AONONG AWMS GHG MITIGATION PROJECT IN FUJIAN PROVINCE

Document Prepared by China Certification Center, Inc.

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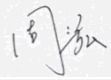
Approved By	Zhou Hong 
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Summary:

China Certification Center, Inc. (hereafter referred to as "CCCI") has performed the 2nd verification of greenhouse gas emission reductions of the project activity "Aonong AWMS GHG Mitigation Project in Fujian Province" (VCS Ref. No. 2692, hereafter referred to as "the project") reported in the monitoring report covering the monitoring period from 01-Jan-2022 to 31-Dec-2022.

The project activity developed in Fujian Province, P. R. China, is to install new animal waste management systems (AWMSs) by replace the current open anaerobic lagoons with 9 new closed anaerobic digesters to a group of 9 swine farms in project area, which will treat the manure and wastewater from the 9 swine farms to avoid methane emissions generated in the baseline uncovered anaerobic lagoons. The project activity involves implemented 9 sets of AWMSs in 9 existing swine farms and the project is expected to produce 733,437 tons of manure and 4,400.63*$10^4 m^3$ of biogas annually. The biogas produced is recovered and combusted for power generation and used by swine farms, total installed capacity of the proposed project is 8.4MW by considering the output of biogas generators. The project is expected to achieve 451,801 tCO_2e of emission reduction annually. The project started operation on 01-May-2020, the VCS ID is 2692.

The approved CDM methodology ACM0010 "GHG emission reductions from manure management systems" (version 08.0) is applied to quantify the GHG removals achieved in this project. The calculation of the GHG emission reductions is carried out in a transparent and conservative manner.

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

This is the 2nd monitoring period started from 01-Jan-2022 to 31-Dec-2022 for VCS scheme.

China Certification Center, Inc. (CCCI) conducted the verification using procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The verification team assessed the project activity's compliance against the VCS Standard Version 4.4, the selected CDM methodology and the monitoring report. The project is eligible under Project Scope 1, 13 and 15. The verification criteria followed the guidance documents provided by VCS included the following:

VCS Standard Version 4.4, VCS Program Guide Version 4.3 and the applied CDM methodology ACM0010 "GHG emission reductions from manure management systems" (version 08.0).

In the course of the verification, 5 Corrective Action Requests (CARs), 3 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

There are no restrictions of uncertainty for this verification.

China Certification Center, Inc. was commissioned by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project, "Aonong AWMS GHG Mitigation Project in Fujian Province" (VCS ID 2692) with regard to the relevant requirements of VCS standard Version 4.4. CCCI confirms all verification activities including objectives, scope and criteria, level of assurance, monitoring system and monitoring report adhere to VCS Standard Version 4.4.

Based on the work performed, it is CCCI's conclusion that the project activity "Aonong AWMS GHG Mitigation Project in Fujian Province" in China, as described in the final version of Monitoring Report, meets all relevant requirements for VCS verification activity and correctly applied the methodology ACM0010 Version 08.0. Hence CCCI therefore provide positive verification opinion as per the requirement of VCS Standard and certify that the GHG emission reduction from the project during the monitoring period from 01-Jan-2022 to 31-Dec-2022 amount to 367,297 tCO_2e VCUs.

CONTENTS

1 INTRODUCTION

1.1 Objective

China Certification Center, Inc. was commissioned by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project for the monitoring period from 01-Jan-2022 to 31-Dec-2022 (both days included).

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

1.2 Scope and Criteria

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

1.3 Level of Assurance

All GHG sinks, sources and GHG emissions equal to or greater than 1% of the total GHG assertions are considered. The project is expected to generated average of 451,801 VCUs per year, and therefore can be considered as a large project per the VCS rules, in regards to its scale, subject to a 1% materiality threshold.

The assessment was conducted to provide a reasonable level of assurance of compliance against the defined audit criteria and materiality threshold within the audit scope. Based on the audit findings the

verification statement reasonably assure that the GHG assertion is materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the Project

The project is implemented by Fujian Aonong Biological Technology Group Incorporation Limited and aims to install new Animal Manure Management Systems by replace the current open anaerobic lagoons with 9 new closed anaerobic digesters to a group of 9 existing swine farms in Fujian Province, which will treat the manure and wastewater from the 9 swine farms to avoid methane emissions generated in the baseline uncovered anaerobic lagoons. An Animal Manure Management System (AWMS) has been installed in each swine farm respectively which treat the manure and wastewater from the 9 existing swine farms. The raw materials such as pig manure and wastewater are collected into waste collecting tanks and then be separated first by Solid-liquid separators. the solid are treated in aerobic composting system, and the organic fertilizers are produced. The liquid is treated through anaerobic digestion and the biogas generated during the treatment process is captured for electricity generation. Anaerobic tanks adopt Upflow Anaerobic Sludge Bed Reactor (UASB) as its anaerobic digester technology, and the biogas generated from the anaerobic digesters is entered the biogas generator set after desulfurization and purification system. The generated electricity is used for daily operation of AWMSs and the swine farms, and the waste heat of the generator is recycled for increasing the temperature of the anaerobic reactor. The project implemented 9 sets of AWMSs in 9 existing swine farms involving 515,636 heads of market swine, 27,450 heads of breeding swine. Live swine are kept for 180 days in the farms before shipment and are estimated to produce 733,437 tons of manure and $4,400.63*10^4 m^3$ of biogas annually. The biogas produced is recovered and combusted for power generation and used for daily operation of AWMSs and the swine farms and the residual biogas (if any) will be flared, the total installed capacity of the proposed project is 8.4MW and the annual electricity production is estimated to be 57,208MWh by considering the output of biogas generators. For conservativeness, baseline emissions from power generation are neglected. The sludge produced from anaerobic digestion are treated through aerobic composting together with the solid, the effluent is used for agriculture irrigation which has been confirmed by site inspection and checking the JPM of the project/3/ and it is located inside the Fujian Province, China.

The project activity enables 9 existing swine farms to use new AWMSs instead of the open anaerobic lagoons in baseline scenario to achieve the harmlessness and ecological utilization of the swine manure, finally generate the electricity to swine farms, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer.

The project is expected to avoid GHG emission of methane from anaerobic treatment of swine manure and wastewater through recovery and destruction of biogas. The estimated emission reduction from the project is 451,801 tCO_2e per year during the fixed 10-year crediting period from 01-May-2020 to 30-Apr-2030.

In the monitoring period from 01-Jan-2022 to 31-Dec-2022, the total verified carbon units (VCUs) achieved in the monitoring period are 367,297 tCO_2e, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer that has been stated in the whole verification report.

The project activity generates GHG emission reductions by avoid GHG emission of methane from anaerobic treatment of swine manure and wastewater would be vented into the atmosphere directly. Thus the project generates GHG emission reductions and produces financial, social and environmental benefits. The project has resulted in the local sustainable development as described in Section 1 of the Monitoring Report. The project was registered as a VCS project on 26-Dec-2022 (joint validation and 1st verification approved together) with VCS Ref. No. 2692 and the emission reductions of 367,297 tCO_2e are certified as verified carbon units (VCUs) for this 2nd monitoring period.

2 VERIFICATION PROCESS

2.1 Method and Criteria

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

- VCS Standard, v4.4/51/
- VCS Program Guide, v4.3/50/
- VCS Program Definitions, v4.3/49/
- VCS-Monitoring-Report-Template-v4.2/38/

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

- Contract review
- Appointment of team members and technical reviewers
- Send Verra-Notice-of-Validation-Verification-Services-NOVS form of this project to VERRA
- A desk review of the VCS Monitoring Report/1/ submitted by the client and additional supporting documents with the use of customized verification documents checklist
- Verification planning
- On-site visit and verification
- Background investigation and follow-up interviews with personnel of the project developer and representative of stakeholders
- Draft verification reporting
- Resolution of Corrective Action Requests (CARs) and Clarification Requests (CLs)
- Final verification reporting
- Technical review
- Final approval of the verification.

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

There is no sampling approach utilized by VVB during the verification.

2.2 Document Review

The VCS MR/1/ of the project and supporting background documents related to the project implementation and monitoring system 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 details, data and parameters, and quantification of GHG emission reductions.

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

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

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

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the verification process. Onsite interviews and information discussions were conducted with project implementer and workers of swine farms and AWMSs, local officer from government, local residents and Project VCS development consultant. The interviews were performed by the verification team on-site (within the project area in Fujian Province, P.R. China) and the following is a list of the main interviewees and subject.

No.	Interviewee			Date	Subject, Reference Number/ID	Team member
	Last name	First name	Affiliation			
1.	Sun	Qiao	Fujian Aonong Biological Technology Group Incorporation Limited Environmental department / General Manager	02-Mar-2023	Discussion on project design and implementation, Main equipment, Technical parameters, Baseline, Monitoring plan, Monitoring system, Monitoring devices, Calibration way, SDG impacts, ER calculation	Guo Jiayuan, Li Yuan
2.	Jin	Haichun	Mintai Farm/ AWMS operation staff	02-Mar-2023	Project implementation, Treatment method, Main equipment, Biogas production, Slurry, Monitoring method, Data record, Data collection, Monitoring devices, General info of interviewee, name, gender, Age, Education, Location	
3.	Shen	Fei				
4.	Qin	Fei	Quanzhou Longjuan Farm/ AWMS operation staff	03-Mar-2023		
5.	Wang	Rui				
6.	Ma	Lichun	Jiayexing Farm/ AWMS operation staff	03-Mar-2023		
7.	Rong	Hai				
8.	Chen	Qihong		04-Mar-2023		

9.	Wu	Kang	Zhangzhou Chengxi Farm / AWMS operation staff		How to obtain this job? What is the main work? Training provided, Salary level, if satisfied	
10.	Wang	Baozhu	Zhangpu Zhaomulan Farm/ AWMS operation staff	04-Mar-2023		
11.	Qiu	Minggang				
12.	Wang	Jixia	Zhangpu Farm/ AWMS operation staff	04-Mar-2023		
13.	Li	Qingying				
14.	Wang	Panpan	Hake Farm/ AWMS operation staff	05-Mar-2023		
15.	Zhou	Hai				
16.	Zhang	Lili	Yongding Farm/ AWMS operation staff	05-Mar-2023		
17.	Tong	Jiajing				
18.	Wang	Jinjing	Liancheng Farm/ AWMS operation staff	06-Mar-2023		
19.	Luo	Yi				
20.	Wei	Beibin	Mintai Farm/ Chief of Swine farm	02-Mar-2023	Scenario before the project started, Swine genetic source on-farm record keeping Feed supplier Swine weight Sale of Swine Living dates of Swine Daily stock of animals in the farm, discounting dead and discarded animals	
21.	Yang	Yiquan	Mintai Farm/ Director of Production Department	02-Mar-2023		
22.	Lu	Shan	Quanzhou Longjuan Farm/ Chief of Swine farm	03-Mar-2023		
23.	Qian	Ruoxin	Quanzhou Longjuan Farm/ Director of Production Department	03-Mar-2023		
24.	Jiang	Beixin	Jiayexing Farm/ Chief of Swine farm	03-Mar-2023		
25.	Wei	Jia	Jiayexing Farm/ Production group leader	03-Mar-2023		
26.	Li/l5/	Wenxiang	Zhangzhou Chengxi Farm / Chief of Swine farm	04-Mar-2023		
27.	Xing	Hai	Zhangzhou Chengxi Farm /	04-Mar-2023		

			Director of Production Department			
28.	Zhao	Dujun	Zhangpu Zhaomulan Farm/ Chief of Swine farm	04-Mar-2023		
29.	He	Yonglin	Zhangpu Zhaomulan Farm/ Manager of Production Department	04-Mar-2023		
30.	Lu	Yunsheng	Zhangpu Farm/ Chief of Swine farm	04-Mar-2023		
31.	Qin	Cong	Zhangpu Farm/ Director of Production Department	04-Mar-2023		
32.	Yan	Hua	Hake Farm/ Chief of Swine farm	05-Mar-2023		
33.	Liu	Rongfu	Hake Farm/ Production Staff	05-Mar-2023		
34.	Fang	Yuyun	Yongding Farm/ Chief of Swine farm	05-Mar-2023		
35.	Fu	Bin	Yongding Farm/ Production group leader	05-Mar-2023		
36.	Pan	Youmei	Liancheng Farm/ Chief of Swine farm	06-Mar-2023		
37.	Yang	Mao	Liancheng Farm/ Director of Production Department	06-Mar-2023		
38.	Wang	Huanhuan	Local Residents	02-Mar-2023	Local Stakeholder Consultation issues, Local environment impact	
39.	Chen	Zhi		02-Mar-2023		
40.	Zhao	Lin		02-Mar-2023		
41.	Guo	Li		03-Mar-2023		
42.	Li	Jiashan		03-Mar-2023		
43.	Sun	Youyou		04-Mar-2023		
44.	Zhou	Qiang		04-Mar-2023		
45.	Qian	Hai		04-Mar-2023		

46.	Chen	Dashan		05-Mar-2023		
47.	Zhang	Man		05-Mar-2023		
48.	Wang	Fei		06-Mar-2023		
49.	Shen	Yue	Local officer/Local Ecological Environment Bureau	02-Mar-2023	Local Stakeholder Consultation issues, SDG impacts, Inputs, Grievances mechanism, Local legislation to swine and biogas	
50.	Wu	Haishu	Local officer/Local Agricultural Bureau			
51.	Zhu	Yanan	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd./ Senior Manager	02-Mar-2023~06-Mar-2023	Ex-ante and monitoring parameters, MR and ER editable issues	

2.4 Site Visits

The verification site inspection was conducted on 02-Mar-2023~06-Mar-2023. A ground inspection of the project was conducted during the site visit and the verification team interviewed project implementer representative and operation staffs.

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

Duration of on-site inspection: 02-Mar-2023~06-Mar-2023				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening meeting Interview with PP Representative, local officers, local residents and consultant representatives	Office in Fujian Aonong Biological Technology Group Incorporation Limited in Ningde City, Fujian Province, P.R. China	02-Mar-2023	Guo Jiayuan, Li Yuan
2	On-site inspection of 9 swine farms Interview with Operation Staffs of the AWMSs and representatives from each swine farm, local residents	Project Area in Fujian Province, P.R.China	02-Mar-2023 ~ 06-Mar-2023	
3	Documents check	Project Area in Fujian Province, P.R. China	06-Mar-2023	
4	Finding Summary	Office in Fujian Aonong Biological Technology Group Incorporation Limited in	06-Mar-2023	

		Longyan City, Fujian Province, P.R. China		
5	Close Meeting	Office in Fujian Aonong Biological Technology Group Incorporation Limited in Longyan City, Fujian Province, P.R. China	06-Mar-2023	

2.5 Resolution of Findings

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

A Corrective Action Request (CAR) is established where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The VCS Standard Version 4.4 requirements have not been met;
- There is a risk that the emission reductions cannot be monitored or calculated.

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

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

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

In the course of the verification 5 Corrective Action Requests (CARs), 3 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

2.5.1 Forward Action Requests

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

2.6 Eligibility for Validation Activities

The VVB CCCI holds accreditation for both validation and verification for the relevant sectoral scope 1, 13 and 15.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs. The project is seeking registration only in VCS program/57/. A declaration from PP/24/ has been provided and checked, PP has confirmed that the project is not registered under any other GHG programs and the Verified Carbon Units (VCUs) generated from this monitoring period is not double counted.

Also, the assessment team checked the registries of CDM EB/56/, CCER/54/ and Gold Standard/55/ to confirm the same.

The net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions. The project activity has not participated under any other GHG programs which has been confirmed via checking the UNFCCC, GS, VCS and other GHG schemes' website, it is verified that the implementation of the project is consistent with the description in the MR and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 01-Jan-2022 to 31-Dec-2022.

Besides, based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO_2e/year which has been verified in the public website/52/, and CCCI confirms that the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/53/. Hence, CCCI confirms that the emission reductions will not be double counted.

3.2 Methodology Deviations

Not applicable as not deviation for methodology.

3.3 Project Description Deviations

Not applicable as not deviation for project description.

3.4 Grouped Project

Not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Through the onsite visit, interviewing the project developer and reviewing the project operation, CCCI confirms that the project installed new Animal Manure Management Systems by replace the current open anaerobic lagoons with 9 new closed anaerobic digesters to a group of 9 existing swine farms in Fujian Province, which will treat the manure and wastewater from the 9 swine farms to avoid methane emissions generated in the baseline uncovered anaerobic lagoons. The verifier has performed a site visit to check the project equipment and interview with staffs from AWMSs and swine farms, it is found that the project implemented 9 sets of AWMSs in 9 existing swine farms involving 515,636 heads of market swine, 27,450 heads of breeding swine. Live pigs are kept for 180 days in the farms before shipment and are estimated to produce 733,437 tons of manure and 4,400.63*$10^4$$m^3$ of biogas annually. All these 9 existing swine farms were put into operation before the implementation of this project since year 2015 which is verified by checking the Licenses for production and operation of the breeding livestock and poultry/8/ for each swine farm and all the information of the project is confirmed consistent with JPM/3/.

By avoid GHG emission of methane from anaerobic treatment of swine manure and wastewater would be vented into the atmosphere directly. Thus the project generates GHG emission reductions and produces financial, social and environmental benefits.

Via checking the MR/1/ and by site inspection, it is verified that there are no changes on the key equipment and technology since the last periodical verification of the project/6/.

On the basis of site visit and the reviewed project monitoring report and other supporting docs, it can be confirms that the realized technology, as well as the monitoring and metering equipment, the project has been implemented and operated as applied methodology/42/ and monitoring plan described in the registered JPM/3/.

This verification covers the period from 01-Jan-2022 to 31-Dec-2022 (including both days). 367,297 tCO_2e emission reductions are achieved during this monitoring period.

The main timeline of the project is as below table, which has been confirmed in the EPC contract/8/, operation log of the project/13/ and statement of all the AWMSs started construction and operation/10/ against the on-site inspection.

Table 4-1 Milestone date of project

Milestone	Date
Start date of AWMS construction of Zhangpu Zhaomulan Farm	11-Dec-2019/8/
Start date of AWMS construction of Zhanghzhou Chengxi Farm	12-Dec-2019/8/
Start date of AWMS construction of Mintai Farm	12-Dec-2019/8/
Start date of AWMS construction of Quanzhou Longjuan Farm	13-Dec-2019/8/
Start date of AWMS construction of Hake Farm	16-Dec-2019/8/
Start date of AWMS construction of Liancheng Yangwang Farm	17-Dec-2019/8/

Start date of AWMS construction of Jiayexing Farm	18-Dec-2019/8/
Start date of AWMS construction of Yongding Yangwang Farm	18-Dec-2019/8/
Start date of AWMS construction of Zhangpu Farm	20-Dec-2019/8/
Start date of AWMS commissioning of Zhanghzhou Chengxi Farm	17-Apr-2020/13/,/10/
Start date of AWMS commissioning of Zhangpu Zhaomulan Farm	20-Apr-2020/13/,/10/
Start date of AWMS commissioning of Jiayexing Farm	21-Apr-2020/13/,/10/
Start date of AWMS commissioning of Quanzhou Longjuan Farm	21-Apr-2020/13/,/10/
Start date of AWMS commissioning of Hake Farm	22-Apr-2020/13/,/10/
Start date of AWMS commissioning of Yongding Yangwang Farm	22-Apr-2020/13/,/10/
Start date of AWMS commissioning of Liancheng Yangwang Farm	23-Apr-2020/13/,/10/
Start date of AWMS commissioning of Zhangpu Farm	24-Apr-2020/13/,/10/
Start date of AWMS commissioning of Mintai Farm	27-Apr-2020/13/,/10/
Date of all the farms put into operation	01-May-2020/13/,/10/
Start date of the crediting period	01-May-2020/3/
VCS registration	26-Dec-2022/57/

Via on-site investigation, CCCI confirms that during this monitoring period, the project run continuously/13/. No events or situations, which may impact the applicability of the applied methodology, occurred during this monitoring period.

