



**Verification and certification report form for
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 UNFCCC reference number of the project activity	Micro Scale Biogas CDM Project of CROSS UNFCCC Ref # 8784		
Scale of the project activity	☐ Large-scale ☒ Small-scale		
Version number of the verification and certification report	01		
Completion date of the verification and certification report	08/06/2021		
Monitoring period number and duration of this monitoring period	03 Duration of the monitoring period is: 01/08/2019 to 31/12/2020 (Inclusive of both the days)		
Version number of the monitoring report to which this report applies	03		
Crediting period of the project activity corresponding to this monitoring period	01/01/2014 to 31/12/2020		
Project participants	M/s Community Reconstruction of Social Service (CROSS)		
Host Party	India		
Applied methodologies and standardized baselines	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User” ver.4		
Mandatory sectoral scopes	Sectoral Scope 1, Energy industries (renewable-/non-renewable sources)		
Conditional sectoral scopes, if applicable	Sectoral Scope 13: Waste handling and disposal		
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	31,140 tCO ₂		
Certified amount of GHG emission reductions or GHG removals for this monitoring period	Amount before 1 January 2013	Amount from 1 January 2013 until 31 December 2020	Amount from 1 January 2021
	NA	12,461 tCO ₂	NA
Name and UNFCCC reference number of the DOE	4K Earth Science Private. Limited UNFCCC Ref No. CDM-E-0069		
Name, position and signature of the approver of the verification and certification report	S. Jagajothi Director		

SECTION A. Executive summary

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4KES has been commissioned by “M/s Community Reconstruction of Social Service (CROSS)” to perform an independent verification of its registered CDM project “Micro Scale Biogas CDM Project of CROSS”, UNFCCC Ref#8784 for the reported GHG emission reductions for the given monitoring period 01/08/2019 to 31/12/2020 (both dates included). The CDM projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs)

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 revised 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 PDD, including the monitoring plan and the corresponding validation opinion(s);
- (b) Previous verification reports, deviation requests, requests for revision of monitoring plan;
- (c) Monitoring report for the monitoring period under verification including CER calculations sheets and all supporting documents;
- (d) The applied monitoring methodology;
- (e) The applied standardized baseline (if applicable);
- (f) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- (g) All information and references relevant to the project activity's resulting in emission reductions

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:

The project activity is the installation of biogas plants (digesters) of 2 m³ capacity each for single households in all Mandals of Chittoor District., Andhra Pradesh, India. The biogas units is fed by cattle dung generated from the households. The biogas stoves replaces the traditional fire wood stoves used for cooking and heating purposes.

In baseline situation, households uses 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 5,000 biogas units of 2 m³ capacity each for single households out of which 3095 units were commissioned.

Methodology:

4KES follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of CDM Accreditation Standard. Subsequently, after the contract is signed, the monitoring report of the project activity is made publicly available on UNFCCC website as per CDM procedures. A desk review of the project documentation is undertaken, which is followed by an remote audit 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 version 02 of CDM VVS for Project Activity, to capture the assessment of applicable CDM requirements as per the, version 2 of CDM Project Standard for Project Activity, registered PDD, applied methodology/ies, applied standardized baseline and/or tools and recent decisions. The CDM verification protocol provides transparent means to

record the observations and compliances by the verification team members and the nonconformities, if any. The CDM verification protocol is the document used by the auditors to check on the requirements as per the latest procedures made available. Following are the time line for the CDM verification under consideration.

Verification contract	20/02/2021
Publication of MR	10/03/2021
Remote audit	29/04/2021
Draft Verification Report	05/05/2021
Final Verification Report	08/06/2021

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 DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader (Acting) & Local Expert	IR	Sudharshan	KV	Central Office	x		x	x
2	Team Leader/Technical Expert (1.1 & 13.1)	IR	Narendra Kumar	R	Central Office	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 DOE or outsourced entity)
1.	Technical reviewer	IR	Indumathi	C	Central Office
2.	Approver	IR	Jagajothi	S	Central Office

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 remote audit check of actual situation in sample households.

C.2. Consideration of materiality in conducting the verification

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The prescribed thresholds for materiality, as per as per §326 of VVS for PA, version 02/12/..

