

Verification and certification report form for GS CDM project activities

(Version 03.0)

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

BASIC INFORMATION

Title and reference number of the project activity	Social Education and Development Society (SEDS) Biogas CDM project for the rural poor UNFCCC Ref # 3541 GS Ref# GS849
Scale of the project activity	☐ Large-scale ☒ Small-scale
GS Version applicable	Version 2.1
Version number and Completion date of the verification and certification report	Version 02 12/04/2021
Monitoring period number and duration of this monitoring period	05 Duration of the monitoring period is: 01/01/2018 to 31/12/2019 (Inclusive of both the days)
Version number of the GS monitoring report to which this report applies	03
Crediting period of the project activity corresponding to this monitoring period	01/01/2018 – 31/12/2024
Project participants	M/s Social Education and Development Society (SEDS) (Host Country) Evangelisches Werk für Diakonie und Entwicklung e.V. (Annex I Country)
Host Party	India
Applied methodologies and standardized baselines	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User” ver.7.
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	31,498 tCO ₂
Certified amount of GHG emission reductions or GHG removals for this monitoring period	24,595 tCO ₂
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

4KES has been commissioned by “M/s Social Education and Development Society (SEDS)” to perform an independent verification of its registered GS CDM project “Social Education and Development Society (SEDS) Biogas CDM project for the rural poor”, UNFCCC Ref#3541 & GS Ref# GS849 for the reported GHG emission reductions for the given monitoring period 01/01/2018 – 31/12/2024 (both dates included). The GS 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, GS Passport 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 and the Gold Standard requirements.

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.

The CDM requirements of the project have been assessed in the CDM verification report (Version 03, dated 25/01/2021) which is submitted to UNFCCC. The Gold standard SD parameter monitoring requirements of the project are assessed in this report.

Description of project:

The project activity is the installation of biogas plants (digesters) of 2 m³ capacity each for single households in Penukonda, Roddam, Somandepalli, Gorantla and Chilamathur Mandals of Anantapur 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 that uses non-renewable biomass for cooking. 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 and all the 5,000 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 onsite visit 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 GS CDM verification under consideration.

Verification contract	10/03/2020
On site verification	03/07/2020
Draft Verification Report	06/07/2020
Final Verification Report	12/04/2021

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	IR	Puratchikkanal	Ma Paa	Central Office	x	x	x	x
2.	Verifier/Local Expert	IR	Puratchikkanal	Ma Paa	Central Office	x	x	x	x
3.	Technical Expert	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	C	Indumathi	Central Office
2.	Approver	IR	S	Jagajothi	Central Office

SECTION C. Means of verification

C.1. Desk/document review

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.

C.2. On-site inspection

The project is a Gold Standard CDM project. 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. Due to the COVID pandemic situation, the DOE already postponed the site visit up to two month. 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.

This is also in line with Gold Standard rule update COVID 19: INTERIM MEASURES published by GS on 06/04/2020 (updated on 23/07/2020)¹

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

¹ https://globalgoals.goldstandard.org/standards/RU_2020-COVID-19_Interim-measures.pdf

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Joshua	Manil Jayasena	SEDS	03/07/2020	- 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
2	P	Nagamani	SEDS	03/07/2020		Narendra Kumar
3	Tetaert	Filip	SEDS	03/07/2020		Anand SR
2.	Padmanaba	Sudha	FCN	03/07/2020	Data Analysis Issues in the MR ER calculation	M P Kanal Narendra Kumar Anand SR
Beneficiary Name						
No	Last Name	First Name	Unit No.	Date	Subject	Team Member
1	M	Eswaramma	3664	03/07/2020	Verification of data collected through survey Awareness about ownership of CERs Working condition of bio-digester unit SD parameters verification Awareness about Grievance mechanism	M P Kanal
2.		Jayamma	3667	03/07/2020		Narendra Kumar
3.	B	Sujathamma	2959	03/07/2020		
4.		Sarojamma	2961	03/07/2020		Anand SR
5.		Chowdamma	2966	03/07/2020		
6.		Suseela	3086	03/07/2020		
7.		Arunamma	3087	03/07/2020		
8.		Nanjamma	3319	03/07/2020		
9.	K	Lakshmidevi	852	03/07/2020		
10.		Rangamma	854	03/07/2020		
11	C	Vijaya Gowri	977	03/07/2020		
12.	K	Varalakshmi	1362	03/07/2020		
13.	K	Saraswathamma	3886	03/07/2020		
14.		Ashwini	976	03/07/2020		
15.	B	Suseelamma	3985	03/07/2020		