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

There are no any methodology deviations relevant.

In conclusion, the verification team confirms that the project implementation is in accordance with the project description contained in the MR/1/ and approved JPM/3/.

The project has neither been registered and rejected nor seeking registration under any other GHG programs, the project activity is not part of any emission trading program, the net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions, which has been confirmed as above section 3.1.

The project does not involve Supply Chain (Scope 3) Emissions as the produced biogas is consumed by the project facility at the project site.

The project was registered as a VCS project activity with the VCS Ref. No. 2692/57/, with 10 years fixed crediting period under VCS Program started from 01-May-2020 to 30-Apr-2030. This monitoring period (01-Jan-2022 to 31-Dec-2022) is the 2nd monitoring period.

The project site is located in Fujian Province P. R. China. There are 9 subsidiary farms involved in the project. Details of the subsidiary farms' location are given in table 4-2 below:

Table 4-2: Project Location

Item	Project Location		
Host Country	China		
Region:	Fujian Province		
Swine farm	**Detail Location**	**East longitude**	**North latitude**
Jiayexing Farm	Wuxian Town, Tong'an District, Xiamen City	24. 7795°	118.1590°
Quanzhou Longjuan Farm	Longjuan Village, Anxi County, Quanzhou City	24.9271°	117.6828°
Zhanghzhou Chengxi Farm	Chengxi Town, Zhangzhou City	24.4437°	117.5871°
Zhangpu Farm	Zhangpu County, Zhangzhou City	24.2631°	117.7143°
Zhangpu Zhaomulan Farm	Zhangpu County, Zhangzhou City	24.2602°	117.7209°
Hake Farm	Yongding District, Longyan City	24.4055°	116.8965°
Mintai Farm	Pingnan County, Ningde City	26.9380°	118.0924°
Liancheng Yangwang Farm	Liancheng County, Longyan City	25.6381°	116.7732°
Yongding Yangwang Farm	Yongding District, Longyan City	24.9872°	116.8232°

The geographical coordinates for the project site are verified as consistent with on-site investigation by GPS devices.

Basic technical details of the project have been provided in the MR which has been verified as actual during site visit/37/ and consistent with the information in approved JPM/3/.

The approved consolidated methodology applied in the project activity is ACM0010–"GHG emission reductions from manure management systems" (version 08.0)/42/. Also refers to the latest approved version of the following tools and guidelines:

- Tool 02 Combined tool to identify the baseline scenario and demonstrate additionality (Version 07.0)/43/
- Tool 05 Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)/44/
- Tool 06 Project emissions from flaring (Version 04.0)/45/
- Tool 08: Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version03.0)/46/
- Tool 14: Project and leakage emissions from anaerobic digesters (Version 02.0)/47/

- Tool 24 Common practice (Version 03.1)/48/

Reference to the following link for detail information about the methodology and tools:

https://cdm.unfccc.int/methodologies/DB/99QRTE6N5QJEB0V2XP374B25SSIXBB

CCCI verify that the project contributes the sustainable development goal through the following aspects through on-site inspection and interview with the project implementer:

- Amount of electricity through capturing biogas is generated by the project (Goal 7 of UN SDG) – verified by interview with staffs and checking the Daily report of electricity/20/ and Emission Reduction Calculation sheet/2/, CCCI confirms that 48,019.48 MWh of power were produced by biogas during this monitoring period and totally 126,281.13 MWh of power were produced by biogas since the project started operation/4/, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;
- Permanent job opportunities provided by implementation of the project (Goal 8 of UN SDG) – verified by interview with staffs and checking the Record keeping book of staffs/25/ cross check with labor contracts of the project/26/, CCCI confirms that 18 permanent job opportunities (9 females and 9 males) have been provided during this monitoring period and totally offers 18 permanent employment opportunities (9 females and 9 males) since the project started operation, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;
- Tonnes of greenhouse gas emissions avoided (Goal 13 of UN SDG) – verified by checking the ER sheet/2/ and previous verification report/4/, CCCI confirms that 367,297 tCO_2e GHG emission reduction achieved during this monitoring period and totally 957,893 tCO_2e GHG emission reduction achieved since the project started operation, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;

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

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

CAR 01 was raised and successfully closed. Refer to Appendix D for detail assessment.

4.2 Safeguards

4.2.1 No Net Harm

In China, an Environmental Impacts Assessment is required according to Chinese legislation/27/. The EIA was designed by Fujian Petrochemical Industry Design Institute/6/ and approved by Fujian Provincial Department of Ecology and Environment on 29-Oct-2019/7/. The analysis of the environmental impacts of the project activity is sufficiently described according to EIA/6/. The assessment is as below,

It is considered that the environmental impacts and the relevant mitigation methods have been comprehensively described in Section 2.3 of approved JPM/3/ including the air pollution and wastewater, noise, and solid waste impact on the ecosystem and environment of local area in project site according to the EIA report/6/.

Associated with the review of EIA/6/, there was no adverse effect on the ecology, air, water and solid waste, for the project subject to the implementation of pollution mitigation measures according to the EIA report/6/. There was also no any endangered species found in the project location.

As per the approval of EIA/7/, it stated that the inspectors from the local Environmental Protection Bureau have to carry out monitoring work for the environmental impact arisen from the project activity during project commissioning periodically. Via interview with the officer from local Environmental Protection Bureau, CCCI confirms that they are satisfactory with the environmental protection and recovery works have been carried out by the project owner. The local Environmental Protection Bureau also did not receive any public comment on the project activity during 2nd monitoring period.

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

Furthermore, via interview with local officer and stakeholders, CCCI confirms that the implementation of the project improves local socio-economic development through creating career opportunities and utilize biogas for power generation that replace the electricity from grid which is dominated by thermal power generation.

CCCI is able to conclude that there were some impacts on environment during the construction and operation periods which has been demonstrated in the MR/1/ and approved JPM/3/ and EIA/6/, also the proper measurements have been carried out by project implementer to mitigate such impacts. Therefore, no net harm on local environment and social community has been detected for the project.

CL 01 was raised and successfully closed. Refer to Appendix D for detail assessment.

4.2.2 Local Stakeholder Consultation

A stakeholder consultation survey was carried out by the project developer in Dec. 2019 which was prior to the start date of the construction. A stakeholder consultation meeting was held at a meeting room of project owner on 05-Dec-2019, during the validation process, it is verified that there is no one thinks that the project has a negative impact on the local life, local stakeholders are supportive of the project construction by checking the meeting records/28/, and thus no need to change the project design based on the stakeholder inputs.

During this monitoring period, the project owner carried out a questionnaire survey for the local stakeholder to collect the relevant comments and suggestions from 26-Jul-2022 to 29-Jul-2022. Via checking the filled 90 questionnaires (about half participations are women) filled/27/, interview with the local officer and local resident during site visit, CCCI confirm that majority of them believed that the project had positive impact on local employment and economy. There were no negative comments and issues from the local stakeholders during the implementation period. Hence there is no need to change the project design based on the stakeholder inputs and CCCI confirms that all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals which in compliance with the VCS requirements.

During the implementation stage of this monitoring period, via checking the filled 90 questionnaires/27/ and interview with the local officer and local residents during site visit, it is confirmed that the local authority and PP has conducted follow-up interviews and ongoing communication with local stakeholders to collect any comments or inputs to the project implementation. Based on the verification team's expertise, it is confirmed that the local government agencies and competent authorities conducts spot checks on the implementation of the project from time to time as per the request from the local government's regulations and the mechanism for on-going communication with local stakeholder has been established successfully and have been carried out at periodic intervals.

Furthermore, PP has ensured that all the input received during the consultation has been taken by collecting comments and suggestions from residents by the local authority, the local government agencies and competent authorities conducts spot checks on the implementation of the project from time to time, and give suggestions on the involved rectification problems and confirmed as effective by site interview with local stakeholders and local officers, the processes have been implemented to receive inputs from local stakeholders as well as communicate with them at periodic intervals which verified in line with the VCS requirements.

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

4.3 AFOLU-Specific Safeguards

N/A.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Assessment of implementation Status of the Project Activity

In accordance with the approved JPM/3/, there are 9 AWMSs in 9 swine farms are involved in this project. The project implemented 9 sets of AWMSs in 9 existing swine farms involving 515,636 heads of market swine, 27,450 heads of breeding swine. Live pigs are kept for 180 days in the farms before shipment and are estimated to produce 733,437 tons of manure and $4,400.63*10^4 m^3$ of biogas annually. Biogas generated during the treatment process is captured for electricity generation and the generated electricity is used for daily operation of AWMSs and the swine farms. The total installed capacity of the proposed project is 8.4MW and the annual electricity production is estimated to be 57,208MWh by considering the output of biogas generators. Solid are treated in aerobic composting system, and the organic fertilizers are produced and the sludge produced from anaerobic digestion are treated through aerobic composting together with the solid, the effluent is used for agriculture irrigation which has been confirmed by site inspection.

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

Basic technical details of the project have been provided in the Joint-PD-MR which has been verified during site visit /9/,/37/.

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

been implemented and operated/37/ as applied methodology/42/ and monitoring plan described in the registered JPM/3/.

The main timeline of the project is listed in section 1.1 of the MR, which has been confirmed in the EPC contract/8/, operation log of the project/13/ and statement of all the AWMSs started construction and operation/10/ against the on-site inspection.

Via on-site investigation, CCCI confirms that during this monitoring period, the project run continuously/13/. No events or situations, which may impact the applicability of the applied methodology, occurred during this monitoring period. On the basis of site visit and the reviewed project documentation it can be confirms that the realized technology, the project equipment, as well as the monitoring and metering equipment, the project has been implemented and operated as applied monitoring methodology and monitoring plan described in the JPM and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 01-Jan-2022 to 31-Dec-2022. 367,297 tCO_2e emission reductions are achieved during this monitoring period.

In conclusion, the verification team confirms that the project implementation is in accordance with the project description contained in the MR/1/ and approved JPM/3/.

CAR 02 was raised and successfully closed. Refer to Appendix D for detail assessment.

4.4.2 Assessment of Data and parameters Available at Validation

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

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

Parameters	Source of data	Values applied	Demonstration by Verification team
GWP_{CH4} –Global Warming Potential of CH_4	Data source IPCC Fifth Assessment Report (AR5)/31/ against the VCS standard Version 4.4/51/ is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	28 tCO_2e/ tCH_4	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the registered JPM/3/ and the Joint Validation and Verification Report/4/.
GWP_{N2O} –Global Warming Potential of N_2O	Data source IPCC Fifth Assessment Report (AR5)/31/ against the VCS standard Version 4.4/51/ is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	265 tCO_2e/tN_2O	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the registered JPM/3/ and the Joint Validation and Verification Report/4/.
D_{CH4} –*Density of* CH_4	Data source ACM0010 (Version 08.0)/42/ is appropriate, which has	0.00067 t/m^3 at room temperature	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the

	been verified and determined in the registered JPM, Joint Validation and Verification Report.	20℃ and 1 atm pressure	applied methodology/42/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
MCF_j–Methane conversion factor for the baseline AWMSj	Data source IPCC 2006 table 10.17, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	71.44%	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$MS\%_{BL,j}$ – Fraction of manure handled in system j in the baseline	In this project, the baseline manure management system is uncovered anaerobic lagoon only. The amount of manure handled by the anaerobic lagoon is 100%.	100%	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the registered JPM/3/ and the Joint Validation and Verification Report/4/.
$W_{default}$– Default average animal weight of a defined population	Data source IPCC 2006 table 10A-7 and 10A-8, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	$W_{default}$ (Market swine) =28kg $W_{default}$ (Breeding swine) =28kg	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$VS_{default}$– Default value for the volatile solid excretion per day on a dry-matter basis for a defined livestock population	Data source IPCC 2006 table 10A-7 and 10A-8, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	$VS_{default}$ (Market swine) =0.3 kg-dm/animal/day $VS_{default}$ (Breeding swine) =0.3 kg-dm/animal/day	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$NEX_{IPCC\ default}$ – Default value for the nitrogen excretion per head of a defined livestock population	Calculated by the equation: $N_{EXIPCC\ default} = N_{rate(T)} * TAM/1000*365$	$NEX_{IPCC\ default}$ (Market swine) =4.29 kg N/ animal/year $NEX_{IPCC\ default}$ (Breeding swine) =2.45 kg N/ animal/year	$NEX_{IPCC\ default}$ is calculated as equation 10.30 in IPCC 2006, $N_{rate(T)}$ and TAM are default value from IPCC 2006 This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.

$N_{rate(T)}$ – Default N excretion rate	Data source IPCC 2006 table 10.19, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	$N_{rate(T)}$ (Market swine) =0.42 kg N (1000 kg animal mass)$^{-1}$ day^{-1} $N_{rate(T)}$ (Breeding swine) =0.24 kg N (1000 kg animal mass)$^{-1}$ day^{-1}	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
TAM – Typical animal mass for livestock category	Data source IPCC 2006 table 10A-7 and 10A-8, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	TAM (Market swine) =28 kg animal^{-1} TAM (Breeding swine) =28 kg animal^{-1}	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$F_{gas\ MS,j,LT}$– Default values for nitrogen loss due to volatilisation of NH_3 and NO_X from manure management	Data source IPCC 2006 table 10.22, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	$F_{gasMS,j,LT}$, (anaerobic lagoon) : 40% $F_{gasMS,j,LT}$, (solid storage) : 45%	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$EF_{N2O,D,j}$– Direct N_2O emission factor for the treatment system j of the manure management system (kg N_2O-N/kg N)	Data source IPCC 2006 table 10.21, chapter 10, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	0 Kg N_2O-N/kg N for anaerobic lagoon and digester 0.01 Kg N_2O-N/kg N for arobic lagoon	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$EF_{N2O,ID,j}$– Indirect N_2O emission factor for the treatment system j of the manure management system	Data source IPCC 2006 table 11.3, chapter 11, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	0.01 kgN_2O-N/kg NH_3-N and NO_X-N	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$EF_{CH4,default}$– Default emission factor for the fraction of CH_4 produced that leaks from the	Data source Tool 14: "Project and leakage emissions from anaerobic digesters (version 02.0)"/47/ for UASB (Upflow Anaerobic	0.05 t CH_4 leaked / t CH_4 produced	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the Tool 14/47/, registered JPM/3/ and the Joint Validation and Verification Report/4/.

anaerobic digester (fraction)	Sludge Blanket) type digesters is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.		
$R_{VS,n}$– Default emission factor for the fraction of CH_4 produced that leaks from the anaerobic digester (fraction)	Data source Appendix 1 of ACM0010 (Version 08.0)/42/ is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	$R_{VS,n}$, aerobic treatment anaerobic digester: 20%,80% for leakage N_2O emission released during project activity $R_{VS,n}$, one cell lagoon :85% for leakage N_2O emission released during baseline scenario	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the applied methodology/42/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$R_{N,n}$– Nitrogen reduction factor	Data source Appendix 1 of ACM0010 (Version 08.0)/42/ is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	$R_{N,n}$, aerobic treatment and anaerobic digester : 5%, 25% $R_{N,n}$, uncovered anaerobic lagoon : 80%	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the applied methodology/42/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
EF_1, EF_4, EF_5– Emission factor for N_2O emissions from N inputs; from N leaching and runoff; from atmospheric deposition of N on soils and water surfaces	Data source IPCC 2006 Guidelines default values are be used, since country specific or region specific data are not available. EF1 from table 11.1, chapter 11, volume 4. EF4 and EF5 from table 11.3, chapter 11, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	EF_1 = 0.010 kg N_2O-N/kg N EF_4 =0.010 kg N_2O-N/(kg NH_3-N and NO_X-N EF_5 = 0.0075 kg N_2O-N/kg N	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
F_{gasm}– Fraction of N lost due to volatilization	Data source IPCC 2006 table 11.3, chapter 11, volume 4/30/is appropriate, which has been verified and determined in the	0.2	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.

	registered JPM, Joint Validation and Verification Report.		
F_{leach} – Fraction of all N added to/mineralised in managed soils in regions where leaching/runoff occurs that is lost through leaching and runoff	Data source IPCC 2006 table 11.3, chapter 11, volume 4/30/is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	0.3	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the IPCC/IPCC/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
MCF_d – Methane conversion factor for leakage calculation	Data source ACM0010 (Version 08.0)/42/ is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	1	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the applied methodology/42/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$EF_{EF,j,y}$ – Emission factor for electricity generation	Data source published by China DNA for ECPG (East China Power Grid) is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	0.58955 tCO_2/MWh	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the source published by China DNA for ECPG (East China Power Grid)/36/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
R_u – Universal ideal gases constant	Data source Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0) is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	8,314 Pa.m^3/kmol.K	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the Tool 08/46/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
MM_i – Molecular mass of greenhouse gas i	Data source Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0) is appropriate, which has been verified and determined in the registered JPM, Joint Validation and Verification Report.	16.04 kg/kmol	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the Tool 08/46/, registered JPM/3/ and the Joint Validation and Verification Report/4/.
$\eta_{flare,m}$–Flare efficiency in minute m	Data source Tool "Project emissions from flaring (Version 04.0)" is appropriate, which has	0%	This is an ex-ante fixed value during the fixed crediting period, the value is verified as consistent among the Tool 06/45/, registered JPM/3/

	been verified and determined in the registered JPM, Joint Validation and Verification Report.		and the Joint Validation and Verification Report/4/.

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

4.4.3 Assessment of Data and parameters Monitored

During the 2nd periodical verification all relevant monitoring parameters as listed in JPM/3/ have been verified and summarized in the below table.

