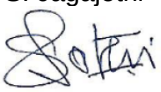
Verification and certification report form for GS project activities

(Version 04.0)

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

BASIC INFORMATION	
Title and GS reference number of the project activity	Biogas project, Uttarakhand, India (GS3906)
Scale of the project activity	☐ Large-scale ☒ Small-scale
Version number of the verification and certification report	1.1
Completion date of the verification and certification report	19/06/2022
Monitoring period number and duration of this monitoring period	Monitoring period no: 3 Duration: (01/01/2020) to (31/12/2020) (Inclusive of both days)
Version number of the monitoring report to which this report applies	1.2
Crediting period of the project activity corresponding to this monitoring period	02/01/2017 – 01/01/2024
Project participants	HELVETAS Swiss Intercooperation Partners in Prosperity (PnP) WWF Switzerland myclimate - The Climate Protection Partnership
Host Party	India
Applied methodologies and standardized baselines	Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption (Version 2.0)
Mandatory sectoral scopes	Sectoral Scope 1 and 13
Conditional sectoral scopes, if applicable	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	28,124 tCO2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	16,609 tCO2e
Name of the VVB	4K Earth Science Private Limited
Name, position and signature of the approver of the verification and certification report	S. Jagajothi  Director

SECTION A. Executive summary

4K Earth Science Private Limited (4KES) has been commissioned by "Myclimate - The Climate Protection Partnership" to perform an independent verification of its registered GS VER project "Biogas project, Uttarakhand, India", GS Ref # GS3906 for the reported GHG emission reductions for the given monitoring period 01/01/2020 - 31/12/2020 (both dates included). The GS VER projects must undergo independent third-party verification and certification of emission reductions as the basis for issuance of Verified Emission Reductions (VERs).

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

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

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

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

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

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

Description of project:

The GS Project activity is the installation of biogas plants (digesters) of 2 m^3 or 3 m^3 capacity each for single households in the districts of Nainital, Udham Singh Nagar, and Haridwar in Uttarakhand and in the districts of Sravasti and Bahraich in Uttar Pradesh, India. The biogas units will be fed by cattle dung generated from the households. The biogas stoves will replace the traditional fire wood used for cooking purposes.

In baseline situation, households used traditional fire wood stove which is inefficient. In the project situation the biogas stoves are used for cooking and hence completely avoiding the usage of traditional stoves which results in savings in non-renewable biomass. Thereby, it avoids the related CO2 emission from the avoidance of non-renewable biomass in cooking. The PP planned to install biogas units in 4,900 households in which 3,900 units were commissioned at the end of this monitoring period i.e., 22/05/2019.

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 Gold Standard Verification work plan of the project activity is made available at Gold Standard registry in accordance with Gold Standard rules.

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

Following are the major milestones for the verification under consideration.

Verification contract	29/10/2021
Remote site verification	09/03/2022 to 14/03/2022
Draft Verification Report	27/03/2022
Final Verification Report	18/04/2022

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader/ Verifier/ Technical Expert (1.1 & 13.2)	IR	Kumar	Senthil	Central	X	X	X	X
2.	Verifier/ Technical Expert (1.1 & 13.2)	IR	Ramaraj	Narendra Kumar	Central	X	X	X	X

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer (TA 1.1 & 13.2)	**IR**	Puratchikkanal	Ma Paa	Central
2	Approver	**IR**	Jagajothi	S	Central

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.		Assessment of the risk	

	Risk that could lead to material errors, omissions or misstatements	Risk level	Justification	Response to the risk in the verification plan and/or sampling plan
1.	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 site visit check of actual situation to sample number of households.
2	Transfer of data from sampling survey sheet to ER sheet	Low	Possible human error during transfer of data to ER sheet	Thorough cross-check required on the transfer of data from survey sheets to the ER sheet
3	Error in ER calculations	High	The sample size was large, hence increasing the chances of error in ER calculation	The ER calculations were checked for accuracy.

C.2. Consideration of materiality in conducting the verification

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

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

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

	MR Version (Draft)	MR Version (Final)
Emission reductions/annum	16,609 tCO_2e	16,609 tCO_2e
Identified Threshold	5.0%	5.0%

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

Parameter	Verification approach	Error identified	Corrected	Extrapolated error for population size (Qty and %)	Within Threshold
$P_{p,y}$	Acceptance sample survey	No error identified.	NA	No Impact	Yes
$U_{p,y}$	Acceptance sample survey	No error identified	NA	No Impact	Yes
N_{biogas}	Verification of project database & checking 10% of records	No error identified	NA	No Impact	Yes
$LE_{p,y}$	Acceptance sample survey	No error identified	NA	No Impact	Yes

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

SECTION D. Means of verification

D.1. Desk/document review

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

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

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

D.2. Remote-site inspection

09/03/2022 to 14/03/2022				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening Meeting, Office Inspection, Verification of monitoring records, interviews and database inspection	Remote	09/03/2022	Senthil
2	Interview with monitoring team	Remote	09/03/2022	Senthil
3	Visit to sample beneficiary households	Beneficiary households,	09/03/2022 to 14/03/2022	Senthil

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**
	Last name	**First name**	**Affiliation**		
1.	Parvez	Khurram	PNPINDIA	09/03/2022 & 14/03/2022	- General aspects of the project - Quality management system - 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 - Data analysis - ER Calculations - MR editorial issues
2	Tiwari	Dhirendra	PNPINDIA		
3	Leon	Paul	Myclimate		
Beneficiary Details with Unit ID					
1	Mangat Sharma		IC RMR 0333	09/03/2022 to 14/03/2022	- Verification of monitored data - Awareness about ownership of VERs - Working condition of digester unit
2	Gopal Singh		IC RMR 0334		
3	Raghuvir singh		IC RMR 0401		
4	Sarjeet Kaur		IC KOT 0332		
5	Lalit Singh Negi		IC KOT 0311		

6	Surendra Kumar	IC KOT 0256 A		- SD parameters verification
7	Kapoor Singh	IC KOT 0288 A		
8	Bhagwan Singh	IC KOT 0216		
9	Pankaj Kumar	IC RMR 0327		
10	Heera singh	IC RMR 0367		
11	Santosh singh	IC RMR 0398		
12	Girish Chand Dubey	IC GAD 0040		
13	Shoban Singh	IC GAD 0049		
14	Pushkar Singh	IC KHA 0049		
15	Raj Kapoor Singh	IC KHA 0295		
16	Kuldeep Saini	IC BHG 0046		
17	Anita Devi	IC BHG 0047		
18	Kavita Devi	IC BHG 0058		
19	Ram Naresh	ICSIV 007		
20	Milan	ICSIV 013		
21	Kamlesh	ICSIV 017		
22	Laxmi kant	ICSIV 042		
23	Surya Prakesh	ICSIV 043		
24	Manoj Bajpeai	IC SIV 121		
25	Udayraj	IC SIV 116		

