Verification and certification report form for CDM project activities

(Version 04.0)

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

BASIC INFORMATION			
Title and UNFCCC reference number of the project activity	Kolar Biogas Project UNFCCC Ref No: 4058		
Scale of the project activity	☐ Large-scale ☒ Small-scale		
Version number of the verification and certification report	01		
Completion date of the verification and certification report	04/04/2022		
Monitoring period number and duration of this monitoring period	Seventh Monitoring period 01/01/2020– 31/12/2020 (including both days)		
Version number of the monitoring report to which this report applies	1.1		
Crediting period of the project activity corresponding to this monitoring period	01/04/2012 to 31/03/2022 (Fixed)		
Project participants	SKG Sangha Foundation myclimate – The Climate Protection Partnership		
Host Party	India		
Applied methodologies and standardized baselines	AMS.I.C – "Thermal energy production with or without electricity" ver. 18 AMS.I.E – "Switch from Non-Renewable Biomass for Thermal Applications by the User" ver.3 AMS.III.R – "Methane recovery in agricultural activities at household/small farm level" ver.1		
Mandatory sectoral scopes	Sectoral Scope 1, Energy industries (renewable-/non-renewable sources) Sectoral Scope 13: Waste handling and disposal		
Conditional sectoral scopes, if applicable	NA		
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	56,227 t CO_2e		
Certified amount of GHG emission reductions or GHG removals for this monitoring period	Amount before 1 January 2013	Amount from 1 January 2013 until 31 December 2020	Amount from 1 January 2021
	NA	52,294 tCO_2e	NA

Name and UNFCCC reference number of the DOE	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

>>

4KES has been commissioned by "Foundation myclimate – The Climate Protection Partnership" to perform an independent verification of its registered CDM project "Kolar Biogas Project", UNFCCC Ref#4058 for the reported GHG emission reductions for the given monitoring period 01/01/2020–31/12/2020 (including both days). The CDM projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs)

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

- The project activity has been implemented and operated as per the registered PDD and 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

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

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

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

Description of project:

The project activity is the installation of biogas plants (digesters) of 2 m^3 or 3 m^3 capacity each for single households in five Taluks – Srinivaspur, Kolar, Mulbagal, Malur, and Bangarapet in Kolar District, Karnataka India. The biogas units will be fed by cattle dung generated from the households. The biogas stoves will replace the traditional fuel wood stoves and kerosene used for cooking and heating purposes.

In baseline situation, households uses traditional fuel wood stove and kerosene which are 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 and kerosene. Thereby, it avoids the related CO_2 emission from the avoidance of non-renewable biomass and kerosene used in cooking. The PP planned to install 9,380 biogas units out of which 7,944 units were commissioned at the end of 7^h monitoring period.

Methodology:

4KES follows a rule-based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of 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 or remote 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 3 of CDM VVS for Project Activity, to capture the assessment of applicable CDM requirements as per version 3 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 timeline for the CDM verification under consideration.

Verification contract	27/10/2021
Publication of MR	15/11/2021
On site verification	21/02/2022 & 22/02/2022
Draft Verification Report	22/02/2022
Final Verification Report	04/04/2022

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 DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader/Technical Expert (1.1 & 13.1)/Local Expert	IR	R	Narendra Kumar	Central Office	x	x	x	x
2	Technical Expert (15.1)	ER	Rao	Koteswar	Central Office				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	Ma Paa	Puratchikkanal	Central Office

2.	Approver	IR	S	Jagajothi	Central Office

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Transfer of data from sampling survey sheet to excel ER spreadsheet	Low	Possible human error during transfer of data to ER spreadsheets and MR	Thorough cross-check required on the transfer of data to the ER spreadsheet and MR.
2.	Wrong data collection/misinterpretation of household situation	Low	It's not complicated monitoring process. Appropriate trainings are conducted for the monitoring personnel.	By means of site visit check of actual situation to sample number of households.

C.2. Consideration of materiality in conducting the verification

>>

The prescribed thresholds for materiality, as per as per §326 of VVS for PA, version 03/12/..

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

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

	MR Version (Draft)	MR Version (Final)
Emission reductions/annum	52,294 tCO_2e	52,294 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	Within Threshold
$N_{operating}$	Complete data check	No error identified	NA	Yes
H_{stove}	Complete data check	No error identified	NA	Yes
$F_{kerosene,\ project}$	Acceptance sampling	No error identified	NA	Yes
$B_{biomass,\ project}$	Complete data check	No error identified	NA	Yes
$B_{biomass,\ non\text{-}project}$	Complete data check	No error identified	NA	Yes
$N_{(T)}$	Complete data check	No error identified	NA	Yes
$B_{manure,generated}$	Complete data check	No error identified	NA	Yes
$B_{manure,fed}$	Complete data check	No error identified	NA	Yes
Application of sludge	Complete data check	No error identified	NA	Yes

SECTION D. Means of verification

D.1. Desk/document review

>>
A desk review is undertaken, 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;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

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

D.2. On-site inspection

Duration of on-site inspection: 21/02/2022 to 22/02/2022				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening Meeting, Office Inspection, Verification of monitoring records, interviews and database inspection	SKG Sangha office	21/02/2022	Narendra Kumar
2.	Visit to sampled of households	Beneficiary households	21/02/2022 & 22/02/2022	Narendra Kumar
3	Closing meeting	SKG Sangha office	22/02/2022	Narendra Kumar