$N_{p,LT}$	*Number of animals of type LT produced annually for the year y*
Title in line with Methodology?	Yes
Value applied	Time: $N_{p,LT}$ 01-Jan-2022 to 31-Jan-2022: 75,908 01-Feb-2022 to 28-Feb-2022: 74,802 01-Mar-2022 to 31-Mar-2022: 75,359 01-Apr-2022 to 30-Apr-2022: 76,023 01-May-2022 to 31-May-2022: 75,346 01-Jun-2022 to 30-Jun-2022: 75,638 01-Jul-2022 to 31-Jul-2022: 76,735 01-Aug-2022 to 31-Aug-2022: 76,389 01-Sep-2022 to 30-Sep-2022: 75,344 01-Oct-2022 to 31-Oct-2022: 76,144 01-Nov-2022 to 30-Nov-2022: 76,449 01-Dec-2022 to 31-Dec-2022: 75,451 **01-Jan-2022 to 31-Dec2022: 909,588**
Data unit correctly expressed?	Yes - number
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data derived from Production record of Market swine issued by PP/16/ for this monitoring period.
Measurement method and procedures	Data were recorded by technicians in farms each month and sourced from the data logged in each swine farm which has been confirmed by site inspection and checking the Production record of Market swine issued by PP/16/. Via site inspection, it is confirmed that each pig involved in this project has a unique electronic ear tag when was born, which is an electronic device dedicated to the identification and electronic management of animals, can track automatically. This electronic ear tag can be connected to the Data Collection System (DCS), which can store and read information. Through this method, the number of swine produced in the farm can be monitored through the auto tracking devices of electronic ear tag once pig slaughter monthly and obtained by the DCS which has been verified as effective by site

	inspection of the electronic ear tag and Data Collection System (DCS). Each farm control and record the numbers strictly due to the swine production and sale are the commercial sources of farms. Hence, the recorded data are confirmed as reasonable and reliable. Above mentioned evidences were provided during site verification. Via comparing the data in MR with the evidence, audit team verified that the data in MR is correct.
Measurement equipment	N/A
Monitoring frequency	Monthly
QA/QC procedure	The Production record of Market swine/16/ is cross-checked with the monthly Sale Records of Market swine/17/ of each farm. Via comparing with both sources, it is verified that the calculated N_{LT} is 448,563 (909,588 *180days/365days) heads. However, according to the number of market pigs produced annually of each farm, the N_{LT} calculated is rounded to an integer as 448,560 heads. While via checking the monthly Sale Records of Market swine/20/ of each farm, audit team confirmed that total 909,588 head of marketing swine is produced and sold into the market which is consistent with the value from Monthly production record of market swine. According to the conservative principle, the 448,560 heads was applied in the calculations of emission reductions in MR, therefore, $N_{p,LT}$ is reasonable and credible.
Purpose of data	BE, PE, LE calculation

$N_{da,LT}$	*Number of days animal of type LT is alive in the farm in the year y*
Title in line with Methodology?	Yes
Value applied	180
Data unit correctly expressed?	Yes - days
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data derived from Production record of Market swine issued by PP/16/ for this monitoring period.
Measurement method and procedures	Data were recorded by technicians in farms each month and sourced from the data logged in each swine farm which has been confirmed by site inspection and checking the Production record of Market swine issued by PP/16/. Via site inspection, it is confirmed that each pig involved in this project has a unique electronic ear tag when was born, which is an electronic device dedicated to the identification and electronic management of animals, can track automatically. This electronic ear tag can be connected to the Data Collection System (DCS), which can store and read information. Through this method, the days of swine alive can be traced by the technical staffs using DCS in each farm, so it is confirmed that the recorded dates are reasonable and reliable. Above mentioned evidences were provided to the verification team during site verification. Via comparing the data in MR with the evidence, audit team verified that the data in MR is correct.
Measurement equipment	N/A
Monitoring frequency	Monthly

QA/QC procedure	The Production record of Market swine/16/ is cross-checked with the sale records of Market swine/17/. Via comparing with both sources, it is verified that the days of swine alive in the farm is 180 days then for sale. Furthermore, the number of days is verified as consistent with the number of days for pigs to be slaughtered by existing large-scale breeding groups in China/58/. Hence the days in MR is correct and actual.
Purpose of data	BE, PE, LE calculation

$N_{AA,LT}$	***Daily stock of animals in the farm, discounting dead and discarded animals***
Title in line with Methodology?	Yes
Value applied	

Time	$N_{AA,LT}$
01-Jan-2022 to 31-Jan-2022	25,029
01-Feb-2022 to 28-Feb-2022	24,995
01-Mar-2022 to 31-Mar-2022	24,985
01-Apr-2022 to 30-Apr-2022	25,028
01-May-2022 to 31-May-2022	25,024
01-Jun-2022 to 30-Jun-2022	24,975
01-Jul-2022 to 31-Jul-2022	25,049
01-Aug-2022 to 31-Aug-2022	25,083
01-Sep-2022 to 30-Sep-2022	25,026
01-Oct-2022 to 31-Oct-2022	25,015
01-Nov-2022 to 30-Nov-2022	24,891
01-Dec-2022 to 31-Dec-2022	24,881
01-Jan-2022 to 31-Dec2022	**24,998**

Data unit correctly expressed?	Yes - number
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data derived from Daily Breeding Pig stock record issued by PP/18/ for this monitoring period.
Measurement method and procedures	This parameter is monitored daily through the auto tracking devices of electronic ear tag. Data were recorded by technicians in farms each day and sourced from the data logged in each swine farm which has been confirmed by site inspection and checking the Breeding Pig stock record issued by PP/18/ of each farm. Via site inspection, it is confirmed that each pig involved in this project has a unique electronic ear tag when was born, which is an electronic device dedicated to the identification and electronic management of animals, can track automatically. This electronic ear tag can be connected to the Data Collection System (DCS), which can store and read information. Through this method, the daily stock number of animals from the first day of monitoring period can be recorded, and this record data including the new imported animal and discounting dead and discharge animals which can be traced and recorded by the technical staffs using DCS in each farm, so it is confirmed that the recorded dates are reasonable and reliable.

	The annual average number of animals ($N_{AA,LT}$) was calculated as an average of the daily stock of breeding swine in the farms without considering dead animals and discarded animals. Above mentioned evidences were provided to the verification team during site verification. Via comparing the data in MR with the evidence, audit team verified that the data in MR is correct.
Measurement equipment	N/A
Monitoring frequency	Daily
QA/QC procedure	N/A as the data from DCS
Purpose of data	BE, PE and LE calculation

W_{site}	***Average animal weight of a defined livestock population at the project site***
Title in line with Methodology?	Yes
Value applied	<table><tr><th>Time</th><th>W_{site} for Market swine(kg)</th><th>W_{site} for Breeding swine(kg)</th></tr><tr><td>01-Jan-2022 to 31-Jan-2022</td><td>58.3</td><td>74.8</td></tr><tr><td>01-Feb-2022 to 28-Feb-2022</td><td>60.4</td><td>76.0</td></tr><tr><td>01-Mar-2022 to 31-Mar-2022</td><td>58.3</td><td>74.7</td></tr><tr><td>01-Apr-2022 to 30-Apr-2022</td><td>57.3</td><td>76.2</td></tr><tr><td>01-May-2022 to 31-May-2022</td><td>57.1</td><td>77.2</td></tr><tr><td>01-Jun-2022 to 30-Jun-2022</td><td>60.0</td><td>76.0</td></tr><tr><td>01-Jul-2022 to 31-Jul-2022</td><td>57.3</td><td>77.7</td></tr><tr><td>01-Aug-2022 to 31-Aug-2022</td><td>59.4</td><td>76.0</td></tr><tr><td>01-Sep-2022 to 30-Sep-2022</td><td>57.2</td><td>74.2</td></tr><tr><td>01-Oct-2022 to 31-Oct-2022</td><td>57.8</td><td>74.6</td></tr><tr><td>01-Nov-2022 to 30-Nov-2022</td><td>57.6</td><td>75.8</td></tr><tr><td>01-Dec-2022 to 31-Dec-2022</td><td>56.8</td><td>76.6</td></tr><tr><td>01-Jan-2022 to 31-Dec2022</td><td>58.1</td><td>75.8</td></tr></table>
Data unit correctly expressed?	Yes - kg
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data derived from Weight records issued by PP/19/ for this monitoring period.
Measurement method and procedures	For monitoring this parameter, a sampling method has been used by PP following the applied methodology and PDD. Sample plan is designed 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)"/40/. For this monitoring period, as per the sample plan in the PDD, below methods have been taken by PP to carry out the sampling, a. To determine the total population - Calculate the overall sample size based on the actual population of pigs in stock firstly– the Production record of Market swine/16/ have been checked and the total population of pigs determined are verified as correct

	and actual; b. To determine the sample size for each farm - The project involved 9 swine farms (all swine farms including market swine and breeding swine), then the sample size in each swine farm is adjusted based on the proportion of the number of each farm in the total number of 9 swine farms– the calculation sheet of sample size/23/ is checked as correct and actual; c. To determine the sample size of each age group - The sample size of each age group of Market swine and Breeding swine in a farm is also calculated based on the proportion of the number of each age group of Market swine and Breeding swine to the total number of swine in two kinds of farms– the calculation sheet of sample size/23/ is checked as correct and actual; d. To ensure representativeness, each defined livestock population has been classified into a minimum of three age categories including Nursery phase, Growing phase and Mature phase – the monthly records of animal weight of a defined livestock population of three age categories/19/ have been checked and the three age categories determined are verified as in line with the PDD and applied methodology e. After the sample size in each age group of Market swine and Breeding swine of each swine farm determined, the sample is conducted in every swine farm. Since swine in different age are kept in the different pig houses, samples can be randomly selected from pig houses of this age group – the samples choosing method is checked as correct and actual; f. For each defined livestock population, a minimum of one monthly sample per age category has been taken - the monthly records of animal weight of a defined livestock population of three age categories/19/ have been checked and one monthly sample per age category determined for each defined livestock population are verified as in line with the PDD and applied methodology g. If the same samples are taken the following month, then new samples will be taken, this will be done every month until the end of the monitoring period - the monthly records of animal weight of a defined livestock population of three age categories/19/ have been checked and confirmed that the samples are not same for each month. PP uses 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)”/40/ and applied methodology. Via site inspection and interview with chiefs of farms, audit team confirmed that the monitoring activities of the W_{site} have been conducted in the three age groups of Nursery phase, Growing phase and Mature phase in each swine farm at least one monthly which is verified as in line with the above requirements and the 95/10 confidence/precision is confirmed as used by PP as the criteria for the reliability of sampling efforts. The one monthly monitoring activity of the samples have been completed in the 9 swine farms during this monitoring period. The monitoring forms have been filled out by the Breeders in the 9 swine farms to record the animal weight of the samples/19/.

<table>
<tr><td></td><td>The implementation of sampling method and process 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.
Via checking the sampling method by reviewing the Weight records issued by PP/19/ and interview with technicians as stated in the MR, it is verified that the sampling and recording method is in line with the monitoring plan and applied methodology/42/.
Above mentioned evidences were provided to the verification team during site verification. Via comparing the data in MR with the evidence, audit team verified that the data in MR is correct.</td></tr>
<tr><td>Measurement equipment</td><td>Weight measurers (one for each farm)
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="10">XK3190-A9+(E)/III level</td><td>2019010125</td><td rowspan="10">15-Apr-2021
08-Apr-2022</td><td rowspan="10">14-Apr-2022
07-Apr-2023</td></tr>
<tr><td>Quanzhou Longjuan</td><td>2018011174</td></tr>
<tr><td>Zhanghzhou Chengxi</td><td>2019020295</td></tr>
<tr><td>Zhangpu</td><td>2019012105</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>2018010406</td></tr>
<tr><td>Hake</td><td>2017031543</td></tr>
<tr><td>Mintai</td><td>2019013913</td></tr>
<tr><td>Liancheng Yangwang</td><td>2018012504</td></tr>
<tr><td>Yongding Yangwang</td><td>2018011158</td></tr>
</table></td></tr>
<tr><td>Monitoring frequency</td><td>Monthly</td></tr>
<tr><td>QA/QC procedure</td><td>The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/ in compliance with JJG539-2016 “Verification Regulation of Digital Indicating Weighting Instruments” in China/35/.</td></tr>
<tr><td>Purpose of data</td><td>Used for estimating $VS_{LT,y}$</td></tr>
</table>

F_{Aer}	*Fraction of volatile solids directed to aerobic treatment*
Title in line with Methodology?	Yes
Value applied	100%
Data unit correctly expressed?	Yes – Fraction
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is 100%, which is conservative for this monitoring period.
Measurement method and procedures	During this monitoring period, there is no equipment install in the project activity to monitor the influent into anaerobic digestion and aerobic system, therefore the value of F_{Aer} is applied as 100%, which is conservative.
Measurement equipment	N/A
Monitoring frequency	Annually
QA/QC procedure	N/A
Purpose of data	PE calculation

n_{dy}	*Number of days treatment plant was operational in year y*
Title in line with Methodology?	Yes
Value applied	365
Data unit correctly expressed?	Yes –days
Appropriate description?	Yes
Correct value provided?	Yes

Source of Data	The monitoring data applied is derived from Daily operation record of each treatment plant/15/ for this monitoring period.
Measurement method and procedures	PP record the actual number of days of each treatment plant that was operational daily. Finally, the Daily operation record of each treatment plant/15/ during this monitoring period were summarized by all the daily record. Via checking the Daily operation record of each treatment plant/15/ and interview with monitoring staff and PP, it is verified that the method is in line with the monitoring plan and applied methodology/42/.
Measurement equipment	N/A
Monitoring frequency	Daily
QA/QC procedure	Daily operation record of each treatment plant/15/ is cross-checked with the Production record of Market swine from DCS system/16/, it is verified that each treatment plant was operational in 365 days during this monitoring period.
Purpose of data	BE calculation

Vf	***Biogas flow***
Title in line with Methodology?	Yes
Value applied	

Time	Vf1- at outlet of the anaerobic digestion (m3)	Vf2- at the inlet of generator (m3)	Vf3- in inlet of flare system (m3)
01-Jan-2022 to 31-Jan-2022	3,259,239.24	3,195,621.55	0.00
01-Feb-2022 to 28-Feb-2022	3,109,997.10	3,049,851.31	0.00
01-Mar-2022 to 31-Mar-2022	3,258,936.48	3,196,184.66	0.00
01-Apr-2022 to 30-Apr-2022	3,237,286.32	3,174,965.65	0.00
01-May-2022 to 31-May-2022	3,176,011.68	3,114,744.10	0.00
01-Jun-2022 to 30-Jun-2022	3,236,924.16	3,173,502.57	0.00
01-Jul-2022 to 31-Jul-2022	3,176,181.06	3,114,565.85	0.00
01-Aug-2022 to 31-Aug-2022	3,259,610.88	3,195,679.66	0.00
01-Sep-2022 to 30-Sep-2022	3,237,274.80	3,175,156.61	0.00
01-Oct-2022 to 31-Oct-2022	3,009,566.10	2,950,020.16	0.00
01-Nov-2022 to 30-Nov-2022	3,236,376.36	3,173,343.22	0.00
01-Dec-2022 to 31-Dec-2022	3,175,045.50	3,113,046.21	0.00
01-Jan-2022 to 31-Dec2022	**38,372,449.68**	**37,626,681.55**	**0**

Data unit correctly expressed?	Yes - m^3
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data derived from Daily operation record/15/ saved automatically in the Data Collection System (DCS) for this monitoring period.
Measurement method and procedures	The biogas flow data were measured by the flow meters installed at each treatment plant (total 27 flow meters 1,2,3), flow meters 1 are installed at outlet of the anaerobic digestion, flow meters 2 are installed at the inlet of biogas power generator and flow meters 3 are installed at the inlet of flare system which have been verified as correct and actual by site inspection.

<table>
<tr><td></td><td>The flowmeters monitored data continuously, record hourly and saved automatically in the Data Collection System (DCS).
The data can be obtained from Data Collection System (DCS) and the monthly data was exported by the staff at the beginning of next month and then recorded in daily operation record, then summarized as the monthly biogas production, biogas flow to the power generator and biogas flow to flare system is the sum of the daily output.
Via checking the measuring method by reviewing the Daily operation record/15/ and interview with monitoring staff, it is verified that the method is in line with the applied methodology.</td></tr>
<tr><td>Measurement equipment</td><td>Flow meters 1 (one for each farm)
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="10">FEW1000/ 1.5 level</td><td>2009110316</td><td rowspan="10">02-Apr-2021
29-Mar-2022</td><td rowspan="10">01-Apr-2022
28-Mar-2023</td></tr>
<tr><td>Quanzhou Longjuan</td><td>2009110319</td></tr>
<tr><td>Zhanghzhou Chengxi</td><td>2009110322</td></tr>
<tr><td>Zhangpu</td><td>2009001541</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>2009001544</td></tr>
<tr><td>Hake</td><td>2009001547</td></tr>
<tr><td>Mintai</td><td>2010002456</td></tr>
<tr><td>Liancheng Yangwang</td><td>2010002459</td></tr>
<tr><td>Yongding Yangwang</td><td>2010002462</td></tr>
</table>
Flow meters 2 (one for each farm)
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="10">FEW1000/ 1.5 level</td><td>2009110317</td><td rowspan="10">02-Apr-2021
29-Mar-2022</td><td rowspan="10">01-Apr-2022
28-Mar-2023</td></tr>
<tr><td>Quanzhou Longjuan</td><td>2009110320</td></tr>
<tr><td>Zhanghzhou Chengxi</td><td>2009110323</td></tr>
<tr><td>Zhangpu</td><td>2009001542</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>2009001545</td></tr>
<tr><td>Hake</td><td>2009001548</td></tr>
<tr><td>Mintai</td><td>2010002457</td></tr>
<tr><td>Liancheng Yangwang</td><td>2010002460</td></tr>
<tr><td>Yongding Yangwang</td><td>2010002463</td></tr>
</table>
Flow meters 3 (one for each farm)
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="10">FEW1000/ 1.5 level</td><td>2009110318</td><td rowspan="10">02-Apr-2021
29-Mar-2022</td><td rowspan="10">01-Apr-2022
28-Mar-2023</td></tr>
<tr><td>Quanzhou Longjuan</td><td>2009110321</td></tr>
<tr><td>Zhanghzhou Chengxi</td><td>2009110324</td></tr>
<tr><td>Zhangpu</td><td>2009001543</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>2009001546</td></tr>
<tr><td>Hake</td><td>2009001549</td></tr>
<tr><td>Mintai</td><td>2010002458</td></tr>
<tr><td>Liancheng Yangwang</td><td>2010002461</td></tr>
<tr><td>Yongding Yangwang</td><td>2010002464</td></tr>
</table></td></tr>
<tr><td>Monitoring frequency</td><td>Continuously by flow meters and reported cumulatively on weekly basis</td></tr>
<tr><td>QA/QC procedure</td><td>The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/.
Via checking the calibration reports/11/, it is confirmed that all the flow meters are calibrated based on JJG1029-2007-Verification Regulation of Vortex-shedding Flowmeter/33/.
And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.</td></tr>
</table>

