Verification and certification report form for CDM project activities

(Version 02.1)

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	Bagepalli CDM Biogas Programme UNFCCC reference number: 0121
Version number of the verification and certification report	03
Completion date of the verification and certification report	09/05/2019
Monitoring period number and duration of this monitoring period	06; 01/01/2017 to 31/12/2018 (Both days included)
Version number of the monitoring report to which this report applies	04, 08/05/2019
Crediting period of the project activity corresponding to this monitoring period	2nd crediting period: 01st September 2013 to 31st August 2020 (Renewable)
Project participants	Agricultural Development and Training Society (ADATS).
Host Party	India
Applied methodologies and standardized baselines	AMS.I.E – "Switch from Non-Renewable Biomass for Thermal Applications by the User" ver.5
Mandatory sectoral scopes linked to the applied methodologies	Sectoral Scope 1, Energy industries (renewable-/non-renewable sources)
Conditional sectoral scope(s) linked to the applied methodologies	Sectoral Scope 13 - Waste handling and disposal
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	37,290 tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	23,674 tCO_2e
Name and UNFCCC reference number of the DOE	Carbon Check (India) Private Limited; [CDM-E-0052]
Name, position and signature of the approver of the verification and certification report	Amit Anand, CEO 

SECTION A. Executive summary

Introduction:

The Project Participant, Agricultural Development and Training Society (ADATS) has commissioned the DOE, Carbon Check (India) Private Ltd. (CCIPL) to perform an independent verification of the CDM Project Activity "Bagepalli CDM Biogas Programme" (Registration Ref No. 0121) in India (hereafter referred to as "Project Activity"). The project activity is the installation of biogas plants (digesters) of 2 m^3 capacity each for single households in 5 taluks (Bagepalli, Chickballapur, Chintamani, Gudibanda and Siddalaghatta) in Chickballapur District, Karnataka, India. The biogas units is fed by cattle dung generated from the households. The biogas stove replaces the traditional fire wood stoves used for cooking and heating purposes.

In baseline situation, households use 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. As per the approved revised PDD/B04/ the PP planned to install 5500 biogas units of 2 m^3 capacity each for single households out of which 5485 units were commissioned.

This report summarises the findings of the verification of the project, performed on the basis of paragraph 62 of the CDM Modalities & Procedures, as well as criteria given to provide for consistent project operations, monitoring and reporting and the subsequent decisions by the CDM Executive Board. Verification is required for all registered CDM project activities intending to confirm their achieved emission reductions and proceed with request for issuance of CERs. This report contains the findings and resolutions from the verification and a certification statement for the certified emission reductions.

Objective:

Verification is the periodic independent review and ex-post determination of both quantitative and qualitative information by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the project activity for the period from 01/01/2017 to 31/12/2018 (including both the days).

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data, and used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner. CCIPL's objective is to perform a thorough, independent assessment of the registered project activity.

In particular, the monitoring plan, monitoring report and the project's compliance with relevant UNFCCC and host Party criteria are verified in order to confirm that the project has been implemented in accordance with the project design document and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the approved revised PDD/B04/ and the approved monitoring methodology/B02/.

Scope:

The scope of the verification is:

- To verify the project implementation and operation with respect to the approved revised PDD/B04/
- To verify the implemented monitoring plan with the approved revised PDD and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.

- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

The verification comprises a review of the monitoring report over the monitoring period from from 01/01/2017 to 31/12/2018 and based on the approved revised PDD in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant.

On-site visit and stakeholders' interviews are also performed as part of the verification process.

The verification team assigned by the DOE concludes that the approved revised PDD /B04/ and the Monitoring report /01/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for project activities, version 02.0 /B01-1/.

The project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the approved revised PDD /B04/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the project activity has resulted in the 23,674 tCO_2e emission reductions during the sixth monitoring period.

CCIPL as a DOE is therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

Two (02) Corrective Action Requests (CAR) and Two (02) Clarification Actions (CL) has been raised and are satisfactorily closed.

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/local expert	IR	Singh	Vikash Kumar	CCIPL	X	X	X	X
2.	Team Member	IR	Dimri	Anubhav	CCIPL	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	Agarwalla	Sanjay Kumar	CCIPL

2.	Final Approval	IR	Anand	Amit	CCIPL

SECTION C. Application of materiality

The Project is a small-scale CDM project activity achieving total emission reductions of less than 30,000 tons of CO_2e per year; as such, a 5 per cent materiality threshold is applied /B01-1/.

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.	Human Error: Recording and reporting of the information in the ER spreadsheet.	*Medium*	*All the ER spreadsheet data of the biogas, including dates of commissioning, non-operation of biogas, continuous use of non-renewable biomass /survey records including data calculation.* *This includes all the parameters to be monitored ex-post as per the approved revised PDD*	The risk has been mitigated by reviewing the recording procedure of the monitored data, training of the personnel involved in the data capture, calculation and by following the monitoring responsibilities. The training records has been reviewed and also confirmed during the on-site visit interviews.
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	*Medium*	*The data is recorded in the spreadsheets based on the raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and biogas commissioning/* non-working & repair records *database.*	The identified risk has been mitigated by reviewing the management system of access to the records. It has also been confirmed through interviews that the raw data is collected by the field personnel/village level volunteers and then transmitted and stored electronically to the PP's office. Verification team has checked the data quality control and found it adequate.

C.2. Consideration of materiality in conducting the verification

In line with Guidelines for Application of materiality in verifications /B03/, a reasonable level of assurance is defined for the verification of the project by complete verification of all the monitoring records was done by the verification team and compared with the values indicated in the emission reduction spread-sheet/02/.