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	12,461 tCO ₂ e	12,461 tCO 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**

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The monitoring report was made for public availability and a desk review was undertaken on the information provided, involving but not limited to,

- A thorough review of the data and information presented in the monitoring report and excel sheets to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of measuring equipment including calibration requirements, and the quality assurance and quality control procedures;
- 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 complete list of documents reviewed and verified is included in the section 'Appendix 3' of this report.

D.2. On-site inspection

As a result of the COVID-19 pandemic, taking into account the rules of relevant national and local authorities (local to the DOE offices as well as to locality of the site visits), World Health Organization (WHO) recommendations, policies of the DOE and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return from specific countries), A DOE may postpone site visits for onsite inspections required by the “CDM validation and verification standard for project activities (version 02.0) (VVS-PA)”.

If the site visits cannot be postponed, a proper justification should be provided by the DOE why the site visits cannot be postponed, including the demonstration of a significant impact of delaying the site visits on the DOE, or project participants or coordinating/ managing entity (e.g. commitment/ timeline as per the validation or verification contract, CER delivery commitment by project participants) reliance on applicable force majeure provisions in the validation or verification contracts, if needed.

For this project activity, the DOE has committed to complete the verification in 2 months. But with the current COVID cases rate in India, the site visit is not expected to happen in near future. Hence the DOE has skipped the on-site visit. However as per the CDM EB, “the DOE may use other standard auditing techniques for validation or verification as referred to in sections 9.1.3 of the VVS for PA”.

Verification team has used the following alternative means for its assessment and to justify that they are sufficient for the purpose of verification. Along with desk review, audit team has conducted remote audit interview (Skype interview) as follows:

- A complete desk review of the MR, as well as all applicable country legal requirement and supportive evidences have been checked by the verification team.
- Verification team has performed Skype interview with PP in order to check implementation, project boundary, current situation, evaluation of data management, QA/QC system, monitoring and metering equipment, monitoring procedures, calibration etc.
- Verification team also interviewed end-user over phone to crosscheck the implementation details and other monitoring details.
- Cross checks between information provided by interviewed personnel (i.e. by checking sources) to ensure that no relevant information has been omitted.
- Cross-check evaluation, for information received from interviews, under the scope of all information and references provided in MR and supporting documents.

Details of interviewees, topics covered and additional information presented in the below section “D.3 Interviews”

Duration of on-site inspection: NA				
No.	Activity performed on-site	Site location	Date	Team member

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	T	Chaithanya	CROSS	29/04/2021	- 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	Sudharshan Narendra Kumar
2	-	Jayasudha	CROSS	29/04/2021		
3	-	Bravin Kumar	CROSS	29/04/2021		
4	Karmala	Pavan Kumar	CROSS	29/04/2021		
6.	Padmanaba	Sudha	FCN	29/04/2021	- Data Analysis - Issues in the MR - ER calculation	Sudharshan Narendra Kumar
Beneficiary Name						
No	Last Name	First Name	Unit No.	Date	Subject	Team Member
1	B	Devi	4107	29/04/2021	- Awareness about ownership of CERs - Working condition of bio-digester unit - SD parameters verification	Sudharshan Narendra Kumar
2.	K	Rukmini	73	29/04/2021		
3.	P	Yasodamma/Prakash	79	29/04/2021		
4.	G	Prabhavathi	3350	29/04/2021		
5.	K	Vani	5752	29/04/2021		
6.	A	Amaravathi	3512	29/04/2021		
7.	S	Amaravathi	4415	29/04/2021		
8.	P	Saraswathi	2845	29/04/2021		
9.	G	Ammanemma	3990	29/04/2021		
10.	K	Geetha	6024	29/04/2021		
11	B	Prameela	4114	29/04/2021		
12.	K	Pushpa	3688	29/04/2021		
13.	K	Thoyajakshi	3775	29/04/2021		

15.	B	Latha	5056	29/04/2021		
16.	K	Muthyalu	6582	29/04/2021		
17.	P	Chamundes wari	2941	29/04/2021		
18.	P	Subbamma	4107	29/04/2021		
19.	Y	Salamma	73	29/04/2021		
20.	B	Krishnamma	79	29/04/2021		
21.	K	Hemalatha	3350	29/04/2021		
22.	-	Varalakshmi	5752	29/04/2021		
23.	B	Jeeva	3512	29/04/2021		

