Verification and certification report form for Gold Standard project activities

BASIC INFORMATION	
Title and GS reference number of the project activity	Jintai Animal Manure Management System GHG Mitigation Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the verification and certification report	01
Completion date of the verification and certification report	24/12/2023
Monitoring period number and duration of this monitoring period	01 01/03/2022 to 31/05/2023 (inclusive of both days)
Version number of the monitoring report to which this report applies	02 dated 27/11/2023
Crediting period of the project activity corresponding to this monitoring period	01/03/2022 to 28/02/2027
Project representative(s)	Henan Deneng Energy&Environmental Protection Technology Co., Ltd.
Host Party	China
Applied methodologies and standardized baselines	ACM0010 "GHG emission reductions from manure management systems" (Version 08.0)
Mandatory sectoral scopes	1 and 13
Conditional sectoral scopes, if applicable	-
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	105,659 tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	42,108 tCO_2e
SDG Impacts:	1. SDG 8: Decent work and Economic Growth (8.5.1) 2. SDG 12: Responsible consumption and production (12.5.1) 3. SDG 13: Climate Action (13.2)
Name and UNFCCC reference number of the VVB	E-0052: Carbon Check (India) Private Ltd.
Name, position and signature of the approver of the verification and certification report	Sanjay Agarwalla

SECTION A. Executive summary

Henan Yangxiang Breeding Co., Ltd, has appointed the VVB, Carbon Check (India) Private Ltd. (CCIPL) is performing the first periodic verification of the GS project "Jintai Animal Manure Management System GHG Mitigation Project " in China (GS project id: GS 12048 for the period 01/03/2022 to 31/05/2023(inclusive of both the dates) This report summarises the findings of validation of the project, performed on the basis of Gold Standard criteria Gold standard for global goals (GS4GG), as well as criteria given to provide for consistent project operations, monitoring and reporting. This report contains the findings and resolutions from the validation and a validation opinion.

The project activity introduces new animal waste management systems to treat the manure from swine farms in Liaoning Province. The purpose of the project activity is to treat the manure and wastewater to avoid methane emissions generated in the baseline uncovered anaerobic lagoons. The project activity treats organic wastes to fertilizer through controlled aerobic treatment by composting of manure and biomass residue which can avoid Methane emissions from uncovered anaerobic lagoons and anaerobically in a solid waste disposal site. An Animal Manure Management System (AWMS) has been installed in swine farm respectively which treat the manure and wastewater from swine farms. All the manure and wastewater are collected into waste collecting tanks and then be separated first by Solid-liquid separator, and by a Upflow Anaerobic Sludge Bed Reactor (UASB) as its anaerobic digester technologies, then the biogas generated. The fermented sludge from the aerobic composting system is used to produce organic fertilizer, which partly distributed to the surrounding farmers freely. The project is expected to achieve 105,659 tCO_2e of emission reduction annually and total emission reduction of 528,294 tCO_2e during the first renewable 5-year crediting period.

Verification is the periodic independent review and ex-post determination of both quantitative and qualitative information by a Validation & verification body (VVB), of the monitored reductions in GHG emissions that have occurred as a result of the project activity during a defined monitoring period.

Certification is the written assurance by a validation & verification body (VVB) that, during a specific period, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the "Jintai Animal Manure Management System GHG Mitigation Project" in the host country "India" for the period 01/03/2022 to 31/05/2023(including both the days).

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner. CCIPL's objective is to perform a thorough, independent assessment of the registered project activity.

In particular, the monitoring plan, monitoring report and the project's compliance with relevant GS and Host Party criteria are verified in order to confirm that the component project/s has/have been implemented in accordance with the previous project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the PDD and the approved monitoring methodology.

Scope:

The scope of the verification is:

- To verify the project implementation and operation with respect to the registered PDD
- To verify the implemented monitoring plan with the registered PDD and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

Verification process:

The verification comprises a review of the monitoring report /01/ over the monitoring period from 30/07/2022 to 31/07/2023 (inclusive) and based on the VPA-DD as part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology, and all related evidence provided by project participants.

On-site interviews and inspections are also performed as part of the verification process.

Conclusion:

The verification team assigned by the validation & verification body (VVB) concludes that the monitoring report /01/, meet all relevant requirements of the Gold Standard as per the requirements of GS4GG. The verification has been conducted in-line with the GS4GG requirements.

The project activity was correctly implemented according to the selected monitoring methodology, monitoring plan and the PDD /03/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. The following table provides the resulted emission reduction from the project as verified through the document review and on-site interviews by the verification team.

Vintage	**ER (tCO_2e)**
01/03/2022– 31/12/2022	27,299 tCO_2e
01/01/2023 – 31/05/2023	14,809 tCO_2e
Total for the monitoring period	**42,108 tCO_2e**

CCIPL as a Validation & verification body (VVB) is therefore pleased to issue a positive verification opinion expressed in the Certification statement.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation	Involvement in			
						Desk review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader	IR	Mathew	Vijay	CCIPL	X	X	X	X
	Technical Expert	IR	Anand	Amit	CCIPL	X	N	N	X
2.	Trainee Assessor	IR	A L	Hariprasath	CCIPL	X	X	X	X
3.	Trainee Assessor	IR	Maria John	Linta	CCIPL	X	N	N	X
4.	Local Expert	IR	Shen	Nara	CCIPL	X	X	X	X

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer	ER	Seshan	Ranganathan	CCIPL
2.	Approver	IR	Agarwalla	Sanjay Kumar	CCIPL

Vijay Mathew: is an appointed Team Leader. He has been involved in carbon offset mechanisms/sustainability standards for more than 14 years. He has completed his Master of Science (M.Sc.) in Energy Systems, Master of Business Administration (M.B.A) and Master of Commerce (M.Com). He has also completed his Post Graduate Diploma in International Business Operations (PGD-IBO) and Post Graduate Diploma in Fire Protection and Safety (PGD-FPS). He is certified Lead Auditor/Assessor in various standards viz. ISO 9001:2015, SA 8000: 2014, ISO 14001:2015, ISO 14064-1:2018, ISO 50001:2018, ISO 45001: 2018 and BS OHSAS 18001: 2007 etc. He has experience in the field of Carbon Offsets both in the regulatory and voluntary front, including project validation. He has participated in GS, VCS, GCC and CDM validations and validations. He has been involved in verification/validation of more than 100 Carbon offset projects. He has also attended several Gold Standard VVB webinar trainings and GS4GG trainings. He is qualified as technical expert for TA 1.1, 1.2, 3.1,13.1 and 13.2 under CDM SS/TA categorization.

Amit Anand: Qualified lead assessor and internal technical reviewer for offset projects validations and verifications under CDM, VCS and Gold Standard (GS) and actively been involved in the validation and verification or internal tec hnical review of more than 200 offset projects. He is qualified as technical expert for TA 1.2, 3.1, 8.1, 13.1 and 14.1 under CDM Sectoral Scope categorization. He has a professional experience of more than 12 years in various capacities with organizations like MITCON, TUV Rheinland, Deloitte and MGM International in the development and validation/verification of carbon offset projects under different market-based mechanism. He was also involved in validation and verification the following Gold Standard Projects: GS 1078, GS 976, GS 850, and GS 916 PoA (GS 1231 (VPA 01) GS 1029 (VPA 02), GS 1030(VPA 03), GS 1031(VPA 04).

Ranganathan Seshan: Holds a Bachelor's Degree in Chemical Engineering and has an overall working experience of around thirty nine years with twenty four years' experience in Chemical process industry (fertilizer & petrochemical manufacturing) covering production, technical services including energy audits and efficiency studies, waste heat -recovery, efficiency studies of boilers ,power plants, safety audits and pollution control activities including waste water treatment, project management, corporate planning, sales, logistics in fertilizer & petrochemical industry. The experience also includes 5 years in process design & engineering for chemical process industry. He is qualified validator, verifier and technical reviewer and has fifteen years' experience working with leading certification bodies. He is involved in the validation/verification of over 200 projects in various roles.

Hariprasath A L : He is appointed as Trainee Assessor and also attended many GS workshops/ webinars.

Linta Maria John: She is appointed as Trainee Assessor and also attended many GS workshops/ webinars.

SECTION C. Means of verification

C.1. Desk/document review

The verification was performed primarily based on the review of the Monitoring report /01/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology. Documents reviewed or referenced during the verification are listed in Appendix 3 of this report.

C.2. On-site inspection

Duration of on-site inspection: 21/06/2023				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	• General information about the project. • Barriers faced/overcome in the processes (additionality) • Local Stakeholder consultation processes • Legal/ Statutory Clearances and Agreements Signed • Baseline determination • Application of appropriate Methodology • Operation and maintenance Procedures • Technical details of project • Data monitoring and storage practices • Calibration and maintenance requirement of the equipment Monitoring Methodology	Sunjiatun Village, Xinnongcun Township, Xinmin city, Liaoning Province	21/06/2023	Vijay Mathew, Nara & Hariprasath A L
2.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD	Sunjiatun Village, Xinnongcun Township, Xinmin city, Liaoning Province	21/06/2023	Vijay Mathew, Nara & Hariprasath A L

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Xu	Saijun	Henan Deneng	21/06/2023	• Discussion on Project Design and eligibility criteria • Proposed Technology to be used in the PA • PP Management System Manual • Discussion on project funding and involvement of any ODA • Discussion on the PA PDD and ER sheet • Discussion on the GS preliminary review comments • Sustainability aspects of the PA SDG impacts, Local stakeholder consultation and Baseline survey of the project activity	Vijay Mathew, Nara & Hariprasath A L

2.	Zhang	Cheng	Kai Feng Guo Tran	21/06/2023	Discussion on the implementation procedures and Operation and maintenance. Local stakeholder consultation and Baseline survey of the project activity	
3.	Zhang	Yang feng	Jintai Yangxiang	21/06/2023	Discussion on the implementation procedures and Operation and maintenance. Local stakeholder consultation and Baseline survey of the project activity	Vijay Mathew, Nara & Hariprasath A L
4.	Wang	Hongbin	Government Official	21/06/2023	Local stakeholder consultation and Baseline survey of the project activity, organic fertilizer distribution.	Vijay Mathew, Nara & Hariprasath A L
5.	Liu	Yewei	Villager	21/06/2023	Local stakeholder consultation and Baseline survey of the project activity, organic fertilizer distribution	Vijay Mathew, Nara & Hariprasath A L

C.4. Sampling approach

N/A

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

The VVB had raised 06 clarifications (CLs) and 05 corrective action requests (CARs) and satisfactorily closed. No FAR has been raised.

SECTION D. Verification findings

D.1. Remaining forward action requests from validation and/or previous verifications

Not applicable

D.2. Compliance of the project implementation and operation with the registered project design document

Means of verification	Document Review, Interview
Findings	CAR 01, CAR 02 and CAR 03 has been raised and resolved successfully. Please refer Appendix 4 below.
Conclusion	A draft monitoring report was submitted to the verification team by the project participants prior to the start of the verification activities. It is checked that the appropriate form has been used for compiling the MR as per the Gold Standard for Global Goals Monitoring Report Template version 1.1 in October 2020/42/. Further every section has been checked against the GS4GG Principles& Requirements/43/. The project activity introduces new animal waste management systems to treat the manure from swine farms in Liaoning Province. The purpose of the project activity is to treat the manure and wastewater to avoid methane emissions generated in the baseline uncovered anaerobic lagoons. The project activity treats organic wastes to fertilizer through controlled aerobic treatment by composting of manure and biomass residue which can avoid Methane emissions from uncovered anaerobic lagoons and anaerobically in a solid waste disposal site. An Animal Manure Management System (AWMS) has been installed in the swine farm respectively which treat the manure and wastewater from swine farms. All the manure and wastewater is collected into waste collecting tanks and then separated first by Solid-liquid separator, and by a Upflow Anaerobic Sludge Bed Reactor (UASB) as its anaerobic digester technologies, then the biogas is generated. The fermented sludge from the aerobic composting system is used to produce organic fertilizer, which partly distributed to the surrounding farmers freely. The same has been confirmed by site inspection and checking the Project Evaluation Report of the project/12/ and Announcement of Organic fertilizer is distributed free of charge/58/. The project activity enables swine farms to use new animal waste management systems instead of the open anaerobic lagoons in baseline scenario to achieve the harmlessness and ecological utilization of the swine manure, the biogas generated during the treatment process will be captured for hot water generation, and the residual biogas will be flared by internal combustion flare (closed flare) if there is any surplus biogas. The project is expected to achieve 105,659 tCO_2e of emission reduction annually and total emission reduction of 528,294 tCO_2e during the first renewable 5-year crediting period. The project applied CDM Methodology ACM0010 “GHG emission reductions from manure management systems” (Version 08.0)/32/. The project start date is 21/12/2021 which has been confirmed by checking the equipment purchase contracts/10/ and was put into operation on 01/03/2022 which has been confirmed by checking the operation log of the project/15/ and record of operation started/09/. The project was applied as a GS-VER project with the GS Reference number of GS12048. According to the PDD and validation report/3/,/4/, the project participant has adopted for the renewable crediting period of 15 years with the start date of 1st crediting period of 01/03/2022. The first monitoring period is from 01/03/2022 to 31/05/2023 (first and last days included) belongs to the first crediting period. As part of the site visit the Verification Team was able to confirm that the project description in MR is in accordance with the project description contained in the PDD/3/.