16.	P	Vijayalakshmi	78	03/07/2020		
17.	D	Shakeena	4691	03/07/2020		
18.	G	Venkatalakshmi	467	03/07/2020		
19.	S	Jayamma	464	03/07/2020		
20.	K	Kanthamma	476	03/07/2020		
21.	R	Thulasamma	473	03/07/2020		

Verification team cross verified SD parameters which are monitored through samples survey. Apart from the verification of SD parameters 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
Since when you are using the biogas plant?	Verification team received varied responses from each household based on the implementation date
Is the biogas system in operating conduction?	All end users confirmed the biogas system in operating condition now.
How many cattle you have?	All end users confirmed having cattle varying from 2 – 8.
Are you aware that the project claims emission reduction and the ownership of the ERs are with SEDS?	All the end users aware that the all the rights of emission reduction are with SEDS as the bio digester was constructed by SEDS at free of cost. They also confirmed about the agreement signed with SEDS for giving away the emission reduction rights to SEDS.
When you use fuel wood for cooking along with biogas, do you intimate to village volunteers?	All households confirmed they will intimate it when the village volunteers visit the households.
Is there any repairs done to your digester or stove? If yes what is the cost you paid for the repair?	Few households confirmed that their stoves/digesters are repaired during the monitoring period. Households reported various repairs done such as burner repair, gate-valve repair, dome re-plaster, gas pipe repair etc. All the households confirmed that the repairs are done free of cost or at nominal price depends on the type of repair.
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 easily contact village volunteer.
Does the village volunteer visit your house regularly? For what purpose?	All the households confirmed that the village volunteer visit their households regularly to check the regular use of biogas stove and to record any non-operational days.
Is indoor smoke reduced due to the use of biodigester?	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 biodigester?	All the households confirmed reduction in cooking time.
Is any there any reduction in use of fertilizer in field due to application of biogas slurry?	All the households confirmed reduction in usage of chemical feterilizer.

C.4. Sampling approach

All the parameters are monitored 100%. No monitoring parameter has been determined by PP though sampling approach.

However, PP has conducted Kitchen test on sample basis in the non-project households to determine the fuel wood consumption of each cooking item. This will be fixed for this crediting period.

The Kitchen test results have been conducted in 10 non-project households where only traditional stoves are used. Verification team checked the appropriateness of test results using the following steps:

- The Method of Kitchen test followed by PP is checked and found to be in accordance with established international/national procedures.
- The Kitchen test results have been crosschecked with the respective Kitchen test monitoring sheet and found no error
- The method of Kitchen test is simple and the PP's staffs are found to be capable of doing the test.

It is also found that the total fuel wood consumption determined though kitchen test is in line with the baseline fuel wood consumption. Hence, the verification team accepts the Kitchen test result.

However, some of the SDG parameters are monitored though sample survey which are randomly cross verified though acceptance sample survey.

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

During the course of verification the findings may be raised as under;

CAR is raised if one of the following occurs:

- Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- Issues identified in a FAR during validation to be verified during verification(s) have not been resolved by the project participants.

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

FAR is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

The verification report contains (Appendix 4) all CARs, CLs and FARs raised during this verification in transparent manner and provides clear information of the issues raised, response received and its resolutions, including the changes in the documents. Total 01 CAR, 05 CLs and 0 FAR are raised in this verification report.

SECTION D. Verification findings

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

Means of verification	Verification team checked previous (4 th) verification reports/4/ and RCP validation report/4/ found that no FAR has been raised.
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Findings	NA
Conclusion	NA

D.2. 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 interview with PP & end users during 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 PDDs. The verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the registered PDD. Interviews with operational personnel and households and random samplings have been carried out.
Findings	CAR-01 is 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 has observed from remote audit 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 interviews and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated and registered PDD/3/ and that all physical features of the project are in place.

D.3. Evaluation of SD Parameters

Means of verification

The verification team checked the sustainable development indicator parameters during the site visit and interview. Following include the discussion on any additional parameters that are monitored in accordance with the monitoring plan for sustainability indicators as referred in the approved Gold Standard Passport (version 9, 08/08/2018) and SD monitoring report version 03 (dated 10/04/2021).