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**
	Last name	**First name**	**Affiliation**		
1.	B	Anil Kumar	SKG Sangha	21/02/2022	- 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	S K	Umesha	SKG Sangha	21/02/2022	
3	AV	Rajanna	SKG Sangha	21/02/2022	
4		Suma	Beneficiary (B 491)	21/02/2022	- Verification of monitored data - Awareness about ownership of CERs - Working condition of digester unit
5		Mounika	Beneficiary (B 418)	21/02/2022	
6		Parwathamma	Beneficiary (B 417)	21/02/2022	
7	V	Vimala	Beneficiary (B 387)	21/02/2022	
8		Pillamma	Beneficiary (B 490)	21/02/2022	

9	A	Sumalatha	Beneficiary (B 24)	21/02/2022	- SD parameter verification
10	K P	Kavitha	Beneficiary (B 91)	21/02/2022	
11		Rathanamma	Beneficiary (B 568)	21/02/2022	
12		Shanthamma	Beneficiary (B 567)	21/02/2022	
13		Rathnamma	Beneficiary (A 303)	22/02/2022	
14		Sunandamma	Beneficiary (A 297)	22/02/2022	
15		Chowdamma	Beneficiary (A 305)	22/02/2022	
16		Amaravathi	Beneficiary (A 304)	22/02/2022	
17		Venkatarathnamma	Beneficiary (A 2118)	22/02/2022	
18		Sundandamma	Beneficiary (A 2117)	22/02/2022	
19		Jayalakshamma	Beneficiary (A 238)	22/02/2022	
20		Anusuyamma	Beneficiary (A 257)	22/02/2022	
21		Bhagyamma	Beneficiary (A 343)	22/02/2022	

D.4. Sampling approach

>>

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

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

- Acceptable quality level (AQL) or the Level of Assurance- 0.5% (i.e. the proportion of discrepancies between the project participants‟ sample records and the DOE sample that are acceptable up to 0.5%
- limit)
- Unacceptable Quality Level (UQL) – 20% (i.e., the proportion of discrepancies between the project participants‟ sample records and DOE sample records that are unacceptable above 20% limit)
- Producer risk -5% (i.e., there is 5% chance that the DOE will wrongly reject the project participants‟ records of acceptable quality)
- Consumer risk -10% (i.e., there is 10% chance that the DOE will wrongly accept the project participants‟ records of records of unacceptable quality)

Verification team has determined acceptance sample size for all the sample survey parameters based on the standard “Sampling and surveys for CDM project activities and programmes of activities” version 9. From the above assumed factors, the verification team determined the minimum sample size (n) as 18 and acceptance number (c) as 1.The same is intimated to PP prior to the site visit. The actual number of sample size where the acceptance survey was done given below:

Parameters	Total Population	PP’s sample size	Acceptance sample size	Acceptance Number	Sampling method used
$N_{operating}$	7,944	539	18	1	simple random sample
H_{stove}	7,944	539	18	1	simple random sample
$F_{kerosene,\ project}$	7,944	539	18	1	simple random sample
$B_{biomass,\ project}$	7,944	539	18	1	simple random sample
$B_{biomass,\ non\text{-}project}$	infinite	102	18	1	simple random sample
$N_{(T)}$	7,944	539	18	1	simple random sample
$B_{manure,generated}$	7,944	539	18	1	simple random sample
$B_{manure,fed}$	7,944	539	18	1	simple random sample

Application of sludge	7,944	539	18	1	simple random sample

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

Parameters	DOE Sample size	No of PP's record beyond unacceptable level	Accepted / Rejected
$N_{operating}$	18	0	Accepted
H_{stove}	18	0	Accepted
$F_{kerosene, project}$	18	0	Accepted
$B_{biomass, project}$	18	0	Accepted
$B_{biomass, non-project}$	18	0	Accepted
$N_{(T)}$	18	0	Accepted
$B_{manure,generated}$	18	0	Accepted
$B_{manure,fed}$	18	0	Accepted
Application of sludge	18	0	Accepted

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

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	1	-
Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	3	2	-
Compliance with the calibration frequency requirements for measuring instruments			-
Assessment of data and calculation of emission reductions or net removals	1	1	1
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	4	4	1

SECTION E. Verification findings

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

Means of verification	Verification team checked the monitoring report with latest version of MR available in the UNFCCC website (ie, version 09) and "Instructions for filling out the monitoring report form" mentioned as attachment to Monitoring report form (version 09).
Findings	CAR-01 is raised and closed satisfactorily
Conclusion	Verification team confirms that final monitoring report is completed using the latest valid version of the applicable monitoring report form/9/.

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

>>

The verification team has reviewed the validation report & previous verification report and observed that there the following forward Action Request (FAR) was raised during validation.

As per PDD, version 14, 70:30 ratio has been considered for installation of 2 m^3 units and 3 m^3 units. Estimated emission reduction has been calculated based on the proposed ratio of 2 m^3 units and 3 m^3 units installed. Since the ratio influence the emission reduction, the same needs to be checked during verification."

PP was asked to justify the same for this monitoring period under FAR-01 in table 1 of Appendix 4 below. As per the response from PP the following is confirmed:

The monitoring report mentions the actual number of units installed. Though the actual implementation is not in line with the schedule mentioned in the PDD, the emission reduction is calculated based on the actual number of units installed. Hence, the verification team found the same to be acceptable.