Purpose of data	PE and LE calculation

$EC_{PJ,j,y}$	*Quantity of electricity consumed by the proposed project in year y*
Title in line with Methodology?	Yes
Value applied	<table><tr><th>Time</th><th>$EC_{PJ,j,y}$</th></tr><tr><td>01-Jan-2022 to 31-Jan-2022</td><td>15.56916</td></tr><tr><td>01-Feb-2022 to 28-Feb-2022</td><td>15.57167</td></tr><tr><td>01-Mar-2022 to 31-Mar-2022</td><td>15.56801</td></tr><tr><td>01-Apr-2022 to 30-Apr-2022</td><td>15.57130</td></tr><tr><td>01-May-2022 to 31-May-2022</td><td>15.56996</td></tr><tr><td>01-Jun-2022 to 30-Jun-2022</td><td>15.57126</td></tr><tr><td>01-Jul-2022 to 31-Jul-2022</td><td>15.57250</td></tr><tr><td>01-Aug-2022 to 31-Aug-2022</td><td>15.57097</td></tr><tr><td>01-Sep-2022 to 30-Sep-2022</td><td>15.57214</td></tr><tr><td>01-Oct-2022 to 31-Oct-2022</td><td>15.57052</td></tr><tr><td>01-Nov-2022 to 30-Nov-2022</td><td>15.56097</td></tr><tr><td>01-Dec-2022 to 31-Dec-2022</td><td>15.56576</td></tr><tr><td>**01-Jan-2022 to 31-Dec2022**</td><td>**186.83422**</td></tr></table> During this monitoring period, all the biogas generated by the anaerobic fermentation process is used for power generation, which is belongs to self-generated and self-consumed. The electricity consumption of AWMSs were sourced from the grid company when the biogas generators were not operation. Via checking the Grid Company Electricity Statement/21/, it is confirmed that the electricity consumed from power grid company only happened in Jiayexing, Quanzhou Longjuan and Zhangpu swine farms due to amount of biogas generated in Jiayexing, Quanzhou Longjuan and Zhangpu swine farms cannot reach the biogas required for the full-load operation of the generator set. When the generator does not generate electricity, the system runs electricity must be purchased from the grid. In other farms, the amount of biogas produced can meet the full load operation of the generators, so there is no need to purchase electricity from power grid.
Data unit correctly expressed?	Yes - MWh
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data derived from Daily report of electricity/20/ for this monitoring period.
Measurement method and procedures	The electricity consumptions were measured by the electricity meter 1 installed at each treatment plant (total 9 meters). Monitoring staff read the readings of electricity daily and recorded meter reading data into Daily report of electricity/20/ which includes the electricity consumption of the treatment plant daily, and then the electricity consumption is calculated for each month. Via checking the measuring method by reviewing the Daily operation record/20/ and interview with monitoring staff, it is verified that the method is in line with the monitoring plan and applied tool/44/.
Measurement equipment	Electricity meter 1 (one for each farm)

<table>
<tr><td></td><td>
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="10">DT862/ 2.0</td><td>20203910010773</td><td rowspan="10">15-Mar-2020</td><td rowspan="10">14-Mar-2025</td></tr>
<tr><td>Quanzhou Longjuan</td><td>20203910007692</td></tr>
<tr><td>Zhangzhou Chengxi</td><td>20203910010373</td></tr>
<tr><td>Zhangpu</td><td>20180110001056</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>20180110003073</td></tr>
<tr><td>Hake</td><td>20194120002034</td></tr>
<tr><td>Mintai</td><td>20203940010062</td></tr>
<tr><td>Liancheng Yangwang</td><td>20203930110166</td></tr>
<tr><td>Yongding Yangwang</td><td>20203910000111</td></tr>
</table>
</td></tr>
<tr><td>Monitoring frequency</td><td>Continuous measurement and daily recording</td></tr>
<tr><td>QA/QC procedure</td><td>The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/.
Via checking the calibration reports/11/, it is confirmed that all the electricity meters are calibrated based on JJG 596-2012 Electrical Meters for Measuring Alternating-current Electrical Energy/32/. And based on this regulation, if the electricity meters can be used normally, recalibration is not required. The validity is five years.
And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.
The electricity data is cross-checked with Grid Company Electricity Statement/21/.</td></tr>
<tr><td>Purpose of data</td><td>PE calculation</td></tr>
</table>

$EG_{d,y}$	*Electricity generated using biogas in year y*
Title in line with Methodology?	Yes
Value applied	

Time	$EG_{d,y}$
01-Jan-2022 to 31-Jan-2022	4,078.59
01-Feb-2022 to 28-Feb-2022	3,891.40
01-Mar-2022 to 31-Mar-2022	4,078.21
01-Apr-2022 to 30-Apr-2022	4,050.89
01-May-2022 to 31-May-2022	3,974.65
01-Jun-2022 to 30-Jun-2022	4,051.72
01-Jul-2022 to 31-Jul-2022	3,974.84
01-Aug-2022 to 31-Aug-2022	4,074.77
01-Sep-2022 to 30-Sep-2022	4,050.90
01-Oct-2022 to 31-Oct-2022	3,766.79
01-Nov-2022 to 30-Nov-2022	4,049.76
01-Dec-2022 to 31-Dec-2022	3,973.43
01-Jan-2022 to 31-Dec2022	**48,019.48**

Data unit correctly expressed?	Yes - MWh
Appropriate description?	Yes

<table>
<tr><td>Correct value provided?</td><td>Yes</td></tr>
<tr><td>Source of Data</td><td>The monitoring data derived from Daily report of electricity/20/ for this monitoring period.</td></tr>
<tr><td>Measurement method and procedures</td><td>The electricity generated was measured by the electricity meter 2 installed in the outlet of biogas generators (total 9 meters).
Monitoring staff read the readings of electricity daily and recorded meter reading data into Daily report of electricity/20/ which includes the electricity generated from biogas generators daily, and then the electricity generated is calculated for each month.
Via checking the measuring method by reviewing the Daily operation record/20/ and interview with monitoring staff, it is verified that the method is in line with the monitoring plan/3/.</td></tr>
<tr><td>Measurement equipment</td><td>Electricity meter 2 (one for each farm)
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="11">DT862/ 2.0</td><td>20203910010774</td><td rowspan="11">15-Mar-2020</td><td rowspan="11">14-Mar-2025</td></tr>
<tr><td>Quanzhou Longjuan</td><td>20203910007693</td></tr>
<tr><td>Zhangzhou Chengxi</td><td>20203910010374</td></tr>
<tr><td>Zhangpu</td><td>20180110001057</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>20180110003074</td></tr>
<tr><td>Hake</td><td>20194120002035</td></tr>
<tr><td>Mintai</td><td>20203940010063</td></tr>
<tr><td>Liancheng Yangwang</td><td>20203930110167</td></tr>
<tr><td>Yongding Yangwang</td><td>20203910000112</td></tr>
</table></td></tr>
<tr><td>Monitoring frequency</td><td>Continuous measurement and daily recording</td></tr>
<tr><td>QA/QC procedure</td><td>The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/.
Via checking the calibration reports/11/, it is confirmed that all the electricity meters are calibrated based on JJG 596-2012 Electrical Meters for Measuring Alternating-current Electrical Energy/32/. And based on this regulation, if the electricity meters can be used normally, recalibration is not required. The validity is five years.
And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.</td></tr>
<tr><td>Purpose of data</td><td>The electricity generated using biogas does not involve the calculation of emission reduction since baseline emissions due to electricity generation is not taken into account. However, according to applied methodology ACM0010 (version08.0), this parameter needs to be monitored.</td></tr>
</table>

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

Source of Data	The monitoring data applied is derived from Tool 05 "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (version 03.0)/44/ for this monitoring period.
Measurement method and procedures	As per the Tool of Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)/44/, it is confirmed that different values applied to different scenarios. For the project, the electricity consumption was derived from the power grid. Hence, scenario A: Electricity consumption from the grid is applied to this situation. For this situation, a default value of 20% is used for $TDL_{j,y}$ in line with the tool/44/ and it is confirmed that this value is the maximum value as per Methodology tool 05 Version 03.0 and conservative. Via checking the Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)/44/, it is confirmed that the data in MR is correct.
Measurement equipment	N/A
Monitoring frequency	Changed once the tool is updated.
QA/QC procedure	N/A, as the value is derived from tool.
Purpose of data	PE calculation

$V_{t,db}$	*Volumetric flow of the gaseous stream in time interval t on a dry basis*
Title in line with Methodology?	Yes
Value applied	

Time	$V_{t,db}$ (m^3 dry gas/h) monitored by flow meter 1	$V_{t,db}$ (m^3 dry gas/h) monitored by flow meter 3
01-Jan-2022 to 31-Jan-2022	4,380.698	0.00
01-Feb-2022 to 28-Feb-2022	4,627.972	0.00
01-Mar-2022 to 31-Mar-2022	4,380.291	0.00
01-Apr-2022 to 30-Apr-2022	4,496.231	0.00
01-May-2022 to 31-May-2022	4,268.833	0.00
01-Jun-2022 to 30-Jun-2022	4,495.728	0.00
01-Jul-2022 to 31-Jul-2022	4,269.061	0.00
01-Aug-2022 to 31-Aug-2022	4,381.197	0.00
01-Sep-2022 to 30-Sep-2022	4,496.215	0.00
01-Oct-2022 to 31-Oct-2022	4,045.116	0.00
01-Nov-2022 to 30-Nov-2022	4,494.967	0.00
01-Dec-2022 to 31-Dec-2022	4,267.534	0.00
01-Jan-2022 to 31-Dec2022	**4,383.654**	**0.00**

Data unit correctly expressed?	Yes –m^3 dry gas/h
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is derived from Daily operation record/15/ saved automatically in the Data Collection System (DCS) for this monitoring period.

Measurement method and procedures	The volumetric flow of the gaseous stream data was measured by the flow meters installed at each treatment plant (total 18 flow meters 1,3), flow meters 1 are installed at outlet of the anaerobic digestion and flow meters 3 are installed at the inlet of flare system which have been verified as correct and actual by site inspection. The flowmeters monitored data continuously, record hourly and saved automatically in the Data Collection System (DCS). The audit team confirmed that the measurement method is actual and the gaseous stream is defined as dry according to the Tool 8:" Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0)"/46/. Hence the monitoring parameter $V_{t,db}$ does not need to be calculated based on the wet basis flow plus water concentration. The data can be obtained from Data Collection System (DCS) and the monthly data was exported by the staff at the beginning of next month and then recorded in daily operation record. Daily biogas flow is equal to the cumulative value of 24 hours, and monthly biogas flow can be accumulated on daily basis. Via checking the measuring method by reviewing the Daily operation record/15/ and interview with monitoring staff, it is verified that the method is in line with the tool and applied methodology.
Measurement equipment	Refer to information for 18 flow meters (1,3) above
Monitoring frequency	Continuously measurement
QA/QC procedure	The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/. Via checking the calibration reports/11/, it is confirmed that all the flow meters are calibrated based on JJG1029-2007-Verification Regulation of Vortex-shedding Flowmeter/33/. And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.
Purpose of data	PE calculation

$V_{i,t,db}$	*Volumetric fraction of greenhouse gas i in a time interval t on a dry basis*
Title in line with Methodology?	Yes
Value applied	

Time	$V_{i,t,db}$
01-Jan-2022 to 31-Jan-2022	61.30
01-Feb-2022 to 28-Feb-2022	60.42
01-Mar-2022 to 31-Mar-2022	60.44
01-Apr-2022 to 30-Apr-2022	61.07
01-May-2022 to 31-May-2022	60.78
01-Jun-2022 to 30-Jun-2022	60.00
01-Jul-2022 to 31-Jul-2022	61.11
01-Aug-2022 to 31-Aug-2022	61.26
01-Sep-2022 to 30-Sep-2022	59.64
01-Oct-2022 to 31-Oct-2022	61.32

<table>
<tr><td></td><td>
<table>
<tr><td>01-Nov-2022 to 30-Nov-2022</td><td>60.64</td></tr>
<tr><td>01-Dec-2022 to 31-Dec-2022</td><td>60.26</td></tr>
<tr><td>01-Jan-2022 to 31-Dec2022</td><td>60.69</td></tr>
</table>
</td></tr>
<tr><td>Data unit correctly expressed?</td><td>Yes –m^3 gas i/m^3 dry gas</td></tr>
<tr><td>Appropriate description?</td><td>Yes</td></tr>
<tr><td>Correct value provided?</td><td>Yes</td></tr>
<tr><td>Source of Data</td><td>The monitoring data applied is derived from Daily operation record/15/ for this monitoring period.</td></tr>
<tr><td>Measurement method and procedures</td><td>The data are measured continuously and record hourly by online gas analysers installed at the outlet of the anaerobic digesters and saved automatically in the DCS. The data can be obtained from DCS and the monthly data was exported by the staff at the beginning of next month. Daily and Monthly CH_4 concentration was calculated based on the 24-hour average and daily average CH_4 concentration and recorded finally in the Daily operation record/15/.
Via checking the measuring method by reviewing the Daily operation record/15/ as stated in the MR and interview with monitoring staff, it is verified that the method is in line with the applied methodology.</td></tr>
<tr><td>Measurement equipment</td><td>Gas analyzers (one for each farm)
<table>
<tr><th>Farm</th><th>Type/ Accuracy</th><th>Serial No.</th><th>Calibrated Date</th><th>Validity</th></tr>
<tr><td>Jiayexing</td><td rowspan="10">SD-800-H16</td><td>2005002122</td><td rowspan="10">02-Apr-2021
29-Mar-2022</td><td rowspan="10">01-Apr-2022
28-Mar-2023</td></tr>
<tr><td>Quanzhou Longjuan</td><td>2005002981</td></tr>
<tr><td>Zhanghzhou Chengxi</td><td>2005110031</td></tr>
<tr><td>Zhangpu</td><td>2005110166</td></tr>
<tr><td>Zhangpu Zhaomulan</td><td>2005110391</td></tr>
<tr><td>Hake</td><td>2006010083</td></tr>
<tr><td>Mintai</td><td>2006010096</td></tr>
<tr><td>Liancheng Yangwang</td><td>2006021142</td></tr>
<tr><td>Yongding Yangwang</td><td>2006031251</td></tr>
</table>
</td></tr>
<tr><td>Monitoring frequency</td><td>Continuously measurement</td></tr>
<tr><td>QA/QC procedure</td><td>The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/.
Via checking the calibration reports/11/, audit team confirmed that all the gas analyzers are calibrated based on JJG693-2011 (Verification Regulation of Alarmer Detectors of Combustible Gas)/34/. And based on this regulation, the validity is one year.
Calibration should include zero verification with an inert gas (e.g. N_2) and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). And the zero verification with an inert gas (N_2) and one reading verification with a standard gas (single calibration gas) are implemented in the process of calibration, which is confirmed as in accordance with JJG693-2011/34/.
All calibration gases are confirmed as from Nanjing Changyuan Industrial Gas Co. Ltd, which is a qualified reference materials manufacturer issued by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China on 06-Sep-2017/12/.
And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.</td></tr>
<tr><td>Purpose of data</td><td>PE calculation</td></tr>
</table>

<table>
<tr><td>T_t</td><td>Temperature of the gaseous stream in time interval t</td></tr>
<tr><td>Title in line with Methodology?</td><td>Yes</td></tr>
<tr><td>Value applied</td><td>
<table>
<tr><th>Time</th><th>Average T_t</th></tr>
<tr><td>01-Jan-2022 to 31-Jan-2022</td><td>308.75</td></tr>
<tr><td>01-Feb-2022 to 28-Feb-2022</td><td>308.99</td></tr>
<tr><td>01-Mar-2022 to 31-Mar-2022</td><td>308.78</td></tr>
<tr><td>01-Apr-2022 to 30-Apr-2022</td><td>308.64</td></tr>
<tr><td>01-May-2022 to 31-May-2022</td><td>308.82</td></tr>
<tr><td>01-Jun-2022 to 30-Jun-2022</td><td>308.78</td></tr>
<tr><td>01-Jul-2022 to 31-Jul-2022</td><td>309.15</td></tr>
<tr><td>01-Aug-2022 to 31-Aug-2022</td><td>308.8</td></tr>
<tr><td>01-Sep-2022 to 30-Sep-2022</td><td>308.81</td></tr>
<tr><td>01-Oct-2022 to 31-Oct-2022</td><td>309.37</td></tr>
<tr><td>01-Nov-2022 to 30-Nov-2022</td><td>308.86</td></tr>
<tr><td>01-Dec-2022 to 31-Dec-2022</td><td>308.21</td></tr>
<tr><td>01-Jan-2022 to 31-Dec2022</td><td>308.83</td></tr>
</table>
</td></tr>
<tr><td>Data unit correctly expressed?</td><td>Yes –K</td></tr>
<tr><td>Appropriate description?</td><td>Yes</td></tr>
<tr><td>Correct value provided?</td><td>Yes</td></tr>
<tr><td>Source of Data</td><td>The monitoring data applied is derived from Daily operation record/15/ for this monitoring period.</td></tr>
<tr><td>Measurement method and procedures</td><td>The temperature of the gaseous stream data was measured by the flow meters installed at each treatment plant (total 27 flow meters 1,2,3), flow meters 1 are installed at outlet of the anaerobic digestion, flow meters 2 are installed at the inlet of biogas generator and flow meters 3 are installed at the inlet of flare system, and record hourly and saved automatically in the DCS system. which have been verified as correct and actual by site inspection.
Via site inspection and checking the manufacture specification of the flow meter/29/, it is confirmed that the flow meter has the function to measure the temperature with recordable electronic signal (digital).
The data are monitored continuously, record hourly and saved automatically in the DCS. The data for this monitoring period have been obtained from DCS and the monthly data was exported by the staff at the beginning of next month. Daily and Monthly temperature was calculated based on the 24-hour average and daily average temperature.
The readout of flowmeter was indicated degrees Celsius(°C). Therefore, the temperature T_t(K) is calculated as the equation T(K)=t(°C)+273.15
Via checking the measuring method by reviewing the Daily operation record/15/ as stated in the MR and interview with monitoring staff, it is verified that the method is in line with the applied methodology.</td></tr>
<tr><td>Measurement equipment</td><td>Refer to information for 27 flow meters above</td></tr>
<tr><td>Monitoring frequency</td><td>Continuously measurement</td></tr>
</table>

QA/QC procedure	The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/. Via checking the calibration reports/11/, it is confirmed that all the flow meters are calibrated based on JJG1029-2007-Verification Regulation of Vortex-shedding Flowmeter/33/. And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.
Purpose of data	PE calculation

P_t	***Pressure of the gaseous stream in time interval t***
Title in line with Methodology?	Yes
Value applied	

Time	P_t
01-Jan-2022 to 31-Jan-2022	101,325
01-Feb-2022 to 28-Feb-2022	101,325
01-Mar-2022 to 31-Mar-2022	101,325
01-Apr-2022 to 30-Apr-2022	101,325
01-May-2022 to 31-May-2022	101,325
01-Jun-2022 to 30-Jun-2022	101,325
01-Jul-2022 to 31-Jul-2022	101,325
01-Aug-2022 to 31-Aug-2022	101,325
01-Sep-2022 to 30-Sep-2022	101,325
01-Oct-2022 to 31-Oct-2022	101,325
01-Nov-2022 to 30-Nov-2022	101,325
01-Dec-2022 to 31-Dec-2022	101,325
01-Jan-2022 to 31-Dec2022	**101,325**

Data unit correctly expressed?	Yes –Pa
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is derived from Daily operation record/15/ for this monitoring period.
Measurement method and procedures	The pressure of the gaseous stream data was measured by the flow meters installed at each treatment plant (total 27 flow meters 1,2,3), flow meters 1 are installed at outlet of the anaerobic digestion, flow meters 2 are installed at the inlet of biogas generator and flow meters 3 are installed at the inlet of flare system, and record hourly and saved automatically in the DCS system which have been verified as correct and actual by site inspection. Via site inspection and checking the manufacture specification of the flow meter/29/, it is confirmed that the flow meter has the function to measure the pressure with recordable electronic signal (digital). The data are monitored continuously, record hourly and saved automatically in the DCS. The data for this monitoring period have been obtained from DCS and the monthly data was exported by the staff at the beginning of next month. Daily and Monthly pressure was calculated based on the 24-hour average and daily average pressure.