D.4. Sampling approach

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During the remote audit, a sampling approach has been used by the verification team to verify the reported values for the monitored parameters as listed in section D.3 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:

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- 0.5% (i.e. the proportion of discrepancies between the project participants' sample records and the DOE sample that are acceptable up to 0.5% 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 8. 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 remote 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 of has been substituted	3095	2019-20 : 50 2020 (1 Aug 20 to 31 Dec 2020) : 46	22	1	simple random sample

During remote audit, verification team visited 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 of 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	2	-
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	3	-	-
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	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	4	3	-

SECTION E. Verification findings

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

Means of verification	Verification team checked the monitoring report with latest version of MR available in the UNFCCC website (ie, version 8.0) and "Instructions for filling out the monitoring report form" mentioned as attachment to Monitoring report form (version 8.0).
Findings	No finding
Conclusion	Verification team confirms that final monitoring report is completed using the latest valid version of the applicable monitoring report form/9/.

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

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Verification team checked validation report/4/ & 2nd verification report/5/ and found that no FAR has been raised.

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 remote 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 remote audit, the verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the revised PDD. Interviews with operational personnel and households and random samplings have been carried out.
Findings	CL-01, CAR-01 & CAR-03 are raised and closed satisfactorily
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 found that 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 remote 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. CAR-01 was raised and closed successfully
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E.4. Post-registration changes**E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹**

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No temporary deviation from registered monitoring plan or monitoring methodology is sought.

E.4.2. Corrections

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No corrections to project information or parameters fixed at validation

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

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No change in the crediting period start date

E.4.4. Inclusion of a monitoring plan

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Not applicable as the PP provided the monitoring plan in registered PDD itself.

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

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No permanent change from registered monitoring plan or monitoring methodology is sought.

E.4.6. Changes to the project design

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No change in project design is sought during this verification.

The PP had applied for a PRC to include all Mandals of Chittoor District during the previous monitoring period. The approval of the PRC by EB on 26/10/2017 has been checked and found to be ok.

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

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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 04) and including applicable tools.
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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).

Findings	No finding
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 2 /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/ & the source mentioned in it
	Rating Biogas	1.69	Yes
	B_y	3.97 tonnes/year/family	Yes
	f_{NRB, y}	0.95	Yes
	NCV_{biomass}	0.015 TJ/tonne	Yes
	EF_{projected_fossilfuel}	81.6 tCO ₂ /TJ	Yes
Findings	No finding		
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 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: 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/14/ maintained by CROSS during remote audit. The value reported in the monitoring report (ie, 3095) is found to be
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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 85.30% of 3095 units. The values (2640 units) were cross-verified with Log book records, digitized monitoring database during remote audit by the verification team. List of non-operational units are also verified and confirmed that there are 455 units were not in operational at the end monitoring period. Hence, the value reported for this parameter is correct.

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 worker 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/18/ by the staffs/volunteers and the same are entered into monitoring solutions/14/. During remote audit the verification team checked with PP on how the daily monitoring taken place during the lockdown due to COVID. Verification team checked all the breakdown log records/18/ and data in the monitoring solution/14/. 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, 567,886) non-usage days is found to be 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 simple random sample survey. PP has conducted survey during the year 2019-20, and 2020(Jul 2020-Dec 2020) in 50 and 46 households respectively which are selected randomly/15/. As verified from the survey result/15/, all the sample households confirm that the bio digester usage substitute non-renewable biomass used in the baseline situation. All the survey sheets/15/ are verified and found that the data mentioned in the excel sheet is correct. During the remote audit, the verification team also checked with PP regarding how the daily monitoring taken place during the COVID lockdown. PP confirmed that the operational status of the biogas system were monitored though telephone wherever possible. In other cases, the case workers visited the households after the lockdown got over and interviewed the end users about the operational status of the biogas system during the lockdown time. The same is confirmed during the interview with monitoring personnel and end user during remote audit. Since PP is able to collect the complete data after the lockdown, this is found to be acceptable. During the remote audit verification team has done acceptance sampling survey where verification team conducted telephonic survey with 22 households (randomly selected from PP's sample population). All the data collected are consistent with PP's record/15/. No error found. Hence, the verification team confirms that the non-renewable biomass of B_y has been substituted by the project activity. It shall also be noted that the parameter is not used for emission reduction as the non-usage of biogas stoves are monitored 100% as mentioned in the above parameter and deducted from emission reduction.

