Verification and certification report form for GS CDM project activities

(Version 04.0)

BASIC INFORMATION	
Title and GS reference number of the project activity	Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh Ref No: GS980
Scale of the project activity	☐ Large-scale ☒ Small-scale
Version number of the verification and certification report	4
Completion date of the verification and certification report	08/04/2024
Monitoring period number and duration of this monitoring period	Monitoring period no: 05 Duration: 31/05/2021 to 31/12/2022 (Inclusive of both days)
Version number of the monitoring report to which this report applies	04
Crediting period of the project activity corresponding to this monitoring period	31/05/2021 to 30/05/2026
Project participants	ACCION FRATERNA ECOLOGY CENTRE
Host Party	India
Applied methodologies and standardized baselines	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User” version 11.0
Mandatory sectoral scopes	Sectoral Scope 01, 3 & 13
Conditional sectoral scopes, if applicable	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	47,328 tCO2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	9,077 tCO2e
Name of the VVB	4K Earth Science Private Limited
Name, position and signature of the approver of the verification and certification report	Chandrakala R Director

SECTION A. Executive summary

4K Earth Science Private Limited (4KES) has been commissioned by "ACCION FRATERNA ECOLOGY CENTRE" to perform an independent verification of its registered GS project "Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh", CDM Ref # 3779 & GS Ref #GS980 for the reported GHG emission reductions for the given monitoring period 31/05/2021 to 31/12/2022 both dates included). The GS CDM projects must undergo independent third-party verification and certification of emission reductions as the basis for issuance of Gold Standard Verified Emission Reductions (GS VERs)

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The actual monitoring systems & procedures and monitoring report conforms with the requirements of the approved monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.

Scope:

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on review of monitoring report, supporting information and

(a) The registered GS PDD and Passport
(b) The approved methodology mentioned in the GS PDD and passport.
(c) GS4GGTransition Annex.
(d) The registered monitoring plan.
(e) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board.
(f) Applicable GS4GG guidance.
(g) CDM Validation and Verification Standard (VVS).
(h) All information and references relevant to the project activity's resulting in emission reductions.
(i) Information related to monitoring of SD parameters.

The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

4KES has based on the recommendations in the latest version of CDM Validation and Verification Standard, employed a rule-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

Description of project:

Accion Fraterna Ecology Centre (AF Ecology Centre) is a Non-Governmental Organization (NGO) working in Anantapur district of Andhra Pradesh, India. The purpose of this Biogas CDM Project activity is to set up 15,000 biogas plants (digesters) for single households in all Mandals of Anantapur District.

Biogas of 2 cum capacity is installed in each household and fed cattle dung into the anaerobic digester for the production of biogas for cooking purposes. By utilizing cattle dung in a controlled anaerobic digestion and combustion system, biogas is available as thermal energy, which is used for cooking and water heating for bath. Biogas is used on a two-ring gas stove supplied as part of the project activity. Households having cattle or willing to collect cattle dung have participated in the project activity. The project was implemented upon registration of the project as a CDM project activity, as the project is financed completely from carbon revenues. The project contributes to social, environmental, economic and technological benefits which contribute to sustainable development of the local environment and the country.

A desk review of the project documentation is undertaken, which is followed by an onsite visit and interviews by the members of verification team in accordance with the latest version of CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and latest version of CDM VVS, to capture the assessment of applicable CDM & GS requirements viz., latest version of CDM Project Standard, applicable GS toolkit, registered CDM PDD & GS-PDD applied methodology/ies and/or tools and recent decisions. The verification protocol provides transparent means to record the observations and compliances by the verification team members and the nonconformities (CARs/CLs), if any. The verification protocol is an internal document, and is available on request. After successful closure of findings (CARs/CLs), the draft verification report is prepared which went through Independent technical review as per 4KES internal procedures and the TR comments were given for any gaps in audit findings. After closure of the TR comments, final verification report is prepared then followed by final approval for the decision made. The approved verification report is given to PP which shall be submitted for request for issuance.

Following are the major milestones for the verification under consideration.

Verification contract	25/08/2022
On site verification	08/06/2023 – 09/06/2023
Draft Verification Report	10/07/2023
Final Verification Report	08/04/2023

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Technical Expert TA (1.1 & 13.2)	IR	Ma Paa	Puratchikanal	Central Office		X	X	X
2.	Team Leader/ /Verifier/ Technical Expert. TA (13.2)	IR	S R	Anand	Central Office	X	X	X	X
3.	Team Member TA (1.2)	IR	Jithamanyu D V	Ganesh	Central Office	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	**IR**	Swaroop Sharma	Chetan	Central
2	Approver	**IR**	R	Chandrakala	Central

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Wrong data collection/misinterpretation of household situation	Low	It's not complicated monitoring process. Appropriate trainings are	By means of site visit check of actual situation to sample number of households.

			conducted for the monitoring personnel.	
2	Transfer of data from sampling survey sheet to ER sheet	Low	Possible human error during transfer of data to ER sheet	Thorough cross-check required on the transfer of data from survey sheets to the ER sheet
3	Error in ER calculations	High	The sample size was large, hence increasing the chances of error in ER calculation	The ER calculations were checked for accuracy.

C.2. Consideration of materiality in conducting the verification

The prescribed thresholds for materiality, as per §326 of CDM VVS for PA,

Prescribed range of ERs/annum	>500,000	300,000-500,000	300,000	SSC PAs	MSC PAs
Prescribed Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The identified/selected materiality threshold for the project activity under current monitoring period is 5% as project activity is small scale project activity.

	MR Version (Draft)	**MR Version (Final)**
Emission reductions/annum	9077 tCO_2e	9077 tCO_2e
Identified Threshold	5.0%	5.0%

The impact of errors observed during verification for each monitoring parameter on the emission reduction calculation is provided below:

Parameter	**Verification approach**	**Error identified**	**Corrected**	**Extrapolated error for population size (Qty and %)**	**Within Threshold**
Biogas Units Constructed	Complete data check	No error identified.	NA	NA	Yes
Number of biogas plants operating	Complete data check	No error identified	NA	NA	Yes
Confirmation that non-renewable biomass has been substituted	Acceptance sampling	No error identified	NA	NA	Yes
Non-usage of biogas plants	Complete data check	No error identified	NA	NA	Yes

No error on the values of the monitoring parameters is found. The change in the emission reduction between draft and final MR is due to the correction in the ER calculation. Please refer the CARs & CLs raised in the Appendix 4.