☒

[check if applicable]

No sampling approach has been used by the VT to verify the following monitored parameters

Parameter	Verification approach	Population (for DOE's sample)	DOE's Sample Size
Number of biogas units installed under the project activity	CDC	--	--
Number of biogas plants operating (Number of plants operating in year)	CDC	--	--
Non-usage days of installed and	CDC	--	--

	operational biogas plants			

☒ *[check if applicable]*

A sampling approach has been applied by the VT for the following monitored parameter(s):

Parameter	Verification approach	Population (for DOE's sample)	DOE's Sample Size
Confirmation that non-renewable biomass of By has been substituted	ASP	2017-130 2018-171	11 11

CDC: Complete data check
ASP: Acceptance Sampling

Some mistakes were identified and subsequently finding was raised. The identified mistakes as listed in findings in Appendix 4 to this report have been determined to be immaterial. And thus, it is confirmed that there are no material errors, omissions or misstatements and a reasonable level of assurance is established.

SECTION D. Means of verification

D.1. Desk/document review

The verification was performed primarily based on the review of the Monitoring report /1/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection: 14/03/2019 to 15/03/2019				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	An assessment of the implementation and operation of the registered project activity as per the approved revised PDD.	ADATS Office and location of implemented biogas units	14/03/2019 to 15/03/2019	Vikash Kumar Singh
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	ADATS Office and location of implemented biogas units	14/03/2019 to 15/03/2019	Vikash Kumar Singh
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the approved revised PDD	ADATS Office and location of implemented biogas units	14/03/2019 to 15/03/2019	Vikash Kumar Singh
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	ADATS Office and location of implemented biogas units	14/03/2019 to 15/03/2019	Vikash Kumar Singh
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the approved revised PDD and the selected methodology and corresponding tool(s), where applicable	ADATS Office and location of implemented biogas units	14/03/2019 to 15/03/2019	Vikash Kumar Singh
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	ADATS Office and location of implemented biogas units	14/03/2019 to 15/03/2019	Vikash Kumar Singh
7.	An identification of quality control and	ADATS Office	14/03/2019	Vikash Kumar Singh

	quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	and location of implemented biogas units	to 15/03/2019	

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Esteves	Ram	ADATS	14/03/2019 to 15/03/2019	General aspects of the project Changes since validation / previous verification Remaining issues from validation/ previous verification Quality management system Involved personnel and responsibilities - Training and practice of the operational personnel Implementation of the monitoring plan Monitoring data management	Vikash Kumar Singh
2.	Padmanabha	Sudha	FCN	14/03/2019 to 15/03/2019	Data Analysis Issues in the MR ER calculation	Vikash Kumar Singh
3.	Pasha	Mukhaem	ADATS	14/03/2019 to 15/03/2019	Involved personnel and responsibilities - Training and practice of the operational personnel Implementation of the monitoring plan Monitoring data management Data uncertainty and residual risks	Vikash Kumar Singh

					Procedural aspects of the Monitoring Maintenance	
4.	--	Waheed	FCN	14/03/2019 to 15/03/2019	Monitoring Surveys	Vikash Kumar Singh
5.	V	Deepa	FCN	14/03/2019 to 15/03/2019	Monitoring Surveys	Vikash Kumar Singh
6.	Ahmed	Sayed Nafees	ADATS	14/03/2019 to 15/03/2019	Monitoring Surveys	Vikash Kumar Singh
7.	--	Hidayat	ADATS	14/03/2019 to 15/03/2019	Monitoring Surveys	Vikash Kumar Singh
8.	Biogas unit	Beneficiaries	Beneficiaries of biogas units	14/03/2019 to 15/03/2019	• Verification of data collected through survey • Awareness about ownership of CERs • Working condition of bio-digester unit SD parameters verification	Vikash Kumar Singh

D.4. Sampling approach

>> N/A

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 approved revised PDD	01	--	--
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	01	--	--
Compliance with the calibration frequency requirements for measuring instruments	--	--	--
Assessment of data and calculation of emission reductions or net removals	--	02	--
Assessment of reported sustainable development co-benefits	--	--	--
Global stakeholder consultation	--	--	--
Others (please specify)	--	--	--

Total	02	02	--

SECTION E. Verification findings

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

Means of verification	Document Review, Interview
Findings	--
Conclusion	CCIPL had made the version 1, dated 17/02/2019 of the Monitoring report /01/, covering the monitoring period from 01/01/2017 to 31/12/2018 (both days inclusive) publicly available on 18/02/2019 through its dedicated interface on the UNFCCC website /B05/. The MR /01/ uses the latest form available at UNFCCC website. The MR /01/ is complete and meets all requirements of the Instructions for filling out the monitoring report form version 06.0 /B05/ and CDM project standard version 02.0 /B01/. This confirms compliance with the §355 and §356 of CDM VVS for project activities, version 02.0 /B01-1/.

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

>> N/A

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

Means of verification	Document Review, Interview
Findings	CL-01 has been raised and satisfactorily closed.
Conclusion	As verified during the on site inspection and document review the verification team has reviewed the biogas units commissioning records, application forms, end user agreements /03/ and non-working & repair log records /04/. 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 approved revised PDD/B04/. 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 approved revised PDD /B04/ and that all physical features of the project are in place. The project has been implemented as described in the approved revised PDD/B04/ as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification. The verification team took cognizance of §341 (b)(i), §357, §358 and §359 of CDM VVS for project activities, version 02.0 /B01-1/.: • The implementation status and equipment installation of the Project are consistent with the approved revised PDD/B04/; • The actual operation of the Project is as per the approved revised PDD/B04/; • Information (data and variables) provided in the monitoring report is in accordance with that stated in the approved revised PDD/B04/.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

>> N/A

E.4.2. Corrections

>> N/A

E.4.3. Change to the start date of the crediting period of the project activity

>> N/A

E.4.4. Inclusion of a monitoring plan

>> N/A

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

>> N/A

E.4.6. Changes to the project design

>> N/A

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

>> N/A

E.5. Compliance of the registered monitoring plan with the methodology including applicable tools and standardized baselines