Average annual hours of operation of a system (Average annual hours of operation of a biogas unit) This parameter was monitored through sample survey. PP has conducted survey during the year 2019-20, and 2020 (Jul 2020 to Dec 2020) in 50 and 45 households respectively selected randomly in each year 15/. As per survey result, the average operating hours of the biogas stoves are 2.35 & 2.48 hours for the year 2019-20, and 2020 (Jul 2020 to Dec 2020) respectively. All the survey sheets/15/ are verified and found that the data mentioned is correct. During the remote audit verification team has done acceptance sampling survey where verification team conducted telephonic survey with 22 households (randomly

	selected from PP's sample population). All the data collected are consistent with PP's record/15/. No error found. It shall also be noted that the parameter is not used for emission reduction.
Findings	CL-02 & CL-03 are raised and closed satisfactorily
Conclusion	Corresponding to the VVS V02/12/, the team confirm that the monitoring has been carried out in accordance with the registered PDD/3/. The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in registered 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.

E.6.3. 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 two parameter that is determined though sampling are: • Confirmation that non-renewable biomass has been substituted • Average annual hours of operation of a system It is observed that these <u>parameters are not used for emission reduction calculation</u> and just <u>used for qualitative purposes</u>. The verification team checked the sampling approach followed for each monitoring parameters to confirm the sampling plan mentioned in the registered PDD. <u>Confirmation that non-renewable biomass has been substituted</u> Since the parameter ‘Confirmation that non-renewable biomass has been substituted’ is the proportion parameter PP has estimated the sample size based on 90/10 confidence / precision level is calculated as per the below formula: $n = \frac{1.645^2 NV}{(N - 1) \times 0.1^2 + 1.645^2 V}$ Where, $V = \frac{p(1 - p)}{p^2}$ n Sample size N Total number of households (5,000) p the proportion (0.99) 1.645 Represents the 90% confidence required 0.1 Represents the 10% relative precision 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. Hence, the sample size required is estimated to be 0. Hence, PP has calculated the sample size based on the proportion of bio digesters in operation: <table><tr><th>Year</th><th>Sample size (based on expected proportion of HH NRB substituted)</th><th>Actual sample size considered for survey/1/</th><th>Is sample size adequate?</th></tr><tr><td>2019-20</td><td>0</td><td>50</td><td>Yes</td></tr><tr><td>2020 (Jul to Dec)</td><td>0</td><td>46</td><td>Yes</td></tr></table> <u>Average annual hours of operation of a system:</u> Since the parameter ‘Average annual hours of operation of a system’ is the mean	Year	Sample size (based on expected proportion of HH NRB substituted)	Actual sample size considered for survey/1/	Is sample size adequate?	2019-20	0	50	Yes	2020 (Jul to Dec)	0	46	Yes
	Year	Sample size (based on expected proportion of HH NRB substituted)	Actual sample size considered for survey/1/	Is sample size adequate?									
	2019-20	0	50	Yes									
	2020 (Jul to Dec)	0	46	Yes									

parameter, PP has estimated the sample size based on 90/10 confidence / precision level is calculated as per the below formula:

$$n = \frac{1.645^2 NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

Where.

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

As per the mean and standard deviation derived from the previous monitoring period survey result, the sample size is estimated.

Year	Estimated sample size @80% response rate	Actual sample size considered for survey/1/	Is sample size adequate?
2019-20	35	50	Yes
2020 (Jul to Dec)	35	46	Yes

For both the parameter, the sample size calculated based on 90/10 confidence / precision level. 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 the PP's survey results. The achieved precision is mention below:

Survey year	Confirmation that non-renewable biomass of By has been substituted	Average annual hours of operation of a system	Is achieved precision is <= 10%
2019-20	0%	5.10%	Yes
2020 (Jul – Dec)	0%	5.77%	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%. For the parameter 'Average annual hours of operation of a system' also the achieved precision levels are within 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 conducted telephonic survey in 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 though sample survey is acceptable.