Thought the actual ratio of 2 m^3 units and 3 m^3 units is not consistent with the ratio considered in the registered PDD, the emission reduction is calculated based on the actual ratio of 2 m^3 units and 3 m^3 units installed. Hence, the verification team found the same to be acceptable.

The FAR raised in the validation report is closed for this verification. Since the implementation is still going on, the ratio of 2 m^3 units and 3 m^3 units size digesters is tended to change. Hence a FAR is raised under table 4 of Appendix 4 to confirm the emission reduction calculation based on the actual ratio at the time of verification.

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

Means of verification	The verification team determined the conformity of the actual project activity and its operation with the validated project design document. Verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the registered PDD/3/ are in place, and that the project participants have operated the CDM project activity as per the registered PDD/3/ . The verification team has checked the information in the monitoring report and compared against the registered PDD. During the onsite inspection, the verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the registered PDD. Interviews with operational personnel and households and random samplings have been carried out.
Findings	No finding
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 at the site 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 registered PDD. The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the registered PDD/3/ and that all physical features of the project are in place.

E.4. Post-registration changes

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

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

E.4.2. Corrections

>>
No corrections proposed to project information or parameters fixed at validation.

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

>>
The crediting period has been change from: 24/11/2011 – 23/11/2021 to 01/04/2012 – 31/03/2022 (Fixed).
The change has been approved: http://cdm.unfccc.int/Projects/DB/SGS-UKL1287587238.03/view

E.4.4. Inclusion of a monitoring plan

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

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

>>
The approved post registration change PRC-4058-001, dated 01/10/2015 includes change in registered monitoring plan in the PDD/3/. No change in monitoring plan is sought during this monitoring period

E.4.6. Changes to the project design

>>
The approved post registration change PRC-4058-001, dated 01/10/2015 includes change in project design. No change in project design is sought during this monitoring period

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

>>
Not Applicable

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

Means of verification	The verification team checked compliance of project monitoring plan with the applied methodology (AMS I.C, version 18, AMS I.E, version 03, AMS III.R, version 01) and including applicable tools.
Findings	No findings
Conclusion	All parameters stated in the monitoring plan and the applied methodology has been fulfilled in the current monitoring report. All baseline emission parameters have been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further sections of this report. The monitoring plan as mentioned in the registered PDD is in accordance with the applied methodology. In the opinion of the verification team the monitoring report complies with the

[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).

	requirement of the registered PDD/3/ and applied methodologies /6/ in the context of the project activity. Thus, it conforms to the requirement of VVS for PA, version 03.

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
$\rho_{kerosene}$	0.817 kg/l	Yes
$NCV_{kerosene}$	43.8 TJ/Gg	Yes
$EF_{kerosene}$	71,900 Kg CO_2/TJ	Yes
$F_{kerosene, baseline}$	24.12 L (liters)/year	Yes
f_{NRB}	0.78	Yes
$B_{Biomass, Baseline}$	4.74 Tonnes/year	Yes
GWP CH_4	25 t CO2 / t CH4	Yes
$VS_{(T)}$	3.8 for dairy cow, 3.1 for buffalo, 1.4 for other cattle	Yes
$B_{o(T)}$	0.15 for dairy cattle, 0.1 for buffalo and other cattle	Yes
MCF_{liquid} $MCF_{liquid\ with\ crust}$ MCF_{solid}	80% 50% 5%	Yes
MS_{liquid} $MS_{liquid\ with\ crust}$ MS_{solid}	0.32 0.20 0.16	Yes

Findings

No findings

Conclusion

The values of ex ante fixed parameters have been verified from the registered PDD/3/.Same has been crosschecked with the source mentioned in the PDD and found to be consistent. The verification team confirms that the values used/applied are correct and justified. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.

E.6.2. Data and parameters monitored

Means of verification

The verification team has determined whether the registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the registered PDD.

During the verification all monitoring parameters listed in Section D.2 of MR were compared with section B.7.1 of the registered PDD have been verified with regard to the:

(i) appropriateness of the applied measurement / determination method, (ii) the correctness of the values applied for ER calculation, (iii) the accuracy, and applied QA/QC measures.

PP has sample survey during the year 2020. PP has selected 530 households randomly for the survey.

The monitored values are assessed as follows:

$N_{operating}$: The parameter "number of units installed and operating" is monitored continuously (and recorded monthly). As and when the plant is commissioned the same is entered into the records of SKG Sangha. If any malfunction is found by staffs of the SKG Sangha through regular check-up or through complains by households, the same will be taken into records and the repair date also will be recorded/18/. The non-usage days will be deducted from the total monitoring period days for the calculation of emission reduction. Hence, the actual number of units installed is considered as **$N_{operating}$**:. Only if the plants are abandoned or not used by household permanently then the same will be deducted from the total number of units installed for the estimation of **$N_{operating}$**. The verification team checked the records/14/ and found that the total number of operating units during this monitoring period is 7,944 respectively at the end of 2020. Verification team also verified all the documents i.e., application, end user agreement, completion certificate & payment receipt for 18 number of samples and found that all the details provided for the respective households in the excel sheet/2/ are matching. Hence, the value considered in the MR is correct.