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

Questions asked by verification team	**Summary of Response by Stakeholders/end users**
Since when you are using the biogas system?	verification team received varied responses from each household based on the implementation date
Is the biogas system is in operating condition now?	All the households visited reported operational condition.
Is there any repairs done for the biogas system?	Few households confirmed that their biogas systems are repaired in the past.
Have you signed end user agreement with Myclimate/PNP through which the GS VER rights are transferred to Myclimate?	All households confirmed that they have signed end user agreement with PNP/Myclimate.
Did you participate any training conducted by PnP?	All households confirmed that the PnP staff trained them on functioning of the biogas unit and on the slurry management during implementation and follow-up visits
How the digester slurry is disposed?	Most of the households confirmed that the digester slurry is used as fertilizer for agriculture as trained by the PnP staff.
If any issue with the biogas system or any grievances, to whom you will report to resolve the issue/ grievances?	All households confirmed that either they report to PnP staff. They also confirmed they have the mobile number of the PnP Staff.
How useful is the biogas system?	All households confirmed cooking in the biogas smokeless compared to old traditional wood stove. They also confirmed cooking in the biogas system is safer and operation of the system is easy.

	The households also mentioned that considerable amount of time saved due to the use of biogas system from fuel wood collection, cooking and cleaning utensils.
Is there any reduction in indoor smoke & eye problem?	All households confirmed reduction in indoor smoke & eye problem
Do you use any other fuel other than biogas?	All households confirmed that only biogas system is used primarily for cooking. But, few households reported they use LPG which they got through Ujjwala scheme, but rarely as after the cylinder given by government. Few households also reported they use fuel wood some times when the cook outdoors or some specific items.
You have any concerns with the biogas system/project?	No households reported any concerns over the project.

D.4. Sampling approach

PP has applied the following values to the parameter (**P_p**) through sampling approach. the PP has applied upper bound value of the confidence interval from the previous monitoring results (of year 2018 and 2019) as the (adjusted) value of the parameter 'Pp,y' for the current monitoring period.

Parameter	Method of monitoring	Number of sample
Quantity of woody biomass consumed in the project scenario in year y and per day in year y. (**P_p**)	Kitchen Performance test (KPT)	52 samples – PFT 2021
Usage rate in project scenario p during year y (**U_p**)	Sample survey	178 samples
Leakage in project scenario p during year y	No survey conducted	NA

Also the following SDG parameters are monitored through annual sample survey

- Share of farmers who used slurry as fertilizer
- Percentage of project households confirming that with the project there is no smoke inside the home.
- Proportion of farmers who saves time for collecting fuel wood

Verification Team along with remote audit assessment observation, objective evidence collections, data generation and recording analysis also considered the views obtained in these interviews while arriving at Verification Opinion. Verification team used acceptance sampling approach to verify the parameters.

Standard auditing techniques has been applied to assess and verify the quality of information provided during the course of verification.

For the parameter 'Quantity of woody biomass consumed in the project scenario in year y and per day in year y. (P_p)' is verified from checking all the KPT test sheets.

For the other parameters which PP determined it through monitoring survey, verification team cross checked the monitored data through acceptance survey. Verification team has determined acceptance sample size for all the sample survey parameters based on the table provided under para 39 of standard "Sampling and surveys for CDM project activities and programmes of activities" version 9.

Producers risk	Consumers risk	AQL	UQL	Sample size	Acceptance Number
5%	10%	1%	15%	23	1

Accordingly, the verification team verified a total of 30 Samples for each survey and observed that the sampling survey results of the PP for all the HHs checked were found to be consistent with VVB's field survey results.

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	2	1	-
Post-registration changes	1	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	2	-	-
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	2	1	-
Stakeholder Inputs & Legal Dispute	-	-	-
Others (please specify)	-	-	-
Total	8	2	-

SECTION E. Verification findings

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

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

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

This is the 3rd verification of the project activity.

A FAR was raised during the deviation request (Deviation reference number COVID_DEV_166, dated 05/01/2021). The same has been checked during the verification. The FAR as follows.

PD shall check the monitored value of the parameter during the next verification cycle (i.e., for MP post 31/12/2019) and retroactively adjust the number of ERs for the current verification accordingly, if the actual trend (in the parameter value) shows that the ERs for the current verification have been overestimated.

The PP has evaluated this point and has provided the response,

- ➔ The value of firewood consumption in biogas plant users is (PFT 2021) 0.00085 t/day/stove, but in PFT 2017 upper bound value of 0.00224 t/day/stove was used, it is concluded that this is not an overestimation in previous verification as the surveys conducted this year showed a reduction from previous value used. Therefore, there is no need for retroactively adjust the number of ERs in previous verification.
- ➔ During the previous PFT 2017 upper bound value 0.00224 t/day/stove was used in the ER calculation. The firewood consumption of the beneficiaries during the current monitoring period is determined through project field test 2021 by the PP and reported value is 0.00085 t/day/household. Verification

team checked the survey data and found the reported value is found to be correct. The reduction of firewood usage among the beneficiaries found during the survey. The use of the lowest PFT -2021 value in the previous verification will increase the emission reductions. Hence the PP claims there is no need for retroactively adjust the number of ERs in previous verification, which is appropriate and acceptable to the verification team.

The VT has checked this information and is of the opinion that the PP has in the previous verification used upper bound values, and hence no overestimation is envisaged, so it is concluded that no adjustment is required for the number ERs of the previous verification.