Means of verification	Document Review, Interview
Findings	--
Conclusion	The verification team has checked the actual monitoring plan/02/ against the latest approved monitoring plan/B04/ and monitoring methodology/B02/ and applicable tools. Furthermore, the verification team has checked monitoring system during the onsite inspection by means of comparison with the information given in the monitoring plan and monitoring methodology. The monitoring plan is completely in accordance with the approved methodology applied by the approved revised PDD/B04/. All the parameters need to be monitored and corresponding monitoring approach have been discussed in the monitoring plan in the approved revised PDD/B04/ and QA/QC procedure has been stipulated. The verification team confirms that the monitoring plan complies with the applied methodology and the monitoring system and all applied procedures are completely in compliance to the latest approved monitoring plan and the methodology AMS I.E. version 5.0 /B02/. The verification team took cognizance of §360, §361 and §362 of CDM VVS for project activities, version 02 /B01-1/.

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	Document Review, Interview
Findings	--
Conclusion	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 approved revised PDD whether all parameters fixed ex-ante for the crediting period have been applied correctly.

Ex-ante Parameter	Value	Assessment
B_y	3.0733 tonnes/year/family	The value is consistent with the approved revised PDD /B04/.
fNRB, y	0.95	The value is consistent with the approved revised PDD/B04/.
NCVbiomass	0.015 TJ/tonne	The value is consistent with the approved revised PDD/B04/.
EFprojected_fossilfuel	81.6 tCO_2/TJ	The value is consistent with the approved revised PDD/B04/.
Diversion of non-renewable biomass **saved under the project activity by households**	2.92 t/HH/yr for all 365 days	The value is consistent with the approved revised PDD/B04/.

The values of ex ante fixed parameters have been verified from the approved revised PDD/B04/. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.

The verification team took cognizance of §363 of CDM VVS for project activities, version 02.0 /B01-1/

E.6.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	--.
Conclusion	All relevant monitoring parameters (as listed in section B. 7.1 of the approved revised PDD/B04/ and D.2 of the MR /01/) have been verified with regard to the appropriateness of the applied measurement / determination method, frequency, the correctness of the values applied for ER calculation /02/, the accuracy, and applied QA/QC measures. Referring to §367 of CDM VVS for project activities, version 02 /B01-1/, the verification team has reviewed all the monitoring as listed below and verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters including the values in the monitoring report. The assessment in this regard is provided below: **Number of installed 2 m^3 systems** (Number of biogas units installed under the project activity): This parameter is monitored as and when a digester is commissioned/started producing gas and the same is entered into the monitoring database. The reported data is cross checked with the online monitoring solution /03/ maintained in ADATS" office during site visit. The value reported in the monitoring report (i.e. 5,485) is found to be correct. Furthermore, verification team during on site inspection based also reviewed the audited balance sheet (for the period of commissioning of biogas unit) and verified the expenditure related to construction and commissioning of the biogas units, this is in compliance with the approved revised PDD (refer appendix 5, p-34 of 36 of the PDD /B04/). **Number of biogas plants operating (Number of plants operating in year):** PP repairs the plants as and when an issue is found by staff or reported by end user.

	So, PP continuously monitors the non-working days when the unit is not operational. The emission reduction has been adjusted based on the non-operational days. Hence, the number of biogas plants operating is monitored as 69.28% of 5,485 units. The values were cross verified with Log book records /04-1/ , digitized monitoring database /04-2/ during site visit by the verification team. Hence, the value reported for this parameter is correct. **Confirmation that non-renewable biomass of By has been substituted (Confirmation that non-renewable biomass has been substituted):** This parameter was monitored through stratified sample survey. PP has conducted survey for this parameter. As verified from the survey result /05/, all the sample households confirm that the bio digester usage substitute non-renewable biomass used in the baseline situation. All the survey sheets /05/ are verified and found that the data mentioned in the excel sheet is correct. During the site visit verification team has done acceptance sampling survey where verification team conducted survey in 11 households (randomly selected from PP's sample population). All the data collected are consistent with PP"s record /05/. No error found. Hence, the verification team confirms that the non-renewable biomass of B_y has been substituted by the project activity. **Non-usage days of installed and operational biogas plants (Usage of non-renewable biomass in case of non-performance of biogas units):** Verification team, during on site inspection noted that the Non-usage days of biogas plants are monitored daily. When the biogas unit is not working, the beneficiaries report to the village level women volunteer, who in turn reports to the Case Worker of the project for the repair of the unit. The date when the plant stopped working and the date when the issue is fixed are noted down in the village level breakdown log book /04-1/ by the staffs/volunteers and the same will be entered into monitoring solutions/04-2/. Verification team checked all the breakdown log records /04-2/ and data in the monitoring solution. Verification team confirms the data reported in the MR (i.e. 1,458,827 non-usage days) is found to be correct. The QA/QC procedure for all the monitoring are in place as per the registered monitoring plan. The personnel involved in the monitoring and operation project were interviewed during the on site inspection and they are found as competent to perform their roles & responsibility and also to ensure QA/QC procedures. As assessed above, verification team has checked the information flow (from data generation, aggregation, to recording, calculation and reporting) for all the monitoring parameters. Furthermore, verification team based on the assessment above confirms the following for each of the monitoring parameter: ✓ the appropriateness of the applied measurement / determination method, frequency as per the monitoring plan of the approved revised PDD. ✓ the applied QA/QC measures as per the monitoring plan of the approved revised PDD ✓ the correctness of the values applied for ER calculation. The verification team took cognizance of §363, §364 and 367 of CDM VVS for project activities, version 02.0 /B01-1/. The monitoring has been carried out in accordance with the monitoring plan in the approved revised PDD. All parameters required by the monitoring plan have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.