Monitoring sample survey:

Some of the SD parameters & Emission reduction parameters are monitored through sample survey during the monitoring period. The verification team checked whether the PPs have applied a sampling approach to determine the monitored values. For the parameters determined through sampling, the verification team checked the sampling approach followed for each monitoring parameters to confirm the sampling plan mentioned in the revised approved PDD.

PP has conducted annual sample survey where the sample size is determined based on the on 90/10 confidence & precision level. The sample size calculation is verified and found to be correct. The chosen minimum sample size of 31 is verified to be correct. The parameters were monitored through stratified sample survey conducted by PP during the year 2018 (at 32 households) and during the year 2019 (at 69 households). The verification team confirmed that the sample size considered for the survey is found to be appropriate.

SD Parameters:

As per the sustainability monitoring plan in the approved revised GS passport, verification team evaluate all sustainable development indicators as followed table:

No	Indicator	Chosen parameter in the registered GS Passport and monitoring report	Way of monitoring	Verification Team's opinion	Verified score
1.	Air Quality	No. of biogas units constructed and operating	Recorded in Monitoring database	The number of bio-digesters installed and operating has been taken from PP's monitoring database/14/. Verification team checked database and found that the value provided (ie, 5000 biogas units) is correct. Since the units are repaired as and when a complaint is received, and 99 % of the units are found to be functional. Based on the days of use of all the constructed biogas units, the functionality rate is calculated as 79%, as 21% of the total biogas days, units were not functional. The indoor air quality will be better in the project households due to smokeless interiors and hence the indicator is rated as positive is correct.	+ (Positive)
		Reduction in incidence of health problems due to better indoor air quality	Sample survey conducted at project households	Reduction in smoke and suspended particles in air leading to cleaner kitchen compared to baseline is monitored through sample survey/15/ conducted among the end users. Verification team checked all the sample survey sheets and found that the details provided in the excel sheet is correct. Verification team also conducted acceptance sample survey during the remote audit in 21 numbers of households and found no error in the parameter values monitored by PP. As per the survey results, the end-users confirms that they realised reduction in the issues viz. i) indoor smoke, ii) suspended particles in air, iii) problems related to Eyes and Lungs, compared to baseline condition. Hence the indicator is rated as positive is correct.	
2.	Other pollutants	Quantity of pathogens in slurry compared to that of dung	Laboratory test of pathogen load in slurry and dung	The laboratory test results/22/ were checked and found that there was decrease in the bacterial count of biogas slurry by 94% compared to that of dung. Thus it has been accepted that the project activity reduces other pollutants and thereby improves cleanliness and sanitation. Hence the indicator is rated as positive is correct.	+ (Positive)
4.	Livelihood of the poor	Improvement in living conditions especially of women in the family as perceived by the communities	Sample survey conducted at project households	All the sample survey sheets/15/ are checked and found that the value provided in the excel sheet is consistent with the sample survey sheets. Also verification team conducted acceptance sample survey during remote audit and confirmed that the values determined by PP though sample survey is correct. As	+ (Positive)

				per the survey results there has been reduction of cooking time by nearly 46%. In the baseline scenario, nearly 4.37 hours per day was spent on cooking, which is now reduced to 2.37 hours/day and hence the saved time is used for other activities by women. There is improvement in living conditions of women as they need not keep blowing air to keep the fire going, which used to affect their lungs and eyes due to smoke and particulate matter. There are also improvements in terms of clearer homes; water savings; cleaner vessels without soot from fire; ease of cooking The women used the time saved due the use of biodigester in cooking for various activates such as own fields farming, work as daily wage and taking up some jobs such as tailoring, run petty shop etc. During the site visit, the verification team also observed, project household women spending time in farming activities, working as daily wage etc. From comparing the monitored values with baseline conditions mentioned in the passport, verification team concludes the project makes positive impacts on this indicator.	
5	Access to affordable and clean energy services	No. of biogas units constructed and operating	Recorded in Monitoring database	The number of biogas units installed and stoves repaired are taken from PP's monitoring database/14/. Verification team checked database and found that the value provided (ie, 5000 biogas units) is correct. Of the 5000 biogas units installed, 4953 of the units are functional and are rid of indoor air pollution due to construction and operation of biogas units and hence the indicator is rated as positive which is correct.	+ (Positive)
6	Human and institutional capacity	Improvement in human and institutional capacity as perceived by the communities.	Sample survey conducted at project households	All the sample survey sheets/15/ are checked and found that the value provided in the excel sheet is consistent with the sample survey sheets. Also verification team conducted acceptance sample survey during remote audit and confirmed that the information obtained by PP though sample survey is correct. As per the survey results families that have school going children have confirmed that they are able to send their children to school in time. As per the survey results about 65% of the women responded to working in their own lands or work as labourer in other lands; 17% of them did non-agricultural activities such as cook in schools, factory employee, run petty shop, sell flowers and tailoring; 50% of women are able to	+ (Positive)

