

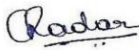


**Verification and certification report form for
GS CDM project activities**

(Version 04.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and GS reference number of the project activity	Bagepalli CDM Biogas Programme GS Ref No: GS410 CDM Ref No: 0121
Scale of the project activity	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
Version number of the verification and certification report	3.0
Completion date of the verification and certification report	08/11/2023
Monitoring period number and duration of this monitoring period	Monitoring period no: 8 Duration: 01/09/2020 to 31/08/2021 (Inclusive of both days)
Version number of the monitoring report to which this report applies	2.0
Crediting period of the project activity corresponding to this monitoring period	01/09/2020 - 31/08/2021 (Second Crediting Period)
Project participants	Agricultural Development and Training Society (ADATS) – India (Host)
Host Party	India
Applied methodologies and standardized baselines	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User” ver.10.1
Mandatory sectoral scopes	Sectoral Scope 1
Conditional sectoral scopes, if applicable	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	13,519 tCO ₂ e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	6,671 tCO ₂ e
Name of the VVB	4K Earth Science Private Limited
Name, position and signature of the approver of the verification and certification report	 Chandrakala R Managing Director



SECTION A. Executive summary

4K Earth Science Private Limited (4KES) has been commissioned by “Fair Climate Network” to perform an independent verification of its registered GS CDM project “Bagepalli CDM Biogas Programme”, GS Ref # GS410 and CDM Ref # 0121 for the reported GHG emission reductions for the given monitoring period 01/09/2020 - 31/08/2021 (both dates included). The GS 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 CDM PDD & GS PDD
- (b) The approved methodology mentioned in the GS PDD
- (c) GS4GG Transition 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 Gold Standard for Global Goals requirements 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:

The project activity is the installation of biogas plants (digesters) of 2 m³ capacity each for single households in 5 Taluks of Chickballapur District, Karnataka, India. The biogas units is fed by cattle dung generated from the households. The biogas stoves replace the traditional fire wood stoves used for cooking and heating purposes.

In baseline situation, households used traditional fire wood stove which is inefficient. In the project situation the biogas stoves are used for cooking and hence completely avoiding the usage of traditional stoves which results in savings in non-renewable biomass. Thereby, it avoids the related CO₂ emission from the avoidance of non-renewable biomass in cooking. The PP planned to install 5,500 biogas units of 2 m³ capacity each for single households out of which 5,485 units were commissioned at the end of this monitoring period

Methodology:

4KES follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of GS/CDM Accreditation Standard. Subsequently, after the contract is signed, the Gold Standard Verification work plan of the project activity is made available at Gold Standard registry in accordance with Gold Standard rules.

A desk review of the project documentation is undertaken, which is followed by an onsite audit and interviews by the members of verification team in accordance with the latest version of GS/CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and latest version of GS/CDM VVS, to capture the assessment of applicable CDM & GS requirements viz., latest version of GS/CDM Project Standard, applicable GS4GG guidelines, registered CDM PDD & GS-PDD, GS Passport 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
Onsite Audit	15/05/2023-16/05/2023
Draft Verification Report	02/08/2023
Final Verification Report	08/11/2023

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 (1.1 & 13.2)	IR	Puratchikkanal	Ma Paa	Central Office	x	x	x	x
2.	Team Leader TA (13.2)	IR	S R	Anand	Central Office	x	x	x	x
2	Team member	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 (1.1 & 13.2)	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.	Transfer of data from sampling survey sheet to excel ER spreadsheet	Low	Possible human error during transfer of data to ER spreadsheets and MR	Thorough cross-check required on the transfer of data to the ER spreadsheet and MR.
2	Wrong data collection/misinterpretation of household situation	Low	It's not complicated monitoring process. Appropriate trainings are conducted for the monitoring personnel.	By means of interview with sample number of households.
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 VVS for PA, version 03 /12/

Prescribed range of ERs/annum	500,000+	300,000+ to 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	6,697tCO ₂ e	6,671tCO ₂ e
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	Within Threshold

Biogas Units Constructed	Complete data check	No error identified	NA	Yes
Number of biogas plants operating	Complete data check	No error identified	NA	Yes
Confirmation that non-renewable biomass has been substituted	Acceptance sampling	No error identified	NA	Yes
Non-usage of biogas plants	Complete data check	No error identified	NA	Yes

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.