	By means of an in-depth review of the PDD and the inspections carried out during the on-site visit, an assessment has been carried out whether the project has been implemented and operated in line with the PDD and whether all physical features of the project are in place. The following has been checked: implemented technology, project equipment as well as monitoring equipment. The verifier has performed a site visit to check the swine farm, project equipment, monitoring equipment and interview with end users and staffs, in addition by all the provided evidence, it is found that the project started first construction on 21/12//2021which has been confirmed by checking the construction contract/11/, and started first commissioning on 21/12/2021 and was put into operation on 01/03/2022 which has been confirmed by checking the operation log of the project/09/ and record of operation started of each AWMS/24/ and has been confirmed in the PDD and validation report/3/,/4/. The factors and parameters used during this monitoring period to arrive at the emission reduction calculations are transparently described in the Monitoring Report/1/ and the emission reductions achieved during this monitoring period are 42,108 tCO_2e/2/. This is the 1st monitoring period of 1st crediting period, and the verification team herewith confirms that the project implementation is consistent since the validation as mentioned in the PDD. There are no major obstructions or gaps noted and no special event such as overhaul and downtimes of biogas digesters occurred during this monitoring period. The actual implementation and operation of the project are found in accordance with the descriptions provided in the PDD. There is no deviation / change evidenced during this monitoring period and there were no delays compared to information in approved project. Assessment concludes the following: - The implementation status of project activity was found to be in compliancewith PDD/3/. - CCIPL has conducted the on-site visit to confirm the implementation status of the project withrespect.to. the realized technology. - The actual operation of project activity was found to be in compliance withPDD/3/. There were no delays compared to information in approved project.

D.3. Post-registration changes

D.3.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1]

Not applicable

D.3.2. Corrections

Not applicable

D.3.3. Changes to the start date of the crediting period

Not applicable

D.3.4. Inclusion of a monitoring plan

Not applicable

[1] Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

D.3.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

Not applicable

D.3.6. Changes to the project design

Not applicable

D.3.7. Changes specific to afforestation and reforestation project activities

Not applicable

D.4. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	The verification team has checked the actual monitoring plan against the registered monitoring plan and monitoring methodology and applicable tools. Furthermore, the verification team has checked monitoring system by means of comparison with the information given in the monitoring plan and monitoring methodology. The monitoring plan is completely in accordance with the approved methodology /32/ applied by the registered PDD/3/.

D.5. Compliance of monitoring activities with the registered monitoring plan

Means of verification	Document Review, Interview
Findings	CAR04, CL01, CL05, CL04 and CL06 has been raised and resolved successfully. Please refer Appendix 4 below.
Conclusion	By means of comparison of the MR with the applied CDM methodology and all applicable GS4GG guidelines, the verification team has checked whether the monitoring system is in compliance with the monitoring plan in the PDD/3/ and related requirements of the applied methodology/32/ whether the sample plan conducted accordingly, the source and the applied value of the SDG monitored parameter is acceptable; whether the parameters monitored explain the operational and management structure, responsibilities and institutional arrangement for data collection/archiving, QA/QC procedures. The monitoring system applied by the project compliance with the registered monitoring plan is demonstrated as below: **Monitoring for SDG parameters** For Mitigation Measure for Safeguarding Principles Employee Training of biogas safety operation SDG 8 Total number of jobs SDG 12 Total organic fertilizers produced. SDG 13 *a)* Number of animals of type LT produced annually for the year y, $N_{p,LT}$ *b)* Number of days animal of type LT is alive in the farm in the year y, $N_{da,LT}$ *c)* Average animal weight of a defined livestock population at the project site, W_{site} *d)* Number of days treatment plant was operational in year y, n_{dy} *e)* *Fraction of volatile solids directed to aerobic treatment,* F_{Aer} *f)* Quantity of electricity consumed by the proposed project in year y, $EC_{PJ,j,y}$ *g)* Volumetric flow of the gaseous stream in time interval t on a dry basis, $V_{t,db}$ *h)* Volumetric fraction of greenhouse gas I in a time interval t on a dry

basis, m³gas i/m³ dry gas, $V_{i,t,db}$

i) Temperature of the gaseous stream in time interval t, T_t;

j) Pressure of the gaseous stream in time interval t, P_t;

k) Maximum methane producing potential of the volatile solid generated by animaltype LT, $B_{0,LT}$

l) The amount of the organic fertilizers generated.

m) Total number of jobs

n) Average monthly salary

o) Employee Training of biogas safety operation

CCIPL confirmed that all the monitoring parameters listed in the PDD have been provided in the MR corresponding to each SDG impact.
Refer to below section Annex 2 for detail assessment of the monitoring parameters

Monitoring framework
The MR contains a diagram illustrating the Organization Structure of the Monitoring Team implemented by the project owner to implement the project activity which is confirmed consistent with the PDD. The GS monitoring team are responsible for the monitoring of all the parameters monitored for this monitoring period. And all the data was reviewed by the project developer. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and ensure that emission reductions verified for this monitoring period.

Monitoring equipment and installation
Measurement instruments are described in the MR as subject to appropriate national standards with respect to installation, accuracy and calibration interval. Main instruments weight measurers, flow meters, electronic truck scale, and electricity meters are used to monitor the related SDG parameters, refer to Annex 2 of this report for detail assessment of the installed monitoring devices.
The flow chart of monitoring system has been provided in the MR and checked by verifier, and via site inspection of the monitoring equipment, CCIPL verified that all the measuring equipment have been installed as per the location in flow chart of monitoring system of MR and monitoring plan in the PDD, thus is considered sufficient to carry out the monitoring requirements as planned in the PDD and requested in the methodology, and the appropriate national standards have been followed.

Corrective actions:
In case of non-conformities would be observed, the corrective action plan will be referred and the whole GS monitoring team will follow recognized standard data evaluation methods to guarantee that the data is reliable and accurate. Via site inspection of the log of the project operation/09/ and interview with the staffs, CCIPL confirmed that there was no correction of nonconformities occurred in implementation of the project or the monitoring plan during the 1st monitoring period.

Quality Assurance and Quality Control
The related QA/QC procedure has been conducted by PP for the monitoring process including data verification and cross check by monitoring team and project owner which has been verified by site interview with staffs and checking the training records/25/.
CCIPL confirmed that the QA/QC procedure has been implemented by PP properly during this monitoring period and the data management is confirmed as effective. Refer to below Annex 2 for detail assessment of each.

Training:
Training related to monitoring have been provided to relevant personnel of monitoring team yearly so that all the staffs are competent for the monitoring work which is verified by checking the training records/25/.

Data management:

	The data management and archiving procedure has been provided in the MR which is confirmed as actual and reasonable by checking the PDD, during the on-site inspection, CCIPL confirmed that all the data has been recorded, collected, managed and archived accordingly for this monitoring period and 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. **Emergency Procedure** Project proponents will take actions to deal with malfunction and/or damage if any damage to the operation of the system, and the most conservative approach are used for emission calculations during the emergency period. Via checking the operation log/09/ and all the data collected for biogas flow and electricity, it is verified that there was no emergency happened during this monitoring period. **Non-Double counting assessment** The VVB has checked for double counting by reviewing all relevant registries including CDM/53/, VCS/54/, China CER/52/ and other GHGs programs such as EU ETS, IREC or subnational, various regional schemes and provincial/state-based schemes. Besides, due to all swine farms involved in this project has unique identified GPS coordinates, hence, it can't be counted in any other voluntary market or emission reduction mechanism. CCIPL confirmed that there is no potential exists for Double Counting of emissions reductions due to issuance of Gold Standard VERs/CO2-certificates from the considered project activity for this monitoring period. Furthermore, via on-site inspection, it is confirmed that the project is located in China which is an eligible host country as defined in section 2.1.6 of GS4GG GHG Emissions Reduction & Sequestration Product Requirements (Version 1.2)/47/. Besides, based on validation team's local expertise, China has a cap & trade scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO2e/year which has been verified in the public website/55/, and it is confirmed that the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/56/. Finally, via checking the Declaration of No Double Counting Statement/26/, it is confirmed that the emission reductions were not double counted for this monitoring period. In conclusion, CCIPL verified that Project Developer has provided Gold Standard with satisfactory justification that no double counting of emission reductions occurred for this monitoring period. In conclusion, the MP is completely in accordance with the approved methodology applied by the GS project and PDD.

D.5.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	Document Review, Interview
Findings	CL 02 CL03 has been raised and resolved successfully. Please refer Appendix 4 below.
Conclusion	Verification team confirms that the data and parameters fixed ex ante are in compliance with the registered PDD /3/ and monitoring plan. Please refer to the Annex 1 for assessment of each parameter.

D.5.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CAR04, CL01, CL05, CL04 and CL06 has been raised and resolved successfully. Please refer Appendix 4 below.

Conclusion	The verification team confirms that the data and parameters monitored are in compliance with the PDD /3/ and the monitoring plan. It is confirmed that the verification team assessed the data / information flow from the point of monitoring to emission reduction calculation and found no gap in the same. Please refer to the Annex 2 for assessment of each parameter

D.5.3. Implementation of sampling plan

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	The sampling implementation has been carried out in accordance with the sampling plan contained in the PDD/3/. **Sampling Design/Size/Target Population**: The sampling plan was provided by PP and has been demonstrated in the PDD. The average animal weight of a defined livestock population at the project site (W_{site}) is monitored by sampling method as per the PDD and applied methodology. The project activity applies stratified random sampling method and for monitoring animal weight of a defined livestock population at the project site (W_{site}), and the sample size is calculated as 414 as per the MR. Via checking the calculation sheet of sample size/02/, the sample size is confirmed as correct which has been verified according to "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"/34/. The sample size of each farm was decided using livestock scale of 16000 and a sampling precision of 95/10. The calculated result indicates that the total sample size for the precision sampling is 414. The sampling plan is confirmed as in line with the GS requirement, CDM sampling standard and guideline and applied methodology. **Sampling Frame:** All the swine population are considered as the sampling frame. **Sampling Selection:** The PP has applied Stratified Sampling Method **Implementation of Sampling Method:**

Sampling plan is designed by PP in PDD for monitoring the parameter W_{site} which is confirmed in line with the requirement for this parameter monitoring in the applied methodology. The sampling plan is designed according to the Standard of "Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)"/33/.

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)" and applied methodology.

Via site inspection and interview with employees of farms and PD, CCIPL confirmed that the monitoring activities of the 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.

PP has used 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)"/33/ and is verified consistent with PDD.

The monthly monitoring activity of the samples have been completed in the swine farm during this monitoring period. The monitoring forms have been filled out by the Breeders in swine farms to record the animal weight of the samples/16/.

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.

Reliability and precision calculation:

According to Guidelines for Sampling and surveys of CDM project activities and programmes of activities (Version 04.0)/34/, confidence/precision have been checked as follows:

The stratified estimated overall mean:

The sample estimated of the overall mean operation hours is confirmed to be calculated with the equation below as per "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"/34/:

$$m_{Strat} = \sum_{i=a}^{k} \frac{g_i}{N} \times m_i$$

Where:
m_{Strat} The stratified estimated overall mean
g_i Size of the i^{th} district where i=a,…,k
N Population total
m_i Mean of the i^{th} district where i=a,…,k

The standard error of the stratified estimated overall mean

The standard error of the stratified estimated overall mean is confirmed to be calculated as per "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"/34/:

$$s.e.(m_{Strat}) = \sqrt{\sum_{i=a}^{k} \left(\frac{g_i}{N}\right)^2 \times \left(1 - \frac{n_i}{g_i}\right) \times \frac{SD_i}{n_i}}$$

Where:
m_{Strat} The stratified estimated overall mean

g_i Size of the i^{th} district where i=a,…,k
N Population total
m_i Mean of the i^{th} district where i= a,…,k

t-value

t- value is depending on:

(i) The level of confidence, and

(ii) The size of the sample.

The t-value associated with 95% confidence and the sample size of 414 is 1.9657 as derived in Microsoft Excel using the TINV function following "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"/34/.

Precision

The precision associated with an estimate is confirmed to be: t-value × standard error of the mean as per "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities"/34/.

Calculation results

According to "Standard for Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)"/33/, the desired confidence level is 95% and the desired precision is 10%. Hence, calculation results is therefore confirmed to be:

Date	t-value	m_{Strat}	s.e. (m_{Strat})	Precision	Relative Precision
2022/03/01-2022/03/31	1.9657	150.43	0.0024	0.0047	0.003%
2022/04/01-2022/04/30	1.9657	161.05	0.0022	0.0044	0.003%
2022/05/01-2022/05/31	1.9657	172.15	0.0024	0.0047	0.003%
2022/06/01-2022/06/30	1.9657	174.97	0.0024	0.0047	0.003%
2022/07/01-2022/07/31	1.9657	155.67	0.0041	0.0082	0.005%
2022/08/01-2022/08/31	1.9657	166.08	0.0039	0.0077	0.005%
2022/09/01-2022/09/30	1.9657	176.13	0.0040	0.0079	0.004%
2022/10/01-2022/10/31	1.9657	186.66	0.0035	0.0069	0.004%
2022/11/01-2022/11/30	1.9657	183.05	0.0040	0.0078	0.004%
2022/12/01-2022/12/31	1.9657	167.25	0.0040	0.0079	0.005%
2023/01/01-2023/01/31	1.9657	177.51	0.0039	0.0077	0.004%
2023/02/01-2023/02/28	1.9657	186.67	0.0039	0.0077	0.004%
2023/03/01-2023/03/31	1.9657	196.99	0.0039	0.0077	0.004%
2023/04/01-2023/04/30	1.9657	189.30	0.0037	0.0072	0.004%
2023/05/01-2023/05/31	1.9657	175.50	0.0376	0.0739	0.042%

The relative precision is less than 10%. The data are within the required specification. Therefore, CCIPL verified that the required confidence/precision has been met.