E.6.3. Implementation of sampling plan

Means of verification	Document Review, Interview

Findings	CL-02 has been raised and satisfactorily closed.
Conclusion	Refer assessment in Appendix 5

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

Means of verification	NA
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	Document Review, Interview
Findings	CAR-01 and CAR- 02 has been raised and satisfactorily closed.
Conclusion	The verification team has performed the following activities to assess the data and calculations of GHG emission reductions achieved by the Project as per the methodology AMS-I.E. ver. 5/B02/: • Verification team based on desk review and on-site inspection confirms that a complete set of data for the specified monitoring period is available. • Review of the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan in the approved revised PDD and applied methodology. • Crosscheck of the calculated emission reductions with the provisions as per the Monitoring Plan with the actual practice during the monitoring period. The equations for baseline emissions, as provided in the monitoring report /1/ and confirmed with the approved revised PDD /B04/ and the methodology AMS-I.E, version 04 /B02/, are: $ER_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossilfuel}$ Where, ER_y =Emission reductions during the year y in tCO_2e B_y (gross per unit) = Quantity of woody biomass that is substituted or displaced in tonnes $f_{NRB,y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non renewable biomass using survey methods $NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne) $EF_{projected\_fossilfuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumer (Default value of 81.6 tCO2/TJ). Hence, the emission reduction reported in the monitoring report/1/ for the monitoring period (i.e. 24,920 tCO2e without leakage adjustment and 23,674 tCO2e with leakage 1246 tCO2e adjustment) is verified to be correct. The verification took cognizance of § 375 of CDM VVS for project activities, version 02.0) /B01-1/ and confirms that:

	• A complete set of data for the monitoring period is available. • Information on the baseline GHG emission calculation provided in the monitoring report has been cross-checked with other sources /03/, /04/, /05/, /06/, as referred above in the assessment. • Calculations of baseline emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology. • Appropriate emission factor values have been correctly applied • No errors, miscalculations, omissions, misstatements or incomplete information has been identified.

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

Means of verification	Document Review, Interview
Findings	--
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and the approved revised PDD/B04/

E.8.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	--
Conclusion	A default (0.95) Net to gross adjustment factor to account for leakages has been considered by the project and the values applied are: By x 0.95 = 3.07 x 0.95 = 2.92 t/HH/yr for all 365 days and thus it is in line with the requirement of monitoring methodology /B02/ and the approved revised PDD /B04/.

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

Means of verification	Document Review, Interview
Findings	--
Conclusion	The verification team has checked if the MR includes a summary table of the emission reductions calculation specifying separately: a. Total baseline emissions, b. Total Project emissions c. Total emission reductions. Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from approved revised PDD /B04/. The total number of CERs achieved during the monitoring period is 23,674 tCO2e. In summary, verification team confirms that actual emission reduction is lower than the estimate of the approved revised PDD for the current monitoring period.

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

Means of verification	Document Review, Interview

Findings	--
Conclusion	The ex ante estimated value of the emission reductions for the monitoring period as per the approved revised PDD is 37,290 tCO2e and the actual emission reductions achieved for the monitoring period is 23,674 tCO2e. The per unit emission reduction estimated ex-ante in the approved revised PDD is 3.39 tCO_2/year/family. The emission reduction calculated for this monitoring period is 2.16 tCO_2/year/family. The emission reduction calculated for previous monitoring period (5^{th} issuance which is 1^{st} after the renewal of crediting period) is 2.37 tCO_2/year/family. The per unit emission reductions for the reported monitoring period are less than the ex-ante estimations and the previous monitoring period. Verification team confirms that actual emission reduction (total and per unit) is lower than the estimate of the approved revised PDD/B04/ for the current monitoring period. The comparison is provided in accordance with the paragraph 266 and 267 of the Project Standard for the project activities, version 02/B01-2/ and the paragraph 373 (d) of the VVS for the project activities, version 02/B01-1/.

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

Means of verification	Document Review, Interview
Findings	--
Conclusion	Not applicable since the actual GHG emission reductions are lower than the estimates in the approved revised PDD

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	Document Review, Interview
Findings	--
Conclusion	The verification team has checked section E.4 of the MR and the ER calculation spreadsheet. The MR in section E.4 includes a summary table of the ER breakdown which states that the GHG emission reductions have completely been generated from 1 January 2013 onwards. Actual GHG emission reductions have been generated from 1 January 2013 onwards. CERs achieved upto 31^{st} Dec 2012 = 0 tCO_2e. CERs achieved from 1^{st} Jan 2013 = 23,674 tCO_2e

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

Means of verification	Not applicable
Findings	NA
Conclusion	Not applicable

E.10. Global stakeholder consultation

Means of verification	Not applicable (this is not first MP)
Findings	NA
Conclusion	Not applicable (this is not first MP)

SECTION F. Internal quality control

The verification report passed a technical review before being submitted to the UNFCCC Executive Board. The technical review is performed by a technical reviewer qualified in accordance with CCIPL's qualification scheme for CDM validation and verification.

SECTION G. Verification opinion

Carbon Check (India) Private Ltd. (CCIPL) has performed the 6th periodic verification of the registered CDM Project Activity "Bagepalli CDM Biogas Programme" having UNFCCC reference number as 0121. The project activity has been implemented 5,485 biogas plants (digesters) of 2 m^3 capacity each for single households in Karnataka State. Each household utilises the dung of its cattle to feed the digester for the production of biogas for cooking purpose and heating of hot water. The aim of the project is to replace the commonly used inefficient wood fired mud stoves technology, with clean, sustainable and efficient biogas.

The verification team assigned by the DOE concludes that the project activity as described in the approved revised PDD /B04/ and the Monitoring report /01/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM Modalities & Procedures, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS requirements for project activities, version 02.0 /B01-1/.