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

Means of verification	As part of the remote audit, the verification team was able to confirm that the project implementation is in accordance with the project description contained in the registered PDD (version 06.5, dated 15/04/2020)/3/ and GS transition document available on GS website. The project activity involved the installation of biogas plants (digesters) of 2 m^3 or 3 m^3 capacity each for single households in villages of Nainital, Udham Singh Nagar and Haridwar Districts of Uttarakhand and in the districts of Sravasti and Bahraich in Uttar Pradesh. The biogas units will be fed by cattle dung generated from the household cattle. The biogas stoves will replace the traditional fire wood stoves used for cooking purposes. The project is being implemented by Partners in Prosperity – PnP. Until March 2019, the project was implemented by Intercooperation Social Development India (ICSD) and later the project transferred to Partners in Prosperity – PnP. The same is confirmed though interview with PnP. Verification team also checked the letter to PnP by ICSD (dated 01/07/2019)/23/and the subcontract agreement between PnP and HELVETAS (dated 16/07/2019)/23/ and confirmed the change of the project proponent. 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 CO_2 emission from the avoidance of non-renewable biomass in cooking. The PP planned to install biogas units in 4,900 households in which 3,900 units were commissioned at the end of this monitoring period ie, 22/05/2019. The verification team determined the conformity of the actual project activity and its operation with the validated project design document. Verification team has, by means of a desk review and an remote site audit, assessed that all physical features of the GS project activity proposed in the revised & approved PDD. 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	CAR01 is raised and closed.
Conclusion	The verification team has reviewed the project database, monitoring database, monitoring survey data, and end user agreements. The verification team has observed based on remote audit techniques that all physical locations of the biogas units on sample basis and found that the details are correctly matching with the monitoring report and monitoring records maintained by PP. The type of the biogas provided and the locations are consistent with the revised PDD. Thus, the verification team has concluded that the project activity was implemented and operated as per revised PDD. The verification team, based on the site visit and document review, was able to conclude that the project activity has been

	commissioned and implemented as per the revised PDD and that all physical features of the project are in place

E.4. Post-registration changes

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

E.4.2. No temporary deviation from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents is sought for this monitoring period. Corrections

No correction is sought in this verification.

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

There are no changes to the start date of the crediting period in this monitoring.

E.4.4. Inclusion of a monitoring plan

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

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

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

E.4.6. Changes to the project design

A Post Registration Change was approved on June 4, 2020. The project has included a new state Uttar Pradesh as part of project scope.

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

Not applicable

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

Means of verification	The verification team checked compliance of project monitoring plan with the applied methodology (Technologies and Practices to Displace Decentralized Thermal Energy Consumption, Version 2.0).
Findings	No findings
Conclusion	All parameters stated in the monitoring plan and the applied methodology has been fulfilled in the current monitoring report. All baseline emission parameters have been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further sections of this report. The monitoring plan as mentioned in the registered PDD is in accordance with the applied methodology. In the opinion of the verification team the monitoring report complies with the requirement of the registered PDD and applied methodologies in the context of the project activity.

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

E.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
$EF_{b,CO2}$	1.7472 tCO_2/t wood	Yes
$EF_{b,non-CO2}$	0.1356 tCO2eq/t wood	Yes
$EF_{p,CO2}$	1.7472 tCO_2/t wood	Yes
$EF_{p,non-CO2}$	0.1356 tCO2eq/t wood	Yes
$f_{NRB,i,y}$	86.48%	Yes
$P_{b,y}$	0.01042 t_biomass/day	Yes
GWP_{CH4}	25	Yes

Findings	No finding
Conclusion	The values of ex ante fixed parameters have been verified from the revised PDD/3/. Same has been crosschecked with the source mentioned in the PDD and found to be consistent. The verification team confirms that the values used/applied are correct and justified. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.

E.6.2. Data and parameters monitored

Means of verification	The verification team has determined whether the approved monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the approved monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the revised PDD. During the verification all monitoring parameters listed in Section D.2 of MR were compared with section B.7.1 of the revised PDD have been verified with regard to the: (i) appropriateness of the applied measurement / determination method, (ii) the correctness of the values applied for ER calculation, (iii) the accuracy, and applied QA/QC measures. The monitored values are assessed as follows: **$P_{p,y}$:** The parameter 'Quantity of woody biomass consumed in the project scenario per day in year y' is determined through field test (FT). The parameter is updated every two years as per the monitoring requirements of the PDD. In line with the PDD requirement. The verification team checked all the KPT results/16/ and found no error in the calculation. Hence, verification team found that the 'Quantity of woody biomass consumed in the project scenario per day in year y' determined through FT (0.00085 (t_biomass/day) FT 2021) is found to be correct. **$U_{p,y}$** : The parameter 'Usage rate in project scenario p during year y' is monitored through annual sample survey. As per usage survey 2020, 76.97 % value is applied. Verification team checked all survey sheets of PP/15/. Also, verification team did acceptance survey in 25 households from the PP's sample population randomly

	and confirmed that the value provided by PP is correct. No error is found in the PP's data. Hence, the usage rate determined by PP (i.e., 76.97% - Monitoring and Usage Survey 2021) is found to be correct. **$N_{p,y}$:** The parameter 'Cumulative number of technology days in the project database for project scenario' is determined from the actual number of days between the installation date of each stove and the end of the monitoring period. The verificaiton team randomly verified (10% of total population) the installation date from Sales record/Project database/14/ and found all the installation date of the digesters are correct. Verification team also checked the number of days calculation of all beneficiaries and found that the estimation is correct. Hence, the value considered for 'Cumulative number of technology days in the project database for project scenario' (i.e., For 2020 = 1,427,400 days) is found to be correct. **N_{biogas}:** The parameter 'Cumulative number units of biogas units installed' is taken from total Sales record. Verification team checked the sales records & the project database/14/ and found that the value considered by PP is correct. Hence, the value considered for the parameter 'Cumulative number units of biogas units installed' as on 31st December 2020 (i.e., 3,900 Nos) is found to be correct. **$LE_{p,y}$:** The parameter **'**Leakage in project scenario p during year y' is justified as per previous monitoring period 1. Verification cross checked the monitoring report of monitoring period 1 and found appropriate for the monitoring as well and PP made following observations during verification. • Verification team observed that 3 stone stove is not a equipment but arrangement of 3 stone which can be prepared easily. The 3 stone stoves were already used in the non-project households outside project boundary. Hence, the project does not make use of old technology in outside project boundary. • Still non-project households still use traditional cook stove. • This project size is very less compared to the whole population and odes not have any effect on NRB. • It is noticed that one GS project is registered in the project area ie, GS 3971 Prayas- A VER project for the rural communities in Uttarakhand. Effect of this project is also negligible since the project size is very small. • Verification team has checked all the PP's sample survey data/15/ and also conducted acceptance sample survey in 30 households selected from PP's sample population. From the acceptance sample survey verification team found that no households use any space heating technology and matching with PP's results. • As verified from baseline survey and interview with PP the baseline technology used is the 3 stone biomass stove which is high emission intensive technology. As validated above, no leakage emission is applicable for this monitoring period. Hence, considering the leakage emission as 0 is found to be appropriate.
Findings	CL-02, CL05, CL06 and CAR-02 has been raised and closed
Conclusion	Corresponding to the §361 of VVS V2/12/, the team confirm that the monitoring has been carried out in accordance with the revised PDD/3/. The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in revised PDD/3/. The monitored data for the parameters has been verified by checking the procedure for information flow and found to be complete and consistent.