H_{stove}: **'**Annual hours of operation of an average system (hours of burner functioning)" is measured through sample basis by the respective household member. Biogas hours per day for cooking and water heating are determined through sample survey and the total value is multiplied by number of days in the year to get the annual operating hours. All the sample records/15/ are verified by the verification team and found that the details provided in the monitoring sheet. Verification team also checked the same during site visit by surveying 18 household randomly selected among the PP samples numbers and found that all the data are correct. No error is found. Hence the value considered for **H_{stove}** (i.e. 1,348.09 h/y) is correct.

$F_{kerosene,\ project}$: The "Annual amount of kerosene consumed by household after installation of biogas unit" is monitored through annual sample survey. Verification team checked all the survey sheets of PP/15/. Also verification team interviewed 18 households in it randomly and found that households are no more using the kerosene and confirmed that the value provided by PP is correct. No error is found in the PPs data. Hence the value considered by PP (i.e., 00 litre/year) is found to be correct.

$B_{biomass,\ project}$: 'Consumption of fuel wood in households participating in the project activities " is monitored through annual sample survey done by PP. Verification team checked all the survey sheets of PP. Also verification team surveyed 18 households in it randomly and confirmed that the value provided by PP is correct. No error is found in the PP"s data. No households reported using biomass for cooking. Hence the value considered by PP (ie, 0 tones/year) is found to be correct.

$B_{biomass,\ non\text{-}project}$: 'Consumption of fuel wood for cooking in households not participating in the project activities" is monitored through annual sample survey. Total biomass usage per day for cooking & water heating is determined though sample survey and the total value is multiplied with number of days in the year to determine the biomass consumption per year. PP has conducted sample survey of non-project households. 102 numbers of non-project household selected for the survey in the project area. Verification team checked all the survey sheet of PP/16/. Also verification team surveyed 18 households in it randomly and confirmed that the value provided by PP is correct. No error is found in the PP"s data. Hence the value considered by PP (ie, 5.37 tonnes/year) is found to be correct.

$N_{(T)}$: 'Annual average animal population in a household (number of heads of dairy cow, buffalo and other cattle) is monitored through annual sample survey. Verification team checked all the survey sheets of PP/15/. Also verification team surveyed 18 households in it randomly and confirmed that the value provided by PP is correct. No error is found in the PP"s data. Hence the average value

	considered by PP (ie, 2.57 dairy cows/HH, 0.01 buffalos/HH & 0.11 other cattle/HH) is found to be correct. **$B_{manure,generated}$: ‘**Average amount of animal manure generated per household per year‟ is monitored thorough annual sample survey. Verification team checked all the survey sheet of PP/15/. Also verification team surveyed 18 households in it randomly and confirmed that the value provided by PP is correct. No error is found in the PP‟s data. Hence the average value considered by PP (ie, 17.99 Tonnes) is found to be correct. **$B_{manure,fed}$: ‘**Average amount of animal manure fed into biogas digester per year‟ is monitored thorough annual sample survey. Verification team checked all 285 survey sheet of PP/15/. Also verification team surveyed 18 households in it randomly and confirmed that the value provided by PP is correct. No error is found in the PP‟s data. Hence the average value considered by PP (ie, 16.77 Tonnes/ year) is found to be correct. **Application of sludge: ‘**Proper application of the sludge from the biogas unit‟ is monitored thorough annual sample survey. Verification team checked all survey sheet of PP/15/. Also verification team surveyed 18 households in it randomly and confirmed that the value (100%) provided by PP is correct. No error is found in the PP‟s data. PP has also conducted training programme for households in sludge treatment and application. The same is verified from the training records/17/ maintained by SKG Sangha. From the above assessment, the verification team concludes that the biodigester sludge is applied properly by the households which do not lead to anaerobic treatment.
Findings	CL-01 raised and closed successfully.
Conclusion	Corresponding to the VVS for PA V03/12/, the team confirm that the monitoring has been carried out in accordance with the registered PDD/3/. The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in registered PDD/3/. The monitored data for the parameters has been verified by checking the procedure for information flow and

E.6.3. Implementation of sampling plan

Means of verification	The verification team checked whether the PP has applied a sampling approach to determine the monitored values. 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 registered PDD. The following parameters are monitored through sampling:

Parameter	Sample size required /3/	Actual sample size considered for survey/1/	Is sample size sufficient?
$B_{biomass,\ non\text{-}project}$	18	102	Yes
H_{stove}	107	530	Yes
$F_{kerosene,\ project}$			
$B_{biomass,\ project}$			
$N_{(T)}$			
$B_{manure,generated}$			
$B_{manure,fed}$			
Application of sludge			

The verification team also checked the precision level from the survey data and confirmed that precision level achieved for all parameter is within the limit of 10%. Hence, the sample size considered for all the parameters are found to be OK.

Verification team has conducted acceptance sampling to verify the parameter monitored through sampling. The verification team calculated the minimum sample

	size (n) as 18 and acceptance number (c) as 1 (considering AQL – 0.5%, UQL - 20%, producer risk – 5% & consumer risk – 10%). Verification team has done survey in randomly in 25 numbers of households (selected from the PP"s sample population) and verified the PP"s survey data.
Findings	CL-02, CL-04, CAR-02 & CAR-04 are raised and closed satisfactorily
Conclusion	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. • PP"s sample population was selected in all the taluks proportionally based on the number units installed in the respective taluk. • The sampling plan is implemented correctly in accordance with the revised approved PDD • Though acceptance sampling, the verification team confirmed that the all the data collected by PP through sample survey are correct. No error found.