SECTION D. Means of verification

D.1. Desk/document review

The verification is performed primarily as a desk review of the documents submitted at various stages of assessments. The review is performed by assessment team using verification protocols (checklists). The assessment team cross-checked the information provided in the MR and information from sources other than those used, if available, and also conducts independent background investigations. 4KES conducted a desk review, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section ‘Appendix 3’ of this report.

In the first verification of 2nd crediting period Mr. Anand S R is a Team Leader, actively participating in Desk Document Review and verification findings. But he has also participated in the 2nd Crediting Period Renewal validation. However, Mr. Anand SR served as a Local Expert, responsible for facilitating translations during interview, without being an Auditor/Team Leader/Technical Expert/Sectoral expert, and was not involved in Desk Document Review or verification findings.

This deviation from the established procedure was observed during the Performance Review and the finding does not bear any impact on the report. In addition to the response to the comment, a deviation request was raised by VVB,which was subsequently approved by Gold Standard on 04/04/2024

D.2. On-site inspection

Site visit was conducted by the VVB for this Verification of GS project on 08/06/2023 and 09/06/2023. Details of interviewees, topics covered and additional information presented in the below section “D.3 Interviews”

Duration of on-site inspection: 08/06/2023 - 09/06/2023				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening Meeting, Office Inspection, Verification of monitoring records, interviews and database inspection	AF Ecology Office	08/06/2023	Anand S R Ganesh Jithamanyu D V
2	Visit to sampled of households	Beneficiary households,	08/06/2023 – 09/06/2023	Anand S R Ganesh Jithamanyu D V
3	Closing meeting	AF Ecology Office	09/06/2023	Anand S R Ganesh Jithamanyu D V

D.3. Interviews

No.	Interviewee				Date	Subject
	Last name	First name	Male or Female	Affiliation		
1.	Estever	Waheed	Male	AF Ecology Centre	08/06/2023	- General aspects of the project - Changes since validation / previous verification - Remaining issues from validation/ previous verification - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan
2	Tetaert	Deepa	Female	AF Ecology Centre		
3	R	Palaiah	Male	AF Ecology Centre		

						- Monitoring data management - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the Monitoring - Maintenance
	Biogas End Users					
No	**Name**	**Male or Female**	**Village**	**Unit ID code**	**Date**	**Subject**
1	Shankareddy	Male	Egava Devappalli	12887	08/06/2023	- Awareness aboutownership of VERs - Working condition ofbio-digester unit - SD parameters verification
2	Bayya Reddy	Male	Thimmebanda	16374	08/06/2023	
3	Kalavathamma	Female	Nagarajahalli	11175	08/06/2023	
4	Nagarathamma	Female	Neelapalli	12163	08/06/2023	
5	Reddappa	Male	Gownicherlapalli	19653	08/06/2023	
6	Indramma	Female	Nallagutlapalli	25302	08/06/2023	
7	Parvathamma	Female	Y. Kurupalli	15153	08/06/2023	
8	Pushpamma	Female	Alambagiri	17954	08/06/2023	
9	Nagamani	Male	Gopasandra	21553	08/06/2023	
10	Narayana Swamy	Male	K. Devaganahalli	10573	08/06/2023	
11	Venkatamma	Male	Maadikere	24003	09/06/2023	
12	Shivamma	Female	Gudarlahalli MV	22667	09/06/2023	
13	Anjinaiah Reddy	Male	Chikka Katigenahalli	22232	09/06/2023	
14	Laxmamma	Female	Jangamaseegehalli	13304	09/06/2023	
15	Shailaja	Female	Seegahalli	13592	09/06/2023	
16	Anjinappa		Y. Chintalapalli	13593	09/06/2023	
17	Manjamma	Female	Peddanahalli	21345	09/06/2023	
18	Renukamma	Female	Dodda Tekuhalli MV	19375	09/06/2023	
19	Jayamma	Female	Y. Chintalapalli	13607	09/06/2023	

20	Laxmamma	Female	K. Gollapalli	19817	09/06/2023	
21	Laxmamma	Female	Kamannahalli	25013	09/06/2023	
22	Rathnamma	Female	Nakkalapalli	19569	09/06/2023	

During the site visit, the verification team interviewed the biogas users randomly. Apart from acceptance sample survey explained below section, the other questions asked by the verification team and the summary of reply received from the stakeholders are given below:

Questions asked by verification team	**Summary of Response by Stakeholders/end users**
Is the biogas system in operating conduction?	All end users confirmed the biogas system in operating condition now.
How many cattle you have?	Verification team received varied responses from each household based on the actual data
Are you aware that the project claims emission reduction and the ownership of the ERs are with ACCION FRATERNA?	All the end users aware that the all the rights of emission reduction are with ACCION FRATERNA as the bio digester was constructed by ACCION FRATERNA at free of cost. They also confirmed about the agreement signed with ACCION FRATERNA for giving away the emission reduction rights to ACCION FRATERNA.
Is there any repairs done to your digester or stove?	Few households confirmed that some minor repairs are done during monitoring period.
If you have any issue with the device/project, you contact whom?	All households confirmed that they have the contact number of the respective Area supervisor of ACCION FRATERNA and for any requirement they can contact the Area Supervisor
Is indoor smoke reduced due to the use of biogas unit?	All the households confirmed reduction in the indoor smoke and thereby reduction in health issues ie, eye related issues, respiratory issues.
Is cooking time reduced due to use of biogas unit?	All the households confirmed reduction in cooking time.
Are you trained by the ACCION FRATERNA team?	All households confirmed they have been received training from ACCION FRATERNA
What are the other benefits of biogas unit?	The summary of the other benefits mentioned by households are: • Easy cooking • Reduction in fuelwood collection time & cooking time • Clean home • Clean vessel • Better lifestyle
Do you have any issue with the project?	No households mentioned any issues with the project.

D.4. Sampling approach

During the on-site verification a sampling approach has been used by the verification team to verify the reported values for the monitored parameters as listed in section D.2 of the MR which are determined through sample survey by PP.