Findings

CL-04 is raised and closed satisfactorily

Conclusion

Verification team concludes the following:

- The sample size considered for the parameter (which is monitored through sampling basis) is found to be appropriate
- 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 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	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 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 4) 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 PDD/3/ and the selected methodology/6/.
Findings	No finding
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, 13,117 tCO₂e without leakage adjustment and 12,461 tCO₂e 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. 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.,656 tCO 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: $ER_y = BE_y - PE_y - L_y$ $= 13,117 - 0 - 656 = 12,461 \text{ tCO}_2\text{e}$ The ER calculation sheet and monitoring report is verified to check the calculation.
Findings	No finding
Conclusion	The verification team confirms the following: • The emission reduction value reported (ie., 12,461 tCO₂e) 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/
	31,140 t CO ₂ e	12,461 t CO ₂ e
	The actual emission reduction achieved during the monitoring period is less than the estimation in the PDD.	
Findings	CAR-02 is raised and closed satisfactorily	
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 3095 units have been constructed and commissioned against a PDD estimate of 5,000 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 CER 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.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has determined the CER achieved during first commitment period and second commitment period
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Findings	No finding
Conclusion	Since the complete monitoring period falls after the first commitment period, the complete emission reductions are correctly reported under the respective column in the MR.

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

Means of verification	Not applicable the project is not claiming any sustainable development co-benefits.
Findings	Not applicable
Conclusion	Not applicable

E.10. Global stakeholder consultation

Means of verification	This is the periodic verification, no comments received during commenting period
Findings	Not applicable
Conclusion	Not applicable

SECTION F. Internal quality control

>>

The draft verification report prepared by team leader is reviewed by an independent technical reviewer before requesting for issuance for this verification period for the project activity 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 CDM requirements. The technical review is conducted by the technical reviewer qualified as per the 4KES procedures established for the qualification of CDM personnel as per EB guidelines.

The independent technical reviewer may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for issuance is submitted to UNFCCC. The final decision is taken by the Head of the DOE. The technical reviewer approves the final version of the report.

The final approval is authorized by the Director, 4KES once the report is approved by the Head/DOE Manager.

SECTION G. Verification opinion

>>

The verification team confirms that 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 and remote audit, 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) 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 12,461 tCO₂e emission reductions during period 01/08/2019 to 31/12/2020.

SECTION H. Certification statement

>>

4K Earth Science Pvt. Ltd. has been contracted by 'M/s Community Reconstruction of Social Service (CROSS)' to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the CDM Project activity "Micro Scale Biogas CDM Project of CROSS" and UNFCCC Reference Number 8784 for the monitoring period 01/08/2019 to 31/12/2020 (including both dates) in the Monitoring Report Version 01 (first version) dated 08/03/2021.

The verification is based on the approved PDD, revised PDD and the 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 CDM Executive Board.

The management of the M/s Community Reconstruction of Social Service (CROSS) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report Version 03 dated 07/06/2021. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the 'M/s Community Reconstruction of Social Service (CROSS)'. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 03, dated 07/06/2021.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the monitoring period 01/08/2019 to 31/12/2020 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 03 dated 07/06/2021 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, 4KES planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated. 4KES confirms the following;

Reporting period: 01/08/2019 to 31/12/2020 (including both dates)

Verified and certified emission in the above reporting period:

	Amount	Unit
Baseline emissions (BE)	13,117	tCO ₂ e
Project emissions (PE)	0	tCO ₂ e
Leakage emissions (LE)	656	tCO ₂ e
Certified emission reductions (CERs)	12,461	tCO ₂ e