Verification methodology and process

The Verification team confirms the contractual relationship signed on 11/02/2019 between the DOE, Carbon Check (India) Private Ltd. and the Project Participant, Agricultural Development and Training Society (ADATS). The team assigned to the verification meets the CCIPL's internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and CCIPL's procedures and requirements.

The verification has been performed as per the requirements described in the CDM VVS for project activities, version 02.0 and constitutes the review and completion of the following steps:

- Reviewing the approved revised PDD /B04/ including the monitoring plan and the corresponding validation report /B04/;
- Publication of the MR (version 1, 17/02/2019) /1/ on the UNFCCC website on 18/02/2019
- Desk review of the validation report, MR and other relevant documents including documents related to the projects activities in emission reductions
- Review of the applied monitoring methodology (AMS-I.E. ver. 5 - Switch from non-renewable biomass for thermal applications by the user) /B02/;
- Review of any CMP and EB decisions, clarifications and guidance /B05/;
- On-site assessment (14/03/2019 to 15/03/2019)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the approved revised PDD/B04/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on-site visit, the verification team confirms that the project activity has resulted in the 23,674 tCO_2e emission reductions during the sixth monitoring period.

The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO_2e)	0	23,674

CCIPL as a DOE is therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

SECTION H. Certification statement

Carbon Check (India) Private Ltd., the DOE, has performed the verification of the registered project activity "Bagepalli CDM Biogas Programme" having UNFCCC reference number as 0121.

The PP is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. The DOE does not express any opinion on the

selected baseline scenario or on the validated and approved revised PDD. The verification is carried out in-line with the requirements of CDM VVS for project activities, version 02.0 /B01-1/.

The verification was performed to identify the compliance with implementation and monitoring requirements, and to verify the actual amount of achieved emission reductions, through obtaining evidence and information on-site that included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

The verification is based on:

- ✓ Approved revised PDD version 6 dated 11/05/2017 and the corresponding validation report /B04/;
- ✓ Approved monitoring methodology AMS-I.E. “Switch from non-renewable biomass for thermal applications by the user”, version 5.0/B02/;
- ✓ Monitoring reports versions 1, 2 ,3 and 4 dated 17/02/2019, 11/04/2019, 01/05/2019, 08/05/2019.

This statement covers verification period from 01/01/2017 to 31/12/2018 (including both the dates).

The DOE has raised 02 clarifications and 02 corrective action request and are satisfactorily closed.

The DOE considers necessary to give reasonable assurance that reported GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology and the monitoring plan contained in the approved revised PDD/B04/ are fairly stated.

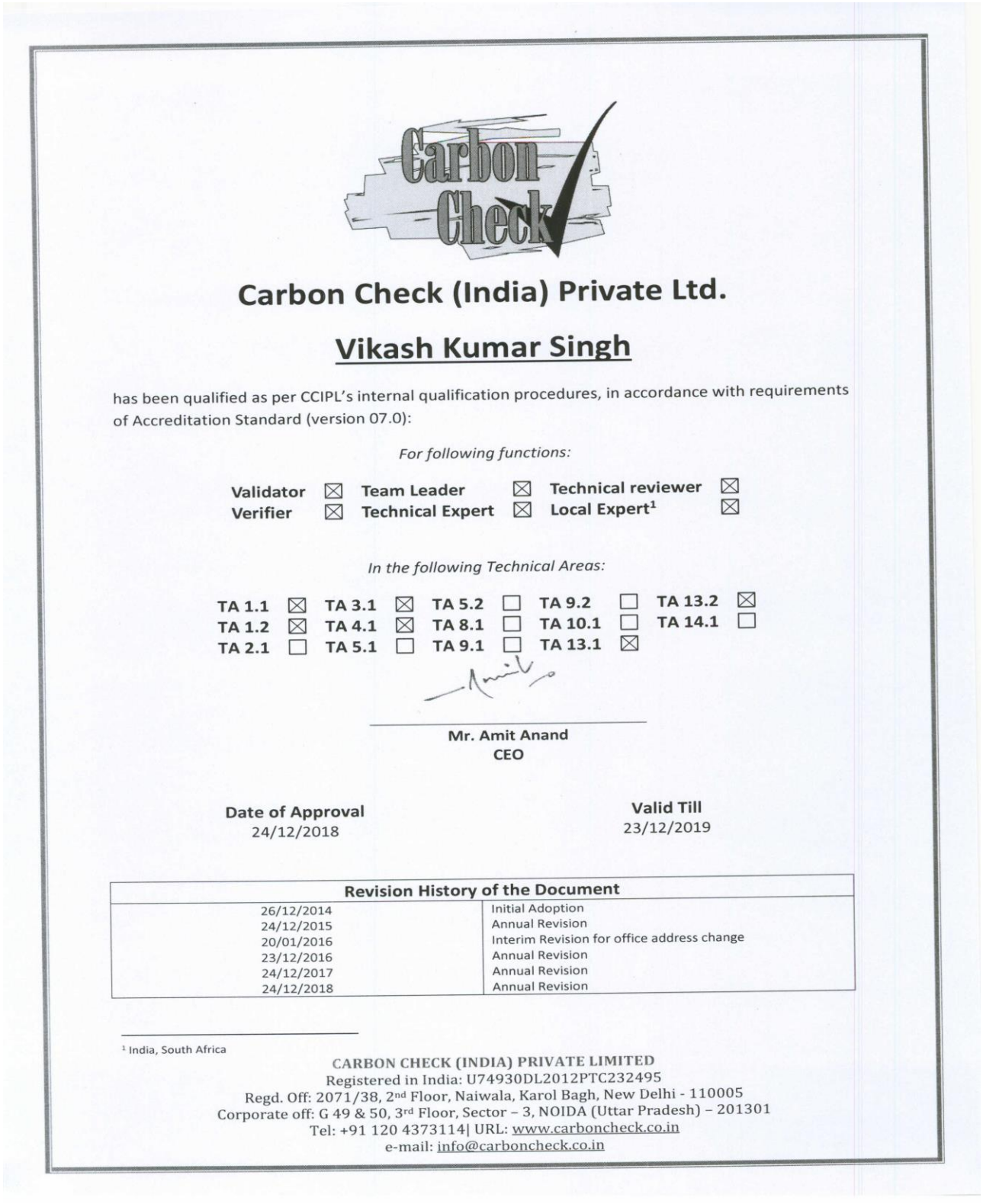
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 23,674 tCO_2e equivalent and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 01/01/2017 and 31/12/2018 onwards as verified during the course of verification are as below:

Item	**Emission reductions up to 31 December 2012**	**Emission reductions from 1 January 2013 onwards**
Emission reductions ($t CO_2e$)	0	23,674

Appendix 1. Abbreviations

Abbreviations	Full texts
ADATS	Agricultural Development and Training Society
CAR	Corrective action request
CCIPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide Equivalent
DNA	Designated National Authority
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
MoV	Means of verification
MP	Monitoring Plan
MR	Monitoring Report
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PS	Project Standard
UNFCCC	United Nations Framework Convention for Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☒
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

Valid Till
23/12/2019

Revision History of the Document	
26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision

[1] India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector – 3, NOIDA (Uttar Pradesh) – 201301
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Carbon Check (India) Private Ltd.

Anubhav Dimri

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒		
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒		

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☐
TA 1.2	☒	TA 4.1	☐	TA 8.1	☒	TA 10.1	☐	TA 14.1	☐
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

Valid Till
23/12/2019

Revision History of the Document

26/12/2014	Initial Adoption
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24/12/2018	Annual Revision

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Carbon Check (India) Private Ltd.

Sanjay Agarwalla

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☒	TA 9.2	☒	TA 13.2	☐
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☒	TA 5.1	☒	TA 9.1	☒	TA 13.1	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

Valid Till
23/12/2019

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
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23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision

[1] India

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Tel: +91 120 4373114| URL: www.carboncheck.co.in
e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/01/	ADATS	a) Monitoring Report b) Monitoring Report c) Monitoring Report d) Monitoring Report	Version 01, dated 17/02/2019 Version 02, dated 11/04/2019 Version 03, dated 01/05/2019 Version 04, dated 08/05/2019	PP
/02/	ADATS	a) Emission Reduction spread-sheet corresponding to /01-a/ b) Emission Reduction spread-sheet corresponding to /01-b/ c) Emission Reduction spread-sheet corresponding to /01-d/	Version 01 Version 02 Version 03	PP
/03/	ADATS	Data source of the parameter "Number of biogas units installed under the project activity"- ADATS InfoNeeds- Super report- consists of biogas basic record set: • Region wise biogas unit • Number of End user agreement signed • Number of commissioned biogas units with details of month/year of commissioning • Total Usage days • Days lost due to major project • Days affected due to minor problems • Total expenditure for all units commissioned.	--	PP
/04/	ADATS	Data source of the parameter "Number of plants operating in year" & "Non-usage days of installed and operational biogas plants": 1. Sample break down log book maintained by village volunteers 2. Consolidated breakdown excel sheet directly downloaded from monitoring server "InfoNeeds" based on above village level log book.	--	PP
/05/	ADATS	Sample Survey sheets and spread sheet as a records Data source of the parameter "Confirmation that non-renewable biomass has been substituted"	--	PP
/06/	ADATS	Sample end user details as extracted from InfoNeeds	--	PP
/07/	ADATS	Training Records: o Training conducted for end	--	PP

		user ○ Training conducted for Mason ○ Training conducted for staffs Training conducted for Village Level Volunteers		
/08/	ADATS	Photographs of sample biogas units	--	PP
/B01/	UNFCCC	1. CDM Validation and Verification Standard version for project activities 02.0 2. CDM Project Standard version 02.0 3. CDM Project Cycle Procedure version 02.0	https://cdm.unfccc.int/	UNFCCC website
/B02/	UNFCCC	Applied baseline and monitoring methodology, AMS-I.E. ver. 5 - Switch from non-renewable biomass for thermal applications by the user	https://cdm.unfccc.int/	UNFCCC website
/B03/	UNFCCC	Guideline: Application of materiality in verifications version 02.0	https://cdm.unfccc.int/	UNFCCC website
/B04/	UNFCCC	1. Registered PDD (version 05 dated 02/08/2013), and corresponding validation report. 2. Revised Approved PDD (version 06 dated 11/05/2017), and corresponding validation report	https://cdm.unfccc.int/	UNFCCC website
/B05/	UNFCCC	Attachment. Instructions for filling out the monitoring report form version 06.0	https://cdm.unfccc.int/	UNFCCC website

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

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

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

Table 2. CL from this verification

CL ID	01	**Section no.**	E.3	**Date:** 04/04/2019
Description of CL				
As per the Monitoring report, the number of biogas installed is 5,485. Review of the report "ADATS InfoNeeds- Super report /03/", however reveals a total of 5,488 units. PP is requested to clarify the inconsistency.				
Project participant response				**Date:** 11/04/2019
The data monitoring system captures the construction processes of all the units commissioned under the project activity. Hence under the project 5488 units were constructed and commissioned. Of the units, 3 units were not used by the household since the day of construction. Hence these units were not included for emission reduction calculations right from the first monitoring report. Hence only ,5485 are accounted for emission reduction calculations.				
Documentation provided by project participant				
--				
DOE assessment				**Date: 01/05/2019**
PP has provided the justification for the inconsistency and the same is found to be acceptable, since the number of biogas for which ERs are being claimed is less than 5488. The approach is conservative and thus acceptable to the verification team. Hence the CL is closed.				