For the determination of DOE‟s acceptance sample size, verification team assumed the following factors:

- Acceptable quality level (AQL) or the Level of Assurance- 1.0% (i.e. the proportion of discrepancies between the project participants‟ sample records and the DOE sample that are acceptable up to 1.0%

- limit)
- Unacceptable Quality Level (UQL) – 20% (i.e., the proportion of discrepancies between the project participants‟ sample records and DOE sample records that are unacceptable above 20% limit)
- Producer risk -5% (i.e., there is 5% chance that the DOE will wrongly reject the project participants‟ records of acceptable quality)
- Consumer risk -5% (i.e., there is 5% chance that the DOE will wrongly accept the project participants‟ records of records of unacceptable quality)

Verification team has determined acceptance sample size for all the sample survey parameters based on the standard "Sampling and surveys for CDM project activities and programmes of activities" version 9. From the above assumed factors, the verification team determined the minimum sample size (n) as 22 and acceptance number © as 1. The same is intimated to PP prior to the site visit. The actual number of sample size where the acceptance survey was done given below:

Parameters	Total Population	PP's sample size	Acceptance sample size	Acceptance Number	Sampling method used
Confirmation that non-renewable biomass has been substituted.	3551	50	22	1	simple random sample

During site visit, verification team visited the selected sample households and interviewed the biogas plant user to check the data reported by PP. The result of the survey is given below:

Parameters	DOE Sample size	No of PP's record beyond unacceptable level	Accepted / Rejected
Confirmation that non-renewable biomass has been substituted.	22	0	Accepted

Verification team finds no error in the PP‟s survey records. Hence verification team accepts all the data determined through sample survey by PP

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	1	-
Compliance of the project implementation and operation with the registered PDD	1	5	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	1	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals		1	
Assessment of reported sustainable development co-benefits	-	-	-
Stakeholder Inputs & Legal Dispute	-	-	-
Others (please specify)	1	4	-
Total	2	12	

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The project is registered under GS4GG, and PP used GS monitoring report template, version 1.1. All the sections of the form were filled as per the GS4GG guidelines and gave all the relevant details.
Findings	No findings
Conclusion	Monitoring report was found to be completed and using the valid version i.e. version 1.1 of the GS MR, hence the monitoring report is complying with the monitoring report form.

E.2. Remaining forward action requests from validation and/or previous verifications

This is 5th verification of the project activity. Verification team checked the following reports for any pending issues from previous verification or GS4GG transition:

- Verification report of 4th Monitoring period/3/
- GS issuance review report of 4th Monitoring period/4/
- GS4GG Transition review report/5/

From the verification of the above-mentioned documents, it is found there is no forward action request (FAR) raised from previous verification or GS4GG transition. However, one Forward Action Requests (FAR) has been raised during the performance review of Renewable Crediting Period (RCP) and this FAR documented in Appendix 4, Table 1, under the category of Remaining Forward Action Requests from validation and/or previous verifications.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	The verification team determined the conformity of the actual project activity and its operation with the validated project design document. Verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed GS CDM project activity proposed in the registered PDD/3/ are in place, and that the project participants have operated the GS CDM project activity as per the registered PDD/3/. The verification team has checked the information in the monitoring report and compared against the registered PDD. During the onsite inspection, the verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the registered PDD. Interviews with operational personnel and households and random samplings have been carried out.
Findings	CAR 04,07,08,09 and 11 were raised and closed.
Conclusion	The verification team has reviewed the biogas units commissioning records, application forms, end user agreements/11/ and non-working & repair log records/12/. The verification team has observed at the site that all physical locations of the biogas units on sample basis and found that the details are correctly matching with the monitoring report and monitoring records maintained by PP. The type of the biogas provided and the locations are consistent with the revised PDD. Thus, the verification team has concluded that the project activity was implemented and operated as per registered PDD. The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the registered PDD and that all physical features of the project are in place.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1]

No temporary deviation from the registered monitoring plan is sought in this verification.

E.4.2. Corrections

No correction is sought in this verification.

E.4.3. Changes to the start date of the crediting period

There has been a change in the start date of crediting period. The start date of the crediting period was changed from 01 Jun 2012 - 31 May 2019 to 31 May 2014 - 30 May 2021. This is due to the fact that there was a delay in the start of the project activity.

E.4.4. Inclusion of a monitoring plan

Monitoring plan was already included in the approved PDD. Hence, not applicable.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

No permanent changes or deviation in the registered monitoring plan is sought

E.4.6. Changes to the project design

During the previously submitted Monitoring Report, there was a change to the project design of registered project activity with regard to addition of multiple sites. This change to the project design of the project activity was approved with the previous monitoring report vide. Version 08 of the PDD dated 21/06/2017

E.4.7. Changes specific to afforestation and reforestation project activities

Not applicable

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	The verification team checked compliance of project monitoring plan with the applied methodology (AMS I.E, version 11) and including applicable tools.
Findings	No findings
Conclusion	All parameters stated in the monitoring plan and the applied methodology has been fulfilled in the current monitoring report. All baseline emission parameters have been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further sections of this report. The monitoring plan as mentioned in the registered PDD is in accordance with the applied methodology. In the opinion of the verification team the monitoring report complies with the requirement of the registered PDD and applied methodologies in the context of the project activity.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	The verification team has checked the ex-ante parameters and data stated in Section D.1 of MR and compared with section B.6.2 of the registered PDD whether all parameters fixed ex-ante for the crediting period have been applied correctly.

[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).

	<table><tr><td>**Ex-ante Parameter**</td><td>**Value**</td><td>**Consistent with the PDD/3/ & the source mentioned in it**</td></tr><tr><td>**Rating Biogas**</td><td>1.78</td><td>Yes</td></tr><tr><td>B_y</td><td>2.82 tonnes/year/family</td><td>Yes</td></tr><tr><td>$f_{NRB, y}$</td><td>73.7%</td><td>Yes</td></tr><tr><td>$NCV_{biomass}$</td><td>0.0156 TJ/tonne</td><td>Yes</td></tr><tr><td>$EF_{projected\_fossilfuel}$</td><td>64.4 tCO_2/TJ</td><td>Yes</td></tr><tr><td>**Diversion of non-renewable biomass saved under the project activity by non-project households**</td><td>0.95* B_y</td><td>Yes</td></tr></table>
Findings	No finding
Conclusion	The values of ex ante fixed parameters have been verified from the revised PDD/3/. Same has been crosschecked with the source mentioned in the PDD and found to be consistent. The verification team confirms that the values used/applied are correct and justified. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.