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CERs	Certified Emission Reductions
CH ₄	Methane
CL	Clarification Request
CO ₂ e	Carbon dioxide equivalent
COP	Conference of Parties
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CROSS	Community Reconstruction of Social Service
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ERPA	Emission Reduction Purchase Agreement
ERs	Emission Reductions
FAR	Forward Action Request
FCN	Fair Climate Network
GHGs	Greenhouse Gas(es)
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
NGO	Non Governmental Organisation
PE	Project Emissions
PDD	Project Design Document
PS	Project Standard
PCP	Project Cycle Procedure
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VLV	Village Level Volunteers
VVS	Validation & Verification Standard
4KES	4K Earth Science Private Limited

Appendix 2. Competence of team members and technical reviewers

<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Sudarshan K V				
Qualification Procedure	Fulfil 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
<i>Appointed</i>	Yes	Yes	Yes	Yes	No	No
<i>Appointed Date</i>	27-12-2020					
Authorized to work as Technical Expert for:						
<i>Authorized Technical Area</i>	Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
	Chemical industries		5.1	Chemical industries		
	Solvent use		12.1	Chemical Industry		
Authorized to work as Local Expert for:						
<i>Country/Countries</i>	India					
<u>Compliance check by:</u> Anand S.R.						

<u>Certificate of Competence</u>			
Name	☒ Mr. ☐ Ms.	Narendra Kumar .R	
Qualification Procedure	Fulfil 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
<i>Appointed</i>	Yes	Yes	Yes
<i>Appointed Date</i>	27-04-2021		
Authorized to work as Technical Expert for:			
<i>Authorized Technical Area</i>	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
	Waste handling and disposal	13.1	Solid waste and wastewater
	Waste handling and disposal	13.2	Manure
Authorized to work as Local Expert for:			
<i>Country/Countries</i>	India		
<u>Compliance check by:</u> Anand S. R.			

<u>Certificate of Competence</u>

Name	☐ Mr. ☒ Ms.	Indumathi .C				
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
<i>Appointed</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Appointed Date</i>	27-04-2021					
Authorized to work as Technical Expert for:						
<i>Authorized Technical Area</i>	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		
	Waste handling and disposal	13.1		Solid waste and wastewater		
	Waste handling and disposal	13.2		Manure		
Authorized to work as Local Expert for:						
<i>Country/Countries</i>	India					
Compliance check by: Anand S. R.						

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	CROSS	Monitoring Report,	Version 01, dated 08/03/2021	CROSS
	CROSS	Monitoring Report,	Version 02, dated 09/05/2021	CROSS
	CROSS	Monitoring Report,	Version 03, dated 07/06/2021	CROSS
2	CROSS	ER Calculation Sheet	Version 01, dated 08/03/2021	CROSS
	CROSS	ER Calculation Sheet	Version 02, dated 09/05/2021	CROSS
3	CROSS	Approved PDD	Version 03, dated 12/07/2017	Publicly available
4	TUV RHEINLAND	Validation Report	dated 10/02/2012	Publicly available
5	4KES	2 nd Verification Report	Version 2, dated 30/03/2020	Publicly available
6	UNFCCC	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User”	Version 04	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	Monitoring Report Form (CDM-MRFORM)	Version 07.0	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 08	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 02	Publicly available
13	UNFCCC	Glossary “CDM terms”	Version 10	Publicly available
14	CROSS	Biogas basic record set: - Biogas application form - End user agreement for CER ownership - Completion certificate - Online monitoring solution	-	CROSS
15	CROSS	Sample survey monitoring sheet for the year 2019-20 and 2020 (Jul – Dec 2020)	-	CROSS
16	CROSS	Previous Monitoring period survey sheets	-	CROSS
17	CROSS	Training Records: - Training conducted for end user - Training conducted for Mason - Training conducted for staffs - Training conducted for Village	-	CROSS

		Level Volunteers		
18	CROSS	Village level plant breakdown log sheets maintained by village level volunteers	-	CROSS
19	CROSS	List of biogas units that are not functional	-	CROSS

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

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

FAR ID	xx	Section no.	E.2	Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this validation