D.2. On-site inspection

Duration of on-site inspection: 15/05/2023				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting, Office Inspection, Verification of monitoring records, interviews and database inspection	ADATS OFFICE	15/05/2023	M.P.Kanal Anand S R Ganesh Jithamanyu D V
2	Visit to sampled of households	VILLAGES	15/05/2023- 16/05/2023	M.P.Kanal Anand S R Ganesh Jithamanyu D V
3	Closing meeting	ADATS OFFICE	16/05/2023	M.P.Kanal Anand S R Ganesh Jithamanyu D V

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Esteves	Ram	ADATS	15/05/2023 - 16/05/2023	<ul style="list-style-type: none"> - 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 - 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 	M.P.Kanal Anand S R Ganesh Jithamanyu D V
2.	Esteves	Mario	ADATS	15/05/2023 - 16/05/2023		
3.		Narasimhappa	ADATS	15/05/2023 - 16/05/2023		
4.	Esteves	Waheed	ADATS	15/05/2023 - 16/05/2023		
5.		Deepa	Desk Worker	15/05/2023 - 16/05/2023		
6.	Padmanaba	Sudha	FCN	15/05/2023 - 16/05/2023		
Beneficiary Name						
No	Last Name	First Name	Unit No.	Date	Subject	Team Member
1	Reddy	Nanja	6370	15/05/2023 - 16/05/2023	<ul style="list-style-type: none"> - Awareness about ownership of CERs - Working condition of bio-digester unit - SD parameters verification 	M.P.Kanal Anand S R Ganesh Jithamanyu D V
2.	-	Ademma	7084	15/05/2023 - 16/05/2023		
3.	-	Marakka	1992	15/05/2023 - 16/05/2023		
4.	-	Narayanamma	8698	15/05/2023 - 16/05/2023		
5.	-	Venkatadasanna	7964	15/05/2023 - 16/05/2023		
6.	Reddy	Narasimha	4028	15/05/2023		

				- 16/05/2023		
7.	-	Anjappa	4029	15/05/2023 - 16/05/2023		
8.	-	Narasamma	4041	15/05/2023 - 16/05/2023		
9.	-	Gangulappa	8216	15/05/2023 - 16/05/2023		
10.	-	Eashwara Reddy	5587	15/05/2023 - 16/05/2023		
11	-	Krishna Reddy	8385	15/05/2023 - 16/05/2023		
12.		Laxmidevamma	4284	15/05/2023 - 16/05/2023		
13.	Reddy	G. Venkata	70	15/05/2023 - 16/05/2023		
14.	-	Narayanappa	5526	15/05/2023 - 16/05/2023		
15.	B V	Krishnappa	2306	15/05/2023 - 16/05/2023		
16.	-	Laxminarasamma	3868	15/05/2023 - 16/05/2023		
17.		Naramma	6786	15/05/2023 - 16/05/2023		
18.	-	Venkataramappa	133	15/05/2023 - 16/05/2023		
19.	-	Laxmidevamma	203	15/05/2023 - 16/05/2023		
20.	-	Jayappa	4777	15/05/2023 - 16/05/2023		
21	-	Jayaramappa	431	15/05/2023 - 16/05/2023		
22.	-	Sreeramappa	5246	15/05/2023 - 16/05/2023		

Verification team cross verified parameters which are monitored through acceptance samples survey. Apart from acceptance sample survey the verification team asked additional questions to the households. The additional questions asked by the verification team and the general 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 ADATS?	All the end users aware that the all the rights of emission reduction are with ADATS as the bio digester was constructed by ADATS at free of cost. They also confirmed about the agreement signed with ADATS for giving away the emission reduction rights to ADATS.
What are all the data collected by Village Volunteers?	All households confirmed the following data are collected by village volunteers regularly: <ul style="list-style-type: none"> • Operational status of biogas unit. • Any repairs • Non operating days
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 details of the village volunteer and for any requirement they can contact village volunteer.
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.
What are the other benefits of biogas unit?	The summary of the other benefits mentioned by households are: <ul style="list-style-type: none"> • Easy cooking • Reduction in fuelwood collection • 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 onsite audit, a sampling approach has been used by the verification team to verify the parallel use of fuelwood by biogas users which is determined through sample survey by PP.

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

1. Producer risk -5% (ie, There is 5% chance that the DOE will wrongly reject the project participants' records of acceptable quality)
2. Consumer risk -5% (ie, There is 5% chance that the DOE will wrongly accept the project participants' records of records of unacceptable quality)
3. 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)
4. Unacceptable Quality Level (UQL) – 20% (ie, the proportion of discrepancies between the project participants' sample records and DOE sample records that are unacceptable above 20% limit)

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 (c) as 1. The same is intimated to PP prior to onsite audit. 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	5,485	48	22	1	simple random sampling

During onsite audit, verification team 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 beyond level	PP's record unacceptable	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. However, it shall be noted that the parameter is not used for emission reduction calculation but used to just confirm that the non-renewable biomass has been substituted due to the use of project devices.