	The verification team has found out that the sampling plan applied is found to be in- line with the monitoring plan mentioned in the PDD/3/ and Sampling and survey standards/33/ and guideline/34/.

D.6. Assessment of data and calculation of SDG impacts

D.6.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	***SDG 12 Baseline Impact:*** Via checking the MR and through interview with local residents, CCIPL confirmed that the organic fertilizer can be produced in project activity. In the baseline situation, as per the interview with end users, CCIPL verified that 0 ton of organic fertilizers can be generated without the project activity. Therefore, Baseline Impact is zero. ***SDG 8 Baseline Impact:*** Via checking the MR and through interview with representative of staffs, CCIPL confirmed that the project created jobs. In the baseline situation, as per interview with representative of staffs, CCIPL verified that no new full-time job created without this project. Therefore, Baseline Impact is zero. ***SDG 13 Baseline Impact:*** Via checking the MR/1/ and through checking the emission reduction calculation sheet/2/, CCIPL confirmed that the amount of GHGs emission avoided or sequestered. in baseline is 0 tCO_2e. Therefore, Baseline Impact is zero.

D.6.2. Calculation of project value or estimation of project situation of each SDG impact

Means of verification	Document Review, Interview
Findings	CAR 05 has been raised and resolved successfully. Please refer Appendix 4 below.
Conclusion	**SDG 8 Project Impact:** For SDG Indicator 8, From 01/03/2022 to 31/12/2022, 2 full-time jobs created (including 1 female and1 male) which is verified in Annex 2. From 01/01/2023 to 31/05/2023, 2 full-time jobs created (including 1 female and1 male) which is verified in Annex 2. For this monitoring period from 01/03/2022 to 31/05/2023, 4 full-time jobs created (including 2 females and 2 males) which is verified in Annex 2. Hence CCIPL confirmed the project is beneficial to local stakeholders. **SDG 12 Project Impact:** For SDG 12, the project installs new animal waste management systems to replace the current open anaerobic lagoons and generates organic fertilizers, as assessed in Annex 2, CCIPL verified that the From 01/03/2022 to 31/12/2022, 5,277 tons of organic fertilizers were generated01/01/2023 to 31/05/2023, 4,181 tons of organic fertilizers were generated.

Therefore, the SDG 12 Project Impact for this monitoring period from 01/03/2022 to 31/05/2023, total 9,458 tons of organic fertilizers were generated.

SDG 13 Project Impact:

As per section B.6.1 of the PDD, the amount of GHGs emissions avoided or sequestered is calculated equal to baseline emission – project emissions – leakage emissions, and the baseline emission, project emissions, leakage emissions are determined by ACM0010" GHG emission reductions from manure management systems (Version 08.0)", the specific calculation method and calculation result in this monitoring period are described as follows:

Baseline Emissions BE_y Calculation Assessment:

Via checking the PDD and the applied methodology, the baseline emissions BE_y in a year y are calculated as:

$$\mathrm{BE}_y = BE_{CH4,y} + BE_{N2O,y} + BE_{elec/heat,y} \quad \text{(Equation 1 ACM0010,V08.0, Equation 1)}$$

Where:

BE_y	Baseline emissions in year y (t CO_2/yr)
$BECH_{4,y}$	Baseline CH_4 emissions in year y (t CO_2/yr)
$BEN_2O_{,y}$	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 CH4 emissions (BECH4, y)

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

(Equation 2 ACM0010,V08.0, Equation 2)

Where:

$BECH_4$, y = Baseline CH_4 emissions in year y (t CO_2/yr)

$GWPCH_4$ = 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℃) and 1atm pressure.

MCFj = Annual methane conversion factor (MCF) for the baseline AWMSj. IPCC 2006 Guidance,table 10.17, chapter 10, volume 4.

B0,LT = Maximum methane producing potential of the volatile solid generated by animal type LT (m^3CH_4/kg -dm)

NLT = Annual average number of animals of type LT for the year y (number)

VSLT,y = Annual volatile solid excretions for livestock LT entering all AWMS on a dry matter weightbasis (kg -dm/animal/yr)

MS%BI,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%BI,j =100%

LT = Type of livestock

j = Type of treatment system

Estimation of various variables and parameters for above equation:

$VS_{LT,y}$

As per the methodology, there are four options to determine this value, via checking the options provided, CCIPL confirmed there is no published country specific data available based with the local expertise of audit team. There is no published country specific data available, so we could not use Option 1. 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 VSLT,y.

Scaling default IPCC values VSdefault to adjust for a site-specific average animal weight as shown in equation below: $\mathrm{VS}_{LT,y} = \left(\frac{W_{site}}{W_{default}}\right) \times VS_{default} \times nd_y$ (Equation 4-ACM0010,V08.0, Equation 4)

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) Annual average number of animals of type LT (N_{LT})

As per the methodology, there are four options to determine this value, via checking the options provided, via site inspection, CCIPL confirmed that there are two types of swine in this project, i.e., Nursery swine and Breeding swine. For Nursery swine, since there is no way to trace the daily stock, so the Option 1 is adopted to calculate NLT for Nursery 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 NLT for Breeding swine.

Option 1:

$$\mathrm{N}_{\mathrm{LT}} = \mathrm{N}_{\mathrm{da},LT} * \left(\frac{N_{p,LT}}{365}\right)$$ （Equation 5） (ACM0010,V08.0,Equation 5a)

Where,

NLT	Annual average number of animals of type *LT* for the year *y* (number)
Nda,LT	Number of days animal of type *LT* is alive in the farm in the year *y* (number)
Np,LT	Number of animals of type *LT* produced annually for the year *y* (number)

Option 2:

$$N_{LT} = \frac{\sum_{1}^{365} N_{AA,\ LT}}{365}$$ (Equation 6 (ACM0010,V08.0, Equation 5b)

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) B0,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)/30/.

CCIPL verified that the maximum methane producing potential (B0,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 Liaoning 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, chapter10/30/.

(D) MCFj

As per the applied methodology, the MCFj values given in table 10.17, chapter 10, volume 4, IPCC 2006 Guidelines/34/ should be used. MCFj values depend on the annual average temperature where the anaerobic manure treatment facility in the baseline existed.

i. For this project, the annual average temperature is confirmed as 9.2℃ and the value of 65% applied is verified as consistent with IPCC/57/.

ii. A conservativeness factor should be applied by multiplying MCFj values (estimated as per above bullet) with a value of 0.94, to account for the 20% uncertainty in the MCFj values as reported by IPCC 2006/30/.

2. Baseline N_2O emissions (BEN_2O,y)

$$BE_{N2O,\ y} = GWP_{N2O} * CF_{N2O-N,N} * \frac{1}{1000} * \left(E_{N2O,D,y} + E_{N2O,ID,y}\right)$$ (Equation -7 ACM0010, V08.0, Equation 6)

where :

$BEN_2O_{,y}$	Annual baseline N_2O emissions in (t CO_2e/yr)
$GWPN_2O$	Global Warming Potential (GWP) for N_2O (t CO_2e/t N_2O)
$CFN_2O_{-N,N}$	Conversion factor N_2O-N to N_2O (44/28)
$EN_2O_{,D,y}$	Direct N_2O emission in year *y* (kg N_2O-N/year)
$EN_2O_{,ID,y}$	Indirect N_2O emission in year *y* (kg N_2O-N/year)

$$E_{N2O,D,y} = \sum_{j,LT} EF_{N2O,D,j} * NEX_{LT,y} * N_{LT} * MS\%_{Bl,j}$$ (Equation 8 ACM0010,V08.0, Equation 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).

$NEX_{LT,y}$	Annual average nitrogen excretion per head of a defined livestock population (kg N/animal/yr)estimated as described in appendix 2 of applied methodology.
$MS\%_{Bl,j}$	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 (5) or (6)(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/32/, two options provided, in the absence of availability of project specific information on protein intake, option 1 is missing the relevant parameters and cannot be used. 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 $NEX_{LT,y}$

$$NEX_{LT,\ y} = \frac{W_{site}}{W_{default}} * NEX_{IPCCdefault}$$ (Equation -12- ACM0010,V08.0, Appendix 2 Equation 2)

where :

$NEX_{LT,y}$	Annual average nitrogen excretion per head of a defined livestock population (kgN/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 (kgN/animal/year)

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

$$Nex_{(T)} = N_{rate(T)} \bullet \frac{TAM}{1000} \bullet 365$$ (Equation 13- IPCC 2006, volume 4, chapter 10 Equation 10.30)

where :

$N_{rate(T)}$	The default N excretion rate, kg N/ (1000 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

$$BE_{elec/heat,y} = BE_{BC,y} + BE_{HG,y}$$ (Equation -14 ACM0010,V08.0, Equation 9)

where :

BEelec/heat,y	Baseline CO_2 emissions from electricity and/or heat used in the baseline (t CO_2/yr)
BEEC,y	Baseline emissions associated with electricity generation in year *y* (t CO_2/yr)
BEHG,y	Baseline emissions associated with heat generation in year *y* (t CO_2/yr)

Via site inspection and checking the baseline scenario, CCIPL 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 hot water

generation and used by the swine farm. So, the baseline CO_2 emission from electricity and/or heat used in the baseline is 0, which is conservative.

The values monitored during monitoring survey are transparently shown in the Monitoring Report Section D.2. Onsite, the verification team cross-checked these values in detail using various supporting records and documents. Refer to the section Annex 1 and Annex 2 of this report for ex-ante and ex-post parameters' assessment.

The SDG 13 Baseline Impact (Baseline emission calculation) is provided in the Emission reduction calculation spreadsheet/2/ in a transparent manner and the calculation found correct. There is no material error noted in the accounting and application of various data against monitored parameters.

The Baseline Impact for SDG 13 during this monitoring period is summarized as below,

Period	BE_{CH4} (tCO_2e)	$BE_{N2O,y}$ (tCO_2e)	BE_y (tCO_2e)
01/03/2022-31/12/2022	**29,470**	**330**	**29,800**
01/01/2023-31/05/2023	**15,886**	**179**	**16,065**
monitoring period	**45,356**	**509**	**45,865**

Total Baseline Impact for SDG 13 (baseline emissions) of the 1st monitoring period (01/03/2022-31/05/2022) is thus verified as 45,865 tCO_2e. Among this, baseline emissions were 29,800 tCO_2e from 01/03/2022-31/12/2022 and 16,065 tCO_2e from 01/01/2023-31/05/2023.

Project Emission Calculation Assessment:

Based on the applied methodology, and via site inspection checking the project implementation, CCIPL confirmed that there are two stages involved in the manure treatment for the project activity: (1) anaerobic digester; (2) aerobic treatment of biogas liquid in lagoon.
The Project emissions are estimated as follows:

$$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{N2O,y} + PE_{EC/FC,y}$$ (Equation -15 ACM0010,V08.0, Equation 11)

where

PEy	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
$PE_{EC/FC,y}$	Project emissions from electricity consumption and fossil fuel combustion (t CO_2e/yr)

I) **PEAD,y**

$$PE_{AD,y} = PE_{EC,y} + PE_{FC,y} + PE_{CH4,y} + PE_{flare,y}$$ (Equation -16- Tool 14,V02.0, Equation 1)

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)
$PE_{flare,y}$	Project emissions from flaring of biogas in year y (t CO_2e)
$PE_{CH4,y}$	Project emissions of methane from the anaerobic digester in year y (t CO_2e)

Since the electricity consumption of the anaerobic digestion system cannot be measured separately from the entire AWMS, so the Project emissions from electricity consumption associated with the anaerobic digester and that is not related to the anaerobic digester will be calculated together.

The project emissions from electricity consumption calculated according to TOOL 05 "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)",

a. $PE_{EC,y}$

$$PE_{EC,y} = \sum_{j,LT} EC_{PJ,J,y} * EF_{EF,j,y} * \left(1 + TDL_{j,y}\right)$$ (Equation -17- Tool 14,V02.0, Equation 1)

where

$PE_{EC,y}$	Project emissions from electricity consumption in year y (t CO_2e)
$EG_{PJ,J,y}$	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*

b. $PE_{FC,y}$

Via site inspection, CCIPL 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 excess 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)/37/

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" /42/ 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; Joint Validation & Verification Report:
(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 16 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)/38/.

As per paragraph 23 of Tool 8:" Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 03.0)"/38/, the way to prove that the gaseous stream is dry needs to demonstrate that the temperature of the gaseous stream (Tt) is less than 60ºC (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 ºC/59/. Therefore, the gas temperature measured by the flowmeter does not exceed 60 ºC, it can be demonstrated that the gaseous stream is dry.

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

$$F_{i,t} = V_{t,db} * v_{i,t,db} * \rho_{i,t}$$ （Equation 20- Tool 08,V03.0, Equation 9）

$$\rho_{i,t} = \frac{P_t * MM_i}{R_u * T_t}$$ （Equation 21- Tool 08,V03.0, Equation 10）

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 (m³ dry gas/h)
$v_{i,t,db}$	Volumetric fraction of greenhouse gas *i* in the gaseous stream in a time interval *t* on a dry basis (m³ gas *i*/m³ dry gas)
$\rho_{i,t}$	Density of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas *i*/m³ gas *i*)
Pt	Absolute pressure of the gaseous stream in time interval *t* (Pa)
MM_i	Molecular mass of greenhouse gas *i* (kg/kmol)
Ru	Universal ideal gases constant (Pa.m3/kmol.K)
Tt	Temperature of the gaseous stream in time interval *t* (K)

Step 2: Determination of flare efficiency

Via site inspection, CCIPL confirmed that the enclosed flares are applied.