	Via checking the measuring method by reviewing the Daily operation record/15/ as stated in the MR and interview with monitoring staff, it is verified that the method is in line with the applied methodology.
Measurement equipment	Refer to information for 27 flow meters above
Monitoring frequency	Continuously measurement
QA/QC procedure	The above calibration information has been confirmed by checking the calibration reports/11/ which has been conducted by qualified parties/12/. Via checking the calibration reports/11/, it is confirmed that all the flow meters are calibrated based on JJG1029-2007-Verification Regulation of Vortex-shedding Flowmeter/33/. And based on the validity as above table, it is confirmed that the installed monitoring equipment has been duly calibrated for this entire monitoring period.
Purpose of data	PE calculation

$\rho_{i,t}$	*Density of greenhouse gas i in the gaseous stream in time interval t*
Title in line with Methodology?	Yes
Value applied	Time / $\rho_{i,t}$ 01-Jan-2022 to 31-Jan-2022 / 0.63 01-Feb-2022 to 28-Feb-2022 / 0.63 01-Mar-2022 to 31-Mar-2022 / 0.63 01-Apr-2022 to 30-Apr-2022 / 0.63 01-May-2022 to 31-May-2022 / 0.63 01-Jun-2022 to 30-Jun-2022 / 0.63 01-Jul-2022 to 31-Jul-2022 / 0.63 01-Aug-2022 to 31-Aug-2022 / 0.63 01-Sep-2022 to 30-Sep-2022 / 0.63 01-Oct-2022 to 31-Oct-2022 / 0.63 01-Nov-2022 to 30-Nov-2022 / 0.63 01-Dec-2022 to 31-Dec-2022 / 0.63 **01-Jan-2022 to 31-Dec2022** / 0.63
Data unit correctly expressed?	Yes –kg gas i/m^3 gas i
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is calculated based on temperature of the gaseous stream in time interval t and pressure of the gaseous stream in time interval t.
Measurement method and procedures	Calculated based on temperature of the gaseous stream in time interval t and pressure of the gaseous stream in time interval t. The monitoring result of Pressure and temperature are listed in the above two tables.
Measurement equipment	N/A
Monitoring frequency	N/A
QA/QC procedure	N/A
Purpose of data	PE calculation

MS%j	*Fraction of manure handled in system j in project activity*

Title in line with Methodology?	Yes
Value applied	100%
Data unit correctly expressed?	Yes –%
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	As no monitoring was conducted in the project activity to monitor the fraction of manure handled, hence using 100% as conservative.
Measurement method and procedures	As this parameter is not monitored during this monitoring period. so, to be conservative, the value of this parameter in the emission reduction calculation is 100%. All the manure flew into AWMSs to be treated; no any manure will be discharged outside. Therefore, the value of this parameter is 100%
Measurement equipment	N/A
Monitoring frequency	Annually
QA/QC procedure	N/A
Purpose of data	PE calculation

$B_{0,LT}$	*Maximum methane producing potential of the volatile solid generated by animal type LT*
Title in line with Methodology?	Yes
Value applied	$B_{0,\,LT}$ (Market swine) =0.29 $B_{0,\,LT}$ (Breeding swine) =0.29
Data unit correctly expressed?	Yes –m^3CH_4/kg -dm
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is derived from Table 10A-7 and 10A-8 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories volume 4, chapter10/30/
Measurement method and procedures	As no monitoring was conducted in the project activity to monitor the value, so, 0.29 m^3CH_4/kg -dm is still applied. The actual methane producing potential of the volatile solid generated by swine manure is 479.4ml/g VS via checking the public literature/60/, which is higher than PDD value, therefore 0.29 m^3CH_4/kg -dm applied in monitoring period is conservative.
Measurement equipment	N/A
Monitoring frequency	Annually
QA/QC procedure	The values will be updated based on latest available data from IPCC The 2019 Refinement to the 2006 IPCC Guidelines which is the latest version of IPCC has been checked/IPCC/. 0.29 m^3CH_4/kg VS in Tables 10.16 chapter 10, volume 4 of is applied for the project, which is the same with the value in IPCC 2006.
Purpose of data	BE, PE calculation

Type	*Type of barn and AWMS*
Title in line with Methodology?	Yes
Value applied	/
Data unit correctly expressed?	/
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is derived from layout and configuration are collected to confirm whether the implementation of project as design/3/

Measurement method and procedures	This monitoring is the 2nd monitoring period and in this monitoring period, the swine barn and AWMS Technical flow charts/14/ are consistent with the design in the registered JPM/3/, no changes occurred.
Measurement equipment	N/A
Monitoring frequency	After the first verification, only changes in the type of barn and AWMS will be reported.
QA/QC procedure	Due to the project has been approved by government, it will not be changed during the implementation periods, hence the Type of barn and AWMS will not be changed, hence type will not be monitored due to all the other parameters monitored can determine if the project type has been changed or not.
Purpose of data	BE calculation

T	*Annual average ambient temperature at project site*
Title in line with Methodology?	Yes
Value applied	Year 2022: 22.1
Data unit correctly expressed?	Yes - °C
Appropriate description?	Yes
Correct value provided?	Yes
Source of Data	The monitoring data applied is derived from Fujian provincial meteorological public website/59/
Measurement method and procedures	This parameter monitored monthly by checking the annual average ambient temperature at project site from public website monthly/59/. The parameter value should be updated upon the changes occur in the monitoring period.
Measurement equipment	N/A
Monitoring frequency	Annually
QA/QC procedure	Cross-Check with the value of ex-ante estimated, i.e., 17-21°C. MCF value is 76% with the lower temperature of 17°C by comparing with the ex-ante value and year 2022 monitored values as per Appendix 3 of ACM0010 (Version 08.0). Then multiplying MCF values with a value of 0.94, so 71.44% of MCF_j is used for calculation during in this monitoring period. Via comparing with the ex-ante value, it is confirmed that MCF_j of 71.44% (76%*0.94) is applied in this monitoring period consistent with the value for ex-ante calculation.
Purpose of data	Used to select the annual MCF_j from IPCC 2006 Guidelines

In conclusion, CCCI confirms that all monitoring parameters have been measured / determined without material misstatements and in line with approved JPM/3/, applied methodology/42/, all applicable standards and relevant requirements.

CAR 03 and CAR 04 was raised and successfully closed. Refer to Appendix D for detail assessment.

4.4.4 Assessment of in Compliance with monitoring plan

The verification team has checked the monitoring plan of the MR against the applied methodology and methodological tools and monitoring plan in registered JPM/3/.

Operational and management structure:

The MR contains a diagram illustrating the Organization Structure of the Monitoring Team to be implemented by the project owner in order to implement the project activity. The VCS monitoring team will be responsible for the monitoring of all the parameters to be monitored. And all the data will be reviewed by the project developer and VVB. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

Monitoring system

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

For the monitoring system and points, via on-site investigation/37/, CCCI confirms that the related monitoring equipment including flow meters, electricity meters, weight measurers, gas analyzers have been installed and consistent with the Figure 4-2 and equipment information provided in MR/1/.

All devices are calibrated/11/ in line with the national calibration standard by qualified parties/12/ as assessed in above section 4.4.3.

Data collection

VCS monitoring team are responsible for data collection. Designated teams read and collect the monitored data regularly. The DCS system automatically monitors and record relevant monitoring data. All data files, relevant documents are collected by project owner, who prepares backup in time and archive all documents properly.

QA/QC procedure

Authorities and responsibilities regarding monitoring plan have been described in section 4.3 of the MR. The installation and calibration of the monitoring equipment fulfils the requirements of national standards as listed in section 4.4.3 above. All the monitoring equipment are checked and maintained periodically according to national standards and rules. All the calibration records/11/ have been documented by the project owner.

Emergency Procedure

Error check routines are established on site and at the point of data storage to detect data measuring/transmission failures as well as malfunctions. During the operation of the project, all equipment and related instruments shall be checked regularly according to the manufacturer's recommendations. If necessary, calibration and/or proper repair have to be carried out immediately.

No malfunctioning or failure of monitoring system occurred during this monitoring period confirmed by checking the calibration records/11/, hence Emergency Procedure is not used in 2nd monitoring period.

Training

Training has been provided to relevant personnel during this monitoring period/22/.

Data management

All data collected as part of monitoring plan will be archived electronically on hard disks and be kept at least 2 years after the end of the last crediting period.

Corrective actions
In case of nonconformities would be observed, a corrective action plan will be established and the whole VCS monitoring team will follow recognized standard data evaluation methods to guarantee that the data is reliable and accurate.

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)"/40/.

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 staff of farms and PP, it is 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 (Nursery phase with 30-60 days, Growing phase with 60-130 days and Mature phase with 130-180 days. The three age categories of breeding swine are classified according to the age in days, i.e. Nursery phase with 30-70 days, Growing phase with 70-220 days and Mature phase with 220-310 days) in each swine 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 PDD 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 9 swine farms involved, all the swine farms including market swine and breeding swine in stock. Due to 9 swine farms have two types of swine, 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 4 farms and divide the swine from each into at least 3 age groups, which is verified by it is as correct and reasonable and in line with the request of applied methodology/45/.

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)"/41/ 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)"/40/.

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 9 swine farms during each monitoring periods. The monitoring forms will be filled out daily by the Breeders in the 9 swine 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.

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

4.4.5 Compliance with the calibration frequency requirements for measuring instruments

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

The information of monitoring equipment used for monitoring in this monitoring period is listed in MR and the calibration information/11/ has been assessed in above section 4.4.3 in each monitoring parameter table.

Furthermore, via checking the certificate of third party who conducted the calibration/12/, CCCI confirms that the third party get the related qualification.

In conclusion, the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan in approved JPM/3/.

Based on that CCCI confirms that all installed monitoring equipment has been duly calibrated for this entire monitoring period/11/.

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

4.4.6.1 Calculation of baseline GHG emissions or removals

For verification of the estimated GHG emission reductions in the MR/1/ and ER calculation sheet/2/, CCCI has downloaded from the UNFCCC website the applicable version of the CDM methodology and all referenced methodological tools.
The calculation of ERs is done as per the applied methodology (ACM0010, ver. 08.0)/42/ which has been assessed as below,

Baseline emissions:

According to the methodology/42/ and registered JPM/3/, the baseline emissions BE_y in a year y are calculated as:

$$BE_y = BE_{CH4,y} + BE_{N2O,y} + BE_{elec/heat,y} \quad (1)$$

Where:

BE_y	=	Baseline emissions in year y (t CO_2/yr)
$BE_{CH4,y}$	=	Baseline CH_4 emissions in year y (t CO_2/yr)
$BE_{N2O,y}$	=	Baseline N_2O emissions in year y (t CO_2/yr)
$BE_{elec/heat,y}$	=	Baseline CO_2 emissions from electricity and/or heat used in the baseline (t CO_2/yr)

1. Baseline CH_4 emissions ($BE_{CH4,y}$)

$$BE_{CH4,y} = GWP_{CH4} * D_{CH4} * \sum_{j,LT}(MCF_j * B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_{Bl,j}) \quad (2)$$

Where:

$BE_{CH4,y}$	=	Baseline CH_4 emissions in year y (t CO_2/yr)
GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 (t CO_2e/t CH_4)
D_{CH4}	=	Density of CH_4 (t/m^3). 0.00067t/m^3 at room temperature (20˚C) and 1am pressure.
MCF_j	=	Annual methane conversion factor (MCF) for the baseline *AWMS$_j$*. IPCC 2006 Guidance, table 10.17, chapter 10, volume 4.
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated by animal type *LT* (m^3CH_4/kg -dm)
N_{LT}	=	Annual average number of animals of type LT for the year y (number)
$VS_{LT,y}$	=	Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)
$MS\%_{Bl,j}$	=	Fraction of manure handled in system j in the baseline. In this project, the baseline manure management system is uncovered anaerobic lagoon only. The amount of manure handled by the anaerobic lagoon is 100%. $MS\%_{Bl,j}$ =100%
LT	=	Type of livestock
j	=	Type of treatment system

Estimation of various variables and parameters for above equation:

(A) *$VS_{LT,y}$*

As per the methodology, there are four options to determine this value, via checking the options provided, it is confirmed there is no published country specific data available based on the local expertise of audit team. The energy intake of the swine is not available, Option 2 can't be used. Option 3 utilizes the average weight of the swine, this data is available and therefore Option 3 is adopted by PP to calculate $VS_{LT,y}$.

Scaling default IPCC values $VS_{default}$ to adjust for a site-specific average animal weight as shown in equation below:

$$VS_{LT,y} = \left(\frac{W_{site}}{W_{default}}\right) * VS_{default} * nd_y \quad (3)$$

Where:

$VS_{LT,y}$ = Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)

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 (kg)

$VS_{default}$ = Default value for the volatile solid excretion per day on a dry-matter basis for a defined livestock population (kg-dm/animal/day)

nd_y = Number of days treatment plant was operational in year y

(B) N_{LT}

As per the methodology, there are four options to determine this value, via checking the options provided, via site inspection, it is confirmed that there are two types of swine in this project, i.e., Market swine and Breeding swine. For Market swine, since there is no way to trace the daily stock, so the Option 1 is adopted to calculate N_{LT} for Market swine. For Breeding swine, the PP can monitor the daily stock of breeding swine in a reliable way, discounting dead breeding swine and discarded them from the productive process from the daily stock. So, the Option 2 is adopted to calculate N_{LT} for Breeding swine.

Option 1:

$$N_{LT} = N_{da,LT} * \left(\frac{N_{p,LT}}{365}\right) \quad (4)$$

Where:

N_{LT} = Annual average number of animals of type *LT* for the year *y* (number)

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

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

Option 2:

If the project developer can monitor in a reliable and traceable way the daily stock of animals in the farm, discounting dead animals and animals discarded from the productive process from the daily stock, then the annual average number of animals (N_{LT}) may be calculated as follows:

$$N_{LT} = \frac{\sum_1^{365} N_{AA,LT}}{365} \quad (5)$$

Where:

N_{LT} = Annual average number of animals of type *LT* for the year *y* (number)

$N_{AA,LT}$ = Daily stock of animals of type *LT* in the farm, discounting dead and discarded animals (number)

(C) $B_{0,LT}$

As per the applied methodology, this value varies by species and diet. Default values are used and they are taken from tables 10A-4 through 10A-9 (IPCC 2006 Guidelines for National Greenhouse Gas Inventories volume 4, chapter10)/IPCC/.

it is verified that the maximum methane producing potential ($B_{0,LT}$) for Market swine and Breeding swine in Asia region is 0.29 m^3 CH_4/kg VS is applicable to the project due to project is located in Fujian Province,

China, Asia which is verified by checking the Table 10A-7 and 10A-8 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories volume 4, chapter 10/IPCC/.

(D) MCF_j

As per the applied methodology, the MCF_j values given in table 10.17, chapter 10, volume 4, IPCC 2006 Guidelines/30/should be used. MCF_j values depend on the annual average temperature where the anaerobic manure treatment facility in the baseline existed.

For this monitoring period, the annual average temperature is 22.1°C which is confirmed as higher than ex ante determined 17-21°C/3/, so MCF value is 76% with the lower temperature of 17 °C by comparing with the ex-ante value and year 2022 monitored values as per Appendix 3 of ACM0010 (Version 08.0). Then multiplying MCF values with a value of 0.94, so 71.44% of MCF_j is used for calculation during in this monitoring period.

2. Baseline NO_2 emissions ($BE_{NO2,y}$)

$$\mathrm{BE}_{N2O,y} = GWP_{N2O} * CF_{N2O-N,N} * \frac{1}{1000} * \quad (E_{N2O,D,y} + E_{N2O,ID,y}) \tag{6}$$

Where:

$BE_{N2O,y}$	=	Annual baseline N_2O emissions in (t CO_2e/yr)
GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (t CO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$E_{N2O,D,y}$	=	Direct N_2O emission in year *y* (kg N_2O-N/year)
$E_{N2O,ID,y}$	=	Indirect N_2O emission in year *y* (kg N_2O-N/year)

$$E_{N2O,D,y} = \sum_{j,LT} EF_{N2O,D,j} * NEX_{LT,y} * N_{LT} * MS\%_{Bl,j} \tag{7}$$

Where:

$E_{N2O,D,y}$	=	Direct N_2O emission in year *y* (kg N_2O-N/yr)
$EF_{N2O,D,j}$	=	Direct N_2O emission factor for the treatment system *j* of the manure management system (kg N_2O-N/kg N). (Estimated with site-specific, regional or national data if such data is available, otherwise use default EF_3 from table 10.21, chapter 10, volume 4, in the IPCC 2006 Guidelines for National Greenhouse Gas Inventories). The site-specific, regional or national data are not available, so this project activity adopts default EF_3.
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in appendix 2
$MS\%_{Bl,j}$	=	Fraction of manure handled in system *j* (fraction)
N_{LT}	=	Annual Average number of animals of type LT for the year *y* estimated as per equation 4 and 5 (number)
N_{LT}	=	Annual Average number of animals of type LT for the year *y* estimated as per equation 4 and 5 (number)

$$E_{N2O,ID,y} = \sum_{j,LT} EF_{N2O,ID} * F_{gasMS,j,LT} * NEX_{LT,y} * N_{LT} * MS\%_{Bl,j} \quad (8)$$

Where:

$E_{N2O,ID,y}$	=	Indirect N_2O emission in year *y* (kg N_2O-N/year)
$EF_{N2O,ID}$	=	Indirect N_2O emission factor for N_2O emissions from atmospheric deposition of nitrogen on soils and water surfaces (kgN_2O-N/kg NH_3-N and NO_X-N). (Estimated with site-specific, regional or national data if such data is available. Otherwise, default values for EF_4 from table 11.3, chapter 11, volume 4 of IPCC 2006 Guidelines for National Greenhouse Gas Inventories can be used). The site-specific, regional or national data are not available, so this project activity adopts default EF_4.
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in Appendix 2
$MS\%_{Bl,j}$	=	Fraction of manure handled in system *j* (fraction)
$F_{gasMS,j,LT}$	=	Default values for nitrogen loss due to volatilisation of NH_3 and NO_X from manure management (fraction)
N_{LT}		Annual Average number of animals of type LT for the year *y* estimated as per equation (4) or (5) (number)

Estimation of various variables and parameters for above equations:

(A)Procedure for estimating *$NEX_{LT,y}$*

As per the Appendix 2 of the applied methodology, two options provided, for this project, neither specific information on Portion of that N intake nor site-specific national or regional data is available. So, the Option 2 is adopted to calculate $NEX_{LT,y}$.