E.6.2. Data and parameters monitored

Means of verification	The verification team has determined whether the approved monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the approved monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the revised PDD. During the verification all monitoring parameters listed in Section D.2 of MR were compared with section B.7.1 of the revised PDD have been verified with regard to the: (i) appropriateness of the applied measurement / determination method, (ii) the correctness of the values applied for ER calculation, (iii) the accuracy, and applied QA/QC measures. The monitored values are assessed as follows: **Biogas Units Constructed** (Number of biogas units constructed): This parameter is monitored as and when a digester is commissioned/started producing gas and the same is entered into the monitoring database. The reported data is cross checked with the online monitoring solution/7/ maintained in AF Ecology Centre' during audit. The value reported in the monitoring report (ie, 3351) is found to be correct. **Number of biogas plants operating** (Number of plants operating in year (t)): PP will repair the plants as and when an issue is found by staff or reported by end user. So, PP continuously monitors the non-working days when the unit is not operational. The emission reduction will be adjusted based on the non-operational days. Hence, the number of biogas plants operating is monitored as 88.72% of 2973 units. The values were cross verified with Log book records/9/, digitized monitoring database/7/ during audit by the verification team. Hence, the value reported for this parameter is correct. **Confirmation that non-renewable biomass of B_y has been substituted**

	(Confirmation that non-renewable biomass has been substituted): This parameter was monitored through stratified random sample survey. PP has conducted survey during the year 2021 and 2022 (31 may 2021 – 31 Dec 2022) of 50 households respectively selected randomly in each year/8/. As verified from the survey result/8/, all the sample households confirm that the bio digester usage substitute non-renewable biomass used in the baseline situation. All the survey sheets/8/ are verified and found that the data mentioned in the excel sheet is correct. During the audit, verification team has conducted acceptance sampling survey where verification team conducted survey in 22 households (randomly selected from PP's sample population) through telephone. All the data collected are consistent with PP's record/8/. No error found. Hence, the verification team confirms that the non-renewable biomass of B_y has been substituted by the project activity. **Non-usage days of biogas plants** (Usage of non-renewable biomass in case of non-performance of biogas units): Non-usage days of biogas plants are monitored daily. When the biogas unit is not working, the beneficiaries report to the village level volunteer, who in turn reports to the biogas field of the project for the repair of the unit. The date when the plant stopped working and the date when the issue is fixed are noted down in the village level breakdown log book/9/ by the staffs/volunteers and the same will be entered into monitoring solutions/7/. During lockdown imposed due to the pandemic, at the village level, the village level volunteers repaired the units with minor problems. Major problems that required repairs by masons were attended to after the lockdown and was safe to visit the villages. The breakdown log was updated after the lockdown period. This approach is found to be acceptable. Verification team checked all the breakdown log records/9/ and data in the monitoring solution/7/. The entire breakdown data reported in the ER sheet/2/ was checked and found to be ok. Verification team confirms the data reported in the MR (ie, 2,73,390 biogas days) non-usage days is found to be correct.
Findings	CAR 06 has been raised and closed.
Conclusion	Corresponding to the VVS V02/6/, the team confirm that the monitoring has been carried out in accordance with the revised PDD/3/ The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in revised PDD/3/. The monitored data for the parameters has been verified by checking the procedure for information flow and found to be complete and consistent.

E.6.2.1. Implementation of sampling plan

Means of verification	The verification team checked whether the PP has applied a sampling approach to determine the monitored values. The only parameter that is determined though sampling is 'Confirmation that non-renewable biomass has been substituted'. It is observed that this parameter is not used for emission reduction calculation and just used for qualitative purposes. PP has selected stratified sampling approach and considered each mandals as one stratum. Since the project is installed only in rural households there is no considerable difference in the economic status and cooking habits of households is expected. However, for better representation of the Mandals, PP has considered each mandals as stratum and conducted survey. This is found to be appropriate. The parameter has no bearing on emission reduction calculations. Since the parameter of interest is the proportion parameter PP has estimated the sample size based on 90/10 confidence / precision level is calculated as per the below formula: $n = \frac{1.96^2 NV}{(N-1) \times 0.1^2 + 1.96^2 V}$

Where,

$$V = \left(\frac{SD}{mean}\right)^2$$

n	=	Sample size
N	=	Total number of households (At the time of survey)
Mean	=	Expected mean
SD	=	Expected standard deviation
1.645	=	Represents 90% confidence required
0.1	=	Represents 10% relative precision

Hence the number of samples needed is 39. Based on survey of non-renewable biomass conducted, zero HHs need to be sampled. Hence the largest of the households to be sampled is 39.

Since the survey is conducted in the households where biogas units are in operational, the expected proportion of the parameter for “Confirmation that non- renewable biomass has been substituted” for each the stratum is 1. Moreover the previous monitoring period survey result also confirms the same. Hence, the sample size required at 90/10 confidence / precision level is estimated to be 0. However, as per the sampling standard, the sample size should be 22. However, PP considered sample size of 50 for (31 May 2021 – 31 Dec 2022) survey.

I) The sample size was determined for “Confirmation that non-renewable biomass has been substituted” as follows:

$$n \geq \frac{1.96^2 N \times p(p-1)(N-1)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 p(p-1)}$$

Where,

n = sample size
N = Total number of households
p = expected proportions
1.96 = Represents the 95% confidence required
0.1 = Represents the 10% relative precision
Checking Reliability
Precision associated with proportion is z-value x standard error of the proportion.

Where,

z-value is 1.96
The standard error of proportion is calculated as $\sqrt{(1-f)\frac{pq}{n}}$

p is the sample proportion and q = (1-p)
f is the sample fraction
n is total population

The ratio of precision to the proportion gives the relative precision, which needs to be within 10%

Parameter	Sample size (based on expected proportion of HH NRB substituted)	Actual sample size considered for survey/1/	Is sample size adequate?
Confirmation that non-renewable biomass has been substituted.	<30	50	Yes

The sample size calculation provided in the ER calculation sheet/2/ is verified and found to be correct. The chosen minimum sample size seems to be acceptable and conservative. Moreover PP has considered more sample than required.

Verification team checked calculation and found that the sample size is correctly distributed all stratum.

Verification team checked the PP’s survey results. From the verification of the survey results itbis observed that in all the households confirms substitution of non-renewable biomass. Hence, the achieved precision is estimated as below :

The sample size calculation provided in the ER calculation sheet/2/ is verified and found to be correct. The chosen minimum sample size seems to be acceptable and conservative. Moreover, PP has considered more sample than required.

Sample survey	**Achieved precision/2/**	**Is less achievevd precision is </= 10%**
2021(May-Dec) 2021(Jan-Dec)	0%	Yes

Since all the sampled households confirms substitution of non-renewable biomass in all the surveys, the achieved precision level is 0% which a within the required precision level of 10%. Hence, the verification team confirms that the sample sizes considered by PP are adequate.

Verification team has conducted acceptance sampling to verify the parameter monitored through sampling. The verification team calculated the minimum sample size (n) as 22 and acceptance number (c) as 1. Verification team has done survey in randomly in 22 numbers of households (selected from the PP’s sample population) though telephone and verified the PP’s survey data. However, it shall be noted that these parameters are not used for the emission reduction calculation.