According to tool 06 paragraph 21 /37/: in the case of encloses flares, the flare efficiency in the minute m ($\eta_{flare,m}$) is 90% when the flame is detected in the minute m ($Flame_m$):

(1) The temperature of the flare ($T_{EG.m}$) and the flow rate of the residual gas to the flare ($F_{RG,m}$) is within the manufacturer's specification for the flare ($SPEC_{flare}$) in minute *m*; and

(2) The flame is detected in minute *m* ($Flame_m$).

Otherwise $\eta_{flare,m}$ is 0%.

Since the flame is not detected in minute, therefore the flare efficiency $\eta_{flare,m}$ is 0%

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:

$$PE_{flare,y} = GWP_{CH4,y} * \sum_{m=1}^{525600} F_{CH4,GR,m} * (1 - \eta_{flare,m}) * 10^{-3}$$ （Equation 18-Tool 06,V04.0, Equation 15）

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*

In summary, the Project emissions associated with the anaerobic digester in year y ($t CO_2e$) is the sum of the Project emissions of methane from the anaerobic digester in year y ($t CO_2e$),

the project emissions from electricity consumption associated with the anaerobic digester and that is not related to the anaerobic digester and the project emission from flaring the biogas. i.e., $PE_{AD,y}= PE_{CH4,\ y+}\ PE_{EC,y}+ PE_{flare,y}$.

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)"/39/. 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:

$$\mathrm{PE}_{\mathrm{CH4,y}} = \mathrm{Q}_{\mathrm{CH4,y}} * \mathrm{EF}_{\mathrm{CH4,default}} * GWP_{CH4}$$ (Equation 19- Tool 14,V02.0, Equation 4)

where

$EF_{CH4,default}$	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 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

QCH4,y shall be measured using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0)/38/. 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 ($QCH4$,) is the accumulation of the mass flow of methane in the gaseous stream in an hourly basis time interval. i.e.,

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

$$\mathrm{F}_{i,t} = V_{t,db} * \nu_{i,t,db} * \rho_{i,t}$$ (Equation 20- Tool 08,V03.0, Equation 9)

$$\rho_{i,t} = \frac{P_t * MM_i}{R_u * T_t}$$ (Equation 21- Tool 08,V03.0, Equation 10)

where:

Fi,t	Mass flow of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas/h)
Vt,db	Volumetric flow of the gaseous stream in time interval *t* on a dry basis (m³ dry gas/h)

$v_{i,t,db}$	Volumetric fraction of greenhouse gas *i* in the gaseous stream in a time interval *t* on a dry basis (m³ gas *i*/m³ dry gas)
$\rho_{i,t}$	Density of greenhouse gas *i* in the gaseous stream in time interval *t* (kg gas *i*/m³ gas *i*)
Pt	Absolute pressure of the gaseous stream in time interval *t* (Pa)
MMi	Molecular mass of greenhouse gas *i* (kg/kmol)
Ru	Universal ideal gases constant (Pa.m3/kmol.K)
Tt	Temperature of the gaseous stream in time interval *t* (K)

In summary, the final determined Project emission associated with the anaerobic digester for the project activity is $PE_{AD,y}= EF_{CH4,default}+ PE_{EC,y}+ PE_{flare,y}$.

ii) Project CH_4 emissions from aerobic AWMS treatment (PEAer, 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.

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

(Equation 22)

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/m^3)
F_{Aer}	Fraction of volatile solid directed to aerobic system (fraction)
LT	Type of livestock
$B_{o,LT}$	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(5(a)) or (5(b))
PEsl,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)

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

So,

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

(Equation 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 (sludge) being treated. (fraction)
D_{CH4}	Density of CH_4 (t/m^3)
F_{Aer}	Fraction of volatile solid directed to aerobic system (fraction)
LT	Type of livestock
$B_{o,LT}$	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 (kg -dm/animal/yr)
N_{LT}	Annual average number of animals of type LT for the year y (number) as as per equation (5(a)) or (5(b))
$MS\%_j$	Fraction of manure handled in system j in the project activity (fraction)
MCF_{sl}	Methane conversion factor (MCF) for the sludge stored in sludge pits (fraction)

iii) Project N_2O emissions in year y ($PE_{N2O,y}$)

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

（Equation 24- ACM0010,V08.0, Equation 14)

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/t N_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 $PE_{N2O,y}$

Option1:

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

（Equation 25- ACM0010,V08.0, Equation 15)

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 (5(a)) or (5(b)) (number)

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

（Equation 26- ACM0010,V08.0, Equation 16)

where:

$E_{N2O,D,y}$	Direct N_2O emission in year *y* (kg N_2O-N/yr)
$E_{N2O,ID,y}$	Indirect N_2O emission in year y (kg N_2O-N/year)
$EF_{N2O,D,j}$	Direct N_2O emission factor for the treatment system j of the manure management system (kg N_2O-N/kgN)
$Q_{EM,m}$	Monthly volume of the effluent mix entering the manure management system (m^3/month)
$[N]_{EM,m}$	Monthly total nitrogen concentration in the effluent mix entering the manure management system (kgN/m^3)

$EF_{N2O,ID}$ Indirect N_2O emission factor for N_2O emissions from atmospheric deposition of nitrogen on soils and water surfaces (kg N_2O-N/kg NH3-N and NOX-N)

$F_{gasMS,j,LT}$ Default values for nitrogen loss due to volatilization of NH3 and NOX from manure management (fraction)

iV) Project emissions from use of heat and/or electricity (PEelec/heat)

$$PE_{EC/FC,y} = PE_{EC,y} + \sum_j PE_{FC,j,y}$$ (Equation 29- ACM0010,V08.0, Equation 19)

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 CPi,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, CCIPL 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

The values monitored during monitoring survey are transparently shown in the Monitoring Report Section D.2. Onsite, the verification team cross-checked these values in detail using various supporting records and documents. Refer to the section Annex 1 and Annex 2 of this report for ex-ante and ex-post parameters' assessment.

The SDG 13 Project Impact (Project emission calculation) is provided in the Emission reduction calculation spreadsheet/2/ in a transparent manner and the calculation found correct. There is no material error noted in the accounting and application of various data against monitored parameters.

The Project Impact for SDG 13 during this monitoring period is summarized as below,

Period	**$PE_{AD,y}$** (tCO_2e)	**$PE_{Aer,y}$** (tCO_2e)	**$PE_{N2O,y}$** (tCO_2e)	**PE_y** (tCO_2e)
01/03/2022-31/12/2022	1,455	50	996	2,501
01/01/2023-31/05/2023	692	26	538	1,256
monitoring period	**2,147**	**76**	**1,534**	**3,757**

Total Project Impact for SDG 13 (project emissions) of the 1st monitoring period (01/03/2022-31/05/2022) is thus verified as 3,757tCO_2e. Among this, project emissions were 2,501tCO_2e from 01/03/2022-31/12/2022 and 1,256 tCO_2e from 01/01/2023-31/05/2023.

	The verification team confirms that a) The complete data was available and is duly reported; b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section Annex 2. of this report); c) Appropriate methods and formulae for calculating project SDG impact were followed. The calculation of project situation of each SDG impact is correct.

D.6.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	As per the applied methodology, Leakage covers the emissions from land application of treated manure as well as the emissions related to anaerobic digestion in a digester, occurring outside the project boundary. These emissions areestimated as net of those released under project activity and those released in the baseline scenario. Net leakage is only considered if they are positive. $LE_y = \left(LE_{PJ,N2O,y} - LE_{BL,N2O,y}\right) + \left(LE_{PJ,CH4,y} - LE_{BL,CH4,y}\right) + LE_{AD,y}$ （Equation 30- ACM0010,V08.0, Equation 20) 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, LEBL, N_2O, y** $LE_{BL,N2O,y} = GWP_{N2O} * CF_{N2O-N,N} * \frac{1}{1000} * \left(LE_{N2O,land,y} + LE_{N2O,runoff,y} + LE_{N2O,vol,y}\right)$ （Equation 31- ACM0010,V08.0, Equation 21) $LE_{N2O,land,y} = EF_1 \prod_{n=1}^{N}\left(1 - R_{N,n}\right) * \sum_{LT} NEX_{LT,y} * N_{LT}$ (Equation 32-- ACM0010,V08.0, Equation 22） $LE_{N2O,runoff,y} = EF_5 * F_{leach} * \prod_{n=1}^{N}\left(1 - R_{N,n}\right) * \sum_{LT} NEX_{LT,y} * N_{LT}$ （Equation 33- ACM0010,V08.0, Equation 23） $LE_{N2O,vol,y} = EF_4 * \prod_{n=1}^{N}\left(1 - R_{N,n}\right) * F_{gasm} * \sum_{LT} NEX_{LT,y} * N_{LT}$ （Equation 34-- ACM0010,V08.0, Equation 24） where: GWP_{N2O} Global Warming Potential (GWP) for N_2O (t CO_2e/t N_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 volatilization 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 (5) or (6) (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 NH3-N + NOX-N volatilized)]
F_{leach}	Fraction of all N added to/mineralized in managed soils in regions where leaching/runoff occurs that is lost through leaching and runoff (fraction)
$R_{N,n}$	Nitrogen reduction factor (fraction)

ii) Estimation of leakage N_2O emissions released during project activity from land application of the treated manure in year y, LEPJ, N_2O

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

（Equation 35- ACM0010,V08.0, Equation 25）

$$LE_{N2O,land,y} = EF_1 \prod_{n=1}^{N}\left(1 - R_{N,n}\right) * \sum_{LT} NEX_{LT,y} * N_{LT}$$ (Equation 36- ACM0010,V08.0, Equation 26）

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

（Equation 37-- ACM0010,V08.0, Equation 27）

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

（Equation 38-- ACM0010,V08.0, Equation 28）

where:

GWP_{N2O}	Global Warming Potential (GWP) for N_2O (t CO_2e/t N_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 yea y (kg N_2O-N/year)
$LE_{N2O,runoff,y}$	Leakage N_2O emissions due to leaching and run-off in year y (k N_2O-N/year)
$LE_{N2O,vol,y}$	Leakage N_2O emissions due to volatilization in year y (kg N_2C N/year)
F_{gasm}	Fraction of N lost due to volatilization (fraction)
N_{LT}	Annual average number of animals of type LT estimated as pe equation (5) or (6) (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 NH3-N + NOX-N volatilized)] F_{leach} Fraction of all N added to/mineralized 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 possible to measure the quantity of manure applied to land in kg manure/yr (QDM) and the nitrogen concentration in kg N/kg manure (NDM) in the manure to estimate the total quantity of nitrogen applied to land. In this case, $\prod_{n=1}^{N}\left(1-R_{N,n}\right)*\sum_{LT} NEX_{LT,y} * N_{LT}$ should be substituted by $Q_{DM} * N_{DM}$. **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: $LE_{BL,CH4,y} = GWP_{CH4} * D_{CH4} * MCF_d * \left[\prod_{n=1}^{N}\left(1-R_{VS,n}\right)\right]*\sum_{j,LT}\left(B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_j\right)$ （Equation 39- ACM0010,V08.0, Equation 29） $LE_{PJ,CH4,y} = GWP_{CH4} * D_{CH4} * MCF_d * \left[\prod_{n=1}^{N}\left(1-R_{VS,n}\right)\right]*\sum_{j,LT}\left(B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_j\right)$ （Equation 40- ACM0010,V08.0, Equation 30） 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 (5) or (6), 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) assumed to be equal to 1 **iV) Estimation of leakage emissions associated with the anaerobic digester**

LEAD,y is determined using the methodological tool 14 “Project and leakage emissions from anaerobic digesters(Version 02.0).
The leakage emissions associated with the anaerobic digester (,) depend on how the digestate is managed. They include emissions associated with storage and composting of the digestate and are determined as follows:

$$LE_{AD,y} = LE_{storage,y} + LE_{comp,y}$$ （Equation 41- Tool 14 ,V02.0, Equation 5）

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 will be captured for Hot water generation or flared (if any). The Emissions from combustion will be calculated in project emissions (if any). After anaerobic digestion, the fermented sludge will be treated in aerobic composting system, which will be used as fertilizer. Wastewater from the new animal waste management systems will be treated aerobically and then used for agriculture irrigation. So, the Estimation of leakage emissions associated with the anaerobic digester is 0. i.e., LEAD,y =0

The values monitored during monitoring survey are transparently shown in the Monitoring Report Section D.2. Onsite, the verification team cross-checked these values in detail using various supporting records and documents. Refer to section Annex 1 and Annex 2 of this report for ex-ante and ex-post parameters’ assessment.

Leakage emission calculation is provided in the Emission reduction calculation spreadsheet/2/ in a transparent manner and the calculation found correct. There is no material error noted in the accounting and application of various data against monitored parameters.