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

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

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

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

Means of verification	As per the methodology the emission reduction is directly calculated. Baseline & Project emissions are not calculated separately. The verification team has checked whether calculations of GHG emission reduction calculation have been carried out in accordance with the formulae and methods described in the registered monitoring plan. In detail the following has been verified: Transparency: It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae. Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet. Correctness: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology. Completeness: It has been checked whether all calculations are complete and without omissions The baseline emissions are calculated for the three components – (i) displacement of kerosene, (ii) displacement of non-renewable biomass and (iii) the capture and destruction of methane from animal manure. The equations applied for the determination of baseline GHG emissions is consistent with the revised approved PDD and methodology: The PDD values of $MS_{manure}(MS_{liquid}, MS_{liquid\ with\ crust}, MS_{solid})$ are estimated based on Fraction of livestock category T"s manure handled using manure management system S in climate region k in baseline (management systems considered are liquid/slurry management system, liquid/slurry with natural crust cover system and solid storage) and percentage of animal confinement per day monitored through

	baseline survey. However as per PDD/3/, the actual confinement time of animal should be considered for the emission reduction calculation. In line with that, PP has estimated animal confinement time through monitoring sample survey which is estimated to be 23.70 hrs/day against the baseline estimated value of 17.68 hrs/day (ie, 74.42%). So, the final baseline emission from animal manure management is adjusted with the factor of 1.34 for the year 2020 (calculated from 23.70/17.68). The verification team checked the calculation and found to be correct. From the calculated baseline emission from the formula, the baseline emission per day is calculated. The project emission per day is multiplied with the actual number of operating days (average operating days of all biogas units during the monitoring period) to estimate the actual baseline emission. Since the baseline emission is adjusted with actual number of operating days, the verification team found this to be appropriate. PP has submitted the calculation in the excel sheet/2/. The baseline 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/.
Findings	No finding
Conclusion	The verification team confirms the following: • The calculations of baseline GHG emissions have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology. The verification team is able to confirm that the parameters are in line with the VVS for PA, Version 03 para 373 • 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. • Hence the baseline emission calculated for the monitoring period (ie, 58,048 tCO2e) is correct

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

Means of verification	The verification team has checked whether calculations of project 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 project emissions are in accordance with the monitoring plan and the approved methodology. Completeness: It has been checked whether all calculations are complete and without omissions The project emissions are calculated for the three components – (i) kerosene usage, (ii) non-renewable biomass usage and (iii) physical leakage of methane from digester. The equations applied for the determination of baseline GHG emissions is consistent with the revised approved PDD and methodology.

	As per the monitored values, no quantity of kerosene is used and some biomass is consumed in the project situation. Hence project emission due to kerosene, biomass consumption and physical leakage is calculated as 5,749 tCO_2 e. The project emission per day is multiplied with the actual number of operating days (average operating days of all biogas units during the monitoring period) to estimate the actual project emissions. Since the project emission is adjusted with actual number of operating days, the verification team found this to be appropriate. PP has submitted the calculation in the excel sheet/2/. The project emission 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/.
Findings	No findings
Conclusion	The verification team confirms the following: • The calculations of project GHG emissions have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology. The verification team is able to confirm that the calculation are in line with the VVS for PA, Version 03 para 373. • 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 project emission calculation is overall correct. • The ER calculation sheet provided is clear, transparent and the calculations provided in the sheet are reproducible. Hence, the project emission reported in the monitoring report for the monitoring period (ie, 5,749 tCO_{2e}) is verified to be correct

E.8.3. Calculation of leakage GHG emissions

Means of verification	As verified from the monitoring data, the biomass consumed in the non-project households is lower than the baseline fuel consumption. Also verification team checked with non-project households and confirmed that the no household used renewable energy before the project start which is now changed to non-renewable biomass. Hence the leakage is considered as zero. However, the project households used biomass for cooking during the nonoperating days. Hence the PP has monitored the non-operating days of the biodigester and deducted equivalent of emission reduction from the total emission reduction. For applied methodologies AMS I-C, AMS I-E and AMS-III.R,/6/ if the energy generating equipment is transferred from another activity or if existing equipment is transferred to another activity, leakage is to be considered. The project does not involve any movable equipment and hence all the bio-digesters are built newly. Hence there is no equipment transfer happed in the project activity.
Findings	No findings
Conclusion	No leakage has to be considered during this MP, as from the non-project HHs surveyed/16/ to assess to the quantity of biomass consumed in the baseline survey and during the project, the consumption of firewood from cooking and for water heating in the non-project households is lower than in the baseline, and thus there is no leakage due to replacement of renewable energy based cooking with NRB saved under the project in non-project households. However, leakage from usage of NRB by project households during the non-operating days of bio-digester is calculated as 5 tCO_{2e} which is verified and found to be correct. The verification

	team is able to confirm that the parameters are in line with the VVS for PA, Version 03 para 373.