CL ID	01	Section no.	E.3	Date: 21/04/2021																				
Description of CL																								
As compared with previous monitoring report, it is found that there are 36 biodigester units installed during this monitoring period. However, as verified from the project database only 33 units were installed during this monitoring period.																								
Clarify																								
Project participant response				Date: 09/05/2021																				
The following three units were constructed during the previous Monitoring Period (June/July 2019), but were not accounted for Emission Reduction calculations. These have been included for ER calculations from 1 August 2019 during this monitoring period. Hence there is difference of three units. These units were not accounted for ER calculations as they were not included in the monitoring solution.																								
<table border="1"> <thead> <tr> <th>Taluk</th><th>Village</th><th>UnitID</th><th>EndUser</th><th>Commission Date</th></tr> </thead> <tbody> <tr> <td>Pichatur</td><td>Kuppamkandriga</td><td>5408</td><td>N.Sujatha</td><td>12-06-19</td></tr> <tr> <td>Pichatur</td><td>Akkagaripeta</td><td>6424</td><td>Y.Mohanamma</td><td>11-07-19</td></tr> <tr> <td>Pichatur</td><td>Akkagaripeta</td><td>6425</td><td>T.Indra</td><td>13-06-19</td></tr> </tbody> </table>					Taluk	Village	UnitID	EndUser	Commission Date	Pichatur	Kuppamkandriga	5408	N.Sujatha	12-06-19	Pichatur	Akkagaripeta	6424	Y.Mohanamma	11-07-19	Pichatur	Akkagaripeta	6425	T.Indra	13-06-19
Taluk	Village	UnitID	EndUser	Commission Date																				
Pichatur	Kuppamkandriga	5408	N.Sujatha	12-06-19																				
Pichatur	Akkagaripeta	6424	Y.Mohanamma	11-07-19																				
Pichatur	Akkagaripeta	6425	T.Indra	13-06-19																				
Find enclosed the end user agreement for these three units, which substantiates the construction of these units.																								
Documentation provided by project participant																								
End User Agreements for the three Unit IDs.																								
DOE assessment				Date: 25/05/2021																				
The project database submitted for this verification and previous verification are compared and found that the Unit 5408, 6424 & 6425 were commissioned during the previous monitoring itself, but not considered in the previous monitoring report by mistake. This is found to be acceptable as it is conservative.																								
The end user agreements of these digesters are also checked and confirmed the commissioning date.																								
CL is closed																								

CL ID	02	Section no.	E.6.2	Date: 21/04/2021
Description of CL				
As per Section D.2 of the MR, the parameter 'Non-usage of biogas plants' is monitored on day to day basis. PP shall clarify how this parameter is monitored on day to day basis during the COVID lockdown.				
Project participant response				Date: 09/05/2021

From the month of March 2020 to July 2020 due to COVID, in the Mandals of S. R. Puram and G. D. Nellore, biogas units are repaired by E. Neelakanta reddy with the help of the village volunteers. In the Mandals of Puttur, Vadamalapeta, Narayanavanam, Nagari and Nindra, biogas units are repaired by K. Pavan with the help of village volunteers. These were reported telephonically to the CROSS office. In the remaining Karvetnagaram, Vedurukuppam, Ramachandrapuram, pitchatur, Nagalapuram and Nindra Mandals most of the villages are announced as Red Zones and village volunteers could not work here. Many villages people were not interested to allow case workers to monitor biogas. After the lockdown, the status of the biogas in remaining villages were monitored and reported. Also many of the households repaired the biogas on their own especially if it was of minor, as they found it convenient to use without spending on LPG or going out to collect fuelwood.

Documentation provided by project participant

Breakdown log for the monitoring period

DOE assessment

Date: 25/05/2021

As mentioned by the PP above, the operational status of the biogas system were monitored through telephone wherever possible. In other cases, the case workers visited the households after the lockdown got over and interviewed the end users about the operational status of the biogas system during the lockdown time. The same is confirmed during the interview with monitoring personnel and end user during remote audit. Since PP is able to collect the complete data after the lockdown, this is found to be acceptable. CL is closed.

CL ID	03	Section no.	E.6.2	Date: 21/04/2021
Description of CL				
In section D.2 of the MR, under the parameter 'Confirmation that non-renewable biomass has been substituted', PP has mentioned total biogas days as 1605030 days. PP shall clarify how this is calculated.				
Project participant response				Date: 09/05/2021
As can be seen in the ER calculations sheet (Cell P3097), this is the total number of days in the Monitoring Period, of all the biogas units that were commissioned. As many of the units were commissioned after 1/August/2019, they account for lesser than 519 days.				
Documentation provided by project participant				
-				
DOE assessment				Date: 25/05/2021
PP provided the calculation in the ER sheet. The same is verified and found to be acceptable. CL is closed.				