CL ID	02	**Section no.**	E.6.3	**Date:** 04/04/2019
Description of CL				
Review of MR and ADATS survey sheet /05/ reveals that PP has oversampled the number of sample for the project. However, it is observed that for few of the strata (for e.g. Taluka Sidlaghatta and Gudibande), the sample size is below the required sample size as calculated/indicated on p 15 of 21 of the monitoring report. PP is requested to clarify.				
Project participant response				**Date:**

As mentioned in the MR, the population is homogeneous in terms of cooking patterns and socio-economic strata. The biogas units implemented in the region is also of single type – 2 cum deenabhandu model. But to capture the data from all the taluks in which the project has been implemented, stratified random sample survey was conducted considering each taluk as a strata.

Also the sample size required (without oversampling) as per the determination of sample size is 93 and 114 for 1st and 2nd year of Monitoring Period. Based on stratification, the number of samples to be surveyed are as follows:

	Sample size required (HHs)		Number of HHs sampled	
Taluk	2016-17	2017-18	2016-17	2017-18
Bagepalli	45	55	62	78
Chickballapur	11	13	15	27
Chintamani	17	21	31	24
Siddalaghatta	14	17	14	32
Gudibanda	6	8	8	10
Total	93	114	**130**	**171**

As can be seen from the above table, the sample size is according to the required sampling size. Over sampling was done in some of the taluks for non-responses.

The table in the MR is corrected to reflect the actual sample size requirement without considering oversampling at taluk level.

As mentioned, the project area is homogeneous and the taluks are just administrative distinctions. To have representative samples from all taluks, the households were sampled in all the taluks.

Documentation provided by project participant

Revised Monitoring Report version 02.0, dated 11/04/2019

DOE assessment	Date: 01/05/2019
The justification provided by the PP is convincing, however the finding is open due to following reason: 1. The text in the MR, particularly above the table which has been revised still provides sample size assuming oversampling (i.e. considering 80% response rate), which is confusing for a reader. 2. The Monitoring report and Sampling spread sheet should provide an information on the actual precision achieved. CL is open	
Project participant response	**Date:** 02/05/2019
1. The text in the MR is revised to provide consistency in the calculations and the text in Monitoring Report to avoid confusion. *2. The monitoring parameter, "Confirmation that non-renewable biomass has been substituted" is a qualitative measurement and has no calculations of mean and standard deviation to estimate precision achieved. Hence not provided in the Monitoring Report and the sampling spread sheet. The results of the survey in terms of qualitative assessment is provided in the Monitoring Report.*	
Documentation provided by project participant	
Revised Monitoring Report version 03.0, dated 01/05/2019	
DOE assessment	**Date:** 02/05/2019
Verification noted on the PP's response and confirm that the parameter "*Confirmation that non-renewable biomass has been substituted*" is *a qualitative parameter and has no calculations of mean and standard deviation to estimate precision achieved. The sample size as calculated was achieved by the PP while conducting the survey, as clarified* in the response above based on which and revision in the monitoring report the CL is closed.	

Table 3. CAR from this verification

CAR ID	01	Section no.		Date: 04/04/2019
Description of CAR				
Heading of Colum "Q" under work sheet "End Users" in CER spread sheet appears to be incorrect.				
Project participant response				**Date:** 11/04/2019
The heading of Column "Q" under work sheet "End Users" in CER spreadsheet is corrected to "Operational Days-2018"				
Documentation provided by project participant				
Revised Emission Reduction Calculations Sheet.				
DOE assessment				**Date:** 01/05/2019
PP has provided revised ER spread sheet with corrected column headline as "Operational Days-2018". Hence the CL is closed.				

CAR ID	02	Section no.		Date: 04/04/2019
Description of CAR				
Review of CER spread sheet and MR report reveals few inconsistencies. The value of Baseline and leakage under section E.1 and E.4 of the monitoring report is inconsistent with the CER sheet.				
Project participant response				**Date:** 11/04/2019
Due to rounding off for year-wise calculations and combining the values, there were inconsistencies. The ER calculations is now combined for both the years and presented instead of Vintage year wise, which removes the anomalies. The values calculated in the CER sheet is consistent with the values in the Monitoring Report.				
Documentation provided by project participant				
Revised CER Calculations Sheet. Revised Monitoring Report version 02.0, dated 11/04/2019				
DOE assessment				**Date:** 01/05/2019
PP has submitted revised MR and revised ER with correct values of Baseline and leakage of biogas units which is found to be consistent. Hence the CL is closed.				

Appendix 5. Assessment of Monitoring parameters monitored through sampling/surveys

<table>
<tr><th>Sl. No.</th><th>Checklist Questions</th><th>Assessment</th></tr>
<tr><td>1.</td><td>Does the Monitoring Report apply sampling for determination of ex-post monitoring parameters?</td><td>Yes, the PP has selected stratified random sampling for one of the ex-post monitoring parameter i.e. Confirmation that non-renewable biomass has been substituted.</td></tr>
<tr><td>2.</td><td>Is the applied sampling plan in accordance with the sampling plan proposed in the registered PoA-DD/ PDD?</td><td>Yes, the applied sampling plan is in accordance with the sampling plan of the approved revised PDD.</td></tr>
<tr><td>3.</td><td>List the parameters determined through sampling and respective parameters of interest.</td><td>Parameters determined through sampling and respective parameters of interest are:
Confirmation that non-renewable biomass has been substituted</td></tr>
<tr><td>4.</td><td>Is the sample size calculated in accordance with the formula presented in the registered PoA-DD/PDD?</td><td>Yes, the sample size calculated is in accordance with the formula presented in the approved revised PDD.</td></tr>
<tr><td>5.</td><td>Are the assumptions used for calculation of sample size appropriate and correct?