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	-		-
Compliance of the project implementation and operation with the registered PDD		1	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	1	-	-
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 other SDG benefits	2	1	-
Stakeholder Inputs & Legal Dispute	-	-	-
Others (please specify)	-	-	-
Total	3	4	0

SECTION E. Verification findings

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

Means of verification	The project is transferred to GS4GG, and PP used GS monitoring report template, version 1.1 which is a valid version. All the sections of the form were filled as per the GS4GG guidelines and gave all the relevant details.
Findings	No findings.

Conclusion	The monitoring report is prepared based on the Version 1.1 GS4GG monitoring report template which is valid at the time of assessment. All sections of the MR is filled correctly.
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E.2. Remaining forward action requests from validation and/or previous verifications

Means of verification	This is a 8 th verification of the project activity. Verification team checked the following reports for any pending issues from previous verification or GS4GG transition: <ul style="list-style-type: none"> • GS Verification report of 7th Monitoring period • GS performance review report of 7th Monitoring period • GS4GG Transition review report
Findings	No findings.
Conclusion	From the verification of the above mentioned documents, it is found there is no forward action request (FAR) raised from 7 th verification or GS4GG transition.

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 a onsite audit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD/3/ are in place, and that the project participants have operated the CDM project activity as per the validated PDD/3/ . The verification team has checked the Information in the monitoring report and compared against the registered / revised PDDs. During the onsite audit, the verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the revised PDD. The number of non operational units is 2551 and operational are 2994 i.e. 54.59%. Interviews with operational personnel and households and random samplings have been carried out.
Findings	CAR01 was raised and closed successfully.
Conclusion	The verification team has reviewed the biogas units commissioning records, application forms, end user agreements/14/ and non-working & repair log records/18/. The verification team checked all physical locations of the biogas units and found that the details are correctly matching with the monitoring report and monitoring records maintained by PP. Thus the verification team concludes that the project activity was implemented and operated as per validated PDD. The verification team, based on the onsite audit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated and revised PDD/3/ 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 documents¹

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

E.4.2. Corrections

No correction is sought in this verification.

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).

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

No changes to the start date of the crediting period is sought.

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

No change in project design is sought in this verification

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 10.1) 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/3/ and applied methodologies (AMS I.E)/6/ in the context of the project activity. Thus, it conforms to the requirement VVS for PA version 3 /12/.

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.		
	Ex-ante Parameter	Value	Consistent with the PDD/3/
	EF_{projected_fossilfuel}	64.4tCO ₂ /TJ	Yes
	f_{NRB,y}	0.85	Yes
	N_{HH}	5,500	Yes
	BC_{BL,HH,y}	3.03 tonnes/HH/year	Yes
	Determination of Leakage	0.95	Yes
Findings	No findings.		
Conclusion	The values of ex ante fixed parameters have been verified from the registered 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 registered monitoring plan has
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been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered 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 registered PDD.

During the verification all monitoring parameters listed in Section D.2 of MR were compared with section B.7.1 of the registered 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:

Date of commissioning of Biogas Units: This parameter is monitored as and when the units were commissioned, the information was entered into the monitoring solution. The PD maintains an online monitoring database and the data from the MR was cross checked with the data from the Online monitoring database during the site visit. The value reported in the monitoring report (i.e. 5,485) is found to be correct.

Number of installed 2 m³ systems: This parameter is monitored on a daily basis and entered into the monitoring database. All the units were already installed in the first crediting period which has been crosschecked in the monitoring database and found to be correct. The PD maintains an online monitoring database and the data from the MR was cross checked with the data from the Online monitoring database during the site visit.

Number of biogas plants operating: This parameter is monitored as logbooks and digitized monitoring database. The women volunteers monitor biogas units that are non-operational days. The PD maintains an online monitoring database and the data from the MR was cross checked with the data from the Online monitoring database during the site visit.

Confirmation that non-renewable biomass has been substituted: This parameter is measured based on a sample survey conducted PP has conducted a KPT to assess the fuelwood used for cooking and atleast once every two years simple random survey is conducted for a statistically determined number of households at 95/10 precision confidence level. The verification of this has been done from the sample survey conducted by PD. All the data is archived and stored throughout the crediting period and an additional 2 years.

BC_{PJ,HH,y}: This parameter was monitored continuously. As and when a biogas units are not functional, the beneficiaries report to the village level volunteer, who in turn report to the Biogas Field Worker (ie, Village level Volunteer) of the project for the repair of the unit. Also the Biogas Field Worker regularly visit the project households and check the operational condition of the digester and record the non-operational days if any.. A logbook is maintained for the reason of non-function and days under repair. Continuous monitoring and entered into the monitoring solution by Biogas Case workers. The logbook/18/ is verified during the on-site visit randomly and confirmed that the data considered in MR is correct.