Findings	No findings
Conclusion	Verification team concludes the following: • The sample size required is calculated as per the requirements of the standard ‘Sampling and surveys for CDM project activities and programmes of activities’ v9 and guidance ‘Sampling and surveys for CDM project activities and programmes of activities’ v4. • The sample size considered for the parameter (which is monitored through sampling basis) is found to be adequate. • PP’s sample population was selected in all the mandals proportionally based on the number units installed in the respective mandals. • The sampling plan is implemented seems to be appropriate. • Through acceptance sampling, the verification team confirmed that all the data collected by PP through sample survey are correct. .

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Not applicable as no monitoring equipment is involved.
Findings	NA

Conclusion	NA

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	As per the methodology the emission reduction is directly calculated. Baseline & Project emissions are not calculated separately. The verification team has checked whether calculations of baseline GHG emissions calculation have been carried out in accordance with the formulae and methods described in the registered monitoring plan. In detail the following has been verified: <u>Transparency:</u> It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. <u>Parameter consistency:</u> It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. <u>Correctness</u>: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology. <u>Completeness:</u> It has been checked whether all calculations are complete and without omissions The equations applied for the determination of GHG emissions reduction is consistent with the registered PDD and applied methodology: The emission reduction is calculated using the formula: $ER_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel}$ Emission reduction is adjusted with 0.95 factor for leakage (Considering 5% leakage) as per the latest version of methodology AMS I.E, version 11 PP has submitted the emission reduction calculation in the excel sheet/2/. The calculation in the excel sheet is checked whether the calculate is in accordance with the formula given in the approved PDD/3/ and the selected methodology/4/.
Findings	CAR 03 was raised and closed successfully.
Conclusion	The verification team confirms the following: • The calculations of baseline GHG emissions have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology. • The emission factor applied is an ex-ante value valid for the fixed crediting period. • Any assumptions used in emission or removal calculations have been justified. • Appropriate emission factor and other reference values have been correctly applied. It can be confirmed that the emission reduction calculation is correct. • The ER calculation sheet/2/ provided is clear, transparent and the calculations provided in the sheet are reproducible. • Hence, the emission reduction reported in the monitoring report/1/ for the monitoring period (ie, 9554 tCO_2e without leakage adjustment and 9077 tCO_2e with leakage adjustment) is verified to be correct.

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	Not applicable as the emission reduction is directly calculated. No project emission is calculated. This is as per the registered PDD & selected methodology.
Findings	No finding
Conclusion	NA

E.8.3. Calculation of leakage GHG emissions

Means of verification	PP has considered 5% leakage as per the latest version of the methodology (AMS I.E). As per the latest version, if PP apply 5% leakage (ie, using the adjustment factor of 0.95) then monitoring of the same is not necessary. Hence, verification team accepts the usage of adjustment factor of 0.95.
Findings	No findings
Conclusion	The PP has applied 0.95 leakage adjustment factor in emission reduction which is acceptable considering the provision in the latest version of the methodology (AMS I.E). Verification team has accepted the same. The leakage estimated in the MR (ie.,477 tCO2e) is found to be correct.

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	MR demonstrate the summary of GHG emission reductions for the monitoring period and calculated according to the applied methodologies as follows: $ER_y = BE_y - PE_y - L_y$ *Where* *ERy* - Emission reduction for total project activity in year y (tCO_2e/yr) $BE_{p,y}$ - Baseline emissions for baseline scenario b in year y tCO_2e/yr) PE_y - Project emissions for project scenario p in year y (tCO_2e/yr) L_y - Leakage for project scenario p in year y (tCO_2e/yr) The ER calculation sheet and monitoring report is verified to check the calculation.
Findings	No findings.
Conclusion	The verification team confirms the following: • The emission reduction is calculated as per the revised PDD and the applied methodology • The emission reduction value reported in the PDD is verified to be correct. • The summary of emission reduction are as below:

Vintage	$BE_{b,y}$ (tCO_2)	$PE_{b,y}$ (tCO_2)	LE_y (tCO_2)	ER* (tCO_2)
31/05/2021 – 31/12/2022	9554	0	477	9077
Total	9554	0	477	9077

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	The verification team has checked whether the MR includes a comparison of actual values of the monitoring period with the estimations in the revised PDD/3/. Section E.5 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the revised PDD
Findings	No finding
Conclusion	The estimated emission reduction as per PDD and the actual emission reduction achieved for the monitoring period are correctly reported in the section E.5 of MR. Since the actual ER is less that estimated ER, hence no justification is required.

Emission reduction estimated as per the revised PDD/3/	Actual emission reduction achieved as per Monitoring report/1/
47328 t CO_2e	9077 t CO_2e

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	The verification team has determined the VER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	No finding
Conclusion	The actual achieved emission reduction is less than the PDD estimation. Hence no justification is required.

E.9. Assessment of reported sustainable development co-benefits

Relevant SDG	**SDG 3: Good Health and Well Being**
Parameter description	i. Reduction in indoor air pollution due to reduction in use of traditional cook stoves. ii. Reduction in health issues due to better indoor air quality due to reduction in use of traditional cook stoves
Monitored Value	100% of the surveyed families.
Means of verification	The improvement in indoor air condition compared to baseline based on community perspective and Reduction in incidence of health problems i.e. eye irritation, respiratory problems, burns and wounds etc., due to better indoor air quality have been monitored though annual sample survey/7/. The sample survey sheets are verified and found that the data reported in MR is correct. It is also cross-verified through interview with end user during the audit.
Findings	CAR-11 is raised and closed satisfactorily
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.

Baseline Estimate	Project Estimate	Net Benefit
i. Use of traditional cookstove causing indoor smoke and health hazards in 3,351 households – 100% households. ii. 0% of HHs having clear indoor air	i. Reduction in indoor air pollution (100% of HHs) ii. Reduction in health issues due in 100% households to better indoor air quality	i. 100% reduction in indoor air pollution (100% of HHs) ii. 100% reduction in health issus

Relevant SDG	**SDG 5: Gender Equality**
Parameter description	Reduction in Hours for collection of woody biomass and cooking
Monitored Value	57% of time for cooking and 100% for fuelwood collection.
Means of verification	Sample survey and record the experience of women for reduction in time spent and other activities undertaken compared to baseline
Findings	No findings
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.

Baseline value	Project Value	Net Benefit

	Women spent time 579.04 hours/year for fetching, processing and storing fuelwood and 4.944 hours/days	0 timer spent for fetching, processing and storing fuelwood and 2.15.	100% reduction in time spent for fetching, processing and storing fuelwood.