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

Means of verification	MR demonstrates the summary of GHG emission reductions for the monitoring period and calculated according to the applied methodologies as follows: $ER_y = BE_y - PE_y - L_y$ = 58,048- 5,749– 5 = 52,294 tCO2e The ER calculation sheet and monitoring report is verified to check the calculation.
Findings	No findings
Conclusion	The verification team confirms the following: • The emission reduction value reported (ie., 52,294 tCO2e) is verified to be correct. • The summary table in the MR has been filled correctly and the values are in line with the related emissions reduction spreadsheet. Since the monitoring period starts after 31/12/2012 and before 01/01/2021, the complete verified emission reductions are correctly reported under the respective column in the MR. The verification team is able to confirm that the parameters are in line with the VVS Version 03 section 373.

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

Means of verification	The verification team has checked whether the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD/3/. Section E.4 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD

Emission reduction estimated as per the approved PDD/3/	Actual emission reduction achieved as per Monitoring report/1/
56,227t CO_2e	52,294 t CO_2e

	The actual emission reduction achieved during the monitoring period is less than the estimation in the PDD which is due to lesser number of units installed. It is also observed that the actual emission reduction per unit is higher than the estimated emission reduction per unit in the PDD. This is mainly due to the change it the Global warming potential of methane. Hence, the difference in emission reduction is acceptable.
Findings	CL-03, CAR-03 are raised and closed satisfactorily
Conclusion	The estimated emission reduction as per PDD and the actual emission reduction achieved for the monitoring period are correctly reported in the section E.5 of MR. The actual achieved emission reduction is less than the PDD estimation hence no justification is required.

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

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

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has determined the CER achieved during first commitment period and second commitment period
Findings	No CAR/CL is raised
Conclusion	Since the complete monitoring period falls after the first commitment period, the complete emission reductions are correctly reported under the respective column

	in the MR.

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

Means of verification	As per the section 7.7 of the VVS for PA, V3 the verification team confirms that the Gold Standard sustainable development monitoring report have been verified along with CDM monitoring report.
Findings	The CAR/CL related to Gold Standard sustainable monitoring have been raised in the GS Verification report and closed successfully. No major findings have been found that would affect the monitoring of the project activity.
Conclusion	The project is applying for Gold Standard sustainable co-benefits, the monitoring report has been verified and a separate verification report has been developed for the same.

E.10. Global stakeholder consultation

Means of verification	The registered CDM Validation report and subsequent verification report for the earlier monitoring period have been checked by the verification team.
Findings	No CAR/CL raised.
Conclusion	This is the 7th monitoring period. During the web-hosting period, the project has not received any comments either during validation or during this verification period. As per the section 9.6 para 391 of VVS for PA (v3) the verification team is able to confirm that no comments have been received during global stakeholder consultation process. Especially, after the publication of the first or this monitoring period report.

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 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 onsite 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 registered PDD/3/ and is in line with VVS for PA, Version 03 paragraph 360

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 52,294 tCO_2e emission reductions during period 01/01/2020– 31/12/2020 (including both days)

SECTION H. Certification statement

>>

4K Earth Science Pvt. Ltd. has been contracted by "Foundation myclimate – The Climate Protection Partnership" to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the CDM Project activity "Kolar Biogas Project" and UNFCCC Reference Number 4058 for the monitoring period 01/01/2020– 31/12/2020 (including both days) in the Monitoring Report Version 01.1 (first version) dated 20/10/2020.

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

The management of the "SKG Sangha" and "Foundation myclimate" are responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report Version 1.1 dated 28/02/2022. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the "SKG Sangha" and "Foundation myclimate". The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 1.1.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the monitoring period 01/01/2020– 31/12/2020 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 01.1 dated 28/02/2022 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, 4K Earth Science Pvt. Ltd 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.

As per the VVS for PA, Version 03, paragraph 374, 4KES confirms and concludes the following;

Reporting period: 01/01/2020– 31/12/2020 (including both dates) ***Verified and certified emission in the above reporting period:***

	Amount	**Unit**
Baseline emissions (BE)	58,048	tCO_2e
Project emissions (PE)	5,749	tCO_2e
Leakage emissions (LE)	5	tCO_2e
Certified emission reductions (CERs)	52,294	tCO_2e

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
GHGs	Greenhouse Gas(es)
GS	Gold Standard
GWP	Global Warming Potential
HH	Household
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
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
PCP	Project Cycle Procedure
SD	Sustainable Development
SDG	Sustainable Development Goal
SHG	Self Help Group
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VER	Verified Emission Reduction
VVB	Validation and Verification Body
VVS	Validation & Verification Standard

Appendix 2. Competence of team members and technical reviewers

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.	**Koteswara Rao**					
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		No	No	No	Yes	No	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**		
		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.	**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, Sri Lanka					
Compliance check by: Anand S. R.							