E.6.2.1. Implementation of sampling plan

Means of verification	The verification team checked whether the PPs have applied a sampling approach to determine the monitored parameters. For the parameters determined through sampling, the verification team checked the sampling approach followed for each

<table>
<tr><td></td><td>monitoring parameters to confirm the sampling plan mentioned in the revised PDD and applied methodology.

The details of the required sample size and actual sample size is given in the below table.

<table>
<tr><th>Parameter</th><th>Minimum sample size required as per methodology & PDD</th><th>Actual sample size considered</th><th>Is sample size is adequate?</th></tr>
<tr><td>Quantity of woody biomass consumed in the project scenario in year y and per day in year y. (P_p)</td><td>20
(with requirement of 90/30 rule)</td><td>52</td><td>Yes</td></tr>
<tr><td>Usage rate in project scenario p during year y (U_p)</td><td>100</td><td>178 samples – Survey 2021</td><td>Yes</td></tr>
<tr><td>Leakage in project scenario p during year y</td><td>Once in two years</td><td>No sampling done</td><td>Not applicable</td></tr>
<tr><td>SD Parameters</td><td></td><td></td><td></td></tr>
<tr><td>Users’ perception on smoke</td><td rowspan="2">100</td><td rowspan="2">178 samples – Survey 2021</td><td rowspan="2">Yes</td></tr>
<tr><td>% of farmers that use slurry as fertilizer</td></tr>
</table>

Hence, the sample size considered for all the parameters are found to be acceptable.</td></tr>
<tr><td>Findings</td><td>CL-02, 03 and CAR 02 is raised and closed</td></tr>
<tr><td>Conclusion</td><td>Verification team concludes the following:
• The sample size considered for all the parameters (which are monitored through sampling basis) are found to be appropriate
• The precision level achieved from the monitored data also confirms that the sample size considered for the monitoring is sufficient.
• The sampling plan is implemented correctly in accordance with the revised PDD</td></tr>
</table>

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

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

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

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

Means of verification	As per methodology, the emission reduction is directly calculated. Hence, not applicable.
Findings	NA.
Conclusion	NA

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

Means of verification	As per methodology, the emission reduction is directly calculated. Hence, not applicable.
Findings	NA
Conclusion	NA

E.8.3. Calculation of leakage GHG emissions

Means of verification	As verified in section E.6.2, the parameter Leakage in project scenario p during year y', the leakage emission is negligible. Hence, the leakage emission is considered as zero.
Findings	NA
Conclusion	The leakage emission is considered as zero. Please refer section E.6.2 above for detailed assessment.

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

Means of verification	The verification team has checked whether calculations of baseline GHG emissions calculation have been carried out in accordance with the formulae and methods described in the registered monitoring plan. In detail the following has been verified: Transparency: It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. Correctness: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology. Completeness: It has been checked whether all calculations are complete and without omissions As per PDD and applied methodology, the emission reduction is calculated using the formula: $ER_y = \sum_{b,p} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,\,fuel} * (f_{NRB,b,\,y} * EF_{fuel,\,CO2} + EF_{fuel,\,nonCO2})) - \sum LE_{p,y}$ **(1)** Σb,p Sum over all relevant (baseline b/project p) couples Np,y Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y Up,y Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate (fraction) Pb,p,y, Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, and as derived from the statistical analysis of the data collected from the field tests *f*NRB,b, y Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario) $NCV_{b,fuel}$ Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton) $EF_{fuel,CO2}$ CO_2 emission factor of the fuel that is substituted or reduced.112 tCO_2/TJ for wood/wood waste. $EF_{fuel,nonCO2}$ Non-CO_2 emission factor of the fuel that is reduced $LE_{p,y}$ Leakage for project scenario p in year y (tCO_2e/yr)

<table>
<tr><td></td><td>From the calculated emission reduction calculated as per above formula, the emission reduction for the vintage 2020 are estimated.

PP has submitted the calculation in the excel sheet/2/. The emission reduction calculation in the excel sheet is checked whether the calculation is in accordance with the formula given in the approved PDD/3/ and the selected methodologies/6/.</td></tr>
<tr><td>Findings</td><td>No findings</td></tr>
<tr><td>Conclusion</td><td>The verification team confirms the following:
The calculations of emission reduction 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 baseline calculation is overall correct.
The ER calculation sheet provided is clear, transparent and the calculations provided in the sheet are reproducible.
Hence, the emission reduction reported in the monitoring report for the monitoring period) is verified to be correct
The summery of baseline emission are as below:
<table>
<tr><th>Vintage</th><th>$\sum BE_{b,y}$ (tCO_2)</th><th>$\sum PE_{b,y}$ (tCO_2)</th><th>$\sum LE_{b,y}$ (tCO_2)</th><th>ER* (tCO_2)</th></tr>
<tr><td>2020 (01/01/2020 to 31/12/2020)</td><td>18,855</td><td>1,547</td><td>699</td><td>16,609</td></tr>
<tr><td>Total</td><td>18,855</td><td>1,547</td><td>699</td><td>16,609</td></tr>
</table>
*rounded down values</td></tr>
</table>

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

<table>
<tr><td>Means of verification</td><td>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.5 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD
<table>
<tr><td>Emission reduction estimated as per the registered PDD/3/</td><td>Actual emission reduction achieved as per Monitoring report/1/</td></tr>
<tr><td>28,124 t CO_2e</td><td>16,609 t CO_2e</td></tr>
</table></td></tr>
<tr><td>Findings</td><td>No finding</td></tr>
<tr><td>Conclusion</td><td>The estimated emission reduction as per PDD and the actual emission reduction achieved for the monitoring period are correctly reported in the section E.5 of MR.

Since the actual ER is less that estimated ER, hence no justification is required.</td></tr>
</table>

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

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

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

<table>
<tr><td>Relevant SDG</td><td>SDG 1
Target 1.4.1 Proportion of population living in households with access to basic services

SDG17</td></tr>
</table>

<table>
<tr><td></td><td>Target 17.7.1 Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies</td></tr>
<tr><td>Parameter description</td><td>Cumulative number units of biogas units installed</td></tr>
<tr><td>Monitored Value</td><td>3,900</td></tr>
<tr><td>Means of verification</td><td>The number of bio-digesters installed and operating has been taken from PP‟s project database. Verification team checked project database and sale records and found that the number digesters installed as on 31/12/2020 is 3,900. Hence it is confirmed that the value provided in the MR is correct.</td></tr>
<tr><td>Findings</td><td>CL05 and CAR02 raised and closed.</td></tr>
<tr><td>Conclusion</td><td>The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.
<table>
<tr><th rowspan="2">Vintage</th><th colspan="3">Number of beneficiaries of the project activity who have ‘continuous & free’ access to biogas for daily cooking</th></tr>
<tr><th>Baseline value</th><th>Project Value</th><th>Net Benefit</th></tr>
<tr><td>2020 (01/01/2020 to 31/12/2020)</td><td>0</td><td>3,900</td><td>3,900</td></tr>
<tr><td>Total</td><td>0</td><td>3,900</td><td>3,900</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Relevant SDG</td><td>SDG 2
Target 2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size