Relevant SDG	**SDG 7: Affordable and Clean Energy**
Parameter description	i. Number of biogas units constructed for the rural communities thereby reducing the use of fuelwood. ii. % of biogas units working after repaired and maintenance for continuous use of biogas units making them operational.
Monitored Value	i. 3,351 units ii. 88.72% operational
Means of verification	i. and ii. The village level volunteers/biogas case workers collect data of the units constructed. Also, the units that that are non-operational and needs repairs are collected. This information is entered into the monitoring solution for the project. As and when the units are repaired, it is entered in the monitoring solution. This data provides information of the parameter.
Findings	No findings
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.

Baseline value	Project Value	Net Benefit
No Biogas Units	i. 3,351 units ii. 88.72% operational	i. 3,351 units ii. 88.72% operational

Relevant SDG	**SDG 8: Decent work and economic growth**
Parameter description	Number of permanent and temporary jobs created due to the project activity.
Monitored Value	

Jobs	Number	No. of Male	No. of Female
CDM Manager	1	1	
Desk Worker	1		1
Case Worker	5	5	
Volunteers	85	8	77
Total	92	14	78
% of Male and Female employees		15%	85%

Of these, 7 are permanent jobs, which includes the CDM Manager, Desk worker and the Case workers. The village level volunteers, 85 in number, are temporary jobs.

Means of verification	The value has been derived from the financial statements of the project
Findings	No findings
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct. **Baseline value** / **Project Value** / **Net Reduction**: No project related jobs created / 92 jobs created due to the project activity of which at least 85% are women; 7 permanent and 85 temporary jobs / 92 jobs created due to the project activity of which at least 85% are women; 7 permanent and 85 temporary jobs

Relevant SDG	**SDG 17: Partnerships for the Goals**
Parameter description	Access to domestic or international carbon funding to implement clean technologies
Monitored Value	100% is carbon revenue.
Means of verification	These details are taken from the PP's audited statement/10/. Verification team checked the audited statement via bank of 100% carbon revenue for construction and maintenance of units.
Findings	No findings
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct. **Baseline value** / **Project Value** / **Net Reduction**: No funding in the baseline scenario / 100% carbon revenue for construction and maintenance of units / 100% carbon revenue for construction and maintenance of units

E.10. Stakeholder Inputs & Legal Dispute

Means of verification	All the inputs from stakeholders are related to repair and maintenance of biogas system. PP attended all the cases and resolved the same. There were no grievances with regard to project implementation received during the current or previous monitoring period Verification team checked the complaints register and confirmed that all the cases are resolved by repairing stove, component and digesters. Verification team checked with Accion Fraterna whether any legal consent or dispute arise during the monitoring period and PPs also confirmed that there are such no legal contests or dispute that has arisen with the project during the monitoring period. Verification team also interviewed stakeholders and independently checked though Google to check any legal dispute ongoing with PP and found no such legal dispute is pending. PP also provided undertaking letter confirming that there is no legal consent or dispute arise during the monitoring period.
Findings	No finding
Conclusion	The verification team confirms the following: • The only grievances received from biogas users are related to repairs & maintenance of stoves. All the cases received during the monitoring period are attended and resolved during the monitoring period itself.

	• No other grievances received during the current or previous monitoring period • No legal consent or dispute raised during the monitoring period.

SECTION F. Internal quality control

The draft verification report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by 4KES are duly followed and the verification report/opinion is reached in an objective manner and complies with the applicable Gold Standard & CDM requirements.

The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team. The independent technical reviewer(s) may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before submit final report to Client/Gold Standard. The final approval decision is taken by the Head of the DOE/Director.

The final decision is authorized by the Director, 4KES, once the report is finalized by the Head of the DOE/DOE Manager.

SECTION G. Verification opinion

The verification team confirms that the the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification, the data submitted by PP was cross verified with the values mentioned in the emission reduction sheet/2/ and monitoring report/1/. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the monitoring plan as mentioned in the approved revised PDD/3/.

Evidences (Documents/interview/On site audit) referred for verification of individual monitoring parameter and fixed parameters are defined in section E.6 above. It is confirmed by the assessment team that the reported emission reductions have been conservatively calculated. A list of referred documents for verification is also included in Appendix 3 of this report.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 9077 tCO_2e emission reductions during period 31/05/2021 – 31/12/2022

SECTION H. Certification statement

4K Earth Science Private Limited has been contracted by 'ACCION FRATERNA ECOLOGY CENTRE' to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported and the contribution to sustainable development indicators from the GS Project activity "Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh" and CDM Ref # 3779 & GS Ref# GS980 for the monitoring period 31/05/2021 – 31/12/2022 (including both dates) in the GS Monitoring Report Version 01 (first version) dated. 31/03/2023.

The verification is based on the revised PDD and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Gold Standard requiments, Kyoto Protocol, Marrakech accord, as well as those defined by the GS Executive Board.

The management of the 'ACCION FRATERNA ECOLOGY CENTRE' is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions &monitoring of SDG parameters on the basis set out within the project Final GS Monitoring Report Version 03 dated 28/07/2023. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the 'ACCION FRATERNA ECOLOGY CENTRE'. The development and maintenance of records and reporting procedures are in accordance with the GS Monitoring Report Version 03.

In our opinion the GHG emissions reductions reported for the project activity are fairly stated in the GS Monitoring Report (final) Version 03, dated 28/07/2023. 4KES based on outcome of verification activities, certifies in writing that, during the monitoring period 31/05/2021 – 31/12/2022 (including both days), the registered CDM GS PA "Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra

Pradesh" in the registered GS CDM PA achieved the verified amount of 9077 tCO_2e reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the PA.