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	SKG Sangha	Monitoring Report,	Version 01.0, dated 27/10/2021	SKG Sangha
	SKG Sangha	Monitoring Report,	Version 1.1, dated 28/02/2022	SKG Sangha
2	SKG Sangha	ER Calculation Sheet for 2020	Version 01.0, dated 27/10/2021	SKG Sangha
	SKG Sangha	ER Calculation Sheet for 2020	Version 1.1, dated 28/02/2022	SKG Sangha
3	SKG Sangha	Approved PDD	Version 14, dated 18/06/2015	Publically available
4	SGS	Validation Report	dated 28/06/2015	Publically available
5	UNFCCC	PRC document page in UNFCCC	Web link UNFCCC	Publically available
	TUV NORD	PRC validation report	Dated 15/07/2015	Publically available
6	UNFCCC	AMS.I.E – "Switch from Non-Renewable Biomass for Thermal Applications by the User"	Version 03	Publically available
		AMS.I.C – "Thermal energy production with or without electricity"	Version 18	
		AMS.III.R – "Methane recovery in agricultural activities at household/small farm level"	Version 01	
7	IPCC	1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	Web Link	Publically available
8	UNFCCC	Kyoto Protocol (1997)	Web Link	Publically available
9	UNFCCC	Monitoring Report Form (CDMMR-FORM)	Version 09	Publically available
10	UNFCCC	CDM Project Standard for Project activity	Version 03	Publically available
11	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities bn	Version 9	Publically available
	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programme of activities	Version 4	Publically available
12	UNFCCC	CDM Validation and Verification Standard for Project activities	Version 03	Publically available
13	UNFCCC	Glossary "CDM terms"	Version 10	Publically available
14	SKG Sangha	Biogas basic record set: Biogas application form End user agreement for CER	-	SKG Sangha
		ownership Completion certificate Online monitoring solution		

15	SKG Sangha	Sample survey monitoring sheets for this monitoring period	-	SKG Sangha
16	SKG Sangha	Non-project household survey sheets for this monitoring period	-	SKG Sangha
17	SKG Sangha	Training Records: Training conducted for end user Training conducted for Mason - Training conducted for staffs Training conducted for Village Level Volunteers	-	SKG Sangha
18	SKG Sangha	Village level plant breakdown log sheets maintained by village level volunteers	-	SKG Sangha
19	SKG Sangha	Photographs and end user details for the biogas units constructed during previous monitoring period but not considered for the emission reduction during the previous monitoring periods.	-	SKG Sangha

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

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

FAR ID	01	**Section no.**		**Date:** 27/01/2022
Description of CL				
As per registered PDD, 70:30 ratio has been proposed for installation of installation of 2 m^3 units and 3 m^3 units and the same is considered for the estimation of emission reduction. Since the implementation is still going on, the emission reduction for the next monitoring period should be calculated based on the actual ratio of 2m^3 & 3m^3 size digesters installed during next verification.				
Project participant response				**Date:** 28/02/2022
At the end of the 7th monitoring period a ratio of 77.58% 2 m3 units and 22.42% 3 m3 units was reached. This was also reflected in the emission reduction calculations.				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** 10/03/2022
Though the actual ratio of 2 m3 units and 3 m3 units is not consistent with the ratio considered in the revised approved PDD, the emission reduction is calculated based on the actual ratio of 2 m3 and 3 m3 units installed. Hence, acceptable. The FAR is closed for this verification. Since the implementation is still going on, the ratio of 2 m3 units and 3 m 3 size digesters is tend to change during next verification. Hence a FAR is raised under table 4 of Appendix 4 to confirm the emission reduction calculation based on the actual ratio at the time of verification. Hence the issue is closed.				

Table 2. CL from this Verification

CL ID	01	**Section no.**	E.6.2	**Date:** 27/01/2022
Description of CL				
As per the MR, the non-functional biogas units are monitored continuously by the local level supervisors. PP shall clarify how the continuous monitoring has been done during the lockdown imposed by host country due to COVID pandemic in the year 2020.				
Project participant response				**Date:** 28/02/2022
Despite the lockdown imposed by India due COVID pandemic in 2020, biogas/LPG supply is an essential service and SKG Sangha has been permitted to move in the villages to attend the repair activities in Kolar. Only the essential repairs have been taken up based on local area maintenance staff mobility.				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** 10/03/2022
The justification provided by PP is found to be acceptable. With the interview with the local supervisor during the site visit, the same has been confirmed. CL is closed.				

CL ID	02	**Section no.**	E.6.3	**Date:** 27/01/2022
Description of CL				
In section D.3 of MR, under the precision level estimation of the monitoring parameters, the following parameters that are monitored through sampling are not reported: • Hours of operation of unit • Amount of manure generated in the farm • Amount of manure fed into the system Clarification requested.				
Project participant response				**Date:** 28/02/2022
In section D.3 of MR, under the precision level estimation of the monitoring parameters *is added the three parameters requested.*				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 10/03/2022
In section D.3 of MR, PP has now included the same missing parameters. CL is closed.				

CL ID	03	Section no.	E.8.5	Date: 27/01/2022
Description of CL				
In Section E.6 of the MR, it is concluded that the actual total emission reduction achieved during the monitoring period is less the estimated emission reduction in the PDD. However, the emission reduction achieved per unit during the monitoring period is 6.58 tCO2 which is much higher than the estimated emission reduction per unit (ie, 5.99). PP shall clarify the same and justify in section E.6 of MR.				
Project participant response				**Date:** 28/02/2022
In section E.6 of the MR is explained the total emission reduction achieved during the monitoring period is lower than the estimated emission reduction in the PDD, but it is considered not only the emission reduction per unit but also the number of units installed. About the difference between the ER per unit in the PDD and the MP, the source is the ER per unit for avoided methane from cattle manure source, in the PDD is used a GWP CH_4 = 21 and in MR a GWP CH_4 = 25. In case the value in latest MR is changed with GWP CH_4 = 21 the ER per unit would be 6.06 tCO2/unit which is much closer to 5.99 tCO2/unit.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 10/03/2022
The justification provided by PP is found to be acceptable. CL is closed.				