PP has conducted a survey to estimate the parallel use of fuelwood by the biogas users. Based on the survey result/15/, no non-renewable biomass were used during the monitoring period. This is verified though acceptance sampling where verification team conducted survey in 22 households (randomly selected from PP's sample population) . All the data collected are consistent with PP's record. No error found in PP's record.

Depending on the number of days the units are not working and parallel pre-project devices were used, the BC_{PJ,HH,y} woody biomass consumption is determined for all

	<p>the project household. The household level estimation of the parameter $BC_{PJ,HH,y}$ can be seen in the excel sheet based calculations for emission reductions. On an average, the fuelwood use is estimated to be 0.00071 t/HH/day for the monitoring period.</p> <p>The QA/QC procedure for all the monitoring are in place as per the monitoring plan of the approved PDD. The personnel involved in the monitoring and operation project were interviewed during the onsite audit and they are found as competent to perform their roles & responsibility and also to ensure QA/QC procedures. As assessed above, verification team has checked the information flow (from data generation, aggregation, to recording, calculation and reporting) for all the monitoring parameters.</p>
Findings	CL03 was raised and closed successfully.
Conclusion	<p>Corresponding to the VVS V02/12/, the team confirm that the monitoring has been carried out in accordance with the approved PDD/3/.</p> <p>The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in approved PDD/3/. All the parameters are monitored as per the frequency mentioned in the registered PDD. The monitored data for the parameters has been verified by checking the procedure for information flow and found to be complete and consistent.</p>

E.6.2.1. Implementation of sampling plan

Means of verification	<p>The verification team checked whether the PP has applied a sampling approach to determine the monitored values. The following parameter that is determined through sampling:</p> <ul style="list-style-type: none"> $BC_{PJ,HH,y}$: Average annual consumption of woody biomass per household in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent <p>The verification team checked the sampling approach followed for the above parameters to confirm the sampling plan mentioned in the registered PDD.</p> <p>PP determined the parameter through simple random sampling method/20/ at biennial frequency which is found to be in line with the PDD requirement.</p> <p>Since the above parameter is a mean parameter, PP has estimated the sample size based on 95/10 confidence / precision level is calculated as per the below formula:</p> $n \geq \frac{1.645^2 N \times p(p - 1)}{(N - 1) \times 0.1^2 \times p^2 + 1.645^2 p(p - 1)}$ <p>Where</p> <p>n = sample size N = Total number of households p = expected proportions 1.645 = Represents the 90% confidence required 0.1 = Represents the 10% relative precision</p> <p>As per the mean and standard deviation derived from the previous monitoring period survey result, the sample size is estimated.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Estimated sample size as per the above formula</th> <th>Actual sample size considered for survey/1/</th> <th>Is sample size adequate?</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">32</td> <td style="text-align: center;">48</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table>	Estimated sample size as per the above formula	Actual sample size considered for survey/1/	Is sample size adequate?	32	48	Yes
Estimated sample size as per the above formula	Actual sample size considered for survey/1/	Is sample size adequate?					
32	48	Yes					