				tend to their cattle and have better income from selling milk to milk cooperatives; 7% of women responded to having a more leisurely life The information was cross checked during interviews conducted during remote audit. Hence, the project makes positive impact on this indicator	
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In summary, verification team confirms that all monitored sustainable development indicators are in accordance to the approved revised GS passport. It is also confirmed that all three categories (ie, Environment, Social Sustainability and Development and Economic and Technological Development) are rated as positive hence the project fulfils the eligibility requirement

Finding: CL-01, CAR-02, CAR-03 & CAR-04 are raised and closed successfully

Conclusion:

The adequacy and compliance of the monitoring plan in the Monitoring report was found as per the requirements laid by the GS Passport, monitoring methodology and the revised PDD. The information flow (from data generation, aggregation, to recording, calculation and reporting) is already included under respective parameter above. The verification team has verified all the data and collected evidence as per the required monitoring frequency and found to be correct and appropriate meeting the requirements of the GS Passport, applied methodology and revised PDD.

D.4. Stakeholder Inputs & Grievance Mechanism

Means of verification	Verification team verified the continuous input and grievance mechanism in place. PP has provided various options for the stakeholders continuous input and grievance viz. Grievance book at SEDS office, Telephone & email access and nominated village volunteers for each village/group of village. The Verification team also interviewed the stakeholders/end users and confirms that they are aware about the grievance mechanism in place for this project activity. The verification team checked the grievances register. All the inputs from stakeholders are related to repair and maintenance of biogas digester. PP attended all the cases and resolved the same. There are no other grievances reported by Stakeholders during the current or previous monitoring period. Verification team checked the repairs and replacement records and confirmed that all the cases are resolved by either repairing the digester and stove. The grievance register maintained at the SEDS office is verified and found that no other grievances received.
Findings	CAR-05 is raised and closed satisfactorily
Conclusion	The verification team confirms the following: - The only grievances received from bio-digester users are related to repairs & maintenance of digesters & stoves. All the cases received during the monitoring period are attended and resolved during the monitoring period itself. - No other grievances received during the current or previous monitoring period

D.5. Assessment of Data & calculation of GHG Emission Reductions

The detailed assessment of GHG emission reduction is provided in the CDM verification report. As assessed by the verification team, the following details are confirmed for the reported monitoring period 01/01/2018 – 31/12/2024 (Inclusive of both the days)

	Amount	Unit
Baseline emissions (BE)	25,890	tCO ₂ e

Project emissions (PE)	0	tCO ₂ e
Leakage emissions (LE)	1,295	tCO ₂ e
Certified emission reductions (CERs)	24,595	tCO ₂ e

D.6. Recommendations / Forward action request

No FAR has been raised in this verification.

SECTION E. 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 and GS 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 F. 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 on site visit, the data submitted by PP was cross verified with the values mentioned in the SD monitoring survey sheet and GS monitoring report/1/. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the SD monitoring plan as mentioned in the approved Passport.

Evidences (Documents/interview/site visit) referred for verification of individual monitoring parameter defined in section D.3 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 24,595 tCO₂e emission reductions during period 01/01/2018 – 31/12/2019.

SECTION G. Certification statement

4K Earth Science Pvt. Ltd. has been contracted by 'M/s Social Education and Development Society (SEDS)' to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the GS CDM Project activity "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" and UNFCCC Ref # 3541 & GS Ref# GS849 for the monitoring period 01/01/2018 – 31/12/2019. (including both dates) in the GS Monitoring Report Version 01 (first version) dated 10/06/2020.

The verification is based on the revised CDM PDD, GS Passport and the SD 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 'M/s Social Education and Development Society (SEDS)' is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out in the CDM monitoring report (version 05, dated 22/01/2021) and monitoring of SD parameters on the basis set out within this final GS Monitoring Report (version 03, dated 10/04/2021). The calculation and determination



of GHG emission reductions from the project is the responsibility of the management of the M/s Social Education and Development Society (SEDS). The development and maintenance of records and reporting procedures are in accordance with the CDM Monitoring Report and GS Monitoring report.

It is our responsibility to express an independent GHG verification on the GHG emissions and on the calculation of GHG emission reductions and & SD parameter assessment opinion of the project for the monitoring period 01/01/2018 – 31/12/2019. (including both dates) based on the reported emission reductions in the Final CDM Monitoring Report (version 05, dated 22/01/2021) for the same period. The verification and conclusion about the GHG emission reductions are provided in the CDM verification report, version 03, dated 25/01/2021 which is submitted to UNFCCC. The assessment of SD parameters is provided in this report.

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: 01/01/2018 – 31/12/2019 (including both dates)

Verified and certified emission in the above reporting period:

Vintage	Period	Gold Standard Voluntary emission reductions (GS CERs)	Unit
2018	01/01/2018 to 31/12/2018	13,182	tCO ₂ e
2019	01/01/2018 to 31/12/2019	11,413	tCO ₂ e
Total	01/01/2018 to 31/12/2019	24,595	tCO ₂ e

Verification team also confirms the SD parameters are correctly monitored and all the monitored indicators rated as positive. Hence, the project results in sustainable development.

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
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
SEDS	Social Education and Development Society
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.	Ma Paa Puratchikkanal				
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
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	29-07-2019					
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		
	Agriculture	15.1		Agriculture		
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: 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	Technical Expert	Technical Reviewer	Financial Expert
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	29-07-2019					
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		
	Waste handling and disposal	13.1		Solid waste and wastewater		
Authorized to work as Local Expert for:						
Country/Countries	India					

<u>Compliance check by:</u> Anand S. R.	
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<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Anand S.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	Technical Expert	Technical Reviewer	Financial Expert
Appointed	No	No	Yes	No	No	No
Appointed Date	29-07-2019					
Authorized to work as Technical Expert for:						
Authorized Technical Area						
Authorized to work as Local Expert for:						
Country/Countries	India					
<u>Compliance check by:</u> R. Narendra Kumar						

<u>Certificate of Competence</u>			
Name	☐ Mr. ☒ Ms.	Indumathi .C	
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
Appointed	Yes	Yes	Yes
Appointed Date	29-07-2019		
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
	Waste handling and disposal	13.1	Solid waste and wastewater
Authorized to work as Local Expert for:			
Country/Countries	India		
<u>Compliance check by:</u> Anand S. R.			

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	SEDS	GS SD Monitoring Report,	Version 01, dated 10/06/2020	SEDS
	SEDS	GS SD Monitoring Report,	Version 02, dated 17/08/2020	SEDS
	SEDS	GS SD Monitoring Report,	Version 03, dated 10/04/2021	SEDS
2	SEDS	CDM Monitoring Report	Version 05, dated 22/01/2021	SEDS
	SEDS	ER Calculation Sheet	Version 05, dated 22/01/2021	SEDS
3	SEDS	Registered PDD (2 nd Crediting period)	Version 14, dated 31/05/2018	Publicly available
	SEDS	GS passport (2 nd Crediting period)	Version 09, dated 08/08/2018	Publicly available
4	TUV Nord	RCP Validation Report (2 nd Crediting period)	Version 2, dated 06/06/2018	Publicly available
5	KBS Cert	GS 4 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	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 07	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	SEDS	Biogas basic record set: - Biogas application form - End user agreement for CER ownership - Completion certificate - Online monitoring solution	-	SEDS
15	SEDS	Sample survey monitoring sheets for the year 2018 & 2019	-	SEDS
16	SEDS	Kitchen Test monitoring sheets conducted in non-project households	-	SEDS
17	SEDS	Training Records:	-	SEDS

		- Training conducted for end user - Training conducted for Mason - Training conducted for staffs - Training conducted for Village Level Volunteers		
18	SEDS	Village level plant breakdown log sheets maintained by village level volunteers	-	SEDS
19	SEDS	List of biogas units that are not functional	-	SEDS
20	SEDS	Employment Records	-	SEDS
21	SEDS	Grievance records	-	SEDS
22	Bangalore Testing Lab	Biogas slurry analysis report Cow dung analysis report	-	SEDS
23	Gold Standard	Performance review report of 4 th verification	-	SEDS
	Gold Standard	Design renewal review report		SEDS

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.	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 Verification

CL ID	01	Section no.	Date: 06/07/2020
Description of CL			
In section 7, under the 'Access to affordable and clean energy services' monitoring, the number of repairs are not mentioned consistently. As per the description above the table, number of repairs done during the monitoring period is 4147; but as per the table it is 4167. As per monitoring database, the number of repairs done during the monitoring period is 5268. Moreover the some of repair items are not traceable from the monitoring solution. Clarification is requested			
Project participant response			Date: 17/08/2020
<i>The value is corrected to 4167, which is in line with the database and the table. The action taken to restore the biogas unit to be operational is only included as repaired. For instance, problems such as "animal sold", "kitchen not used" are not included as it does not come under units repaired. Hence the total number of repairs is 4167.</i>			
Documentation provided by project participant			
<i>Revised SD Report, Version 2.</i>			
DOE assessment			Date: 01/10/2020

PP has now made the number repairs consistently in the MR. The explanation regarding the problems that are not traceable is found to be acceptable
CL is closed.

Table 3. CAR from this verification

CAR ID	01	Section no.		Date: 06/07/2020
Description of CAR				
The title of the project mentioned in the SEDS SD report is not consistent with the registered documents.				
Project participant response				Date: 17/08/2020
<i>The title is corrected.</i>				
Documentation provided by project participant				
<i>Revised SD Report, Version 2.</i>				
DOE assessment				Date: 01/10/2020
The Title of the project is now corrected by PP and the corrected name is found to be consistent with the registered documents. CAR is closed				

CAR ID	02	Section no.	-	Date: 06/07/2020
Description of CAR				
In all the SD monitoring parameter table, the result of monitoring value is provided. However, the monitoring method followed for each SD parameter is not clearly explained in the SD report.				
Project participant response				Date: 17/08/2020
<i>The monitoring methods for each of the SD Indicators are provided in the revised SD Report</i>				
Documentation provided by project participant				
<i>Revised SD Report, Version 2</i>				
DOE assessment				Date: 01/10/2020
PP has now clearly provided monitoring method for each SD parameter in the SD report. CAR is closed.				

CAR ID	03	Section no.	-	Date: 06/07/2020
Description of CAR				
In section 7, under the 'Air quality' monitoring, the total biogas units that are not functional is mentions as 48. As per the monitoring database, the total dysfunctional/demolished units as on end of monitoring period are 47. Corrective action is requested				
Project participant response				Date: 17/08/2020
<i>It is a type error. The value is corrected to 47</i>				
Documentation provided by project participant				
<i>Revised SD Report, Version 2.</i>				
DOE assessment				Date: 01/10/2020
The typo error has been corrected by PP. CAR is closed				

CAR ID	04	Section no.	-	Date: 06/07/2020
Description of CAR				
In section 7, under the 'Other pollutant' monitoring, the value of Total Bacterial Count for dung and biogas slurry mentioned is not consistent with the respective test result.				
Project participant response				Date: 17/08/2020
<i>The typo error is corrected.</i>				
Documentation provided by project participant				
<i>Revised SD Report, Version 2</i>				
DOE assessment				Date: 01/10/2020
The typo error is corrected by PP and the revised value is consistent with the test result. CAR is closed.				

CAR ID	05	Section no.	-	Date: 06/07/2020
Description of CAR				
PP shall explain the grievance mechanism in place and the grievances received during the monitoring period and the action taken on the grievances.				
Project participant response				Date: 17/08/2020
<i>The section on grievance mechanism is included in the revised SD Report</i>				
Documentation provided by project participant				
<i>Revised SD Report, Version 2.</i>				
DOE assessment				Date: 01/10/2020
PP has explained the grievances mechanisms in place and details of the grievances in the SD report. CAR is closed				

Table 4. FAR from this verification

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

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