The Verified emission reduction during the monitoring period 31/05/2021 – 31/12/2022 (including both dates) is stated below:

Vintage	**Duration**	**Gold Standard verified emission reductions**
2021	31/05/2021 – 31/12/2021	3199
2022	01/01/2022 – 31/12/2022	5878
Total	31/05/2021 – 31/12/2022	9077

Appendix 1. Abbreviations

Abbreviations	Full texts
4KES	4K Earth Science Pvt. Ltd
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CH4	Methane
CL	Clarification Request
CO2e	Carbon dioxide equivalent
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
FCN	Fair Climate Network
GHGs	Greenhouse Gas(es)
GS	Gold Standard
GVC	Gram Vikas Committees
GVK	Gram Vikas Kosh
GWP	Global Warming Potential
HH	Household
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LE	Leakage Emissions
MR	Monitoring Report
MP	Monitoring Plan
NCV	Net Calorific Value
NGO	Non Governmental Organisation
PE	Project Emissions
PDD	Project Design Document
PS	Project Standard
PCIA	Partnership for Clean Indoor Air
PCP	Project Cycle Procedure
SD	Sustainable Development
SDG	Sustainable Development Goal
SHG	Self Help Group
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VER	Verified Emission Reduction
VVB	Validation and Verification Body
VVS	Validation & Verification Standard
WBT	Water Boiling Test

Appendix 2. Competence of team members and technical reviewers

Certificate of Competence						
Name	☒ Mr. ☐ Ms.	**Ma Paa Puratchikkanal**				
Qualification Procedure	*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:						
	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	15-07-2023					
Authorized to work as Technical Expert for:						
Authorized Technical Area	**Sectoral Scope**	**TA Code**	**Technical Area within the scope**			
	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation			
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables			
	Energy demand	3.1	Energy demand			
	Construction	6.1	Construction			
	Waste handling and disposal	13.1	Solid waste and wastewater			
	Waste handling and disposal	13.2	Manure			
	Agriculture	15.1	Agriculture			
Authorized to work as Local Expert for:						
Country/Countries	India, Sri Lanka					
Compliance check by: Anand S. R.						

Certificate of Competence						
Name	☒ Mr. ☐ Ms.	**Anand S R**				
Qualification Procedure	*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:						
	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	Yes	Yes	No	No	No
Appointed Date	15-07-202023					
Authorized to work as Technical Expert for:						
Authorized Technical Area	**Sectoral Scope**	**TA Code**	**Technical Area within the scope**			
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables			
	Waste handling and disposal	13.1				
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Swati S Acharya						

Certificate of Competence						
Name	☒ Mr. ☐ Ms.	**Ganesh Jithamanyu D V**				
Qualification Procedure	*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:						
	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	No	Yes	No	No	No
Appointed Date	15-07-2023					
Authorized to work as Technical Expert for:						
Authorized Technical Area	**Sectoral Scope**	**TA Code**	**Technical Area within the scope**			
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables			
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Anand S. R.						

Certificate of Competence						
Name	☒ Mr. ☐ Ms.	**Chetan Swaroop Sharma**				
Qualification Procedure	*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:						
	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	Yes	Yes	Yes	Yes	Yes
Appointed Date	15-07-2023					
Authorized to work as Technical Expert for:						
Authorized Technical Area	**Sectoral Scope**	**TA Code**	**Technical Area within the scope**			
	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation			
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables			
	Energy distribution	2.1	Energy distribution			
	Energy demand	3.1	Energy demand			
	Waste handling and disposal	13.1	Solid waste and wastewater			
	Waste handling and disposal	13.2	Manure			
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Anand S. R.						

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP	Monitoring Report	Version 01, dated 31/03/2023	PP
	PP	Monitoring Report	Version 03, dated 28/07/2023	PP
2	PP	VER Calculation Sheet	Version 01	PP
3	Carbon Check	3nd verification report	Revision 2, dated 21/02/2023	Publicly available
4	UNFCCC	AMS I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User	Version 04	Publicly available
5	Gold Standard	GS4GG Transition Review		PP
6	UNFCCC	CDM Validation and Verification Standard	Version 04	Publicly available
7	AF Ecology centre	Biogas basic record set: -Biogas application form -End user agreement for VER ownership -Completion certificate -Online monitoring solution	-	AF Ecology centre
8	AF Ecology centre	Sample survey monitoring sheets for the year 2021(Jan-May)	-	AF Ecology centre
9	AF Ecology centre	Village level plant breakdown log sheets maintained by village level volunteers	-	AF Ecology centre
10	AF Ecology centre	General Ledger	-	AF Ecology centre
11	AF Ecology centre	End user Agreement ER sheet	-	AF Ecology centre
12	AF Ecology centre	ER sheet	-	AF Ecology centre

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

Table 1: Remaining forward action requests from validation and/or previous verifications

FAR ID	01	Section no.	Previous Performance review	Date: 18/12/2023
Description of FAR				
For the next verification, the VVB shall ensure that the interviews/ direct interaction shall be conducted from the PP's sample size.				
Project participant response				**Date:**
NA				
Documentation provided by project participant				
DOE assessment				**Date:** 20/12/2023
The verification team has conducted interviews and engaged in direct interactions based on the sample size provided by the Project Proponents (PP)				

Table 2. CL from this Verification

CL ID	**01**	**Section no.**		**Date: 11/07/2023**
Description of CL				
PP is to provide the proof or supporting documents for verification process for the following, ➢ *Sustainable Development Goals (SDG) claims* ➢ *Latest Kitchen Performance Test (KPT).* ➢ *Jobs created due to the project activity.* ➢ *Carbon funding.* ➢ *End user agreement.* ➢ *ERPA (Emission Reduction Purchase Agreement).*				
Project participant response				**Date:**
The following documents are enclosed • *The pathogen report is included in Annex 1 of the Monitoring Report* • *The minutes of the report is enclosed* • *The kitchen performance test is provided.* • *The list of volunteers and enclosed* • *The ERPA showing the carbon finance* *The end user agreements*				
Documentation provided by project participant				
• *The minutes of the report is enclosed* • *The kitchen performance test is provided.* • *The list of volunteers and enclosed* • *The ERPA showing the carbon finance* • *The end user agreements*				
DOE assessment				**Date: 21/07/2023**
Pathogen report is not included. And the image provide in Annex 1 is not clear provide clear image. Kindly provide and send the updated MR. *Hence CL 01 is open.*				
Project participant response				**Date:**
The PDD does not include Pathogen report for SDG parameter in CP2. There is also no Annex-1 in the MR.				
Documentation provided by project participant				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CL 01 is closed.				

CL ID	**02**	**Section no.**	C	**Date: 11/07/2023**
Description of CL				
How day to day basis non-operational days is recorded. Does the staff visit every day to biogas unit? PP need to clarify.				
Project participant response				**Date:**
The non-operational days are recorded by the village level volunteers. The volunteers visit the households at least monthly once to check on the units. Also in case of any repairs or maintenance, the end user calls the village level volunteer. The date of the issue reported or found through field visit is noted down and entered into the online monitoring solution. As and when it is repaired, it is again entered into the monitoring solution. These days are recorded as non-operational days. This is also included in the revised monitoring report.				
Documentation provided by project participant				
Revised Monitoring Report				
DOE assessment				**Date: 01/08/2023**

The above mentioned have been verified and found ok. Hence CL 02 is closed.

Table 3. CAR from this verification

CAR ID	**01**	**Section no.**	ER Sheet	**Date: 11/07/2023**
Description of CAR				
The monitoring period number which is mentioned in ER sheet is inconsistent with the key project information of the PDD. Please rectify..				
Project participant response				**Date:**
This is the fifth monitoring report. This is updated in the revised ER Calculation sheet.				
Documentation provided by project participant				
Revised Monitoring Report				
DOE assessment				**Date: 21/07/2023**
The above mentioned have been verified and found ok. Hence CAR 01 is closed.				

CAR ID	**02**	**Section no.**	D.2	**Date: 11/07/2023**
Description of CAR				
In section D.2, under ***Number of biogas plants operating*** *table, the number of units constructed mentioned in Measurement methods and procedure is inconsistent with the Key Project Information. PP is to rectify.*				
Project participant response				**Date:**
It is a typo error. The number of biogas units constructed is 3,351. This is corrected throughout the monitoring report.				
Documentation provided by project participant				
Revised Monitoring Report				
DOE assessment				**Date: 21/07/2023**
The above mentioned have been verified and found ok. Hence CAR 02 is closed.				

CAR ID	**03**	**Section no.**	E.5.1	**Date: 11/07/2023**
Description of CAR				
In this section, the explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period is given for Jan 2021 – May 2021. This monitoring period is 31 may 2021 – 31/12/2022. Please rectify.				
Project participant response				**Date:**
The monitoring period is corrected in the revised monitoring report.				
Documentation provided by project participant				
Revised monitoring period				
DOE assessment				**Date: 21/07/2023**
The above mentioned have been verified and found ok. Hence CAR 03 is closed.				

CAR ID	**04**	**Section no.**	B.1	**Date: 11/07/2023**
Description of CAR				
1. PP needs to provide the copies of the data records which used to record repair and maintenance details as mentioned in MR. *2. PP needs to provide the complete details of the demolished units, sold cattle, etc (not functional at all) in the MR.*				

Project participant response	**Date:**
1. The data records are provided as excel sheet – breakdown log, which includes the repair and maintenance details 2. The excel sheet - breakdown log has all the details of the units with their problems, date of the issue found and repaired if so.	
Documentation provided by project participant	
DOE assessment	**Date: 21/07/2023**
The above mentioned have been verified and found ok. Hence CAR 04 is closed.	

CAR ID	**05**	**Section no.**	Excel Sheet	**Date : 11/07/2023**
Description of CAR				
In Breakdown Log excel sheet, K column has the number of units yet to be fixed. PP need to clearly mention how this number has arrived and also does this number include all problems reported in breakdown load sheet?				
Project participant response				**Date :**
As and when the units are repaired, the date of repair is entered into the monitoring solution. Until fixed, these are not accounted for emission reduction calculations from the date of problem was detected. The number of units not yet fixed is the number of units non-operational. This includes all the units reported with the problems as provided.				
Documentation provided by project participant				
DOE assessment				**Date: 21/07/2023**
The above mentioned have been verified and found ok. Hence CAR 05 is closed.				

CAR ID	**06**	**Section no.**	KPI and MR document	**Date: 21/07/2023**
Description of CAR				
1. PP need to submit the PDD, version 8, dated 14/12/2021 2. PP need to submit the final GS review document related to CP renewal for VVB				
Project participant response				**Date:**
Documentation provided by project participant				
The PDD version 8 is submitted The final GS review document related to CP renewal is also submitted				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CAR 06 is closed.				

CAR ID	**07**	**Section no.**	Table 1	**Date: 21/07/2023**
Description of CAR				
PP needs to mention the units of each parameter in the table 1.				
Project participant response				**Date:**
The units are mentioned in the revised Monitoring Report				
Documentation provided by project participant				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CAR 07 is closed.				

CAR ID	**08**	**Section no.**	A.1	**Date: 21/07/2023**
Description of CAR				
PP need to mention about the details on crediting renewal of the project in the section for proper understanding.				
Project participant response				**Date:**

The details of the crediting renewal of the project is included in the revised monitoring report.				
Documentation provided by project participant				
Revised Monitoring Report				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CAR 08 is closed.				

CAR ID	**09**	**Section no.**	A.2	**Date: 21/07/2023**
Description of CAR				
Host country map: Andhra Pradesh state map is not correct. Please rectify.				
Project participant response				**Date:**
The host country map with Andhra Pradesh state is revised.				
Documentation provided by project participant				
Revised Monitoring Report				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CAR 09 is closed.				

CAR ID	**10**	**Section no.**	Excel Sheet	**Date: 21/07/2023**
Description of CAR				
ER Excel workbook, end user sheet, cell M has improper date. *Please rectify.*				
Project participant response				**Date:**
The date is corrected in the excel sheet – ER Calculations sheet of end user sheet.				
Documentation provided by project participant				
Revised ER Calculations sheet.				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CAR 10 is closed.				

CAR ID	**11**	**Section no.**	D.4	**Date: 21/07/2023**
Description of CAR				
Details of the pilot survey results along with calculations need to be mentioned in the MR document. Also how many hhs surveyed and how the precision has been achieved need to be mentioned in the MR.				
Project participant response				**Date:**
Details of pilot survey results and calculations are included in the MR.				
Documentation provided by project participant				
DOE assessment				**Date: 01/08/2023**
The above mentioned have been verified and found ok. Hence CAR 11 is closed.				

CAR ID	**12**	**Section no.**	D.2	**Date: 21/07/2023**
Description of CAR				
1. PP need to submit report or data of sampling conducted for the for the monitored parameter "Confirmation that non-renewable biomass has been substituted". *2. $BC_{PJ,HH,y}$ PP need to provide the details of survey conducted for parallel use of pre project devices. Since many of the biogas units are either demolished or not function due to repair, households use traditional stoves to meet their energy requirement. However PP says, "0" used in parallel use of traditional stoves. PP need to provide proper justification to this parameter with proper evidence.*				
Project participant response				**Date:**
1. the parallel use of fuelwood along with biogas is zero, But those units which are not working the fuelwood use is considered as $BC_{PJ,HH,y}$, So the days since not working to the date of repair, for the non-use of biogas, fuelwood use is considered. This accounts for 0.30 t/HH/yr and 0.33 t/HH/yr for 2021 and 2022. This is included in the revised monitoring period.				
Documentation provided by project participant				
Revised monitoring period.				
DOE assessment				**Date: 01/08/2023**

The above mentioned have been verified and found ok. Hence CAR 12 is closed.

Table 4. FAR from this Verification

FAR ID	NA	**Section no.**		**Date :**
Description of FAR				
Project participant response				**Date :**
Documentation provided by project participant				
DOE assessment				**Date:**