Option 2:

In the absence of availability of project specific information on protein intake, which should be justified in the JMR, national or regional data should be used for the nitrogen excretion $NEX_{LT,y}$, if available. In the absence of such data, default values from table 10.19 of the IPCC 2006, volume 4, chapter 10 may be used and should be corrected for the animal weight at the project site in the following way:

$$NEX_{LT,y} = \frac{W_{site}}{W_{default}} * NEX_{IPCC\ default} \quad (9)$$

Where:

$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr)
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 (kg)
$NEX_{IPCC\ default}$	=	Default value for the nitrogen excretion per head of a defined livestock population (kg N/animal/year)

Via checking the IPCC, it is confirmed that below equation is used for calculate NEX IPCC default

$$NEX_{IPCC\ default} = N_{rate(T)} * \frac{TAM}{1000} * 365 \quad (10)$$

Where:

$N_{rate(T)}$ = the default N excretion rate, kg N/ (1,000 kg animal mass)/ day, table 10.19, chapter 10, volume 4 of IPCC 2006 Guidelines

TAM = Typical animal mass for livestock in kg/animal

3. Baseline CO_2 emission from electricity and/or heat used in the baseline

$$BE_{elec/heat,y} = BE_{EC,y} + BE_{HG,y} \quad (11)$$

Where:

$BE_{elec/heat,y}$ = Baseline CO_2 emissions from electricity and/or heat used in the baseline (t CO_2/yr)

$BE_{EC,y}$ = Baseline emissions associated with electricity generation in year *y* (t CO_2/yr)

$BE_{HG,y}$ = Baseline emissions associated with heat generation in year *y* (t CO_2/yr)

Via site inspection and checking the registered JPM/3/, it is confirmed that baseline scenario of this project is uncovered anaerobic lagoon, and no heat used in the baseline, only minor electricity will be used, so the emission can be excluded for simplification. In addition, the biogas generated during the treatment process in this project will be captured for power generation and used by the AWMSs and 9 swine farms. The electricity generated will not be connected to another user or to the regional power grid. So, the baseline CO_2 emission from electricity and/or heat used in the baseline is 0, which is conservative.

Based on methodology and above all the formulars listed, baseline emissions during this monitoring period are calculated using the following formula:

$$BE_y = BE_{CH4,y} + BE_{N2O,y}$$

The values monitored during monitoring survey are transparently shown in the Section 5.1 of MR. During onsite, the audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

The Baseline Emissions during this monitoring period is summarized as below,

Date	$BE_{CH4,y}$ (tCO_2e/yr)	$BE_{N2O,y}$ (tCO_2e/yr)	BE_y (tCO_2e/yr)
01-Jan-2022~31-Dec-2022	424,964	6,932	431,896

Total Baseline emissions of the 1st monitoring period is thus verified as 431,896 tCO_2e.

In conclusion, the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission calculations have been justified. Appropriate emission factors, GWP and other reference values have been correctly applied. No

errors, miscalculations, omissions, misstatements or incomplete information has been identified. It can be confirmed that the baseline calculation is overall correct

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

4.4.6.2 Calculation of Project GHG emissions or removals

Based on the applied methodology and registered JPM/3/, the Project emissions are estimated as follows:

$$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{N2O,y} + PE_{EC/FC,y} \quad (12)$$

Where:

PE_y	=	Project emissions in year y
$PE_{AD,y}$	=	Project emissions associated with the anaerobic digester in year y (t CO_2e/yr)
$PE_{Aer,y}$	=	Project CH_4 emissions from aerobic AWMS treatment (t CO_2e/yr)
$PE_{N2O,y}$	=	Project N_2O emissions in year y (t CO_2/yr)
$PE_{EC/FC,y}$	=	Project emissions from electricity consumption and fossil fuel combustion (t CO_2e/yr)

i) $PE_{AD,y}$

$PE_{AD,y}$ is determined using the methodological tool "Project and leakage emissions from anaerobic digesters" (Version 02.0) as defined in the applied methodology, as per the tool

$$PE_{AD,y} = PE_{EC,y} + PE_{FC,y} + PE_{CH4,y} + PE_{flare,y} \quad (13)$$

Where:

$PE_{AD,y}$	=	Project emissions associated with the anaerobic digester in year y (t CO_2e)
$PE_{EC,y}$	=	Project emissions from electricity consumption associated with the anaerobic digester in year y (t CO_2e)
$PE_{FC,y}$	=	Project emissions from fossil fuel consumption associated with the anaerobic digester in year y (t CO_2e)
$PE_{CH4,y}$	=	Project emissions of methane from the anaerobic digester in year y (t CO_2e)
$PE_{flare,y}$	=	Project emissions from flaring of biogas in year y (t CO_2e)

a. $PE_{EC,y}$

The project emissions from electricity consumption is calculated according to the "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (version 03.0).

$$PE_{EC,y} = \sum_{j,LT} EC_{PJ,J,y} * EF_{EF,j,y} * (1 + TDL_{j,y}) \quad (14)$$

Where:

$PE_{EC,y}$	=	Project emissions from electricity consumption in year y (t CO_2e)

$EC_{PJ,j,y}$	=	Quantity of electricity consumed by the project electricity consumption source *j* in year *y* (MWh/yr)
$EF_{EF,j,y}$	=	Emission factor for electricity generation for source *j* in year *y* (t CO_2/MWh)
$TDL_{j,y}$	=	Average technical transmission and distribution losses for providing electricity to source *j* in year *y*

As the electricity generated by this project is used firstly for the operation of AWMS, and then surplus electricity is supplied to the swine farms, if the generator set is in a shutdown state or the electricity is insufficient for the operation of AWMSs, the electricity consumed by the project is provided from the regional power grid ECPG.

During the monitoring period, all the biogas generated by the anaerobic fermentation process is used for power generation, which is belongs to self-generated and self-consumed. The electricity consumption of AWMSs were sourced from the grid company when the biogas generators were not operation.

Via checking the Grid Company Electricity Statement/21/, it is confirmed that the electricity consumed from power grid company only happened in Siyang Naliuji swine farm due to amount of biogas generated in Siyang Nanliuji swine farm cannot reach the biogas required for the full-load operation of the generator set. When the generator does not generate electricity, the system runs electricity must be purchased from the grid. In other three farm, the amount of biogas produced can meet the full load operation of the generators, so there is no need to purchase electricity from power grid.

b. $PE_{FC,y}$

Via site inspection and checking the registered JPM/3/, it is confirmed that there are no fossil fuels involved in the project for anaerobic digestion process, hence $PE_{FC,y}$=0.

c. $PE_{flare,y}$

Via site inspection, it is confirmed that the residual gas stream will be flared by flaring, so the project emissions from flaring of biogas ($PE_{flare,y}$) shall be estimated using the tool 06 " Project emissions from flaring" (version 04.0)/45/

The calculation procedure in this tool determines the project emissions from flaring the residual gas ($PE_{flare,y}$) based on the flare efficiency ($\eta_{flare,m}$) and the mass flow of methane to the flare ($F_{CH4,RG,m}$). The flare efficiency is determined for each minute m of year y based either on monitored data or default values.

The calculation procedure of project emissions from flaring is given in the following steps:

STEP 1: Determination of the methane mass flow of the residual gas;

STEP 2: Determination of the flare efficiency;

STEP 3: Calculation of project emissions from flaring.

Step 1: Determination of the methane mass flow in the residual gas

The tool 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" shall be used to determine the following parameter $F_{CH4,m}$:

The following requirements apply:

(a) The gaseous stream to which the tool is applied is the residual biogas for flaring;

(b) The flow of the gaseous stream shall be measured continuously;

(c) CH_4 is the greenhouse gas *i* for which the mass flow should be determined;

(d) The simplification offered for calculating the molecular mass of the gaseous stream is valid (equations 3 and 17 in the tool); and

(e) The time interval *t* for which mass flow should be calculated is every minute *m*.

$F_{CH4,m}$, which is measured as the mass flow during minute *m*, shall then be used to determine the mass of methane in kilograms fed to the flare in minute *m* ($F_{CH4,RG,m}$). $F_{CH4,m}$ shall be determined on a dry basis.

Therefore, option A is adopted to calculate the mass flow of the residual biogas for flaring as per Too 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0)/49/.

As per paragraph 23 of Tool 8:" Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0)"/46/, the way to prove that the gaseous stream is dry needs to demonstrate that the temperature of the gaseous stream (T_t) is less than 60°C (333.15 K) at the flow measurement point. For this project, the flowmeters installed in the outlet of the anaerobic tanks and the temperature of the anaerobic treatment unit of this project is designed as medium temperature i.e. 35~38 °C. Therefore, the gas temperature measured by the flowmeter does not exceed 60 °C, it can be demonstrated that the gaseous stream is dry.

The mass flow of greenhouse gas i ($F_{i,t}$) is determined as follows:

$$F_{i,t} = V_{t,db} * \upsilon_{i,t,db} * \rho_{i,t} \quad (15)$$

$$\rho_{i,t} = \frac{P_t * MM_i}{R_u * T_t} \quad (16)$$

Where:

$F_{i,t}$	=	Mass flow of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas/h)
$V_{t,db}$	=	Volumetric flow of the gaseous stream in time interval *t* on a dry basis (m^3 dry gas/h)
$\upsilon_{i,t,db}$	=	Volumetric fraction of greenhouse gas *i* in the gaseous stream in a time interval *t* on a dry basis (m^3 gas *i*/m^3 dry gas)
$\rho_{i,t}$	=	Density of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas *i*/m^3 gas *i*)
P_t		Absolute pressure of the gaseous stream in time interval *t* (Pa)
MM_i		Molecular mass of greenhouse gas *i* (kg/kmol)
R_u		Universal ideal gases constant (Pa.m^3/kmol.K)
T_t		Temperature of the gaseous stream in time interval *t* (K)

Therefore, option A is adopted to calculate the mass flow of the residual biogas for flaring as per Too 08 "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0)/46/. The formulars are same to above (15) and (16).

Step 2: Determination of flare efficiency

Via site inspection, it is confirmed that the open flares are applied

According to tool 06 paragraph 18: in the case of open flares, the flare efficiency in the minute m ($\eta_{flare,m}$) is 50% when the flame is detected in the minute m *(Flame$_m$)*, otherwise $\eta_{flare,m}$ is 0%.

Since the flame is not detected in the minute, therefore, fixed value of 0% for the flare efficiency is applied for this project, and this is for conservative.

Step 3: Calculation of project emissions from flaring

Project emissions from flaring are calculated as the sum of emissions for each minute m in year y, based on the methane mass flow in the residual gas ($F_{CH4,RG,m}$) and the flare efficiency ($\eta_{flare,m}$), as follows:

$$PE_{flare,y} = GWP_{CH4,y} * \sum_{m=1}^{525600} F_{CH4,GR,m} * \left(1 - \eta_{flare,m}\right) * 10^{-3} \quad (17)$$

Where:

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

$F_{CH4,RG,m}$ is determined as above assessment. So the Project emissions from flaring can be calculated by:

$$PE_{flare,y} = GWP_{CH4,y} * V_{t,db} * \upsilon_{i,t,db} * \rho_{i,t} * \left(1 - \eta_{flare,m}\right) * 10^{-3} \quad (18)$$

Where:

$V_{t,db}$	=	Volumetric flow of the residual gas for flaring in time interval *t* on a dry basis (m^3 dry gas/h)
$\upsilon_{i,t,db}$	=	Volumetric fraction of greenhouse gas *i* in the gaseous stream for flaring in a time interval *t* on a dry basis (m^3 gas *i*/m^3 dry gas)
$\rho_{i,t}$	=	Density of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas *i*/m^3 gas *i*)

During this monitoring period, via checking the flaring mass flow of methane monitored by flow meter 3 in each farm as recorded in Daily operation record/15/ saved automatically in the Data Collection System (DCS), the audit team confirmed that no residual gas was flared during this monitoring period.

Hence, the project emissions from flaring of biogas is 0, $PE_{flare,y}$=0.

d. $PE_{CH4,y}$

The project emissions from methane from the anaerobic digester is calculated according to the tool "Project and leakage emissions from anaerobic digesters (Version 02.0)"/47/. According to the tool, Project emissions of methane from the anaerobic digester include 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.

These emissions are calculated using a default emission factor ($EF_{CH4,default}$), as follows:

$$PE_{CH4,y} = Q_{CH4,y} * EF_{CH4,default} * GWP_{CH4} \quad (19)$$

Where:

$PE_{CH4,y}$	=	Project emissions of methane from the anaerobic digester in year y (t CO_2e)
$Q_{CH4,y}$	=	Quantity of methane produced in the anaerobic digester in year y (t CH_4)
$EF_{CH4,default}$	=	Default emission factor for the fraction of CH_4 produced that leaks from the anaerobic digester (fraction)
GWP_{CH4}	=	Global warming potential of CH_4 (t CO_2 / t CH_4)

$Q_{CH4,y}$

Due to the project is a large scale, $Q_{CH4,y}$ was determined following step 1 and Option 1 of the applied tool. Below is the formula used for the calculation of $Q_{CH4,y}$.

Option1: Procedure using monitored data

$Q_{CH4,y}$ shall be measured using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0)/46/. When applying the tool, the following applies:

(a) The gaseous stream to which the tool is applied is the biogas collected from the digester;

(b) CH_4 is the greenhouse gas i for which the mass flow should be determined; and

(c) The flow of the gaseous stream should be measured on an hourly basis or a smaller time interval; and then accumulated for the year y. Please note that units need to be converted to tons, when applying the results in this tool.

The biogas is produced and collected from anaerobic digestion process. The flowmeters are installed at the outlet of the biogas digesters and the measured on an hourly basis time interval. So the quantity of methane produced in the digester in year y ($Q_{CH4,y}$) is the accumulation of the mass flow of methane in the gaseous stream in an hourly basis time interval. i.e., $Q_{CH4,y} = \sum_{i=1}^{8760} F_{i,t}$.

As per the tool, the mass flow of greenhouse gas i ($F_{i,t}$) is determined as follows:

$$F_{i,t} = V_{t,db} * \upsilon_{i,t,db} * \rho_{i,t} \quad (20)$$

$$\rho_{i,t} = \frac{P_t * MM_i}{R_u * T_t} \quad (21)$$

Where:

$F_{i,t}$	=	Mass flow of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas/h)
$V_{t,db}$	=	Volumetric flow of the gaseous stream in time interval *t* on a dry basis (m^3 dry gas/h)
$\upsilon_{i,t,db}$	=	Volumetric fraction of greenhouse gas *i* in the gaseous stream in a time interval *t* on a dry basis (m^3 gas *i*/m^3 dry gas)
$\rho_{i,t}$	=	Density of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas *i*/m^3 gas *i*)
P_t	=	Absolute pressure of the gaseous stream in time interval *t* (Pa)
MM_i	=	Molecular mass of greenhouse gas *i* (kg/kmol)

R_u = Universal ideal gases constant (Pa.m³/kmol.K)

T_t = Temperature of the gaseous stream in time interval *t* (K)

In summary, during this monitoring period, the final determined Project emission associated with the anaerobic digester for the project activity is **$PE_{AD,y} = PE_{EC,y} + PE_{CH4,y}$**

The values monitored during monitoring survey are transparently shown in the Section 5.2 of MR. During onsite, audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

So $PE_{AD,y}$ during this monitoring period is calculated as below table

Date	$PE_{EC,y}$ (tCO_2e)	$PE_{CH4,y}$ (tCO_2e)	$PE_{AD,y}$ (tCO_2e)
01-Jan-2022~31-Dec-2022	133	20,539	20,672

ii). $PE_{Aer,y}$

IPCC guidelines specify emissions from aerobic lagoons as 0.1 per cent of total methane generating potential of the waste processed, which can be used as a default for all types of aerobic AWMS treatment.

$$PE_{Aer,y} = GWP_{CH4} * D_{CH4} * 0.001 * F_{Aer} * \left[\prod_{n=1}^{N}(1 - R_{VS,n})\right] * \sum_{j,LT}(B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_j) + PE_{sl,y} \quad (22)$$

All sludge produced from the aerobic composting will be used for land application which is calculated as leakage emission. So the $PE_{sl,y}$=0.

So,

$$PE_{Aer,y} = GWP_{CH4} * D_{CH4} * 0.001 * F_{Aer} * \left[\prod_{n=1}^{N}(1 - R_{VS,n})\right] * \sum_{j,LT}(B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_j) \quad (23)$$

Where:

GWP_{CH4} = Global Warming Potential (GWP) of CH_4 (t CO_2e/tCH_4)

$R_{VS,n}$ = Fraction of volatile solid degraded in AWMS treatment method n of the N treatment steps prior to waste being treated (fraction)

D_{CH4} = Density of CH_4 (t/m³)

F_{Aer} = Fraction of volatile solid directed to aerobic system (fraction)

LT = Type of livestock

$B_{0,LT}$ = Maximum methane producing potential of the volatile solid generated by animal type LT (m^3CH_4/kg dm)

$VS_{LT,y}$ = Annual volatile solid excretion livestock type LT entering all AWMS on a dry matter weight

basis in (kg -dm/animal/yr)

N_{LT} = Annual average number of animals of type LT for the year y (number) as estimated in equation above

$PE_{sl,y}$ = Project CH_4 emissions from sludge disposed of in storage pit prior to disposal during the year y (t CO_2e/yr)

$MS\%_j$ = Fraction of manure handled in system j in the project activity (fraction)

The values monitored during monitoring survey are transparently shown in the Section 5.2 of MR. During onsite, audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

So $PE_{Aer,y}$ during this monitoring period is calculated as below table

Date	$PE_{Aer,y}$ (tCO_2e)
01-Jan-2022~31-Dec-2022	119

iii). $PE_{N2O,y}$

$$PE_{N2O,y} = GWP_{N2O} * CF_{N2O-N,N} * \frac{1}{1000} * (E_{N2O,D,y} + E_{N2O,ID,y}) \quad (24)$$

Where:

$PE_{N2O,y}$ = Project N_2O emissions in year y (t CO_2/yr)

GWP_{N2O} = Global Warming Potential (GWP) for N_2O (t CO_2e/tN_2O)

$CF_{N2O-N,N}$ = Conversion factor N_2O-N to N_2O (44/28)

$E_{N2O,D,y}$ = Direct N_2O emission in year y (kg N_2O-N/year)

$E_{N2O,ID,y}$ = Indirect N_2O emission in year y (kg N_2O-N/year)

The same method used to estimate the emissions in the baseline should be used to estimate the project emissions of nitrous oxide, so the Option 1 is used to calculate the Project N_2O emissions $PE_{N2O,y}$.