SDG 3
Target 3.9.3 Mortality rate attributed to unintentional poisoning</td></tr>
<tr><td>Parameter description</td><td>Percentage of farmers who applicate the sludge from the biogas unit</td></tr>
<tr><td>Monitored Value</td><td>76.97% - Monitoring and Usage Survey 2021</td></tr>
<tr><td>Means of verification</td><td>The value has been derived from the project database and the monitoring surveys. As per the project database, 3,900 households were provided the biogas units.
As part of the project monitoring process, random households were selected and surveyed from the project database to determine the SDG impact. During the monitoring each of the randomly surveyed households were requested to provide the information on the use of the biogas slurry for agriculture.

VVB verified the same with survey forms, as well as interviewed few beneficiaries and cross verified the reported values.</td></tr>
<tr><td>Findings</td><td>No findings</td></tr>
<tr><td>Conclusion</td><td>The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.
<table>
<tr><th>Vintage</th><th>Baseline value</th><th>Project Value</th><th>Net Benefit</th></tr>
<tr><td>2020 (01/01/2020 to 31/12/2020)</td><td>4%</td><td>76.97 %</td><td>72.97 %</td></tr>
<tr><td>Total</td><td>4%</td><td>76.97 %</td><td>72.97 %</td></tr>
</table></td></tr>
</table>

Relevant SDG	**SDG 2** **Target 2.3.1** Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size

	SDG 4 **Target 4.4.1** Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill **SDG 17** **Target 17.7.1** Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies
Parameter description	Total number of people trained on different aspects of the project
Monitored Value	In 2020: 1091 Persons and 19 User Group. • 79 Awareness campaign. • 204 O&M training. • 187 O&M Farmer's training. • 398 Farmer's training. • 224 Refresher training.

Awareness campaign

Date	Number of participants
7-Oct-20	17
16-Oct-20	22
21-Oct-20	40
	79

O&M training

Date	Number of participants
26-Sep-20	12
3-Oct-20	6
10-Oct-21	6
17-Oct-20	7
24-Oct-20	12
31-Oct-20	9
7-Nov-20	13
20-Nov-20	8
28-Nov-20	20
5-Dec-20	20
12-Dec-20	9
19-Dec-20	18
23-Dec-20	43
26-Dec-20	21
	204

O&M Farmer's training

Date	Number of participants
26-Sep-20	16
3-Oct-20	6
10-Oct-20	10
17-Oct-20	12
24-Oct-20	16
31-Oct-20	14
7-Nov-20	13
20-Nov-20	12
28-Nov-20	20
5-Dec-20	20
12-Dec-20	9
19-Dec-20	18
26-Dec-20	21
	187

Farmer's training

Date	Number of participants
15-May-20	13
23-May-20	15
30-May-20	32
6-Jun-20	22
13-Jun-20	19
27-Jun-20	14
25-Jul-20	19
1-Aug-20	18
8-Aug-20	21
22-Aug-20	17
29-Aug-20	21
26-Sep-20	16
3-Oct-20	6
10-Oct-20	10
17-Oct-20	12
24-Oct-20	16
31-Oct-20	14
7-Nov-20	13
20-Nov-20	12
28-Nov-20	20
5-Dec-20	20
12-Dec-20	9
19-Dec-20	18
26-Dec-20	21
	398

Refresher's training

Date	Number of participants
28-Nov-20	20
28-Nov-20	24
28-Nov-20	23
28-Nov-20	20
28-Nov-20	14
28-Nov-20	24
28-Nov-20	14
28-Nov-20	25
5-Dec-20	60
	224

Means of verification	The verification team discussed with PP and PP confirmed that the different trainings mason training, O&M training, etc. verification team checked the PnP records document such as 'Biogas Audit requirement' and 'Income generation women training data'. And found appropriate trainings are conducted and hence contributes positively to this SDG parameter.
Findings	No findings
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.

Relevant SDG	**SDG 3** **Target 3.9.1** Mortality rate attributed to household and ambient air pollution
Parameter description	Proportion of families surveyed who stated there is no smoke inside the home divided by total of users interviewed.
Monitored Value	100.00 % (Monitoring survey 2021).
Means of verification	The Users' perception on smoke is determined using annual sample survey. PP has conducted sample survey of 178 households during the 2021. Verification team checked all survey sheet of PP. Also, verification team also conducted acceptance survey in 25 households from the PP's sample population randomly from PP's sample population and confirmed that the value provided by PP is correct. No error is found in the PP's data.
Findings	No finding
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct. Hence, project contributes positively to the indicator.

Vintage	Baseline value	Project Value	Net Benefit
2020 (01/01/2020 to 31/12/2020)	0	100.00 %	100.00 %
Total	0	100.00 %	100.00 %

Relevant SDG	**SDG 5** **Target 5.A.1** (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure.
Parameter description	Number of women trained by PnP on income generating activities
Monitored Value	353

Income generating activities training

Date	Number of participants
28-Feb-20	56
31-Jul-20	25
31-Jul-20	15
31-Jul-20	18
4-Aug-20	19
6-Aug-20	23
10-Aug-20	14
10-Aug-20	14
10-Aug-20	16
29-Aug-20	10
4-Nov-20	15
6-Nov-20	17
9-Nov-20	23
9-Nov-20	20
9-Nov-20	28
20-Nov-20	20
12-Oct-20	10
12-Dec-20	10
TOTAL	**353**

Means of verification	Verification team checked the training records and found that the details of the training provided to woman on income generation activities is correct. PP has also provided list of user group created during the monitoring period including the details such as location of the group, formation date, group president, number of member in each group and meeting schedule which is verified consistent with details provided in the MR. The verification team also interviewed the PnP management and few people who are included in the user group and found that the user group details provided in the MR is correct.
Findings	No finding
Conclusion	The parameter is monitored appropriately, in accordance with the registered monitoring plan. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. All the monitored parameter values reported in the MR are found to be correct.