CL ID	04	Section no.	E.6.3	Date: 27/01/2022
Description of CL				
In Section D.3 of the MR, PP mentioned the 530 sample households are selected randomly from total population. PP shall submit the random selection sheet for verification.				
Project participant response				**Date:** 28/02/2022
As mentioned in section D.3 according to the "Standard Sampling and Surveys for CDM Project Activities and Programme of Activities" Version 09.0 the sample size was chosen for a 95/10 level of precision (a 95% confidence interval and 10% margin of error), this approach was accepted by CDM for previous Verification Reports. Based on baseline survey data, the maximum sample size is 162, but it was planned to survey 400 households to get a better precision. Nevertheless, on the ground the number of surveyed households went up to 530 to fulfil the desired precision which was achieved at 95% level of confidence One of the key points was that SKG Sangha has selected randomly some villages, which are not surveyed – when is possible - in the previous years (an excel with the villages surveyed in the 8 annual monitoring surveys has been shared to VVB to evidence this approach). As the sample size is significant SKG Sangha selected specific number of both sizes (2m3 and 3m3) of plants in each taluk (based on the number set in spreadsheet 'monitoring plan' - ER excel file), then SKG Sangha selected villages where surveys are to be carried out (not surveyed previously). SKG Sangha has surveyed units in the selected villages. This is according to the monitoring plan specified in the PDD.				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** 10/03/2022
The random selection method used by PP is found to be acceptable. CL is closed.				

`

Table 3. CAR from this Verification

CAR ID	01	Section no.	E.1	Date: 27/01/2022
Description of CAR				
The monitoring period is not consistently reported in MR & ER sheet. The reported monitoring period is 7th monitoring period in the crediting period. However, in ER sheet and few places in MR, it is reported as 8th Monitoring period or 6th Monitoring period. Corrective action is requested				
Project participant response				**Date:** 28/02/2022
The ER sheet and MR were corrected and all the quotes about the number of monitoring report is set as 7th MP.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 10/03/2022
PP has corrected the monitoring period number in MR & ER sheet. CAR is closed				

CAR ID	02	Section no.	E.6.3	Date: 27/01/2022
Description of CAR				
The sampling standard referred in section D.3 of MR and CDM project standard referred in section E.7 are not valid version. PP shall refer the valid version of the standards in the MR.				
Project participant response				**Date:** 28/02/2022
The sampling standard referred in section D.3 of MR was updated with Sampling and surveys for CDM project activities and programmes of activities Version 09.0. and the CDM project standard referred in section E.7 of MR was updated with Standard CDM project standard for project activities Version 03.0.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 10/03/2022
PP now referred the latest version of sampling standard & guideline. CAR is closed.				

CAR ID	03	Section no.	E.8.5	Date: 27/01/2022
Description of CAR				
In section E.7 of MR, PP mentioned the project does not fall under Type I category which is not correct. As the project falls under both Type I and Type III, the small-scale limit for both the type shall be justified in the MR.				
Project participant response				**Date:** 28/02/2022
In section E.7 is added the next statement: According Standard CDM project standard for project activities Version 3.0 the small-scale project type applicable to the generic small-scale CPA Type I: For thermal applications of biomass, biofuels or biogas (e.g. cookstoves), the limit of 45 MW(th) is the installed/rated capacity of the thermal application equipment or device(s) (e.g. biogas stoves). Each cubic meter (m3) of biogas contains the equivalent of 6 kWh of calorific energy*. The units installed under the project activity is 2m3 and 3m3 and thus 12kwh and 18kwh respectively. The number of hours that biogas is used is 3.69h (based on Monitoring Survey), thus the energy output is 3.25kW for 2m3 unit and 4.87kW for 3m3 unit. Based on the number of units installed per size, the total output capacity is 28.70MW which is below the limit for Type I - 45 MW(th). http://www.electrigaz.com/faq_en.htm http://www.biogas2.com/faq/ https://energypedia.info/wiki/Electricity_Generation_from_Biogas#Conversion_to_Electricity In ER calculation excel file is added a new sheet 'Max. limit' where is explained the calculations above.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 10/03/2022
PP now included justification of Scale for Type I. CAR is closed.				

CAR ID	04	Section no.	E.6.3	Date: 27/01/2022
Description of CAR				
PP shall provide the sample survey sheet, end user agreements & monthly monitoring reports prepared by supervisors of the following digester IDs for verification:				

B 208	B 384	B 161	A 1351	A 226	A 1404	A 14	D 44	A 168	D 479
D 89	D 1243	D 1914	E 1083	E 576	E 520	E 94	E 1027	E 1100	E 613

Project participant response	**Date:** 28/02/2022
The sample survey sheet, end user agreements & monthly monitoring reports prepared by supervisors of the 20 biogas users requested has been shared with the VVB during site visit.	
Documentation provided by project participant	
Sample survey sheets, End user agreements & monthly monitoring reports.	
DOE assessment	**Date:** 10/03/2022
PP has now provided the requested documents. CAR is closed.	

Table 4. FAR from this verification

FAR ID	01	Section No.		Date: 10/03/2022
Description of FAR				
As per registered PDD, 70:30 ratio has been proposed for installation of 2 m3 units and 3 m3 units and the same is considered for the estimation of emission reduction. Since the implementation is still going on, the emission reduction for the next monitoring period should be calculated based on the actual ratio of $2m^3$ & $3m^3$ size digesters installed during next verification.				
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