	<p>The sample size calculation provided in the ER calculation sheet/2/ is verified and found to be correct. The chosen minimum sample size found to be adequate.</p> <p>Verification team checked the PP's survey results. As per the survey result, no households used non-renewable biomass for cooking during the monitoring period. Hence, the achieved precision level is 0% which is within the required precision level of 10%.</p> <p>Hence, the verification team confirms that the sample size considered by PP is adequate.</p> <p>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 conducted a survey randomly in 22 numbers of households (selected from the PP's sample population) and verified the PP's survey data. No error is found in PP's sample data. All the data are found to be within acceptable quality level. Hence, the data collected by PP through sample survey is acceptable.</p>
Findings	No findings raised
Conclusion	<p>Verification team concludes the following:</p> <ul style="list-style-type: none"> • The sample size considered for the parameter (which is monitored through sampling basis) is found to be appropriate • PP's sample population was selected randomly from the total population. • The sampling plan implemented seems to be appropriate. • Through acceptance sampling, the verification team confirms 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 equipments 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	<p>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 GHG emission reduction calculation have been carried out in accordance with the formulae and methods CDM-VCR-FORM Version 01.0 Page 12 of 22 described in the registered monitoring plan. In detail the following has been verified: Transparency: It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. Parameter consistency: 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. Correctness: 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. Completeness: 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:</p> $E_{T_y} = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel}$ <p>Emission reduction is adjusted with 0.95 factor for leakage (considering 5% leakage) as per the latest version of methodology AMS I.E, version 5) PP has submitted the emission reduction calculation in the excel sheet/2/. The calculation in the excel sheet is checked whether the calculation is in accordance with the formula given in the approved PDD/3/ and the selected methodology/6/</p>
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Findings	No findings.
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> • 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, 7,022tCO₂e without leakage adjustment and 6,671tCO₂e 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	NA
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. As per the methodology AMS I.E ver 10.1. leakage emissions related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced which is the monitoring database. Thus we can say that the methodology requirements are complied with in this project. Hence, verification team accepts the usage of adjustment factor of 0.95.
Findings	No finding
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., 351tCO ₂ e) 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 demonstrates the summary of GHG emission reductions for the monitoring period and calculated according to the applied methodologies as follows: $ER_y = BE_y - PE_y - L_y$ $= 7,022 - 0 - 351 = 6,671\text{tCO}_2\text{e}$ <p>The ER calculation sheet and monitoring report is verified to check the calculation.</p>
Findings	CAR03 was raised and closed successfully.
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> • The emission reduction value reported (ie., 6,671tCO₂e) is verified to be correct. • The summary table in the MR has been filled correctly and the values are in line with the related emissions reduction spreadsheet. • Since the monitoring period starts after 31/12/2012, the complete verified emission reductions are correctly reported under the respective column in the MR.

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 registered PDD/3/. Section E.4 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD	
	Emission reduction estimated as per the approved PDD/3/	Actual emission reduction achieved as per Monitoring report/1/
	13,519 t CO ₂ e	6,671 t CO ₂ e
	The actual emission reduction achieved during the monitoring period is less than the estimation in the 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. The actual achieved emission reduction is less than the PDD estimation as only 5,485 units have been constructed and commissioned against a PDD estimate of 5,500 biogas units. Since the actual ER is less than estimated ER, hence no justification is required.	

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 other SDG benefits

Relevant SDG	SDG 3: Good Health and Well Being
Parameter	i. Continued improved indoor air condition and reduced respiratory problems especially for women and children.
Source	i. Based on experience by the communities for reduction in health problems through sample survey.
Monitored Value	i. 54.59% of sampled Households reported reduction in air pollution
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 through annual sample survey/15/. 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 onsite audit.
Findings	CL02 was raised and closed successfully
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.

Relevant SDG	SDG 2: end hunger, achieve food security and improved nutrition and promote sustainable agriculture
Parameter	Nutrient value of fields applying biogas slurry compared to baseline scenario using dung.
Source	Laboratory tests of soils from agriculture lands applying biogas slurry vs dung

Monitored Value	1. NPK content of soil after applying biogas slurry			
Means of verification	Slurry manure is considered far more superior to farm yard manure in respect of Nitrogen, Phosphorus and Potassium contents. The fields treated with biogas slurry and dung was analyzed for Organic Carbon, Nitrogen, Phosphorus and Potassium in the laboratory. The results are shown in Table 5. There has been an increase in the organic carbon, nitrogen, Phosphorus and Potassium content of soils treated with biogas slurry compared to that of soils treated with farm yard manure (FYM).			
		Soil treated with Farm Yard Manure	Soil treated with Biogas Slurry	Percentage increase in the Soil.
	Organic Carbon	0.24%	0.79%	229%
	Nitrogen (N) (Kg/acre)	38	53	39%
	Phosphorus (P) (kg/acre)	18	22	22%
	Potassium (K) (kg/acre)	82	88	7%
	<p>Table 1: Soil analysis for NPK</p> <p>In the baseline, the communities used to pile dung and use it as manure. After implementation of biogas project, the slurry from the biogas is used as manure. The use of biogas slurry as organic manure can give benefit in terms of improved soil conditions. Most of the biogas beneficiaries are agriculturalists and use biogas slurry as manure in the field. One more advantage of slurry is the reduction of pests and weeds in the fields as the seeds of weeds get killed in the bio-methanation process.</p> <p>Soils from agriculture land will be collected that are being treated with biogas slurry and dung. The soils will be analysed at the laboratory for organic carbon and NPK content. This lab test done by the Project participant has been reviewed and confirmed.</p>			
Findings	CL01 was raised and closed successfully.			
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.			