P.S.: Provide assessment on appropriateness of value of proportion (p), standard deviation (STDEV) or variance (v) used for calculation of sample size.</td><td>Stratified random sampling was applied by the PP for selection of the monitoring samples with 90/10 confidence / precision level. The same is deemed acceptable as per the approved revised PDD.

The variance (v) used for calculation of sample size is found to be appropriate.</td></tr>
<tr><td>6.</td><td>What are the sample sizes obtained for the parameters being monitored? Is the determined sample size deemed adequate for the parameter of interest being monitored?

P.S.: If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student’s t-distribution shall be used if the resulting sample size is less than 30.</td><td>It was found that for the parameter of interest, the confidence/precision (90/10) was met. The number of samples for the parameter covered during the monitoring activity is as given below:

<table><tr><th>Parameter</th><th>Samples covered during monitoring</th></tr><tr><td>Confirmation that non-renewable biomass has been substituted</td><td>2017-130
2018-171</td></tr></table></td></tr>
<tr><td>7.</td><td>Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort?</td><td>PP has oversampled and It was found that for all the parameters, the respective confidence/precision (90/10) was met. The number of samples for each of the parameters covered during the monitoring activity is as given below:</td></tr>
</table>

<table>
<tr><td></td><td>P.S.: If there is more than one parameter to be estimated in a CDM project activity, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen for the sampling effort with one common survey, or the sampling effort and survey is repeated for each of the parameters. A random sub-sample within the common survey is allowed as long as: (i) the reliability specification (e.g. 90/10 confidence/precision for small-scale CDM project activities and 95/10 for large scale CDM project activities) is achieved for each individual parameter; and (ii) the random sub-sample is consistent with the design of the survey and the corresponding sample size calculation.</td><td><table><tr><th>Parameter</th><th>Samples covered during monitoring</th></tr><tr><td>Confirmation that non-renewable biomass has been substituted</td><td>2017-130
2018-171</td></tr></table></td></tr>
<tr><td>8.</td><td>Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?</td><td>Yes, the assumed response rate is reasonable (appropriate and correct) for the determination of samples to be surveyed for the parameter of interest.</td></tr>
<tr><td>9.</td><td>Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?</td><td>Yes, verification based on review of sample taken and on site inspection interview/observation confirms that sample selected by PP for determination of the monitored parameters are random from each of the strata. It can be considered as representative of the population.</td></tr>
<tr><td>10.</td><td>Has minimum target level of precision been achieved based on estimates from the actual samples?</td><td>Yes, the minimum target level of precision been achieved based on estimates from the actual samples.

<table><tr><th>Parameter</th><th>Target precision level</th><th>Precision achieved</th></tr><tr><td>Confirmation that non-renewable biomass has been substituted</td><td>10%</td><td>the parameter is a qualitative parameter and has no calculations of mean and standard deviation to estimate precision achieved</td></tr></table>
This has been checked and confirmed by reviewing Survey database /05/ provided by PP.</td></tr>
<tr><td>11.</td><td>In case the minimum target level of precision has not been achieved based on estimates from the actual samples, please specify the approach adopted by PP to reach the required precision and also justify the appropriateness of the adopted approach in accordance with the applied methodology or paragraph 17 of Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).</td><td>Not applicable.</td></tr>
<tr><td>12.</td><td>Has VT applied acceptance sampling to verify that the results of sampling efforts undertaken by PP for determination of ex-post parameters. If yes, please provide a detailed justification of the approach adopted including</td><td>DOE used sampling during verification for checking the parameter “Confirmation that non-renewable biomass has been substituted. A</td></tr>
</table>

	information on (but not limited to): (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level (e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample	sample size of 11 households was chosen from PP's sample. A sample size of 11 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 10 %. Acceptance number (c) thus determined for the sample is 0. . No discrepant records were observed in all the 11 samples visited and thus c=0. Thus, CME's set of records has been accepted in line with §32 of the sampling standard (version 07.0) /B07/.
13.	Are the procedures for the selected survey and data collection method unambiguously defined and do they adequately provide for minimizing non-sampling errors?	Verification team based on on-site inspection interviews and review of documented procedure /05/ confirms that the selected survey and data collection method is unambiguously defined. This also adequately ensure minimizing non-sampling errors.
14.	Have potential sources of bias inherent in the selected data collection method, such as self-selection and under-coverage, been anticipated? Have mechanisms for mitigating these been considered?	Review of sampling records /05/ and on-site inspection interviews with the Personnel conducted Surveys does not any reveal sources of bias inherent in the selected data collection.
15.	Is the quality control and assurance strategy adequate?	Verification team based on review of provided documents /05/ and on-site inspection interviews confirms that the quality control and assurance strategy is adequate.
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	The verification team has focused on abilities, qualifications and recognition of involved personnel in survey. During the on-site visit it was confirmed that the team was qualified as confirmed by on site inspection interviews and trained /07/ to carry out surveys.
17.	Does the PP have a process in place to ensure data quality is maintained to a high standard? This should include: a) Are the personnel trained and experienced? b) What is the level of supervision and guidance provided to staff? c) Is there a standardized system for data entry and analysis to produce final result? d) Is there a system or process in place to minimize the introduction of errors? e) Is there a system in place to ensure all collected data is processed; f) Are quality checks performed on data entered, for example range checks, g) inconsistency checks, checking of subsamples of data by supervisors; h) is there a system to check for errors, record and report errors reported and document the remedial action taken; i) What is the level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion?	Verification team based on review of provided documents /05/, /07/, / and on-site inspection interviews confirms the following: ✓ the personnel involved in the surveys are trained and experienced. ✓ there exists a standardized system for data entry and analysis to produce final result. ✓ there exist a system or process in place to minimize the introduction of errors. ✓ there a system in place to ensure all collected data is processed.

		✓ there exists a quality checks of data entered.

- - - - -

Document information

Version	*Date*	*Description*
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