The leakage calculation during this monitoring period is summarized as below,

Period	**$LE_{BL,N2O,y}$** (tCO_2e)	**$LE_{PJ,N2O,y}$** (tCO_2e)	**$LE_{PJ,CH4,y}$** (tCO_2e)	**$LE_{BL,CH4,y}$** (tCO_2e)	**LE_y** (tCO_2e)
01/03/2022-31/12/2022	234	0	0	5,585	0
01/01/2023-31/05/2023	127	0	0	3,010	0
monitoring period	**361**	**0**	**0**	**8,595**	0

So, leakage emissions associated with the project activity is 0. i.e., $LE_y=0$

D.6.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	Document Review, Interview

<table>
<tr><td>Findings</td><td>No findings in this section</td></tr>
<tr><td>Conclusion</td><td>Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG impact is as following,

SDG 8 impact net benefit

From 01/03/2022-31/05/2023, Net Benefit SDG 8 (Total number of jobs) = Project Impact of SDG8 (2 full-time jobs created (1 females and 1 males)) – Baseline Impact of SDG8 (0) =0 full-time jobs created

From 01/03/2022-31/05/2023, Net Benefit SDG 8 (Average monthly salary) = Project Impact of SDG8 (5,000 RMB/person (equal salaries were paid for men and women)) – Baseline Impact of SDG8 (0) =0 income

SDG 12 impact net benefit

Net Benefit SDG 12 for 01/03/2022-31/05/2023= Project Impact of SDG12 (9,458 tons organic fertilizer produced) – Baseline Impact of SDG12 (0) =0 tons organic fertilizer produced

SDG 13 impact net benefit

In accordance with applied methodology, PDD and validation report,

Net Benefit SDG 13 for 01/03/2022-31/05/2023 (Amount of GHGs emission avoided or sequestered) = baseline emission – project emission – leakage emission = 45,865 tCO_2e -3,757 tCO_2e -0 tCO_2e = 42,108 tCO_2e

The emission reductions during this monitoring period from 2022 to 2023 are summarized in the table below.

<table>
<tr><th>Date</th><th>Estimation of baseline emissions (tCO_2e)</th><th>Estimation of project activity emissions (tCO_2e)</th><th>Estimation of leakage (tCO_2e)</th><th>Estimation of overall emission reductions (tCO_2e)</th></tr>
<tr><td>01/03/2022-31/12/2022</td><td>29,800</td><td>2,501</td><td>0</td><td>27,299</td></tr>
<tr><td>01/01/2023-31/05/2023</td><td>16,065</td><td>1,256</td><td>0</td><td>14,089</td></tr>
<tr><td>01/03/2022-31/05/2023</td><td>45,865</td><td>3,757</td><td>0</td><td>42,108</td></tr>
</table>

All the figures as per the monitoring report were cross-checked by the verification team against basic monitored data. Refer to Annex 2 for detail assessments.</td></tr>
</table>

D.6.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	The ex-ante estimate value of the emission reductions for the monitoring period as per the PDD /03/ is 105,659 tCO_2e and the actual emission reductions achieved for the monitoring period is 42,108 tCO_2e.

SDG	Values estimated in ex ante calculation of PDD	Actual values achieved during this monitoring period
13	105,659 tCO_2e	42,108 tCO_2e
12	19,491 tons organic fertilizers generation	9,458 tons organic fertilizers generation
8	2 jobs for local people (including 1 female and 1 male). Average monthly salary 5,000 RMB/person	2 jobs for local people (including 1 female and 1 male). Average monthly salary 5,000 RMB/person

The emission reduction calculations provided in the spreadsheet /02/ have been verified to be correct and in line with the PDD /03/.

D.6.6. Remarks on difference from estimated value in registered PDD

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	The ex-ante estimates value of the emission reductions for the monitoring period as per the PDD /03/ is 105,659 tCO_2e and the actual emission reductions achieved for the monitoring period is 42,108 tCO_2e. For SDG 13, since actual emission reduction is lower than the estimated value and hence it is acceptable to the verification team. The monitoring report /01/ provides reason for decrease in the actual emission reduction and the same was confirmed by the verification team by interviewing the representatives of PP and by reviewing the actual implementation status of the project. For other SDG parameters, PP has provided justification in the Monitoring report and assessment of the same is provided below: • SDG 12: The actual value is same as the estimated value, which is deemed appropriate and thus acceptable to the VVB. • SDG 8: The actual value is same as the estimated value, which is deemed appropriate and thus acceptable to the VVB. • SDG 13: The actual value is lower than the estimated value, which is deemed appropriate and thus acceptable to the VVB.

D.7. Safeguards reporting

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	Via checking the Section D.1 and Appendix 1 in PDD, CCIPL confirmed that there is one Safeguarding principle need to be monitored with assessment question answered 'Potentially' i.e., in case of biogas is not handled properly during the operation period of the project, methane explosion may be caused. This parameter has been monitored and assessed in section Annex 2. Hence, it is confirmed that during this monitoring period, no biogas explosion or leakage occurred. And via site visit and interview with local stakeholders, CCIPL verified that the project was implemented normally and in line with the design in the PDD, there was no information on any assessment questions answered 'Potentially' related to Safeguarding principles. All the Information on any assessment questions answered as "No", so there is no need to re-assessment the Safeguarding principles.

	Except one 'Potentially' assessment question has been monitored, all the Information on any assessment questions answered as "No", so there is no need to re-assessment the Safeguarding principles during this monitoring period.

D.8. Stakeholder inputs and legal disputes

Means of verification	Document Review, Interview
Findings	No findings in this section
Conclusion	As confirmed through the onsite visit and interview with the local stakeholders, CCIPL verified that the inputs/grievances mechanism has been in place. As per onsite checking the Grievance Books/31/ and internet/email address which has beenprovided during the validation process and interview with PP and local stakeholders, CCIPL verified that they have access to provide issues or comments through given methods. And via checking the different approach, CCIPL verified that there were no inputs/grievances received during this monitoring period. All the methods of continuous input /grievance mechanism are confirmed during on- site investigation and interviews. CCIPL verified that there were no comments/complaints received from the stakeholders during this monitoring period of the project activity.

SECTION E. Internal quality control

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The verification report shall pass a technical review before being submitted to the Gold Standard. The technical review is performed by a technical reviewer qualified in accordance with CCIPL's qualification scheme for validation and verification.

SECTION F. Verification/Certification opinion

>>

Carbon Check (India) Private Ltd. (CCIPL) has performed the 1st periodic verification of the registered GS Project Activity "Jintai Animal Manure Management System GHG Mitigation Project (GS 12048)".

The verification team assigned by the VVB concludes that the project activity as described in the PDD /03/ and the Monitoring report /01/, meets all relevant requirements of the Gold Standard. The verification has been conducted in-line with the GS4GG requirements project activities.

Verification methodology and process

The Verification team confirms the contractual relationship signed /14/ between the VVB, Carbon Check (India) Private Ltd. and the Project Participant. The team assigned to the verification meets the CCIPL's internal procedures including the UNFCCC/GS requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and CCIPL's procedures and requirements.

The verification has been performed as per the requirements described in the GS4GG and constitutes the review and completion of the following steps:

- Reviewing the PDD /03/, including the monitoring plan and the corresponding validation report /04/;
- Desk review of the MR /01/ and other relevant documents including documents related to the project activities in emission reductions.
- Review of the applied monitoring methodology CDM Methodology: ACM0010 GHG emission reductions from manure management systems (Version 08.0). /B01/;
- On-site inspection (21/06/2023)
- Resolution of CARs and CLs raised during verification.
- Issuance of Verification Report

The project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the PDD. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the document review and remote interviews, the verification team confirms that the project activity has resulted in the 42,108tCO_2e emission reductions during the reported monitoring period.

This statement covers verification period from 01/03/2022 to 31/05/2023 (inclusive of the both the dates).

The VVB has raised 06 clarifications and 05 corrective action requests, all of which are satisfactorily closed.

The VVB considers necessary to give reasonable assurance that reported GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology and the monitoring plan contained in the PDD are fairly stated.

The VVB, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 42,108 tCO_2e equivalent and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records.

Vintage	**ER (tCO_2e)**
01/03/2022 – 31/12/2022	27,299 tCO_2e
01/01/2023 – 31/05/2023	14,809 tCO_2e
Total for the monitoring period	**42,108 tCO_2e**

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CA	Corrective Action/ Clarification Action
CER	Certified Emission Reduction
CAR	Corrective Action Request
CCIPL	Carbon Check (India) Private Ltd.
CL	Clarification Request
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
FA	Final Approval
FAR	Forward Action Request
FVR	Final Validation Report
GHG	Greenhouse gas(es)
GS	Gold Standard
AWMS	Animal Waste Management System
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LE	Leakage Emissions
MP	Monitoring Period
EIA	Environmental Impact Assessment
MWh	Mega Watt Hour
OSV	On Site Visit
PE	Project Emissions
PP(s)	Project Participant(s)
QC/QA	Quality Control/ Quality Assurance
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
VVB	Validation & verification body
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
SDG	Sustainable Development Goals

Appendix 2. Competence of team members and technical reviewers

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Vijay Mathew

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☒ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India			

in the following Technical Areas:

☐ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☐ TA 4.1
☐ TA 4. n	☐ TA 5.1	☐ TA 5.2	☐ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☒ TA 13.2
☐ TA 14.1	☐ TA 15.1	☐ TA 16.1		

Issue Date

5th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
2022[1]	Annual revision
Jan 2023	Annual revision
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Amit Anand

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☒ Plastic Waste Expert
☒ CCB Expert	☐ Legal Expert	☒ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India and RSA			

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☐ TA 4.1
☐ TA 4. n	☐ TA 5.1	☐ TA 5.2	☐ TA 7.1	☒ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☒ TA 13.2
☒ TA 14.1	☒ TA 15.1	☐ TA 16.1		

Issue Date

5th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
2022[1]	Annual revision
Jan 2023	Annual revision
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Carbon Check (India) Private Limited

Certificate of Competency

Mr. S Ranganathan

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☐ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India			

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☐ TA 4.1
☐ TA 4. n	☒ TA 5.1	☐ TA 5.2	☐ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☒ TA 13.2
☐ TA 14.1	☐ TA 15.1	☐ TA 16.1		

Issue Date

5th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
2022	Initial Adoption
Jan 2023	Annual revision
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Appendix 3. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
1.	PP	1st periodic Monitoring Report of "Jintai Animal Manure Management System GHG Mitigation Project"	- Version No. 01, dated 15/11/2023 - Version No. 02, dated 27/11/2023	PP
2.	PP	1st periodic Emission Reduction Calculation spreadsheet of "Jintai Animal Manure Management System GHG Mitigation Project"	-ER LN003 Version 2.0 Jintai No Dated 21/12/2023	PP
3.	PP	GS4GG Project Design document of "Jintai Animal Manure Management System GHG Mitigation Project"	- Version No. 04, dated 17/10/2023	PP
4.	CTI	Validation report of "Jintai Animal Manure Management System GHG Mitigation Project""	- Version No. 1.0, dated 13/11/2023	N/A
5.	PP	Stakeholder Consultation Report of "Jintai Animal Manure Management System GHG Mitigation Project"	- Version No. 01, dated 17/12/2023	PP
6.	Local Market Supervision and Administration Bureau	Business License of PP	07/06/2016	PP
7.	Nanyang Institute of Environmental Protection Science Co., Ltd.	Environment Impact Assessment (EIA)	Issued in 30/03/2017	PP
8.	Ecology and Environment Bureau of Nanyang City	EIA approval	Issued on 08/04/2021	PP
9.	PP	Operation log of the project	Operation log of the project-(01/03/2022-31/05/2023)	PP
10.	PP and Weifang Kangcheng Environment	Equipment purchases and contracts with Weifang Kangcheng Environmental	21/12/2021	PP

	al Protection Engineering Co., Ltd.	Protection Engineering Co., Ltd.		
11.	PP and Weifang Kangcheng Environmental Protection Engineering Co., Ltd.	General construction and installation contract	General construction and installation contract of the project signed on 21/12//2021	PP
12.	Xinmin Jintai Yangxiang Agriculture and Animal Husbandry Co. Ltd.	Project Evaluation Report	Issued on 14/02/2021	PP
13.	Henan Institute of Metrology	Calibration Reports	Calibration Reports to the electricity meters with validity covering this monitoring period	PP
			Calibration Reports to all the Weight measurers with validity covering this monitoring period	
			Calibration Reports to all the electronic truck scale with validity covering this monitoring period	
			Calibration Reports to all the flow meters with validity covering this monitoring period	
14.	CCIPL	Verification contract between VVB & PP	21/03/2023	VVB
15.	PP	Operation log- Biogas monitoring records	Biogas monitoring records covering this monitoring period (01/03/2022-31/05/2023)	PP
16.	PP	Records of animal weight	Monthly records of animal weight of a defined livestock population of three age categories (01/03/2022-31/05/2023)	PP
17.	PP	Thermal monitoring records	Thermal monitoring records covering this monitoring period	PP
18.	PP	Breeding Swine stock record	Breeding Swine stock record of swine farm covering this monitoring period (01/03/2022-31/05/2023)	PP
19.	PP	Daily operation record	Daily operation record of this treatment plant covering monitoring period (01/03/2022 31/05/2023)	PP
20.	Jiangsu Hengda	Manufacture specification	Manufacture specification of the flow meter of biogas	PP
21.	PP	Operation record of organic fertilizer workshop	Operation record of organic fertilizer workshop covering this monitoring period (01/03/2022-31/05/2023)	PP