Relevant SDG	SDG 5: Gender Equality
Parameter description	% carbon revenue to women biogas users % carbon revenue to BCS which is spent for social cause of women from small and marginal farmholders' families
Source	Bank Transactions and audit reports of ADATS
Monitored Value	Rs. 10,376/family was paid for repair and maintenance of biogas units.
Means of verification	This parameter is monitored continuously and reported in the monitoring report as and when submitted for certification and also the audit reports
Findings	No finding



Conclusion	<p>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.</p> <p>After completing the obligation of ERPA to the carbon investor, the carbon revenue is being distributed to the women for her contribution of environmental services and also aid in repair and maintenance of biogas unit. This also provides an incentive to continue using biogas.</p> <p>A part is also provided to BCS, which is a community development organisation to address social cause of women.</p>
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Relevant SDG	SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all		
Parameter description	i. Construction of biogas units for rural communities. ii. Maintenance of constructed biogas units and elimination of use of firewood.		
Source	Based on data from online monitoring solution		
Monitored Value	i. 5,485 biogas units were constructed for the rural communities thereby reducing the use of 3.03 t/HH/year ii. A total of 366 units were repaired and maintained for continuous use of biogas units making them operational.		
Means of verification	The value has been derived from the project database in the online monitoring solution/14/. As per the project database, 5,485 households were provided the biogas units in which 54.59% (2994) digesters were in operational condition at the end of the monitoring period.		
Findings	CAR04 was raised and closed successfully.		
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
	i. In the baseline, 5,485 families were using fuelwood on traditional stoves without chimney, air vent and grate. ii. There was also no support system for repair and maintenance.	54.59% functionality of biogas units due to repair and maintenance of biogas units	54.59% functionality of biogas units due to repair and maintenance of biogas units

Relevant SDG	SDG 13: Climate Action				
Parameter description	Reduction in GHG emissions due to the project activity that is determined applying the approved UNFCCC methodology I.E.				
Source	Monitoring Database				
Monitored Value	6,671tCO ₂				
Means of verification	This parameter is monitored and reported as per the procedures and measurement methods mentioned in the registered PDD.				
Findings	No finding				
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.				
	Emission reductions = Baseline emissions - leakage- Project emissions				
	Year	Baseline emissions	Leakage	Project emissions	Emission reductions
	2020	2,347	117	0	2,230
	2021	4,675	234	0	4,441
	Total	7,022	351	-	6,671

Relevant SDG	SDG 17: Partnerships for the Goals
Parameter description	i. Access to domestic or international carbon funding to implement clean technologies



Monitored Value	Rs. 11.17million carbon funding received for construction, repair and maintenance to the project till end of monitoring period
Source	Audited statement for the project
Means of verification	These details are taken from the PP's audited statement/24/. Verification team

	checked the audited statement and found that a total of Rs. 11.17million carbon investment received for construction, repair and maintenance to the project till end of monitoring period						
Findings	CAR02 is raised and closed successfully.						
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. <table border="1"> <thead> <tr> <th>Baseline value</th> <th>Project Value</th> <th>Net Reduction</th> </tr> </thead> <tbody> <tr> <td>Without carbon funding to implement clean technologies, the families were using traditional cookstoves emitting GHG emissions.</td> <td>Rs. 11.17 million i.e. 100% carbon revenue for construction, repair, maintenance and monitoring the project after the ERPA commitments have been cleared</td> <td>Rs. 11.17 million i.e. 100% carbon revenue for construction, repair, maintenance and monitoring the project after the ERPA commitments have been cleared</td> </tr> </tbody> </table>	Baseline value	Project Value	Net Reduction	Without carbon funding to implement clean technologies, the families were using traditional cookstoves emitting GHG emissions.	Rs. 11.17 million i.e. 100% carbon revenue for construction, repair, maintenance and monitoring the project after the ERPA commitments have been cleared	Rs. 11.17 million i.e. 100% carbon revenue for construction, repair, maintenance and monitoring the project after the ERPA commitments have been cleared
Baseline value	Project Value	Net Reduction					
Without carbon funding to implement clean technologies, the families were using traditional cookstoves emitting GHG emissions.	Rs. 11.17 million i.e. 100% carbon revenue for construction, repair, maintenance and monitoring the project after the ERPA commitments have been cleared	Rs. 11.17 million i.e. 100% carbon revenue for construction, repair, maintenance and monitoring the project after the ERPA commitments have been cleared					

E.10. Stakeholder Inputs & Legal Dispute

Means of verification	<p>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.</p> <p>Verification team checked with BCS 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 through 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</p>
Findings	No finding
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> • The only grievances received from biogas unit users are related to repairs & maintenance of stoves. All the cases received during the monitoring period are attended and resolved. • No other grievances received during the current or previous monitoring period • No legal consent or dispute arise 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/onsite 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 6,671 tCO₂e emission reductions during period 01/09/2020 to 31/08/2021.