CL ID	04	Section no.	E.6.3	Date: 21/04/2021
Description of CL				
In section D.3, PP has estimated sample size calculation for the 2020 (Aug-Dec 2020) survey based on the mean & standard deviation achieved from the survey of the previous monitoring period. PP shall clarify why mean & standard deviation of 2019-20 (Aug 2019 –July 2020) survey has not been used which is the most recent data available at the time of survey.				
Project participant response				Date: 09/05/2021
As the previous MR was verified by the DOE and issued, it was considered for sample size selection. The sample size with the 2019-20 provided a sample size of 16, while 46 were sampled. Thus the sample size is still more than required.				
Total number of households		3095		
Mean		2.353		
Standard Deviation		0.511		
Represents the 90% confidence required		1.645		
Represents the 10% relative precision		0.1		
V		0.047		
Sample size		13		
@80% response rate		16		
Documentation provided by project participant				
Excel sheet with Sample size calculations with mean and standard deviation of 2019-20				

DOE assessment	Date: 25/05/2021
The explanation is found to be acceptable. Moreover, even with the previous survey result, the sample size for the 2020 survey works out to be only 16. Hence, the actual sample size considered is found to be acceptable. CL is closed.	

Table 3. CAR from this validation

CAR ID	01	Section no.	E.3	Date: 21/04/2021
Description of CAR				
In section B.1 of MR, the number of digester units installed are inconsistently mentioned.				
As per the description provided there are 3059 units were installed at the end of this monitoring period. But as per the table provided, the 3095 units were installed at the end of monitoring period.				
Corrective action is requested				
Project participant response				Date: 09/05/2021
<i>This is a typographic error. It is corrected to 3095 in the revised Monitoring Report</i>				
Documentation provided by project participant				
<i>Revised Monitoring Report</i>				
DOE assessment				Date: 25/05/2021
PP has corrected the number of digester in section B.1. CAR is closed.				

CAR ID	02	Section no.	E.8.5	Date: 21/04/2021
Description of CAR				
In the ex-ante ER estimation provided in section E.5.1, the number of days considered for the period August 2020 to December 2020 is not correct.				
Project participant response				Date: 09/05/2021
<i>The duration of the monitoring period for 2nd year (2020) and the number of days is corrected in the revised monitoring period. The revision is August 2020 – December 2020 and the number of days is 153 days.</i>				
Documentation provided by project participant				
<i>Revised MR</i>				
DOE assessment				Date: 25/05/2021
The number of days is now corrected. However, the estimated emission reduction provided to be correct. CAR is closed.				

CAR ID	03	Section no.	E.3					Date: 21/04/2021	
Description of CAR									
PP shall provide the end user agreements of the following digester IDs for verification:									
2651	2690	2836	3150	3621	3987	4188	4488	4741	5198
4468	4471	4552	4856	5341	5722	6462	6503	6549	6551
Project participant response							Date: 09/05/2021		
The end user agreements of the following Biogas Unit IDs are provided									
2651	2690	2836	3150	3621	3987	4188	4488	4741	5198
4468	4471	4552	4856	5341	5722	6462	6503	6549	6551
Documentation provided by project participant									
End User Agreements of the following Biogas Unit IDs.									
2651	2690	2836	3150	3621	3987	4188	4488	4741	5198
4468	4471	4552	4856	5341	5722	6462	6503	6549	6551
DOE assessment							Date: 25/05/2021		

PP has provided requested end user agreement. The agreements are checked and found to be okay. CAR is closed.

Table 4. FAR from this verification

FAR ID	XX	Section No.	Date: DD/MM/YYYY
Description of FAR			
Project participant response			Date: DD/MM/YYYY
Documentation provided by project participant			
DOE assessment			Date: DD/MM/YYYY

- - - - -

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	6 April 2021	Revision to: • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN); • Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		