Option 1:

$$E_{N2O,D,y} = \sum_{j,LT} EF_{N2O,D,j} * NEX_{LT,y} * N_{LT} * MS\%_j \quad (25)$$

Where:

$E_{N2O,D,y}$ = Direct N_2O emission in year *y* (kg N_2O-N/yr)

$EF_{N2O,D,j}$ = Direct N_2O emission factor for the treatment system *j* of the manure management system (kg N_2O-N/kg N)

$NEX_{LT,y}$ = Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in appendix 2

$MS\%_j$ = Fraction of manure handled in system *j* (fraction)

N_{LT} = Annual Average number of animals of type LT for the year *y* estimated as per equation 4 and 5 (number)

$$E_{N2O,ID,y} = \sum_{j,LT} EF_{N2O,ID} * F_{gasMS,j,LT} * NEX_{LT,y} * N_{LT} * MS\%_j \quad (26)$$

Where:

$E_{N2O,ID,y}$ = Indirect N_2O emission in year *y* (kg N_2O-N/year)

$EF_{N2O,ID}$ = Indirect N_2O emission factor for N_2O emissions from atmospheric deposition of nitrogen on soils and water surfaces (kgN_2O-N/kg NH_3-N and NO_X-N)

$NEX_{LT,y}$ = Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr) estimated as described in appendix 2

$MS\%_j$ = Fraction of manure handled in system *j* (fraction)

$F_{gasMS,j,LT}$ = Default values for nitrogen loss due to volatilisation of NH_3 and NO_X from manure management (fraction)

N_{LT} = Annual Average number of animals of type LT for the year *y* estimated as per equation 4 and 5 (number)

The values monitored during monitoring survey are transparently shown in the Section 5.2 of MR. During onsite, audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

So $PE_{N2O,y}$ during this monitoring period is calculated as below table

Date	$PE_{N2O,y}$ (tCO_2e)
01-Jan-2022~31-Dec-2022	25,144

iv) $PE_{elec/heat}$

$$PE_{EC/FC,y} = PE_{EC,y} + \sum_j PE_{FC,j,y} \quad (27)$$

Where:

$PE_{EC,y}$ = Project emissions from electricity consumption in year y. The project emissions from electricity consumption will be calculated following the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". In case, the electricity consumption is not measured then the electricity consumption shall be estimated as follows $EC_{PJ,y} = \sum_i CP_{i,y} * 8760$, where $CP_{i,y}$ is the rated capacity (in MW) of electrical equipment i used for the project activity.

$PE_{FC,y}$ = Project emissions from fossil fuel combustion in process j during the year y. The project emissions from fossil fuel combustion will be calculated following the latest version of

the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion". For this purpose, the processes j in the tool corresponds to all fossil fuel combustion in the AWMS (not including fossil fuels consumed for transportation of feed material and sludge or any other on-site transportation).

Via site inspection, it is confirmed there is no consumption of heat related to the anaerobic digester. Hence, these emissions should not be considered.

Besides, as described in above, since the electricity consumption that is not related to the anaerobic digester cannot be separated from the total electricity consumption, therefore the emission for consumption of electricity is calculated in $PE_{EC,y}$.

The same for the $PE_{FC,y}$, please refer to $PE_{FC,y}$ calculation in above.
Therefore, $PE_{elec/heat}$=0.

So Project Emissions during this monitoring period is calculated as below table

Date	$PE_{AD,y}$ (tCO_2e)	$PE_{Aer,y}$ (tCO_2e)	$PE_{N2O,y}$ (tCO_2e)	PE_y (tCO_2e)
01-Jan-2022~31-Dec-2022	20,672	119	25,144	45,935

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

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

4.4.6.3 Calculation of Leakage GHG emissions or removals

As per the applied methodology and registered JPM/3/, Leakage emission is calculated as below formular,

$$LE_y = \left(LE_{PJ,N2O,y} - LE_{BL,N2O,y}\right) + \left(LE_{PJ,CH4,y} - LE_{BL,CH4,y}\right) + LE_{AD,y} \quad (28)$$

Where:

$LE_{PJ, N2O, y}$ = Leakage N_2O emissions released during project activity from land application of the treated manure in year y (t CO_2e/yr)

$LE_{BL, N2O, y}$ = Leakage N_2O emissions released during baseline scenario from land application of the treated manure in year y (t CO_2e/yr)

$LE_{PJ, CH4, y}$ = Leakage CH_4 emissions released during project activity from land application of the treated manure in year y (t CO_2e/yr)

$LE_{BL, CH4, y}$ = Leakage CH_4 emissions released during baseline scenario from land application of the treated manure in year y (t CO_2e/yr)

$LE_{AD, y}$ = Leakage emissions associated with the anaerobic digester in year y (t CO_2e)

i) Estimation of leakage N_2O emissions released during baseline scenario from land application of the treated manure in year y, $LE_{BL,N2O,y}$

$$LE_{BL,N2O,y} = GWP_{N2O} * CF_{N2O-N,N} * \frac{1}{1000} * (LE_{N2O,land,y} + LE_{N2O,runoff,y} + LE_{N2O,vol,y}) \quad (29)$$

$$LE_{N2O,land,y} = EF_1 * \prod_{n=1}^{N}(1 - R_{N,n}) * \sum_{LT} NEX_{LT,y} * N_{LT} \quad (30)$$

$$LE_{N2O,runoff,y} = EF_5 * F_{leach} * \prod_{n=1}^{N}(1 - R_{N,n}) * \sum_{LT} NEX_{LT,y} * N_{LT} \quad (31)$$

$$LE_{N2O,vol,y} = EF_4 * \prod_{n=1}^{N}(1 - R_{N,n}) * F_{gasm} * \sum_{LT} NEX_{LT,y} * N_{LT} \quad (32)$$

Where:

GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (t CO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$LE_{N2O,land,y}$	=	Leakage N_2O emissions from application of manure waste in year y (kg N_2O-N/year)
$LE_{N2O,runoff,y}$	=	Leakage N_2O emissions due to leaching and run-off in year y (kg N_2O-N/year)
$LE_{N2O,vol,y}$	=	Leakage N_2O emissions due to volatilisation in year y (kg N_2O-N/year)
F_{gasm}	=	Fraction of N lost due to volatilization (fraction)
N_{LT}	=	Annual average number of animals of type LT estimated as per equation 4 and 5 (number)
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/year) estimated as described in appendix 2
EF_1	=	Emission factor for N_2O emissions from N inputs (kg N_2O-N/kg N input)
EF_5	=	Emission factor for N_2O emissions from N leaching and runoff in (kg N_2O-N/kg N leached and runoff)
EF_4	=	Emission factor for N_2O emissions from atmospheric deposition of N on soils and water surfaces, [kg N- N_2O/ (kg NH_3-N + NO_X-N volatilized)]
F_{leach}	=	Fraction of all N added to/mineralised in managed soils in regions where leaching/runoff occurs that is lost through leaching and runoff (fraction)
$R_{N,n}$	=	Nitrogen reduction factor (fraction)

The values monitored during monitoring survey are transparently shown in the Section 5.2 of MR. During onsite, audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

So $LE_{BL, N2O, y}$ during this monitoring period is calculated as below table

Date	$LE_{BL, N2O, y}$ (tCO_2e)
01-Jan-2022~31-Dec-2022	4,925

ii) Estimation of leakage N_2O emissions released during project activity from land application of the treated manure in year y, $LE_{PJ, N2O}$

$$LE_{PJ,N2O} = GWP_{N2O} * CF_{N2O-N,N} * \frac{1}{1000} * (LE_{N2O,land,y} + LE_{N2O,runoff,y} + LE_{N2O,vol,y}) \quad (33)$$

$$LE_{N2O,land,y} = EF_1 * \prod_{n=1}^{N}(1 - R_{N,n}) * \sum_{LT} NEX_{LT,y} * N_{LT} \quad (34)$$

$$LE_{N2O,runoff,y} = EF_5 * F_{leach} * \prod_{n=1}^{N}(1 - R_{N,n}) * \sum_{LT} NEX_{LT,y} * N_{LT} \quad (35)$$

$$LE_{N2O,vol,y} = EF_4 * \prod_{n=1}^{N}(1 - R_{N,n}) * F_{gasm} * \sum_{LT} NEX_{LT,y} * N_{LT} \quad (36)$$

Where:

GWP_{N2O}	=	Global Warming Potential (GWP) for N_2O (t CO_2e/tN_2O)
$CF_{N2O-N,N}$	=	Conversion factor N_2O-N to N_2O (44/28)
$LE_{N2O,land,y}$	=	Leakage N_2O emissions from application of manure waste in year y (kg N_2O-N/year)
$LE_{N2O,runoff,y}$	=	Leakage N_2O emissions due to leaching and run-off in year y (kg N_2O-N/year)
$LE_{N2O,vol,y}$	=	Leakage N_2O emissions due to volatilisation in year y (kg N_2O-N/year)
F_{gasm}	=	Fraction of N lost due to volatilization (fraction)
N_{LT}	=	Annual average number of animals of type LT estimated as per equation 4 and 5 (number)
$NEX_{LT,y}$	=	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/year) estimated as described in appendix 2
EF_1	=	Emission factor for N_2O emissions from N inputs (kg N_2O-N/kg N input)
EF_5	=	Emission factor for N_2O emissions from N leaching and runoff in (kg N_2O-N/kg N leached and runoff)
EF_4	=	Emission factor for N_2O emissions from atmospheric deposition of N on soils and water surfaces, [kg N- N_2O/ (kg NH_3-N + NO_X-N volatilized)]
F_{leach}	=	Fraction of all N added to/mineralised in managed soils in regions where leaching/runoff occurs that is lost through leaching and runoff (fraction)
$R_{N,n}$	=	Nitrogen reduction factor (fraction)

It is not possible to measure the quantity of manure applied to land in kg manure/yr (Q_{DM}) and the nitrogen concentration in kg N/kg manure (N_{DM}) in the manure to estimate the total quantity of nitrogen applied to land. In this case, $\prod_{n=1}^{N}(1-R_{N,n}) * \sum_{LT} NEX_{LT,y} * N_{LT}$ does not need to be replaced by $Q_{DM} * N_{DM}$.

The values monitored during monitoring survey are transparently shown in the Section 5.2 of MR. During onsite, audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

So $LE_{PJ, N2O, y}$ during this monitoring period is calculated as below table

Date	$LE_{PJ, N2O, y}$ (tCO_2e)
01-Jan-2022~31-Dec-2022	17,613

iii) Estimation of leakage CH_4 emissions from land application of the treated manure

The calculation of methane emissions from land application of manure in the baseline and project cases are estimated as below:

$$LE_{BL,CH4,y} = GWP_{CH4} * D_{CH4} * MCF_d * \left[\prod_{n=1}^{N}(1-R_{VS,n})\right] * \sum_{j,LT}(B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_j) \quad (37)$$

$$LE_{PJ,CH4,y} = GWP_{CH4} * D_{CH4} * MCF_d * \left[\prod_{n=1}^{N}(1-R_{VS,n})\right] * \sum_{j,LT}(B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_j) \quad (38)$$

Where:

$LE_{BL,CH4,y}$	=	Leakage CH_4 emissions released during baseline scenario from land application of the treated manure in year *y* (t CO_2e/yr)
$LE_{PJ,CH4,y}$	=	Leakage CH_4 emissions released during project activity from land application of the treated manure in year *y* (t CO_2e/yr)
$R_{VS,n}$	=	Fraction of volatile solid degraded in AWMS treatment method *n* of the *N* treatment steps prior to sludge being treated
GWP_{CH4}	=	Global Warming Potential (GWP) of CH_4 (t CO_2e/tCH_4)
D_{CH4}	=	Density of CH_4 (t/m^3)
$B_{0,LT}$	=	Maximum methane producing potential of the volatile solid generated by animal type LT (m^3CH_4/kg dm)
N_{LT}	=	Annual average number of animals of type *LT* estimated as per equation 4 and 5, expressed (number)
$VS_{LT,y}$	=	Annual volatile solid excretions for livestock *LT* entering all AWMS on a dry matter weight basis (kg -dm/animal/yr)
$MS\%_j$	=	Fraction of manure handled in system *j* in the project activity (fraction)

MCF_d = Methane conversion factor (MCF_d) assumed to be equal to 1

The values monitored during monitoring survey are transparently shown in the Section 5.2 of MR. During onsite, audit team cross-checked these values in detail using various supporting records and documents. Refer to the above section 4.4.2 of this report for ex-ante and above section 4.4.3 for ex-post parameters' assessment.

So $LE_{BL, CH4, y}$ and $LE_{PJ, CH4, y}$ during this monitoring period is calculated as below table

Date	$LE_{BL, CH4, y}$ (tCO_2e)	$LE_{PJ\ CH4, y}$ (tCO_2e)
01-Jan-2022~31-Dec-2022	89,218	95,194

iV) Estimation of leakage emissions associated with the anaerobic digester

$LE_{AD,y}$ is determined using the methodological tool "Project and leakage emissions from anaerobic digesters(Version 02.0)/47/.

The leakage emissions associated with the anaerobic digester ($LE_{AD,y}$) depend on how the digestate is managed. They include emissions associated with storage and composting of the digestate and are determined as follows:

$$LE_{AD,y} = LE_{storage,y} + LE_{comp,y} \quad (39)$$

Where:

$LE_{AD,y}$ = Leakage emissions associated with the anaerobic digester in year *y* (t CO_2e)

$LE_{storage,y}$ = Leakage emissions associated with storage of digestate in year *y* (t CO_2e)

$LE_{comp,y}$ = Leakage emissions associated with composting digestate in year *y* (t CO_2e)

The anaerobic digestion process of this project is carried out in a fully enclosed system. The biogas generated during the treatment process is captured for power generation or flared (if any). The Emissions from combustion is calculated in project emissions (if any). After anaerobic digestion, the fermented sludge is treated in aerobic composting system and organic fertilizer can be produced. Wastewater from the new animal waste management systems will be treated aerobically and then used for agriculture irrigation. So, the leakage emissions associated with the anaerobic digester is 0. i.e., $LE_{AD,y}$ =0.

So Leakage Emissions during this monitoring period is calculated as below table

Date	$LE_{PJ,CH4,y}$ (tCO_2e)	$LE_{BL,CH4,y}$ (tCO_2e)	$LE_{BL,N2O,y}$ (tCO_2e)	$LE_{PJ,N2O,y}$ (tCO_2e)	LE_y (tCO_2e/yr)
01-Jan-2022~31-Dec-2022	95,194	89,218	4,925	17,613	18,664

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

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

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

The MR includes a summary table of the emission reductions calculation. Summary of emission reductions during the monitoring period is calculated as below formular which in line with the registered JPM/1/ and applied methodology/42/,

$$ER_y = BE_y - PE_y - LE_y$$

Furthermore, as per the applied methodology, if the actual methane captured from anaerobic digesters in project activity is lower than ($BE_{CH4,y}$ - $PE_{AD,y}$), then ($BE_{CH4,y}$ - $PE_{AD,y}$) is replaced by actual methane captured $Q_{CH4,y}$.

Biogas captured during monitoring period is 38,372,449.68 m^3, which equals to 410,765 tCO_2e. Baseline methane emission ($BE_{CH4,y}$) is 424,964 tCO_2e. The project emissions associated with anaerobic digester is ($PE_{AD,y}$) is 20,672 tCO_2e. Actual methane captured from anaerobic digesters is higher than the difference of $BE_{CH4,y}$ and $PE_{AD,y}$ (404,292 tCO_2e =424,964 tCO_2e -20,672 tCO_2e). Therefore, the equation ($BE_{CH4,y}$ - $PE_{AD,y}$) can be used to calculate emission reduction.

Hence, the emission reductions during this monitoring period in year 2022 are summarized in the table below

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01-Jan-2022~ 31-Dec-2022	431,896	45,935	18,664	367,297
Total	**431,896**	**45,935**	**18,664**	**367,297**

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer to above sections 4.4.3 for the detail assessment of each monitoring parameters and Appendix C for the supporting evidence used to determine the GHG emission reductions.

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

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

4.6 Non-Permanence Risk Analysis

N/A

5 VERIFICATION OPINION

CCCI has been commissioned by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. to carry out the Verified Carbon Standard (VCS) 2nd periodic verification of the project activity Aonong AWMS GHG Mitigation Project in Fujian Province (VCS ID 2692), for the monitoring period from 01-Jan-2022 to 31-Dec-2022, with regard to the relevant requirements for VCS Standard Version 4.4.

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

In the course of the verification, 5 Corrective Action Requests (CARs), 3 Clarification Requests (CLs) were raised and successfully closed and no Forward Action Request (FAR) was raised for the project activity.

The verification is based on the approved CDM methodology ACM0010 (version 08.0) and the MR. The PPs are responsible for the collection, calculation and determination of the GHG data in accordance with the monitoring plan and the reporting of GHG emission reductions on the basis set out within the MR.

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

- The monitoring plan in the MR is as per the applied methodology;
- The monitoring complies with the monitoring plan in the approved JPM;
- The MR and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS Standard Version 4.4;
- The monitoring equipment being essential for monitoring and determination of emission reduction runs reliably and is calibrated appropriately;
- The monitoring system is in place and generates GHG emission reductions data;
- The GHG emission reductions are calculated without material mis-statements.

Based on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these, CCCI planned and performed verification work to obtain the information and explanations that we considered necessary to provide reasonable assurance that reported GHG emission reductions are fairly stated.

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

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

Verification period: From 01-Jan-2022 to 31-Dec-2022

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)

01-Jan-2022~ 31-Dec-2022	431,896	45,935	18,664	367,297
Total	**431,896**	**45,935**	**18,664**	**367,297**

The estimated ex-ante GHG emission reductions and removals, the achieved emission reductions and removals for this monitoring period, percentage difference and justification of the difference have been given in below table

Year	Ex-ante emissions reductions/ removals	Achieved emissions reductions/ removals	Percent difference	Justification for the difference
01-Jan-2022~ 31-Dec-2022	451,801	367,297	-18.70%	The actual ER value is 18.70% lower than the ex-ante estimated value. The significant difference is due to number of animals in the swine farm and the average animal weight is lower than the estimated values in the registered JPM which has been confirmed during site visit, interview with PP and checking the data from records of swine number and weight comparing with JPM. It is verified there is no risk of increase.

APPENDIX A: ABBREVIATIONS

Abbreviations	Full texts
AWMS	Animal Waste Management System
BE	Baseline Emission
CAR	Corrective Action Request
CCER	China Certified Emission Reduction
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO_2	Carbon dioxide
CP	Crediting Period
DNA	Designated National Authority
ECPG	East China Power Grid
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reduction
ETS	Emission Trading Scheme
FAR	Forward Action Request
PER	Project Evaluation Report
GHG	Green House Gas
GS	Gold Standard
GSC/GSP	Global Stakeholder Consultation Process
IPCC	Intergovernmental Panel on Climate Change
JPM	Joint-PD-MR
KP	Kyoto Protocol
LSC	Local Stakeholder Consultation
MoV	Means of Validation
MP	Monitoring Plan
ODA	Official Development Assistance
PA	Project Activity
PE	Project Emission
PP	Project Participant
PS	Project Standard
QC/QA	Quality control/Quality assurance
ECPG	East China Power Grid

SD	Sustainable Development
SDG	Sustainable Development Goals
tCO_2e	Tonnes of Carbon di oxide equivalent
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

APPENDIX B: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Mr. Wang Wei	Team Leader	Mr. Wang Wei (Master Degree in Environmental Sceince) is an Auditor appointed by CCCI for the GHG project assessment. Before hired by CCCI, he has several years of work experience in CDM projects validation/verification as Lead Auditor in Bureau Veritas. He has worked in carbon markets since 2009 and gained extensive experience in the development and implementation of CDM projects with background includes both project validation and verification, in different sectoral scopes, including renewable energy, Manufacturing Industries, transport and Waste handling and disposal.