SECTION H. Certification statement

4K Earth Science Private Limited has been contracted by 'Bagepalli CDM Biogas Programme ' 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 "Bagepalli CDM Biogas Programme" and GS Ref# GS410 for the monitoring period 01/09/2020 to 31/08/2021 (including both dates) in the GS Monitoring Report Version 02 dated 20/07/2023.

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

The management of the 'Bagepalli CDM Biogas Programme' 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 02 dated 19/07/2023. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the 'M/s Bagepalli Coolie Sangha (BCS)'. The development and maintenance of records and reporting procedures are in accordance with the GS Monitoring Report Version 02 dated 19/07/2023

In our opinion the GHG emissions reductions reported for the project activity are fairly stated in the GS Monitoring Report (final) Version 02, dated 20/07/2023. 4KES based on outcome of verification activities, certifies in writing that, during the monitoring period 01/09/2020 to 31/08/2021 (including both days), the registered CDM GS PA "Biogas CDM Project of Bagepalli Coolie Sangha" in the registered GS CDM PA achieved the verified amount of 6,671 tCO₂e reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the PA

The Verified and certified emission reduction during the monitoring period 01/09/2020 to 31/08/2021 (including both dates) is stated below:

Year	Baseline emissions	Leakage	Project emissions	Emission reductions
2020	2,347	117	0	2,230
2021	4,675	234	0	4,441
Total	7,022	351	-	6,671



Appendix 1. Abbreviations

Abbreviations	Full texts
4KES	4K Earth Science Pvt. Ltd
BCS	Bagepalli Coolie Sangha
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CH ₄	Methane
CL	Clarification Request
CO ₂ e	Carbon dioxide equivalent
DOE	Designated Operating Entity
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
FT	Field Test
GHGs	Greenhouse Gas(es)
GS	Gold Standard
GWP	Global Warming Potential
HH	Household
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
KPT	Kitchen Performance Test
LE	Leakage Emissions
LPG	Liquefied Petroleum Gas
MDG	Millennium Development Goal
MP	Monitoring Plan
MR	Monitoring Report
NCV	Net Calorific Value
NGO	Non Governmental Organisation
NRB	Non Renewable Biomass
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

Appendix 2. Competence of team members and technical reviewers

<u>Certificate of Competence</u>						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> 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/GCC/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 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			
	GHG+					
	E+					
	S+					
	SDG+					
Authorized to work as Local Expert for:						
Country/Countries	India, Sri Lanka, Indonesia, Vietnam, Turkey, Thailand, Brazil, Myanmar					
Compliance check by: Swati S Acharya						

<u>Certificate of Competence</u>						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ganesh Jthamanyu 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	yes	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			

	GHG+		
	E+		
	S+		
	SDG+		
Authorized to work as Local Expert for:			
Country/Countries	India		
Compliance check by: Swati S Acharya			

Certificate of Competence						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> 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	No	Yes	Yes	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		
	GHG+					
	E+					
	S+					
SDG+						
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Swati S Acharya						

Certificate of Competence						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> 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: Swati S Acharya			

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	ADATS	GS Monitoring Report,	Version 01, dated 12/04/2021	ADATS
	ADATS	GS Monitoring Report,	Version 02, dated 20/07/2023	ADATS
2	ADATS	ER Calculation Sheet	Version 02	ADATS
3	ADATS	Approved PDD	Version 12, dated 16/05/2017	Publicly available
4	ADATS	5 th Verification Report	Version 2, dated 16/05/2017	Publicly available
5	Carbon Check	6 th Verification Report	Version 3, dated 09/05/2019	Publicly available
	Carbon Check	7 th Verification Report		Publicly available
6	UNFCCC	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User”	Version 07	Publicly available
7	IPCC	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	Web Link	Publicly available
8	UNFCCC	Kyoto Protocol (1997)	Web Link	Publicly available
9	UNFCCC	GS Monitoring Report Template	Version 1.1	Publicly available
10	UNFCCC	CDM Project Standard for project activities	Version 02	Publicly available
11	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities	Version 09	Publicly available
	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programme of activities	Version 04	Publicly available
12	UNFCCC	CDM Validation and Verification Standard for project activities	Version 03	Publicly available
13	UNFCCC	Glossary “CDM terms”	Version 10	Publicly available
14	ADATS	Biogas basic record set: - Biogas application form - End user agreement for VER	-	ADATS