22.	PP	Record keeping book	Record keeping book including employment	PP
23.	PP and employees	Labor contracts	Labor contracts signed with employees for implementation ofthis project	PP
24.	PP	Record of operation started date of Jintai swine farm	Project Commencement Report	PP
25.	PP	Technical Training Records	Technical Training Records of project 1. Training Records 2. Annual Training Notices 3. Training attendance record	PP
26.	PP	Declaration of no double counting and not involved in other GHG scheme	Issued on 27/11/2022	PP
27.	PP	ODA declaration	Declaration of Non-Use of ODA by project owner of GS12048 issued on 27/11/2022	PP
28.	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
29.	Nanyang Power Supply Bureau of State Grid Henan Electric Power Company	Electricity readings	Electricity meter readings covering this monitoring period (01/03/2022-31/05/2023)	PP
30.	IPCC	IPCC	2006 IPCC Guidelines for National Greenhouse Gas Inventories	Public Website
31.	VVB	Site Visit Photo	Photo taken by verifier during site visit including main equipment, monitoring devices, DCS system, swine farms, Grievance Book etc.- 21/06/2023	N/A
32.	UNFCCC	CDM Approved Small Scale Methodology ACM0010	"ACM0010 GHG emission reductions from manure management systems" (Version 08.0.0)	UNFCCC website
33.	UNFCCC	Standard of Sampling and surveys	Standard of "Sampling and surveys for CDM project activities and programmes of activities (Version 09.0)"	UNFCCC website
34.	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
35.	UNFCCC	Methodological tool	Combined tool to identify the baseline scenario and demonstrate additionality (Version 07.0)	UNFCCC website
36.	UNFCCC	Methodological tool	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)	UNFCCC website
37.	UNFCCC	Methodological tool	Project emissions from flaring (Version 04.0)	UNFCCC website
38.	UNFCCC	Methodological tool	Tool to determine the mass flow of a greenhouse gas in a gaseous	UNFCCC website

			stream (Version 07.0)	
39.	UNFCCC	Methodological tool	Project and leakage emissions from anaerobic digesters (Version 02.0)	UNFCCC website
40.	UNFCCC	Methodological tool	Common practice (Version 03.1)	UNFCCC website
41.	UNFCCC	Methodological tool	Investment analysis (version 11.0)	UNFCCC website
42.	GS	GS4GG MR template	Gold Standard for the Global Goals Monitoring Report (MR) Template, version 1.1 in October 2020	GS Website
43.	GS	Gold Standard for the Global Goals Principles and Requirements	Version 1.2	GS Website
44.	GS	Gold Standard for the Global Goals Safeguarding Principles & Requirements	Version 1.2	GS Website
45.	GS	Gold Standard for the Global Goals Community Services Activity Requirements	Version 1.2	GS Website
46.	GS	Gold Standard for the Global Goals Stakeholder Consultation and Engagement Requirements	Version 1.2	GS Website
47.	GS	GS4GG GHG Emissions Reduction & Sequestration Product Requirements	Version 2.1	GS Website
48.	National Standard	JJG 596-2012	Electrical Meters for Measuring Alternating-current Electrical Energy	Public website
49.	National Standard	JJG1029-2007	Verification Regulation of Vortex-shedding Flowmeter	Public website
50.	National Standard	JJG693-2011	Verification Regulation of Alarmer Detectors of Combustible Gas	Public Website
51.	National Standard	JJG539-2016	Digital Indicator Scale Verification Regulations	Public Website
52.	China CER platform	CCER- China Certified Emission Reduction platform	http://cdm.ccchina.org.cn/ccer.aspx	Public Website
53.	UNFCCC	UNFCCC website	https://cdm.unfccc.int	UNFCCC website
54.	VERRA	VCS	https://verra.org/project/vcs-program/	VCS website
55.	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
56.	Ministry of Ecology and Environment of China	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
57.	IPCC	IPCC Fifth Assessment Report	IPCC Fifth Assessment Report	Public Website
58	PP and Fangcheng Yuyuan Fertilizer Co., Ltd.	Announcement of Organic fertilizer is distributed free of charge	Issued on 25/02/2022	PP
59	National Standard	GB-T 36195	Technical specification for sanitation treatment of livestock and poultry	Public Website

			manure https://oss.baigongbao.com/2020/12/14/MRyhTKQcWC.pdf	

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. FARs from this verification

FAR ID	NA	Section no.		Date:
Description of CAR				
NA				
PP response				**Date:**
Documentation provided by the CME				
DOE assessment				**Date:**

Table 2. CARs from this verification

CAR ID	01	Section no.	A.1 of the MR	Date: 23/11/2023
Description of CAR				
As per the PDD, the biogas generated during the treatment process will be captured for hot water generation, and the residual biogas will be flared by internal combustion flare (closed flare) if there is any surplus biogas. The details related to residual gas and flaring is not mentioned in the section A.1 of the MR. PP is requested to revise the same.				
PP response				**Date: 28/11/2023**
The relevant details related to residual gas and flaring has supplemented in section A.1, please review.				
Documentation provided by PP				
Revised MR				
VVB assessment				**Date: 05/12/2023**
PP has revised the section A.1 of the MR as mentioned above, the same found to be appropriate to the VVB. Hence, CAR 01 is closed.				

CAR ID	02	Section no.	Key Project Information	Date: 23/11/2023
Description of CAR				
PP is requested to provide the sum of amount achieved for the SDG claims for selected vintage in the Table 2 of the MR.				
PP response				**Date: 28/11/2023**
The sum of amount achieved for the SDG claims for selected vintage have supplemented in Table 2, please review.				
Documentation provided by PP				
Revised MR				
VVB assessment				**Date: 05/12/2023**
PP has provided sum of amount achieved for the SDG claims vintage in the Table 2 of the MR, the same found to be appropriate to the VVB. Hence, CAR 02 is closed.				

CAR ID	03	Section no.	B.1 of MR	Date: 23/11/2023
Description of CAR				

PP is requested to provide the all the milestone for implementation of the project in the table 5 of the section B.1 of MR. The details such as EIA approval date, PER date etc are, missing in the table.
PP response **Date: 28/11/2023**
The milestone details including EIA approval date, PER date and the first submission date to GS of this project have supplemented in the table 5 of the section B.1, please review.
Documentation provided by PP
MR
VVB assessment **Date: 05/12/2023**
PP has provided all the milestone for implementation of the project in the table 5 of the section B.1 of MR, the same found to be appropriate to the VVB. Hence, CAR 03 is closed.

CAR ID	**04**	**Section no.**	**MR Sheet**	**Date: 23/11/2023**
Description of CAR				
The value applied for the parameter $R_{N,n-}$ Nitrogen reduction factor is not provided in the MR sheet, PP is requested to provide the same.				
PP response				**Date: 28/11/2023**
The parameter $R_{N,n-}$ Nitrogen reduction factor applied in monitoring report, 80% for anaerobic digester as "One-cell lagoon" has provided in the sub-sheet Data Available at Validation of MR sheet, please review.				
Documentation provided by PP				
MR and MR sheet				
VVB assessment				**Date: 05/12/2023**
PP has revised the MR sheet, and the values are now consistent, the same found to be appropriate to the VVB. Hence, CAR 04 is closed.				

CAR ID	**05**	**Section no.**	**MR Sheet**	**Date: 23/11/2023**
Description of CAR				
The calculation result for the baseline emission and project emissions provided in the MR is not consistent with values in MR sheet. PP is requested to correct the same.				
PP response				**Date: 28/11/2023**
The calculation result for the baseline emission and project emissions provided in the MR has corrected to same values with MR sheet, please review.				
Documentation provided by PP				
MR and MR sheet				
VVB assessment				**Date: 05/12/2023**
PP has revised the MR sheet, and the values are now consistent with the MR, the same found to be appropriate to the VVB. Hence, CAR 05 is closed.				

Table 3. CL from this verification

CL ID	**01**	**Section no.**	**D.1 of MR**	**Date: 23/11/2023**
Description of CL				
PP has used IPCC 2006 values for various monitoring parameters. PP is requested to clarify why the latest available 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories has not been used.				
PP response				**Date: 28/11/2023**
The parameter such as MCF_j, MCF_{sl}, $B_{0,LT}$, $W_{default}$, $VS_{default}$, $EF_{N2O,D,j}$, $F_{gasMS,j,LT}$, etc. are all quoted from the methodology ACM0010, and the parameter data source of ACM0010 is still the IPCC 2006 guidelines, which have not change to the latest available 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Therefore, the parameter values are kept the same with ACM0010 to avoid ambiguity caused by differences between MR and methodology's source citation.				

Documentation provided by PP	
N/A	
VVB assessment	**Date: 05/12/2023**
The justification provided by the PP is found to be appropriate and acceptable to the VVB. Hence, CL 01 is closed.	

CL ID	02	Section no.	D.1 of MR	Date: 23/11/2023
Description of CL				
The parameter $B_{0,LT}$ is taken as parameter to be monitored in the PD and Ex-ante in the MR. PP is requested to clarify the same.				
PP response				**Date: 28/11/2023**
The parameter $B_{0,LT}$ has corrected to the section D.2.Data and parameters monitored in MR, please review.				
Documentation provided by PP				
MR				
VVB assessment				**Date: 05/12/2023**
PP has revised the section D.2 of the MR and the same found to be appropriate to the VVB. Hence, CL 02 is closed.				

CL ID	03	Section no.	D.1 of MR	Date: 23/11/2023
Description of CL				
The parameter such as MCF_{sl} (Methane conversion factor (MCF) for the sludge stored in sludge pits), $CF_{N2O-N,N}$ (Conversion Factor N_2O-N to N_2O) and $TDL_{j,y}$ (Average technical transmission and distribution losses for providing electricity to source j in year y) is included as ex-ante parameters in the MR but not in the PD. PP is requested to clarify the same.				
PP response				**Date: 28/11/2023**
These parameters which are over-elaborated have been deleted in the MR. Please review				
Documentation provided by PP				
MR				
VVB assessment				**Date: 05/12/2023**
PP has revised the section D.1 of the MR and the same is consistent with the PD. The revisions found to be appropriate to the VVB. Hence, CL 03 is closed.				

CL ID	04	Section no.	D.2 of MR	Date: 23/11/2023
Description of CL				
The parameters demonstrated in the section D.2, Data and parameters monitored such as $MS\%_j$ (Fraction of manure handled in system j in project activity y.), $V_{t,db,biogas}$ (Volumetric flow of the gaseous stream in time interval t on a dry basis), $V_{t,db,flare}$ (Volumetric flow of the gaseous stream in time interval t on a dry basis of the residual gas in the enclosed flare), $Flame_m$, $T_{EG,m}$ (Mass flow of methane in the residual gas in the minute m), $F_{CH4,RG,m}$ (Mass flow of methane in the residual gas in the minute m), $Q_{CH4,y}$ (Methane mass in the year y) and organic fertilizers is not discussed in the PD.PP is requested to clarify the same. If required PP is requested to include the missed parameters in the PD.				
PP response				**Date: 28/11/2023**
The MS%j has been deleted for redundant explanation, and the $V_{t,db,biogas}$, $V_{t,db,flare}$, $Flame_m$, $T_{EG,m}$, $F_{CH4,RG,m}$, and $Q_{CH4,y}$, which just the representation of intermediate data in calculation process but not the key monitoring parameter has been deleted in the MR and the MR sheet. Please review.				
Documentation provided by PP				
MR				

VVB assessment	Date: 05/12/2023
PP has revised the section D.2 of the MR and the same is consistent with the PD. The revisions and the justifications is found to be appropriate to the VVB. Hence, CL 04 is closed.	

CL ID	05	Section no.	D.2 of MR	Date: 23/11/2023

Description of CL

1. The parameters such as F_{Aer} (Fraction of volatile solids directed to aerobic treatment), $B_{0,LT}$ (Maximum methane producing potential of the volatile solid generated by animal type LT), Average monthly salary and Employee Training of biogas safety operation which has been chosen as parameters to be monitored in the PD has not included or discussed in the MR. PP is requested to clarify the same.

2. PP is requested to clarify why the parameters for the following are not monitored for this project

   a) Daily stock of animals in the farm, discounting dead and discarded animals, NAA,LT

   b) Biogas flow, Vf

   c) Density of greenhouse gas i in the gaseous stream in time interval t, ρi,t;

   d) Fraction of volatile solids directed to aerobic treatment FAer;

   e) Fraction of manure handled in system j in project activity MS%j

   f) Annual average ambient temperature at project site, T

PP response	Date: 28/11/2023

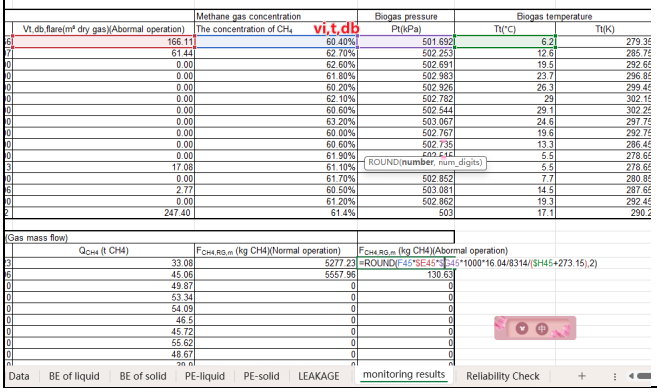
1. The parameters of F_{Aer}, $B_{0,LT}$, Average monthly salary and Employee Training of biogas safety operation have supplemented in the section D.2. Please review.

2. The clarification why the parameters for the following are not monitored for this project are as follows:

A) Daily stock of animals in the farm, discounting dead and discarded animals,NAA,LT is not available in the monitoring period but the monthly records of Np,LT is available, so the parameter Np,LT is adopted.

B) The biogas flow has been monitored in this project, and the monitoring parameter is Fi,t, Mass flow of greenhouse gas j in the gaseous stream in time interval t (kg gas/h) according to the TOOL 08 has the same function with Vf.