Mr. Huang Peng	Technical Reviewer	Mr. Huang Peng is a Lead Auditor based in Beijing with experience in the validation and verification of more than 90 CDM projects, including wind power, hydro power, LNG cogeneration and energy efficiency projects. He has more than 5 years working experience for energy efficiency and energy conservation project. He has had responsibility to investigate new energy conservation technology, working together with the staffs on-site, establish and perform monitoring plan to confirm the actual effect of the technology, mainly focus on Boilers, Steam turbines, furnace efficiency, TRT, CDQ and Iron-steel production line, frequency control of motor speed, green light and efficiency of hydro turbines and then transfer to the relevant industry in China.

APPENDIX C: DOCUMENTS REVIEWED OR REFERENCED

No	Author	Title	References to the document	Provider
1.	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.	MR	Monitoring Report of Aonong AWMS GHG Mitigation Project in Fujian Province for 2nd monitoring period • Draft Version 01, dated 02-Feb-2023 • Final Version 02, dated 30-Mar-2023	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.
2.	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.	ER Sheet	Emission Reduction Calculation sheet (related to this monitoring period) • Version 01, dated 02-Feb-2023	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.
3.	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.	Approved JPM	Approved Joint-PD-MR of Aonong AWMS GHG Mitigation Project in Fujian Province, version 03, dated 23-Dec-2022	VERRA Website
4.	CTI	Joint Validation and Verification report	Joint Validation and Verification report of Aonong AWMS GHG Mitigation Project in Fujian Province, version 2.0, dated 26-Dec-2022	VERRA Website
5.	Local Administrative Examination and Approval Bureau	Business License	Business License of Fujian Aonong Biological Technology Group Incorporation Limited and Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.	Project Owner
6.	Fujian Petrochemical Industry Design Institute	EIA	Environmental Impact Assessment (EIA) issued Sep. 2019	Project Owner
7.	Fujian Provincial Department of Ecology and Environment	EIA approval	EIA approval of Aonong AWMS GHG Mitigation Project in Fujian Province, dated on 29-Oct-2019	Project Owner
8.	Project Owner and Fujian Juli Environmental Engineering Co., Ltd.	EPC contract	Engineering Procurement Construction contract signed on 05-Nov-2019	Project Owner
9.	Manufacturers	Technical agreement	Technical agreement of main equipment	Project Owner
10.	Project Owner	Statement	Statement of time for all the AWMSs started construction and operation	Project Owner

11.	Fujian Metrology Institute	Calibration certificates	Calibration Reports to all the electricity meters with validity covering this monitoring period	Project Owner
			Calibration Reports to all the Weight measurers with validity covering this monitoring period	
			Calibration Reports to all the biogas analysers with validity covering this monitoring period	
			Calibration Reports to all the flow meters with validity covering this monitoring period	
12.	Fujian Provincial Administration for Market Regulation	Certificate of Metrological Authorization	Certificate of Metrological Authorization of Fujian Metrology Institute issued on 26-Jan-2017 valid to 25-Jan-2023	Project Owner
	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China		The State Certificate for the Gradation of the Certified Reference Materials of Nanjing Changyuan Industrial Gas Co. Ltd issued on 06-Sep-2017	
13.	Project Owner	Operation log of the project	Operation log of the 9 AWMSs plants	Project Owner
14.	Project Owner	Technical flow charts	Technical flow charts in the project site of 9 AWMSs	Project Owner
15.	Project Owner	Daily operation record	Daily operation record of each treatment plant covering this monitoring period	Project Owner
16.	Project Owner	Production record of Market swine	Production record of Market swine of each farm covering this monitoring period	Project Owner
17.	Project Owner	Sale Records of Market swine	Monthly Sale Records of Market swine of each farm covering this monitoring period	Project Owner
18.	Project Owner	Breeding Pig stock record	Breeding Pig stock record of each farm covering this monitoring period	Project Owner
19.	Project Owner	Records of animal weight	Monthly records of animal weight of a defined livestock population of three age categories	Project Owner
20.	Project Owner	Daily report of electricity	Daily report of electricity issued by PP for this monitoring period	Project Owner
21.	State Grid Xiamen Tongan Electric Power Company	Grid Company Electricity Statement	Grid Company Electricity Statement issued to Jiayexing swine farm for this monitoring period	Project Owner
	State Grid Fujian Electric Power Co., Ltd. Anxi County Power Supply Company		Grid Company Electricity Statement issued to Quanzhou Longjuan swine farm for this monitoring period	

	Zhangzhou Development District Power Supply Company		Grid Company Electricity Statement issued to Zhangpu swine farm for this monitoring period	
22.	Project Owner	Technical Training Records	Technical Training Records of project 1. Training Records in this monitoring period 2. Training register list	Project Owner
23.	PP	Calculation sheet of sample size	Calculation sheet of sample size for monitoring W_{site}	PP
24.	Project Owner	Declaration	Declaration of no double counting issued by Project Owner dated on 15-Dec-2021	Project Owner
25.	Project Owner	Record of staffs	Record keeping book of staffs	Project Owner
26.	Project Owner	Labor contract	Labor contracts of the staffs	Project Owner
27.	Project Owner and local stakeholders	Local Stakeholder Consultation Records	Local stakeholder consultation process evidences during this monitoring period: 90 filled questionnaires by attendance	Project Owner
28.	Project Owner	Local Stakeholder Consultation Records prior to the construction start date	Local stakeholder consultation process evidences: - The Meeting Notice Letter for invitation; - LSC Meeting attendance's list with signature; - Minutes of meeting - Filled questionnaires	Project Owner
29.	Shangyi Instrument (Shanghai) Co., Ltd.	Manufacture specification	Manufacture specification of the flow meter	PP
30.	Intergovernmental Panel on Climate Change	IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories 2019 Refinement to the 2006 IPCC Guidelines	www.ipcc-nggip.iges.or.jp
31.	Intergovernmental Panel on Climate Change	AR5	IPCC Fifth Assessment Report	www.ipcc-nggip.iges.or.jp
32.	National Standard	JJG 596-2012	Electrical Meters for Measuring Alternating-current Electrical Energy	Public website
33.	National Standard	JJG1029-2007	Verification Regulation of Vortex-shedding Flowmeter	Public website
34.	National Standard	JJG693-2011	Verification Regulation of Alarmer Detectors of Combustible Gas	Public Website
35.	National Standard	JJG539-2016	Digital Indicator Scale Verification Regulations	Public Website

36.	Ministry of Ecology and Environment of the People's Republic of China	Baseline emission factor of China	2019 China regional power grid carbon dioxide baseline emission factor OM calculation instructions http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml	Public Website
37.	VVB	Site Visit Photo	Photo taken by VVB during site visit including main equipment, swine farms, monitoring devices, etc.	N/A
38.	VERRA	Template	VCS-Monitoring-Report-Template-v4.2	VERRA
39.	VERRA	Registration and Issuance Process	Registration and Issuance Process version 4.3	VERRA
40.	UNFCCC	Standard of Sampling and surveys	Standard of "Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)"	UNFCCC website
41.	UNFCCC	Guideline of Sampling and surveys	Guideline of the "Sampling and surveys for CDM project activities and programmes of activities (Version 04.0)"	UNFCCC website
42.	UNFCCC	CDM Approved Methodology ACM0010	"GHG emission reductions from manure management systems" (Version 08.0)	UNFCCC website
43.	UNFCCC	Methodological tool	Combined tool to identify the baseline scenario and demonstrate additionality (Version 07.0)	UNFCCC website
44.	UNFCCC	Methodological tool	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 3.0)	UNFCCC website
45.	UNFCCC	Methodological tool	Project emissions from flaring (Version 04.0)	UNFCCC website
46.	UNFCCC	Methodological tool	Tool to determine the mass flow of a greenhouse gas in a gaseous stream (Version 07.0)	UNFCCC website
47.	UNFCCC	Methodological tool	Project and leakage emissions from anaerobic digesters (Version 02.0)	UNFCCC website
48.	UNFCCC	Methodological tool	Common practice (Version 03.1)	UNFCCC website
49.	VERRA	VCS Program Definitions	VCS Program Definitions, v4.3	VCS website
50.	VERRA	VCS Program Guide	VCS Program Guide, v4.3	VCS website
51.	VERRA	VCS Standard	VCS Standard, v4.4	VCS website
52.	Ministry of Ecology and Environment of China	China cap & trade scheme	http://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html	Public Website

53.	Ministry of Ecology and Environment of China	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
54.	China CER Exchange Info-platform	China CER	http://cdm.ccchina.org.cn/ccer.aspx	Website
55.	GS	Gold Standard	http://www.goldstandard.org/	Website
56.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Website
57.	VCS	VCS	https://verra.org/project/vcs-program/	Website
58.	Public Info	Days for pigs to be slaughtered	Number of days for pigs to be slaughtered by existing large-scale breeding groups in China https://zhuanlan.zhihu.com/p/38676811 http://finance.people.com.cn/n1/2017/1121/c1004-29658996.html	Website
59.	Fujian Provincial Climate Centre	Public information of local temperature for this monitoring period	https://www.tianqi5.cn/fujian_lishitianqi.html	Public info
60.	Public Website	Public literature of methane producing potential of the volatile solid generated by swine manure	http://www.doc88.com/p-9902182440715.html	Public Website

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

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

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

Table 2.CL from this verification

CL ID	01	Section no.	2.1	Date : 10/03/2023
Description of CL				
The actual implementation of the project in this monitoring period is not clarified to prove no net harm.				
Project participant response				Date : 20/03/2023
The description of the impact of project operation on the environment in this monitoring period has been clarified, the details can be seen in section 2.1 of MR (version02).				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				Date: 30/03/2023
The revised MR is checked, CCCI confirms that actual implementation of the project in this monitoring period is clarified. As per the approval of EIA/7/, it stated that the inspectors from the local Environmental Protection Bureau have to carry out monitoring work for the environmental impact arisen from the project activity during project commissioning periodically. Via interview with the officer from local Environmental Protection Bureau, CCCI confirms that they are satisfactory with the environmental protection and recovery works have been carried out by the project owner. The local Environmental Protection Bureau also did not receive any public comment on the project activity during 2nd monitoring period. During the on-site interview, the local residents were interviewed to confirm if there was critical impact to their living environment. It is verified that the project activity does not cause adverse effect to their daily life. Furthermore, via interview with local officer and stakeholders, CCCI confirms that the implementation of the project improves local socio-economic development through creating career opportunities and utilize biogas for power generation that replace the electricity from grid which is dominated by thermal power generation. CCCI is able to conclude that there were some impacts on environment during the construction and operation periods which has been demonstrated in the MR/1/ and approved JPM/3/ and EIA/6/, also the proper measurements have been carried out by project implementer to mitigate such impacts. Therefore, no net harm on local environment and social community has been detected for the project. CL 01 is closed.				

CL ID	02	Section no.	2.2	Date : 10/03/2023

Description of CL	
For Local Stakeholder Consultation process in this monitoring period, 1. Summary of outcomes of the local stakeholder communication is not clarified. 2. How, who and where to distribute the questionnaires is not clarified.	
Project participant response	**Date :** 20/03/2023
1. The summary of outcomes of the local stakeholder communication was added to section 2.2 of MR (version 02). The details as follows: *The stakeholder survey results are as follows: 95% of the surveyed stakeholders are aware of the purpose of the project; All respondents believe that the project has a positive impact on the environment (70% believe that the project can improve odor, 18% believe that the project can improve water quality, and 12% of respondents believe that the implementation of the project can reduce waste pollution); Regarding the impact of the project implementation on the lives of the respondents, 64% of the respondents believe that the project can improve the living environment, 22% of the respondents believe that the project can improve employment opportunities, and the remaining 14% of the respondents believe that the project can Provide free organic fertilizers to nearby farmers; All respondents agree with the measures taken by the project for environmental protection; Regarding the impact of the project on local employment, 94% of the respondents believed that the project had a positive impact on employment, and 6% believed that it had no impact; 95% of the respondents believed that the project had a positive impact on the local economy, and 5% believed that it had no impact on the economy; 100% of the respondents support the project construction; 86% of the respondents think that such projects can be promoted and implemented in other regions, and 14% have no opinion on whether such projects can be implemented.* 2. A questionnaire survey was adopted for stakeholder consultation by PP and the employees hired by the project owner manually distributed 10 questionnaires near each swine farm, and the project distributed a total of 90 questionnaires.	
Documentation provided by project participant	
/1/- version 02 /27/	
VVB assessment	**Date:** 30/03/2023
1. The revised MR is checked, CCCI confirms that actual Local Stakeholder Consultation results related to this monitoring period are clarified. 2. The revised MR is checked, CCCI confirms that the detail information of questionnaires distributed is clarified clearly. Refer to section 4.2 of this report for detail assessment of the Local Stakeholder Consultation results and approaches. CL 02 is closed.	

CL ID	03	Section no.	4.3	Date : 10/03/2023
Description of CL				
The emergency procedure is not clarified and if any emergency occurred during this monitoring period is not clarified.				
Project participant response				**Date :** 20/03/2023
The emergency procedure has been added into section 4.3 of MR (version 02), the details as follows: ***Emergency procedure*** *Employees need to be familiar with the process flow and emergency situations that may occur during project operation and operate in strict accordance with the technical specifications of each process treatment equipment and monitoring equipment. During the operation of the project, all equipment and related instruments shall be checked regularly according to the manufacturer's recommendations. If necessary, calibration and/or proper repair have to be carried out immediately.* *In case of malfunction and/or damage of any system or piece of the process, it may cause damage to the operation of the system, especially serious damage to the biogas generation and combustion system it must be dealt with as soon as possible and reported to the responsible technician immediately.*				

During this monitoring period, there was no emergency event occurred, such as overhaul and downtimes of anaerobic digesters. All the equipment operated well, and no equipment was under overhauled during this monitoring period and There was no emergency happened during this monitoring period.
Documentation provided by project participant
/1/- version 02 /11/
VVB assessment **Date:** 30/03/2023
The revised MR is checked, CCCI confirms that emergency procedure has been added. No malfunctioning or failure of monitoring system occurred during this monitoring period confirmed by checking the calibration records/11/, hence Emergency Procedure is not used in 2nd monitoring period. CL 03 is closed.

Table 3.CAR from this verification

CAR ID	01	**Section no.**	1.1	**Date :** 10/03/2023
Description of CAR				
For the table of audit history, the information is not provided in line with MR template requirement. Revision is requested.				
Project participant response				**Date :** 20/03/2023
The information provided in table 1-2 has been revised as per the MR template requirement.				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				**Date:** 30/03/2023
revised MR is checked, CCCI confirms that audit history information has been provided in line with MR template requirement and time periods are verified as correct by checking the dedicated VCS website for this case. CAR 01 is closed.				

CAR ID	02	**Section no.**	3.1	**Date :** 10/03/2023
Description of CAR				
The Process flow of the project activity in Figure 3-1 is not completed, ECPG is missing.				
Project participant response				**Date :** 20/03/2023
The revised process flow of project activity in Figure 3-1 includes the ECPG.				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				**Date:** 30/03/2023
The updated MR is checked, PP has provided the ECPG connection to the project as process flow which is verified as correct and consistent with JPM/3/. CAR 02 is closed.				

CAR ID	03	**Section no.**	4.1	**Date :** 10/03/2023
Description of CAR				
For the ex ante parameter GWP_{CH4} and GWP_{N2O}, the applied VCS standard is not the latest version. Revision is requested.				
Project participant response				**Date :** 20/03/2023
The latest version of VCS standard is Version 4.4, which has been updated in section 4.1 of MR (version 02).				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				**Date:** 30/03/2023

The updated MR is checked, PP has updated the version to 4.4 which is confirmed as the latest available version. CAR 03 is closed.

CAR ID	04	Section no.	4.2	Date : 10/03/2023
Description of CAR				
For the monitoring parameter $EC_{PJ,j,y}$, PP stated the swine farm who purchased electricity from power grid is not with correct swine farm name.				
Project participant response				**Date :** 20/03/2023
For monitoring parameter $EC_{PJ,j,y}$, the swine farm who purchased electricity from power grid has been revised, the details as follows: *In this monitoring period, all the biogas generated by the anaerobic fermentation process is used for power generation. While the amount of biogas generated in Jiayexing swine farm, Zhangzhoulongjuan swine farm and Zhangpu swine farm cannot reach the biogas required for the full-load operation of the generator set. When the generator does not generate electricity, the system runs electricity must be purchased from the grid. In other swine farm, the amount of biogas produced can meet the full load operation of the generators, so there is no need to purchase electricity from power grid. So, in this monitoring period, the electricity consumed from power grid company only happened in Jiayexing swine farm, Zhangzhoulongjuan swine farm and Zhangpu swine farm.*				
Documentation provided by project participant				
/1/- version 02 /21/				
VVB assessment				**Date:** 30/03/2023
The updated MR is checked, PP has updated the footnote 26. During this monitoring period, all the biogas generated by the anaerobic fermentation process is used for power generation, which is belongs to self-generated and self-consumed. The electricity consumption of AWMSs were sourced from the grid company when the biogas generators were not operation. Via checking the Grid Company Electricity Statement/21/, it is confirmed that the electricity consumed from power grid company only happened in Jiayexing, Quanzhou Longjuan and Zhangpu swine farms due to amount of biogas generated in Jiayexing, Quanzhou Longjuan and Zhangpu swine farms cannot reach the biogas required for the full-load operation of the generator set. When the generator does not generate electricity, the system runs electricity must be purchased from the grid. In other farms, the amount of biogas produced can meet the full load operation of the generators, so there is no need to purchase electricity from power grid. CAR 04 is closed.				

CAR ID	05	Section no.	5	Date : 10/03/2023
Description of CAR				
For quantification of GHG emission reductions, PP did not provide all the related formular and calculation process for BE, PE and LE as per the applied methodology and JPM, and the data determined process for each parameter in this monitoring period is missing also.				
Project participant response				**Date :** 20/03/2023
The related formular, the calculation process for BE and the data determined process for each parameter used in the BE calculation has been added to section 5.1 of MR (version 02). The related formular, the calculation process for PE and the data determined process for each parameter used in the PE calculation has been added to section 5.2 of MR (version 02). The related formular, the calculation process for LE and the data determined process for each parameter used in the LE calculation has been added to section 5.3 of MR (version 02).				
Documentation provided by project participant				
/1/- version 02				
VVB assessment				**Date:** 30/03/2023

The updated MR is checked, PP has updated the whole part of section 5 to include the related formular and calculation process for BE, PE and LE as per the applied methodology and JPM as requested above. Refer to section 4.4.6 of this report for detail assessment of the formular and calculation process for BE, PE and LE. CAR 05 is closed.

Table 4.FAR from this verification

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