		ownership - Completion certificate - Online monitoring solution		
15	ADATS	Sample survey monitoring sheets & survey result excel sheet	-	ADATS
16	ADATS	Previous Monitoring period survey sheets	-	ADATS
17	ADATS	Training Records: - Training & meeting organised for end users - Training conducted for staffs	-	ADATS
18	ADATS	Village level plant breakdown log sheets maintained by village level volunteers	-	ADATS
19	ADATS	List of biogas units that are not functional	-	ADATS
20	ADATS	Screenshots of simple random sample selection for the sample survey	-	ADATS
21	ADATS	Grievance records	-	ADATS
22		Biogas slurry analysis report Cow dung analysis report	Dated 04/03/2019	ADATS
23	ADATS	Undertaking letter	-	ADATS
24	ADATS	Audited Statement of BCS	2018-19, 2019-20 & 2020-21	ADATS
25	Gold Standard	Performance review report of 6th verification	-	ADATS
26	ADATS	GS4GG Transition Annex	-	ADATS

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

Table 2. Remaining FAR from validation and/or previous verifications

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
<i>No FARs from previous verification</i>				
Project participant response				Date: DD/MM/YYYY
<i>NA</i>				
Documentation provided by project participant				
<i>NA</i>				
VVB assessment				Date: DD/MM/YYYY

Table 3. CL from this validation

CL ID	01	Section no.	Table 1	Date: 20/07/2023
Description of CAR				
Project Participant is to provide the proof for the increase in organic carbon,N,P and K mentioned for SDG 2.				
Project participant response				Date: 26/07/2023
<i>The lab report is provided as proof.</i>				
Documentation provided by project participant				
<i>Soil test report.</i>				
DOE assessment				Date: 07/08/2023
The test report has been reviewed and confirmed. CL01 is closed.				

CL ID	02	Section no.	D.1,	Date: 20/07/2023
Description of CAR				
Project Participant is to provide the latest KPT conducted in the Project area.				
Project participant response				Date: 26/07/2023
<i>the KPT conducted is provided for the project area.</i>				
Documentation provided by project participant				
<i>Kitchen performance test.</i>				
DOE assessment				Date: 07/08/2023
The KPT has been reviewed and confirmed. CL02 is closed.				

CL ID	03	Section no.	D.2	Date: 20/07/2023
Description of CAR				
The household level questionnaire used for measuring the average annual consumption of the woody biomass is to be provided.				
Project participant response				Date: 26/07/2023
<i>Sample copies of the questionnaire is provided.</i>				
Documentation provided by project participant				
<i>Sample Survey.</i>				
DOE assessment				Date: 07/08/2023
The sample surveys have been reviewed and confirmed. CL03 is closed.				

Table 4. CAR from this validation

CAR ID	01	Section no.	Cover Page	Date: 20/07/2023
Description of CAR				
Project Participant is to provide the verification report for MR 07.				
Project participant response				Date: 26/07/2023
<i>Kind enclosed the Verification Report of MR 07.</i>				
Documentation provided by project participant				
<i>MR 07 Verification report.</i>				
DOE assessment				Date: 07/08/2023
The verification report has been reviewed and verified. CAR01 is closed.				

CAR ID	02	Section no.	Table 1	Date: 20/07/2023
Description of CAR				
Project Participant is to provide proof for the 11.17 Million INR carbon funding to maintain the biogas units.				
Project participant response				Date: 26/07/2023
<i>Find enclosed the proof of 11.7 million INR of carbon funding.</i>				
Documentation provided by project participant				
<i>Carbon revenue excel sheet</i>				
DOE assessment				Date: 07/08/2023
The proof for the carbon funding to maintain the biogas plant units have been reviewed and verified. CAR02 is closed.				

CAR ID	03	Section no.	ER Sheet	Date: 20/07/2023
Description of CAR				
The data in the ER sheet is for the period 01/09/2020-31/12/2022 which is not consistent with the monitoring period mentioned in the MR. Hence all the data in MR is for the period 01/09/2020-31/08/2021.				





<i>All the data is presented only for 2020 to 2021 of the monitoring period.</i>	
Documentation provided by project participant	
<i>Revised ER sheet.</i>	
DOE assessment	Date: 07/08/2023
The revised ER sheet has been reviewed and confirmed. CAR03 is closed.	

CAR ID	04	Section no.	D.2, Number of installed 2 m3 systems	Date: 20/07/2023
Description of CAR				
The monitoring period mentioned in the table here is inconsistent with the rest of the MR.				
Project participant response				Date: 26/07/2023
<i>the monitoring period is made consistent as 2020-2021 throughout the MR.</i>				
Documentation provided by project participant				
<i>Revised MR</i>				
DOE assessment				Date: 07/08/2023
The revisions made in the MR have been reviewed and confirmed. CAR04 is closed.				

Table 5. FAR from this validation

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
<i>NA</i>				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				Date: DD/MM/YYYY