C) The ρi,t can be calculated by Pt, MMi, Ru and Tt according to the Tool 08,V03.0, Equation 10, the MMi and Ru are the defalut parameters and the Pt, Tt can be monitored by the flowmeter, so the ρi,t dosen't need to be monitored for its just used in the calculation process of the biogas and methane mass which can be verified in the MR sheet as follows please review.



D) There is no condition for monitoring Fraction of volatile solids directed to aerobic treatment (FAer), according to the conservative principle, use the maximum value of 100%.

E) The mannure process has not changed during the monitoring period, so the fraction of manure handled in system j in project activity, MS%j, adopts the value from equipment suppliers and related research instead of monitoring value.

F) As per the Data / Parameter table 25. of ACM0010, Annual average ambient temperature at project site, T, is used to select the annual MCF from IPCC 2006 guidelines, while the average temperature at farm site is below 10 degree Celsius which is outside the 10 to 28 degree Celsius range according to the volume 4, chapter 10, page 10.43 of IPCC 2006 guidelines, "While these temperature ranges should cover most climate conditions, areas that have extreme high or low annual average temperatures outside the 10 to 28 degree Celsius range should utilize the end-of-range (i.e., 10 or 28 degree) values or investigate developing country-specific values. ",

so the average temperature of the site from National Bureau of Statistics of China is applied.

Documentation provided by PP

MR

VVB assessment | **Date: 05/12/2023**

PP has revised the section D.2 of the MR and the same is consistent with the PD. The revisions and justification by the PP is found to be appropriate to the VVB. Hence, CL 05 is closed.

CL ID	06	Section no.	Section C OF MR	Date: 23/11/2023

Description of CL

PP is requested to provide calibration records for all the flow meters, electricity meters, weighing bridge and electronic truck scale.

PP response | **Date: 28/11/2023**

The calibration records for all the flow meters, electricity meters, weighing bridge and electronic truck scale have supplemented in Table 7 of section C, please review.

Documentation provided by PP

MR

VVB assessment | **Date: 05/12/2023**

PP has included calibration for all the flow meters, electricity meters, weighing bridge and electronic truck scale have supplemented in Table 7 of section C of the MR, the same found to be appropriate to the VVB. Hence, CL 06 is closed.

Annex 1: Assessment of data and parameters fixed ex-ante at the time of validation

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$GWPCH_4$
Data unit	tCO_2e/tCH_4
Default values used	28
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Source of verification of the source	IPCC Fourth/Fifth Assessment Report

Relevant SDG Indicator	SDG 13, Climate action
Parameter	GWP_{N2O}
Data unit	tCO_2e/tN_2O
Default values used	265
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Source of verification of the source	IPCC Fifth Assessment Report, 2014

Relevant SDG Indicator	SDG 13, Climate action
Parameter	DCH4
Data unit	t/m3
Default values used	0.00067
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Source of verification of the source	ACM0010 Version 08.0

Relevant SDG Indicator	SDG 13, Climate action
Parameter	MCF_j
Data unit	Fraction
Default values used	61.1%
Purpose of data	Calculation of baseline emissions Calculation of project emissions Calculation of leakage
Source of verification of the source	Average temperature is 9.2 ℃, which from National Bureau of Statistics of China.

Relevant SDG Indicator	SDG 13, Climate action
Parameter	MCF_d
Data unit	Fraction
Default values used	1
Purpose of data	Calculation of leakage
Source of verification of the source	ACM0010 Version 08.0, page 30

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$MS\%_{Bl,j}$
Data unit	Fraction
Default values used	Liquid $MS\%_{Bl,j}$=30%*76%=22.8% Solid $MS\%_{Bl,j}$ =1-22.8%=77.2% Liquid $MS\%_{Bl,j}$+Solid $MS\%_{Bl,j}$ =100%

Purpose of data	Estimation of Baseline
Source of verification of the source	Equipment suppliers and related research The cleaning efficiency of dry manure cleaning process is 30%[2]; the solid-liquid separation efficiency is 76%

Relevant SDG Indicator	SDG 13, Climate action
Parameter	Conservative Factor
Data unit	Fraction
Default values used	0.94
Purpose of data	Estimation of Baseline and project emission
Source of verification of the source	ACM0010: "GHG emission reductions from manure management systems (Version 08.0) "

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$W_{default}$
Data unit	kg
Default values used	28
Purpose of data	Estimation of Baseline
Source of verification of the source	2006 IPCC guideline, volume 4, chapter 10, tbl. 10A-7&8

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$VS_{default}$
Data unit	kg-dm/animal/day
Default values used	0.3
Purpose of data	Estimation of Baseline
Source of verification of the source	2006 IPCC guideline, volume 4, chapter 10, tbl. 10A-7&8

Relevant SDG Indicator	SDG 13, Climate action
Parameter	R_u
Data unit	$Pa.m^3/kmol.K$
Default values used	8,314
Purpose of data	Estimation of project emission
Source of verification of the source	Universal ideal gases constant

Relevant SDG Indicator	SDG 13, Climate action
Parameter	MM_i
Data unit	kg/kmol
Default values used	16.04 kg/kmol for methane
Purpose of data	Estimation of project emission
Source of verification of the source	TOOL08 (Version 03.0)

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$EF_{N2O, D,j}$
Data unit	kg N_2O-N/kg N

[2] https://www.hnkemuhua.com/news/4_256

Default values used	0 for uncovered anaerobic pond, 0.01 for composting – passive strip stacking.
Purpose of data	Estimation of project emission and baseline emission
Source of verification of the source	2006 IPCC default value, vol. 4, ch. 10, tbl. 10.21

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$N_{rate(T)}$
Data unit	kg N/1000kg animal mass/day
Default values used	0.24
Purpose of data	Estimation of baseline emissions
Source of verification of the source	2006 IPCC default value, vol. 4, ch. 10, tbl. 10.19

Relevant SDG Indicator	SDG 13, Climate action
Parameter	TAM
Data unit	kg/hd
Default values used	28
Purpose of data	Estimation of baseline emissions
Source of verification of the source	2006 IPCC guideline, volume 4, chapter 10, tbl. 10A-7&8

Relevant SDG Indicator	SDG 13, Climate action
Parameter	TAM
Data unit	kg/hd
Default values used	28
Purpose of data	Estimation of baseline emissions
Source of verification of the source	2006 IPCC guideline, volume 4, chapter 10, tbl. 10A-7&8

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$EF_{N2O,ID}$
Data unit	kg N_2O-N/kg NH_3-N and NO_X-N
Default values used	0.01
Purpose of data	Estimation of project emission and baseline emission
Source of verification of the source	2006 IPCC default value, vol. 4, ch. 11, tbl. 11.3

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$F_{gasMS,j,LT}$
Data unit	Fraction
Default values used	40% for anaerobic ponds; 45% for solid storage.
Purpose of data	Estimation of project emission and baseline emission
Source of verification of the source	2006 IPCC default value, vol. 4, ch. 10, tbl.10.22

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$EF_{EF,j,y}$
Data unit	tCO_2/MWh
Default values used	0.66125
Purpose of data	Estimation of project emission
Source of verification of the source	Published by DNA for SCPG

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$EF_{CH4,\ default}$
Data unit	tCH_4 leaked / tCH_4 produced
Default values used	0.05
Purpose of data	Estimation of project emission
Source of verification of the source	Page 12 of TOOL 14: "Project and leakage emissions from anaerobic digesters (Version 02.0) "

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$\eta_{flare,m}$
Data unit	%
Default values used	80%
Purpose of data	Estimation of project emission
Source of verification of the source	On the page 6 of TOOL 06: "Project emissions from flaring (Version 04.0) "

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$R_{VS,n}$
Data unit	Fraction
Default values used	$R_{VS,n}$, aerobic treatment and 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
Purpose of data	Estimation of project emission / leakage calculation
Source of verification of the source	Appendix 1 of methodology ACM0010 and EIA

Relevant SDG Indicator	SDG 13, Climate action
Parameter	$R_{N,n}$
Data unit	Fraction
Default values used	$R_{N,n}$, uncovered anaerobic lagoon: 80%
Purpose of data	Estimation of leakage calculation
Source of verification of the source	Appendix 1 of methodology ACM0010

Relevant SDG Indicator	SDG 13, Climate action
Parameter	EF_1
Data unit	kg N_2O-N/kg N
Default values used	0.01
Purpose of data	Estimation of leakage emission
Source of verification of the source	table 11.1, chapter 11, volume 4, 2006 IPCC

Relevant SDG Indicator	SDG 13, Climate action
Parameter	EF_5
Data unit	kg N_2O-N/kg N
Default values used	0.0075
Purpose of data	Estimation of leakage emission
Source of verification of the source	table 11.3, chapter 11, volume 4, 2006 IPCC

Relevant SDG Indicator	SDG 13, Climate action

Parameter	EF_4
Data unit	Kg N_2O-N/kg NH_3-N and NO_X-N
Default values used	0.01
Purpose of data	Estimation of leakage emission
Source of verification of the source	table 11.3, chapter 11, volume 4, 2006 IPCC

Relevant SDG Indicator	SDG 13, Climate action
Parameter	F_{leach}
Data unit	Fraction
Default values used	0.3
Purpose of data	Estimation of leakage emission
Source of verification of the source	table 11.3, chapter 11, volume 4, 2006 IPCC

Relevant SDG Indicator	SDG 13, Climate action
Parameter	F_{gasm}
Data unit	Fraction
Default values used	0.2
Purpose of data	Estimation of leakage emission
Source of verification of the source	2006 IPCC default value, vol. 4, ch. 11, tbl.11.3

Annex 2: Assessment of data and parameters monitored

<table>
<tr><th>Monitoring Parameter Requirement</th><th>Assessment/ Observation by the VVB</th></tr>
<tr><td>Relevant SDG Indicator</td><td>SDG 13
Indicator 13.2.1 “Amount of CO_2e emissions reduced by the project per year”</td></tr>
<tr><td>Data / Parameter:
(as in monitoring plan of PDD):</td><td>Number of animals of type LT produced annually for the year y.($N_{p,LT}$)</td></tr>
<tr><td>Unit</td><td>Number</td></tr>
<tr><td>Measuring frequency/Time Interval:</td><td>Monitored monthly</td></tr>
<tr><td>Reported value</td><td>
<table>
<tr><td rowspan="2">Time</td><td>LN003</td></tr>
<tr><td>Number</td></tr>
<tr><td>01/03/2022-31/03/2022</td><td>15,993</td></tr>
<tr><td>01/04/2022-30/04/2022</td><td>15,985</td></tr>
<tr><td>01/05/2022-31/05/2022</td><td>15,976</td></tr>
<tr><td>01/06/2022-30/06/2022</td><td>15,971</td></tr>
<tr><td>01/07/2022-31/07/2022</td><td>15,981</td></tr>
<tr><td>01/08/2022-31/08/2022</td><td>15,975</td></tr>
<tr><td>01/09/2022-30/09/2022</td><td>15,970</td></tr>
<tr><td>01/10/2022-31/10/2022</td><td>15,965</td></tr>
<tr><td>01/11/2022-30/11/2022</td><td>15,954</td></tr>
<tr><td>01/12/2022-31/12/2022</td><td>15,979</td></tr>
<tr><td>01/01/2023-31/01/2023</td><td>15,967</td></tr>
<tr><td>01/02/2023-28/02/2023</td><td>15,958</td></tr>
<tr><td>01/03/2023-31/03/2023</td><td>15,952</td></tr>
<tr><td>01/04/2023-30/04/2023</td><td>15,948</td></tr>
<tr><td>01/05/2023-31/05/2023</td><td>15,975</td></tr>
</table>
</td></tr>
<tr><td>Verified Source of Data</td><td>Confirmed by checking, operation log record /09/, Biogas monitoring records/15/ and ER sheets /2/.</td></tr>
</table>

Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 “Amount of CO2e emissions reduced by the project per year”
Data / Parameter: **(as in monitoring plan of PDD):**	Number of days animal of type LT is alive in the farm in the year y ($N_{da,LT}$)
Unit	Number
Measuring frequency/Time Interval:	Monitored monthly
Reported value	
Verified Source of Data	Confirmed by checking, operation log record /09/, Biogas monitoring records/15/ and ER sheets /2/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA

Time	LN003
	Days
01/03/2022-31/03/2022	31.00
01/04/2022-30/04/2022	30.00
01/05/2022-31/05/2022	31.00
01/06/2022-30/06/2022	30.00
01/07/2022-31/07/2022	31.00
01/08/2022-31/08/2022	31.00
01/09/2022-30/09/2022	30.00
01/10/2022-31/10/2022	31.00
01/11/2022-30/11/2022	30.00
01/12/2022-31/12/2022	31.00
01/01/2023-31/01/2023	31.00
01/02/2023-28/02/2023	28.00
01/03/2023-31/03/2023	31.00
01/04/2023-30/04/2023	30.00
01/05/2023-31/05/2023	31.00

Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 "Amount of CO_2e emissions reduced by the project per year"
Data / Parameter: **(as in monitoring plan of PDD):**	Average animal weight of a defined livestock population at the project site (W_{site})
Unit	Kg
Measuring frequency/Time Interval:	Monitored monthly
Reported value	