Vintage	Baseline value	Project Value	Net Reduction
2020 (01/01/2020 to 31/12/2020)	0	353	353
Total	0	353	353

Relevant SDG	**SDG 7** **Target 7.1.2** Proportion of population with primary reliance on clean fuels and technology
Parameter description	Usage rate in project scenario p during year y
Monitored Value	76.97% - Monitoring and Usage Survey 2021
Means of verification	The parameter 'Usage rate in project scenario p during year y' is monitored through annual sample survey. As per usage survey 2021, 76.97 % value is applied. Verification team checked all survey sheets of PP/15/. Also, verification team did acceptance survey in 25 households from the PP's sample population randomly and confirmed that the value provided by PP is correct. No error is found in the PP's data. Hence, the usage rate determined by PP (ie, 76.97 - Monitoring and Usage Survey 2021) is found to be correct.

Findings	No findings
Conclusion	The verification team confirms the values reported are in line with the monitoring plan as per registered document.

E.10. Stakeholder Inputs & Legal Dispute

Means of verification	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 stove or replacement of the stove. Verification team checked with PP whether any legal consent or dispute arise during the monitoring period and PP also confirmed that there are no such legal contests or dispute that has arisen with the project during the monitoring period
Findings	No finding
Conclusion	The verification team confirms the following: • The only grievances received from biogas users are related to repairs & maintenance of stoves. All the cases received during the monitoring period are attended and resolved during the monitoring period itself. • No other grievances received during the current or previous monitoring period • No legal consent or dispute raised during the monitoring period.

SECTION F. Internal quality control

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

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

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

SECTION G. Verification opinion

The verification team confirms that the the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification and on-site visit, 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/site visit) 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 **16,609 tCO_2e** emission reductions during period 01/01/2020 to 31/12/2020.

SECTION H. Certification statement

4K Earth Science Pvt. Ltd. has been contracted by 'myclimate – The Climate Protection Partnership' to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported and the contribution to sustainable development indicators from the GS Project activity "Biogas project, Uttarakhand, India" and GS Reference Number GS3906 for the monitoring period 01/01/2020 to 31/12/2020 (including both dates) in the Monitoring Report Version 01 (first version) dated 25/01/2022

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

The management of the 'myclimate – The Climate Protection Partnership' and 'Partners in Prosperity (PnP)' are responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions &monitoring of SD parameters on the basis set out within the project Final Monitoring Report Version 1.2 dated 24/05/2022. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the 'myclimate – The Climate Protection Partnership' and 'Partners in Prosperity (PnP)'. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 1.2 dated 24/05/2022.

In our opinion the GHG emissions reductions reported for the project activity are fairly stated in the Monitoring Report (final) 1.2 dated 24/05/2022. 4KES based on outcome of verification activities, certifies in writing that, during the monitoring period 01/01/2020 to 31/12/2020 (including both days), the registered GS PA "Biogas project, Uttarakhand, India" in the registered GS PA achieved the verified amount of **16,609 tCO_2e** reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the PA

The Verified and certified impacts during the monitoring period 01/01/2020 to 31/12/2020 (including both dates) is stated below:

Sustainable Development Goals Targeted	**SDG Impact**	**Amount Achieved**	**Units/ Products**
SDG 1: No poverty	Cumulative number units of biogas units installed	3,900	Units
SDG 2: Zero Hunger	Share of farmers who used slurry as fertilizer	72.97	%
	Number of people trained (men and women) on different aspects of the project	1,091 persons and 19 User Groups	Number of people
SDG 3: Good health and well-being	User's perception on smoke.	100.00	%
	Concerning soil pollution, share of farmers who used slurry as fertilizer	72.97	%
SDG 4: Education	Number of people trained (men and women) on different aspects of the project	1,091 persons and 19 User Groups	Number of people
SDG 5: Gender equality	Number of women trained by ICSD (since 2019 PnP) on income generating activities	353	Number of people

	Proportion of farmers who saves time for collecting fuel wood	98.88	%
SDG 7: Affordable and clean energy	Number of persons that benefit from efficient and clean technologies	18,162	Number of people
SDG 8: Decent work and economic growth	Number of local people employed (men and women) due to the project activity	4	Number of people
	Average wages of people employed (men and women) due to the project activity	338,181	INR
SDG 12: Sustainable consumption and production	Fuel savings in % achieved by project technologies compared to baseline	91.80	%
SDG 13: Climate action	ER expected in the crediting period	16,609	VERs
SDG15: Life on Land	Amount of wood equivalents saved by the project	3.49	Tons/y/HH
SDG17: Partnership for the goals	Number of people trained (men and women) on different aspects of the project	1,091 persons and 19 User Groups	Number of people
SDG17: Partnership for the goals	Cumulative number units of biogas units installed	3,900	Units

Appendix 1. Abbreviations

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

Appendix 2. Competence of team members and technical reviewers

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Narendra Kumar .R**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		27-04-2021					
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		
		Waste handling and disposal		13.2	Manure		
Authorized to work as Local Expert for:							
Country/Countries		India					
Compliance check by: Anand S. R.							

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Ma Paa Puratchikkanal**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		27-04-2021					
Authorized to work as Technical Expert for:							
Authorized Technical Area		**Sectoral Scope**		**TA Code**	**Technical Area within the scope**		
		Energy industries (renewable - / non-renewable sources)		1.1	Thermal energy generation		
		Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
		Energy demand		3.1	Energy demand		
		Construction		6.1	Construction		
		Waste handling and disposal		13.1	Solid waste and wastewater		
		Waste handling and disposal		13.2	Manure		
		Agriculture		15.1	Agriculture		

Authorized to work as Local Expert for:	
Country/Countries | India	
Compliance check by: Anand S. R.	

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Senthil Kumar V**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		29-09-2021					
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		
		Waste handling and disposal		13.2	Manure		
Authorized to work as Local Expert for:							
Country/Countries		India					
Compliance check by: Anand S. R.							

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	myclimate	Monitoring Report	Version 01, dated 25/01/2022	myclimate
	myclimate	Monitoring Report	Version 1.1, dated 24/05/2022	myclimate
	myclimate	Monitoring Report	Version 1.2, dated 01/04/2022	myclimate
2	myclimate	VER Calculation Sheet	Version 01	myclimate
3	myclimate	Revised and approved PDD	Version 8, Dated 14/10/2020	myclimate
	myclimate	VER Estimation sheet	Dated 14/10/2020	myclimate
4	4K Earthscienc e	Final Verification Report	Version 2.1 Dated 21/08/2020	publicly available
5	GS	Technologies and Practices to Displace Decentralized Thermal Energy Consumption (Version 3.1),25th August 2017	Version 03.1	publicly available
6	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
7	UNFCCC	Kyoto Protocol (1997)	Web Link	publicly available
8	GS	Template: Gold standard for the Global Goals Monitoring report	Version 01	publicly available

9	UNFCCC	CDM project standard for project activities	Version 02	publicly available
10	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
11	UNFCCC	CDM validation and verification standard for project activities	Version 02	publicly available
12	UNFCCC	Glossary "CDM terms"	Version 08	publicly available
13	PnP	Biogas basic record set: - Sales record - End user agreement for VER ownership - Project database	-	myclimate
14	PnP	Usage Survey monitoring sheets for this monitoring period	Conducted for the year 2020	myclimate
15	PnP	Sample Field Test data	Conducted for the year 2017	myclimate
16	PnP	SD Parameter monitoring sheet	Conducted for the year 2020	
17	PnP	Training Records: - Training conducted for O&M staff - Training conducted for Masons - Training conducted for women - Training conducted to people age less than 35 - Training conducted for beneficiaries	Conducted for the year 2020	myclimate
18	PnP	Employment records: - Salaried employed list - Biogas service provided list - Mason list Employment contracts	For period: 01/01-2020-31/12/2020	
19	PnP	Plant complaint register	Covering the period 01/01/2020-31/12/2020	myclimate

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

Table 1. CL from this Verification

CL ID	01	**Section no.**	-	**Date:** 22/02/2022
Description of CL				
Project Participant (PP) is requested to share the following details: 1.No.of Units installed in current Monitoring Period (01/01/2020-31/12/2020) 2. Total Sales Record for the current Monitoring Period (01/01/2020-31/12/2020) 3. Supporting for SDG 7 4. Selected few photographs of units installed & trainings conducted in current Monitoring Period (01/01/2020-31/12/2020) 5. Register for stakeholder Complaints / Grievance				
Project participant response				**Date:** 25/03/2022

1. The number of units installed during 2020 were zero, in ER calculation excel file 'Database' spreadsheet is shown that the last units were installed in 2019.
2. In the same in ER calculation excel file 'Database' spreadsheet is shown the list of 3,900 units installed since 2015.
3. About supporting for SDG 7 as you will see in section D.2 MR (p.30) the value of this parameter is based on the number of units (3900 – Database sheet in Excel file 'GS3906 ER Calculation MR3'), the usage rate (based on usage surveys, see excel file 'Monitoring-Usage survey 2021 MR3') and the average size of a family (based on monitoring surveys – see excel file 'Monitoring-Usage survey 2021'). The evidence for SDG7 have already been shared.
4. Some photographs of units installed & trainings conducted in 2020 are submitted to VVB as part of our answer to your 1st round.
5. For stakeholder Complaints / Grievance, in the link shared previously https://mycbox.myclimate.org/index.php/s/xweWWQyyGwbioT6 there is a folder SDG Data 2020/Complains Passbook Photo 2020 with 2 pdf files, here the source of photos included in section G.1 of MR for complaints/grievances.

Documentation provided by project participant

1. Excel database
2. Photographs
3. Complaints passbook for complaints/Grievances

DOE assessment | **Date:** 03/04/2022

1. The number of units installed in 2020 is zero, so it is ok.
2. Total units are checked and found to be ok.
3. SDG 7 has been checked based on the units of installation, the database has been checked and the value is found to be ok.
4. Training records based on photographs are found to be ok.
5. Complaints/Grievance reports have been checked, hence ok, CL01 is closed.

CL ID	02	**Section no.**	B.1	**Date:** 22/02/2022

Description of CL

PP is requested to confirm that the Project Activity has been implemented and operated as per the registered GS Passport /PDD and there have been no major changes during the current monitoring period.

Project participant response | **Date:** 25/03/2022

At the section of section B.1 is added the next statement 'Project Activity has been implemented and operated as per the registered GS Passport /PDD after the Design Change (see section B.2.5 below) and there have been no major changes during the current monitoring period as no new biodigester were installed in period 01/01/2020-31/12/2020' to confirm the VVB inquiry.

Documentation provided by project participant

Revised MR

DOE assessment | **Date:** 03/04/2022

Revised MR as been checked, PP has stated that the project is operational as per the registered PDD. CL02 is closed.

CL ID	03	**Section no.**	B.1.1	**Date:** 22/02/2022

Description of CL

FAR was raised during the previous verification (2nd), the PP is requested to share the following documents w.r.t 2nd Verification / Monitoring Period:

1. Monitoring Report,
2. Verification Report, and
3. Emission Reduction Calculation Sheet.

Documentation provided by project participant

The MR, VR and ER calculation sheet for 2nd verification are submitted to VVB as part of the statements mentioned in section B.1.1.

DOE assessment | **Date:** 03/04/2022

The FAR has been checked. Since the PP has used the upper bound values in the previous verification, the adjustment of ERs during the previous verification is deemed not necessary. CL03 is closed.

CL ID	04	**Section no.**	B.2.5	**Date:** 22/02/2022
Description of CL				
PP is requested share to & fro emails and confirmation email from Gold Standard for the approval of Post Registration Changes.				
Project participant response				**Date:** 25/03/2022
The email and GS Design Change Review Final approved by GS on June 04, 2020 are submitted to VVB.				
Documentation provided by project participant				
Emails				
DOE assessment				**Date:** 03/04/2022
The emails of the PP with the GS has been checked and found to be agreable. Hence CL04 is closed.				

CL ID	05	**Section no.**	B.2.5	**Date:** 22/02/2022
Description of CL				
Uttar Pradesh state has been added as one of the additional changes, PP to clarify if there were any plants installed in this state during the current monitoring period.				
Project participant response				**Date:** 25/03/2022
As mentioned in CL ID 01 the number of units installed during 2020 were zero, in ER calculation excel file 'Database' spreadsheet is shown that the last units were installed in 2019 including the units in Uttar Pradesh.				
Documentation provided by project participant				
Database				
DOE assessment				**Date:** 03/04/2022
The database has been checked, since no units have been added during the monitoring period, the CL05 is closed.				

CL ID	06	**Section no.**	C - (C)	**Date:** 22/02/2022
Description of CL				
PP is requested to share the Baseline and Project non-renewable biomass (NRB) assessment				
Project participant response				**Date:** 25/03/2022
The information of Baseline and Project non-renewable biomass (NRB) assessment is explained in PDD v6.5 (version approved during Design Change) appendix 9, the excel with the NRB calculation is also submitted to VVB. Both documents were approved during the GS Design Change Review.				
Documentation provided by project participant				
Excel sheet				
DOE assessment				**Date:** 03/04/2022
The excel as been checked for the NRB assessment and found to be satisfactory. CL06 is closed.				

CL ID	07	**Section no.**	C - (D)	**Date:** 22/02/2022
Description of CL				
PP is requested to share - List of beneficiaries to be surveyed 2019 (footnote no:9).				
Project participant response				**Date:** 25/03/2022
There are typos in footnote 8, 9 and 11, the correct evidence is 'List of beneficiaries to be surveyed 2021', the document is submitted to VVB. This document evidence the number of surveys to be done for monitoring and usage surveys and Field Performance Test based on the database and the number of units installed per District and biodigester's age.				
Documentation provided by project participant				
List of beneficiaries to be surveyed 2021'				
DOE assessment				**Date:** 03/04/2022
The document as been corrected, the error has been checked to rectified. CL07 is closed.				

CL ID	08	Section no.	D.2	Date: 22/02/2022
Description of CL				
PP is requested to share the PnP employment, training details for the current monitoring.				
Project participant response				**Date:** 25/03/2022
The list of training of SDG 2-4-17 are in the link shared previously https://mycbox.myclimate.org/index.php/s/xweWWQyyGwbioT6 there is a folder SDG Data 2020/SDG 2-4-17_Training Scan Data 2020 - 1092 Participants with 5 pdf files with the training conducted during the current monitoring period.				
Documentation provided by project participant				
Employment details Training details				
DOE assessment				**Date:** 03/04/2022
The PP has provided the training records and the employment details, the same has been checked and found to be OK. CL08 is closed.				

Table 2. CAR from this verification

CAR ID	01	Section no.	C & D.2	Date: 22/02/2022
Description of CAR				
The following URLs are not working or not accessible: 404 Error: https://globalgoals.goldstandard.org/standards/407_V2.0_EE_ICS_Technologies-and-Practices-to-Displace-%20Decentrilized-Thermal-Energy-TPDDTECConsumption.pdf%20p.26 https://paycheck.in/salary/minimumwages/22125- uttarakhand https://paycheck.in/salary/minimumwages/21888- uttar-pradesh/21965-all-registered-factories-which-are-not-mention				
Project participant response				**Date:** 25/03/2022
The footnote 7 has been corrected, it is https://globalgoals.goldstandard.org/standards/407_V2.0_EE_ICS_Technologies-and-Practices-to-Displace-Decentrilized-Thermal-Energy-TPDDTECConsumption.pdf p.26 The links included in section D.2 parameter SDG8 - Number of jobs offered has been separated https://paycheck.in/salary/minimumwages/22125-uttarakhand https://paycheck.in/salary/minimumwages/21888-uttar-pradesh/21965-all-registered-factories-which-are-not-mention				
Documentation provided by project participant				
All links				
DOE assessment				**Date:03/04/2022**
The links provided by the PP has been checked with the data provided, it is working and fine. CAR01 is closed.				

CAR ID	02	Section no.	D.3	Date: 22/02/2022
Description of CAR				
The sample survey carried comprises of 178 samples for 4 districts out of 5, the Bahraich district has substantial coverage of samples even when the no. of installations is only 394 nos, whilst., sample coverage is 31%. Whereas Haridwar & U.S. Nagar comprises a total of 1477 installations (461 & 1016 respectively) and sample coverage is cumulative of 38% (12% for Haridwar & 26% for U.S. Nagar), the selection of sample is based on of the key factor 'age'. The spread and distribution of sample survey needs further clarity and also the impact on VER calculations due to the reduced efficiency based on the age.				
Project participant response				**Date:** 25/03/2022

The document 'List of beneficiaries to be surveyed 2021' evidence how the number of surveys for monitoring and usage surveys and Field Performance Test surveys were defined based on the database and the number of units installed per District and factor age of the biodigesters.

The sample for monitoring and usage surveys of 178 samples cover 4 of 5 district (Shrawasti only has 6 units installed), the reason because Bahraich district has a substantial coverage is because as GS rule defined a minimum sample of 30 survey per biodigester's age. Bahraich district has almost all the units installed that have 2 years - and also an importance coverage for units with 3 years (see table below). The age of each unit was defined based on the court date before the survey were conducted (the court date was defined at 31.05.2021 – see excel file List of beneficiaries to be surveyed 2021 spreadsheet 'Database; cell V2).

Districts	# units installed	Share of units %	# Monitoring & Usage survey	Share of Survey %
Nainital	**2023**	51.9%	**85**	48%
U.S Nagar	**1016**	26.1%	**26**	15%
Haridwar	**461**	11.8%	**12**	7%
Bahraich	**394**	10.1%	**55**	31%
Shrawasti	**6**	0.2%	**0**	0%
	3900		**178**	

Stove age	Bahraich	Haridwar	Nainital	Shrawasti	U S Nagar	Grand Total
2	171			6		177
3	223		169			392
4		20	652			672
5		299	514		802	1615
6		142	688		214	1044
Grand Total	**394**	**461**	**2023**	**6**	**1016**	**3900**

As mentioned, the number of samples is based on factor 'age' and district with a minimum number of surveys per age (based on GS rules) of 30 surveys – which lead to a change in the representation of sample size for surveys in Haridwar & U.S. Nagar, but the spread and distribution of sample survey do not impact on VER calculations. In MR section D.2 parameter Up,y (Usage rate in project scenario p during year y) is explained that the single usage parameter weighted to be representative of the quantity of project technologies of each age being credited (see Monitoring & Usage survey file cell GM185 and GM204). In this excel file is demonstrate that the results of usage surveys were used to define the usage rate per age and then the final 'Usage parameter weighted' calculated as 78.62% (see table below), but as the simple average usage rate found of the usage surveys was 76.97%, this value was used for ER calculation.

Until Dec 31, 2020	# units	Share of units installed %	Usage rate per age
Age5-6	506	13%	81.08%
Age4-5	2068	53%	81.08%
Age3-4	541	14%	75.76%
Age2-3	499	13%	70.27%
Age1-2	286	7%	76.47%
	3900	**Usage parameter weighted**	**78.72%**

Formula for usage parameter weighted: Biogas population in each age group * Values applied for weighted average assessment / Total biogas units

$Population_{5-6}$*Usage $rate_{5-6}$ + $Population_{4-5}$*Usage $rate_{4-5}$ + $Population_{3-4}$*Usage $rate_{3-4}$ + $Population_{2-3}$*Usage $rate_{2-3}$ + $Population_{1-2}$*Usage $rate_{1-2}$ / Total population

Documentation provided by project participant

List of beneficiaries to be surveyed 2021'

DOE assessment	Date:03/04/2022
The PP has done a survey to cover the households and age of the units, in doing so they followed the GS requirements to cover 30 samples. So the explanation provided by the PP is deemed acceptable. Hence CAR02 is closed.	

Appendix 1. Table 3. FAR from this verification

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

- - - - -

Document information

Version	*Date*	*Description*
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