15/07/2023, version 3.0 dated 10/11/2023
2. Estimated ER calculation spreadsheet
3. VCS Standard v4.4, issued on 19/09/2019, updated on 17/01/2023
4. VCS Programme Guideline v4.3, issued on 19/09/2019, updated on 17/01/2023
5. CDM Validation and Verification Standard for project activities version 03
6. CDM Project Standard for project activities version 03
7. CDM project cycle procedure for project activities version 03
8. Approved methodology AMS-III.D.: Methane recovery in animal manure management systems, Version 21.0
9. Staff roster of the project activity
10. Tool 06: Project emissions from flaring, Version 04.0
11. Tool 14: Project and leakage emissions from anaerobic digesters, version 02.0
12. Environmental Impact Assessment (EIA) Report compiled by Sichuan Splendid China Environmental Protection Technology Co., Ltd. in August 2018
13. EIA Approval issued by Environment Protection Bureau of Qiandongnan Miao and Dong Autonomous Prefecture on 17/11/2017
14. Business License of Guizhou Aonong Qihuan Animal Husbandry Co., Ltd
15. Construction plan of the project (evidence of the operation start date)
16. Operation Log of Huangping Aonong Swine Breeding Farm
17. Attendance list of Stakeholder Consultation Meeting on 17/02/2020
18. Technical Specification of enclosed flaring system
19. Nameplate of the equipment

20. Construction contract signed between the project owner and Guangdong Shuiqing Environment Protection Science and Technology Co., Ltd.
21. "Notice on Strengthening Enterprise Greenhouse Gas Emission Report Management" issued by National Development and Reform Committee of P. R. China
22. Questionnaires for stakeholder meeting
23. Attendance List of CTI auditing meeting
24. "List of key emissions in the national carbon emissions transaction quota management in 2019-2020" issued by Ministry of Ecology and Environment of P.R.China
25. Local temperature:
http://invest.guizhou.gov.cn/tzgz/tzgz/zshj/qdnz/201601/t20160119_10996514.html;
<http://ystqdn.cn/file/about.html>
26. Technical Specifications of digester
27. Photos of baseline open lagoon
28. Environment Check and Accept Report of the project was completed by Guizhou Longsheng Environmental Protection Technology Co., Ltd.
29. “Major Items Change List for Pollution Impact Construction Projects (Trial)(2020 Issuance)” issued by Ministry of Ecology and Environment of People's Republic of China on 13/12/2020
https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202012/t20201216_813415.html
30. Meeting minutes of Guizhou Aonong Qihuan Animal Husbandry Co., Ltd for the project technology change on 05/03/2020.
31. Specification of the project change issued by Guizhou Aonong Qihuan Animal Husbandry Co., Ltd.
32. Stakeholder meeting minutes for the project change on 23/03/2021.
33. Shareholder information of Guizhou Aonong Qihuan Animal Husbandry Co., Ltd (PP of the project) and contract signed between the PP and farm owner
34. Contract signed between Guizhou Aonong Qihuan Animal Husbandry Co., Ltd (PP of the project) and farm owner for claiming of the GHG emission reductions from the project activity.
35. Design Scheme of the project activity.
36. Operation Record of the livestock farm

37. Instructions of the flaring system
38. Statement of no double counting of GHG emission reductions obtained from the project signed by swine farm owner
39. Relative records of local agricultural and rural bureau

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

CL ID	01	Section no.	1.1	Date: 13/07/2023
Description of CL				
Please supplement construction start date and operation start date in section 1.1 of the PD.				
Project proponent response				Date: 15/07/2023
The project started construction on 20/02/2020 and started operation on 01/08/2021, which has been supplemented in section 1.1 Of the PD.				
Documentation provided by project proponent				
PD (version 2.0 dated 15/07/2023)				
DOE assessment				Date: 17/07/2023
The construction start date and operation start date has been supplemented in section 1.1 of the PD and validated CTI to be correct. Therefore, CL 01 was closed.				

CAR ID	01	Section no.	1.11	Date: 13/07/2023
Description of CAR				
Please supplement Technical Parameters and supporting materials of digester in section 1.11 of the PD.				
Project proponent response				Date: 15/07/2023
Technical parameters and supporting materials have been provided to validation team. The digester with effective volume of 2,639 m ³ will be installed and he project is expected to produce 2,639 m ³ biogas per day.				

Documentation provided by project proponent	
PD (version 2.0 dated 15/07/2023)	
DOE assessment	Date: 17/07/2023
Technical parameters of the digester has been supplemented in section 1.1 of the PD and supporting materials have been provided, which have been confirmed by CTI and is correct. Therefore, CAR 01 was closed.	

CAR ID	02	Section no.	3.1	Date: 13/07/2023
Description of CAR				
The technology applied by the project activity is anaerobic digestion which is not consistent with the PD version 01. The applied methodology shall be changed to AMS III.D.				
Project proponent response				Date: 15/07/2023
The PD version 01 was based on the FSR. However, in consideration of the increasing labor cost in China and other reasons, PP has changed the technology from aerobic composting to anaerobic digestion. The applied methodology has been changed to AMS III.D and other parts of the PD has been modified accordingly.				
Documentation provided by project proponent				
PD (version 2.0 dated 15/07/2023)				
DOE assessment				Date: 17/07/2023
Applied methodology has been changed to AMS III.D which is applicable to the project activity, which have been confirmed by CTI and is correct. Therefore, CAR 02 was closed.				

FAR ID	NA	Section no.	NA	Date: NA
Description of FAR				
NA				
Project proponent response				Date: NA

NA	
Documentation provided by project proponent	
NA	
DOE assessment	Date: NA
NA	