Time	LN003
	kg
01/03/2022-31/03/2022	150.43
01/04/2022-30/04/2022	161.05
01/05/2022-31/05/2022	172.15
01/06/2022-30/06/2022	174.97
01/07/2022-31/07/2022	155.68
01/08/2022-31/08/2022	166.09
01/09/2022-30/09/2022	176.13
01/10/2022-31/10/2022	186.66
01/11/2022-30/11/2022	183.06
01/12/2022-31/12/2022	167.19
01/01/2023-31/01/2023	177.46
01/02/2023-28/02/2023	186.62
01/03/2023-31/03/2023	196.94
01/04/2023-30/04/2023	189.26
01/05/2023-31/05/2023	175.42

Verified Source of Data	Confirmed by checking, operation log record /09/, Biogas monitoring records/15/ and ER sheets /2/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	Monitoring equipment- Weight measurer Series number- 1004662217 Type- SCS-0.5T Date of calibration- 21/02/2023 Calibration standard- JJG539-2016 (Digital Indicator Scale Verification Regulations) Validity- 21/02/2024

Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 “Amount of CO2e emissions reduced by the project per year”
Data / Parameter: **(as in monitoring plan of PDD):**	Number of days treatment plant was operational in month (n_{dy})
Unit	Number
Measuring frequency/Time Interval:	Daily
Reported value	

Time	LN003
	Days
01/03/2022-31/03/2022	31.00
01/04/2022-30/04/2022	30.00
01/05/2022-31/05/2022	31.00
01/06/2022-30/06/2022	30.00
01/07/2022-31/07/2022	31.00
01/08/2022-31/08/2022	31.00
01/09/2022-30/09/2022	30.00
01/10/2022-31/10/2022	31.00
01/11/2022-30/11/2022	30.00
01/12/2022-31/12/2022	31.00
01/01/2023-31/01/2023	31.00
01/02/2023-28/02/2023	28.00
01/03/2023-31/03/2023	31.00
01/04/2023-30/04/2023	30.00
01/05/2023-31/05/2023	31.00

Verified Source of Data	Confirmed by checking, Operation log record /09/, Biogas monitoring records/15/, Thermal monitoring records/17/ and ER sheets /2/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place

data and reporting of emission reductions and are necessary QA/QC processes in place?	
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 "Amount of CO2e emissions reduced by the project per year"
Data / Parameter: **(as in monitoring plan of PDD):**	Fraction of volatile solids directed to aerobic treatment (F_{Aer})
Unit	Fraction
Measuring frequency/Time Interval:	Annually
Reported value	100% was used in the pre-calculation. There is no condition for monitoring Fraction of volatile solids directed to aerobic treatment, according to the conservative principle, use the maximum value of 100%
Verified Source of Data	Confirmed by checking, PER/11/ and ER sheets /2/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 "Amount of CO_2e emissions reduced by the project per year"
Data / Parameter: **(as in monitoring plan of PDD):**	Maximum methane producing potential of the volatile solid generated by animal type LT ($B_{0,LT}$)
Unit	m^3CH_4/kg dm
Measuring frequency/Time Interval:	Annually
Reported value	$B_{0,LT}$ (Breeding swine) =0.29

Verified Source of Data	Confirmed by checking, IPCC 2006 table 10A-7&8, chapter 10, volume 4 /30/ and ER sheets/02/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 “Amount of CO2e emissions reduced by the project per year”
Data / Parameter: **(as in monitoring plan of PDD):**	Volumetric flow of the gaseous stream in time interval t on a dry basis ($V_{t,db}$)
Unit	m^3 dry gas/h
Measuring frequency/Time Interval:	Continuously measurement by the flow meter.
Reported value	

Time	LN003
	m^3
01/03/2022-31/03/2022	15807.78
01/04/2022-30/04/2022	21192.71
01/05/2022-31/05/2022	24040.48
01/06/2022-30/06/2022	26401.71
01/07/2022-31/07/2022	27727.36
01/08/2022-31/08/2022	23323.30
01/09/2022-30/09/2022	23521.48
01/10/2022-31/10/2022	26997.33
01/11/2022-30/11/2022	24483.71
01/12/2022-31/12/2022	19446.92
01/01/2023-31/01/2023	19842.53
01/02/2023-28/02/2023	21667.11
01/03/2023-31/03/2023	24384.67
01/04/2023-30/04/2023	20578.04
01/05/2023-31/05/2023	20838.20

Verified Source of Data	Confirmed by checking, operation log records/09/, biogas monitoring records/15/ and ER sheets/02/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and	Monitoring equipment- Flow meter Series number- FM01:2303246, FM02:2303247, FM03:2303241

calibration as per the requirements of registered PDD:	Type- LUGB-DN32 Date of calibration and its validity – FM01- 10/02/2023 to 10/02/2024 FM02- 10/02/2023 to 10/02/2024 FM03- 11/02/2023 to 11/02/2024 Calibration standard- JJG1029-2007 (Verification Regulation of Vortex- shedding Flowmeter)
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 “Amount of CO2e emissions reduced by the project per year”
Data / Parameter: **(as in monitoring plan of PDD):**	Pressure of the gaseous stream in time interval t (P_t)
Unit	Pa
Measuring frequency/Time Interval:	Continuously measurement by the flow meter. Once per minute.
Reported value	

Time	LN003
	Pa
01/03/2022-31/03/2022	501.692
01/04/2022-30/04/2022	502.253
01/05/2022-31/05/2022	502.691
01/06/2022-30/06/2022	502.983
01/07/2022-31/07/2022	502.926
01/08/2022-31/08/2022	502.782
01/09/2022-30/09/2022	502.544
01/10/2022-31/10/2022	503.067
01/11/2022-30/11/2022	502.767
01/12/2022-31/12/2022	502.735
01/01/2023-31/01/2023	502.515
01/02/2023-28/02/2023	502.932
01/03/2023-31/03/2023	502.852
01/04/2023-30/04/2023	503.081
01/05/2023-31/05/2023	502.862

Verified Source of Data	Confirmed by checking, operation log records/09/, biogas monitoring records/15/ and ER sheets/02/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes

Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	Monitoring equipment- Flow meter Series number-, FM03:2303241 Type- LUGB-DN32 Date of calibration and its validity - FM03- 11/02/2023 to 11/02/2024 Calibration standard- JJG1029-2007 (Verification Regulation of Vortex- shedding Flowmeter)
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 “Amount of CO2e emissions reduced by the project per year”
Data / Parameter: **(as in monitoring plan of PDD):**	Temperature of the gaseous stream in time interval t (Tt)
Unit	K
Measuring frequency/Time Interval:	Continuously measurement by the flow meter. Once per minute.
Reported value	

Time	LN003
	K
01/03/2022-31/03/2022	279.35
01/04/2022-30/04/2022	285.75
01/05/2022-31/05/2022	292.65
01/06/2022-30/06/2022	296.85
01/07/2022-31/07/2022	299.45
01/08/2022-31/08/2022	302.15
01/09/2022-30/09/2022	302.25
01/10/2022-31/10/2022	297.75
01/11/2022-30/11/2022	292.75
01/12/2022-31/12/2022	286.45
01/01/2023-31/01/2023	278.65
01/02/2023-28/02/2023	278.65
01/03/2023-31/03/2023	280.85
01/04/2023-30/04/2023	287.65
01/05/2023-31/05/2023	292.45

Verified Source of Data	Confirmed by checking, operation log records/09/, biogas monitoring records/15/ and ER sheets/02/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes

Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	Monitoring equipment- Flow meter Series number-, FM03:2303241 Type- LUGB-DN32 Date of calibration and its validity - FM03- 11/02/2023 to 11/02/2024 Calibration standard- JJG1029-2007 (Verification Regulation of Vortex- shedding Flowmeter)
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 “Amount of CO2e emissions reduced by the project per year”
Data / Parameter: **(as in monitoring plan of PDD):**	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis ($V_{i,t,db}$)
Unit	m^3 gas i/m^3 dry gas
Measuring frequency/Time Interval:	Continuously measurement by methane detector. Data to be aggregated monthly and yearly.
Reported value	

Time	LN003
	fraction
01/03/2022-31/03/2022	60.4%
01/04/2022-30/04/2022	62.7%
01/05/2022-31/05/2022	62.6%
01/06/2022-30/06/2022	61.8%
01/07/2022-31/07/2022	60.2%
01/08/2022-31/08/2022	62.1%
01/09/2022-30/09/2022	60.6%
01/10/2022-31/10/2022	63.2%
01/11/2022-30/11/2022	60.0%
01/12/2022-31/12/2022	60.6%
01/01/2023-31/01/2023	61.9%
01/02/2023-28/02/2023	61.1%
01/03/2023-31/03/2023	61.7%
01/04/2023-30/04/2023	60.5%
01/05/2023-31/05/2023	61.2%

Verified Source of Data	Confirmed by checking, operation log records/09/, biogas monitoring records/15/ and ER sheets/02/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes

Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	Monitoring equipment- Digester outlet Series number- MD01: 800220118135 Type- FIX800-W-CH4 Date of calibration and its validity –09/02/2023-08/02/2024 Calibration standard- JJG693-2011 Alarmer Detectors of Combustible Gas
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 13 Indicator 13.2.1 "Amount of CO_2e emissions reduced by the project per year"
Data / Parameter: **(as in monitoring plan of PDD):**	Quantity of electricity consumed by the project electricity consumption source j in every month ($EC_{PJ,j,y}$)
Unit	MWh/yr
Measuring frequency/Time Interval:	Continuous measurement and at least monthly recording.
Reported value	

Time	LN003
	MWh
01/03/2022-31/03/2022	102.02
01/04/2022-30/04/2022	102.02
01/05/2022-31/05/2022	105.42
01/06/2022-30/06/2022	102.02
01/07/2022-31/07/2022	105.42
01/08/2022-31/08/2022	105.42
01/09/2022-30/09/2022	102.02
01/10/2022-31/10/2022	105.42
01/11/2022-30/11/2022	102.02
01/12/2022-31/12/2022	105.42
01/01/2023-31/01/2023	105.42
01/02/2023-28/02/2023	95.22
01/03/2023-31/03/2023	105.42
01/04/2023-30/04/2023	102.02
01/05/2023-31/05/2023	105.42

Verified Source of Data	Confirmed by checking, Electricity meter readings/29/ and ER sheets/02/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes

Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	Monitoring equipment- Electricity meter Series number-, 20191163313275 Type- DTS634 Date of calibration and its validity - 16/02/2022 & 10/02/2023 Calibration standard- JJG596-2012 (Electrical Meters for Measuring Alternating-current Electrical Energy)
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	**Assessment/ Observation by the VVB**
Relevant SDG Indicator	SDG 12 Indicator 12.5.1 “Responsible consumption and production”
Data / Parameter: **(as in monitoring plan of PDD):**	The amount of the organic fertilizers generated
Unit	Tons
Measuring frequency/Time Interval:	Monthly
Reported value	

Time	LN003
	tons
01/03/2022-31/03/2022	0.00
01/04/2022-30/04/2022	0.00
01/05/2022-31/05/2022	102.30
01/06/2022-30/06/2022	506.60
01/07/2022-31/07/2022	580.90
01/08/2022-31/08/2022	969.90
01/09/2022-30/09/2022	1079.40
01/10/2022-31/10/2022	608.40
01/11/2022-30/11/2022	564.00
01/12/2022-31/12/2022	865.60
01/01/2023-31/01/2023	1018.50
01/02/2023-28/02/2023	605.50
01/03/2023-31/03/2023	1036.50

	01/04/2023-30/04/2023	736.30
	01/05/2023-31/05/2023	784.30
Verified Source of Data	Confirmed by checking, operation record of organic fertilizer/21/ and ER sheets/02/.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	Monitoring equipment- Weight measurer Series number- 2020012 Type- SCS-0.5T Date of calibration- 26/02/2022 & 21/02/2023 Calibration standard- JJG539-2016 (Digital Indicator Scale Verification Regulations) Validity- 22/02/2024	
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place	
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA	

Monitoring Parameter Requirement	Assessment/ Observation by the VVB	
Relevant SDG Indicator	SDG 8 Indicator 8.5.1 “Decent work and Economic Growth”	
Data / Parameter: (as in monitoring plan of PDD):	Full-time jobs created for both male and female.	
Unit	Number of full-time jobs created	
Measuring frequency/Time Interval:	Annually	
Reported value	Time	LN003
		Numbers
	2022	The project increases 2 full-time jobs created (including 1 female and 1 male)
	2023	The project increases 2 full-time jobs created (including 1 female and 1 male)
Verified Source of Data	Confirmed by checking, employments records/22/ and Labour contracts/23/.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA	
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place	

In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Relevant SDG Indicator	SDG 8 Indicator 8.5.1 “Decent work and Economic Growth”
Data / Parameter: (as in monitoring plan of PDD):	Average monthly salary
Unit	RMB/person
Measuring frequency/Time Interval:	Monthly
Reported value	To be monitored and for ex ante estimation, the average monthly salary is 5000 RMB/person with equal salaries for men and women in the same post. The actual number of the data used in the monitoring periods will be monitored by Project proponents
Verified Source of Data	Confirmed by checking, employments records/22/ and Labour contracts/23/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Relevant SDG Indicator	SDG 8 Indicator 8.5.1 “Decent work and Economic Growth”
Data / Parameter: (as in monitoring plan of PDD):	Employee Training of biogas safety operation
Unit	
Measuring frequency/Time Interval:	Annually
Reported value	To be monitored and for ex ante estimation, the average monthly salary is 5000 RMB/person with equal salaries for men and women in the same post. The actual number of the data used in the monitoring periods will be monitored by Project proponents
Verified Source of Data	Confirmed by checking, training records/25/

Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Assessment of details of monitoring equipment, its specification and calibration as per the requirements of registered PDD:	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA