

Verification and Certification report

for

**GS labeling of CDM programme of
activities**

For

Nepal Biogas Support Program-PoA

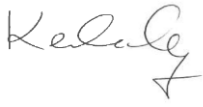
Verification period:

01/08/2017 to 31/07/2018

Submitted by:



BASIC INFORMATION		
Title and UNFCCC reference number of the programme of activities (PoA)	Nepal Biogas Support Program-PoA	
	CDM ref no: 9572	PoA GS ref no: 3110
	CPA 9572-0001 CPA 9572-0002 CPA 9572-0003 CPA 9572-0004 CPA 9572-0005 CPA 9572-0006 CPA 9572-0007	CPA GS ref no: GS 3109 CPA GS ref no: GS 3113 CPA GS ref no: GS 3114 CPA GS ref no: GS 3116 CPA GS ref no: GS 3566 CPA GS ref no: GS 6393 CPA GS ref no: GS 6394
Version number(s) of the PoA-DD(s) to which this report applies	14.0	
Version number of the verification and certification report	01. ~~21~~	
Completion date of the verification and certification report	~~0083/1109~~ /2019	
Monitoring period number and duration of this monitoring period	Monitoring period number: 05 for the PoA Duration of the MR period: 01/08/2017 to 31/07/2018	
Number and version number of the monitoring report to which this report applies	Monitoring period number: 05 for the PoA Version number of the MR: 0 ~~23~~ .0	
Coordinating/managing entity (CME)	Alternative Energy Promotion Centre (AEPC)	
Host Parties	Host Parties of the PoA	Is this a host Party to a CPA covered in this report? (yes/no)
	Nepal	Yes
Applied methodologies and standardized baselines	AMS.I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User (version 04)	
Mandatory sectoral scopes linked to the applied methodologies	SS 1: Energy industries (renewable/non-renewable sources)	
Conditional sectoral scopes linked to the applied methodologies, if applicable	SS 13	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	CPA-1: 61,889 tCO ₂ e CPA-2: 66,236 tCO ₂ e CPA-3: 66,329 tCO ₂ e CPA-4: 66,397 tCO ₂ e CPA-5: 65,883 tCO ₂ e CPA-6: 61,565 tCO ₂ e CPA-7: 61,191 tCO ₂ e Total: 449,490 tCO ₂ e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs	368,354 tCO ₂ e	

covered in this report	
Name and UNFCCC reference number of the DOE	EPIC Sustainability Services Private Limited (E-0062)
Name, position and signature of the approver of the verification and certification report	 K.Suryanarayana Murthy, Managing Director

SECTION A. Executive summary

EPIC Sustainability Services Private Limited (EPIC) has been contracted by Alternative Energy Promotion Centre (AEPC) to undertake the fifth periodic independent verification of the registered GS programme of activity titled “Nepal Biogas Support Program-PoA” (GS PoA ref no: 3110, UNFCCC reference number: 9572), covering 1 to 7 CPA's. The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 01/08/2017 to 31/07/2018 (first and last day included); and to verify that the data reported are complete and transparent.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board's decisions.

The verification team has, based on the recommendations in the Validation and Verification Standard^{/1/} version 2.0, Gold Standard for Global Goals (GS4GG), GS requirements ver 2.2, Gold standard toolkit ver 2.2, relevant GS annexes and employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generations of GS-CERs. The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

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 the CDM plus GS validated and approved project design document PoA-DD (hereinafter referred to as PoA-DD), corresponding validation report, CPA-DD's (CPA 1 to CPA 7), corresponding validation report, previous monitoring reports and its corresponding verification reports. These documents were reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

The PoA involves the implementation of biogas applications at individual households in Nepal. The programme of activities reduces GHG emissions due to displacing firewood by biogas from animal waste and human excreta. Only the replacement of non-renewable biomass is counted as emission reduction under CDM/GS for this project. This verification covers CPA-1, CPA-2, CPA-3, CPA-4, CPA-5, CPA-6 and CPA-7.

Target group under the Biogas Support Program (BSP) are rural households who currently use non-renewable biomass (firewood). The BSP is centrally managed by Alternative Energy Promotion Centre (AEPC) with the support of Biogas Sector Partnership Nepal (BSP-NEPAL), the implementing agency of the AEPC. AEPC is a public entity that executes all renewable/alternative energy programmes in Nepal including this POA.

The verification team determines the conformity of the actual project activity and its operation with the registered PoA-DD and CPA-DDs. The verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM programme of activity are in place, and that the project participants have operated the CDM project activity as per the PoA-DD^{/5/} and the CPA-DD. Thus the verification team has concluded that the project activity was implemented and operated as per PDD^{/5/}, and that all physical features of the project are in place and comply with para 270 to 273 of VVS^{/1/}.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been implemented as per the PoA-DD and the CPA-DDs. The start date of this monitoring period is 01st August 2017 which is in line with the end date of the previous monitoring period.

The monitoring report for this monitoring period is in compliance with the monitoring plan of the PoA-DD and the CPA-DD. The project activity was registered by applying the small scale methodology AMS.I.E version 4.0 and the verification was carried out in accordance with the applied methodology. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring Report.

EPIC's 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 and Gold standard. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

The verification team has planned and performed the work to obtain the information and explanations that is considered necessary to provide sufficient evidence for it to give reasonable assurance that the amount of calculated GHG emission reductions for this monitoring period were fairly stated.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

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 review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Anbazhagan	Prabu Das	EPIC, Central office, Bangalore	√	√	√	√
2.	Auditor	IR	Dayanananda Sagar	Siddaramu	EPIC, Central office, Bangalore	√	√	√	√
3.	Host Country Expert	ER	Sujan	Adhikari	EPIC, Central office, Bangalore	√	√	√	√

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	Vishnu	Govindarao	EPIC, Central office, Bangalore

SECTION C. Application of materiality in conducting the verification

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.	Errors in manual transfer of records from handwritten information to excel spreadsheets (including misstatements and omissions)	Medium	Likely human error during data transfer and ineffective QA/QC procedures	During document review and on-site visit, complete review of the data transfer process and the cross-check mechanism followed by the PP needs to be checked
2.	Operational percentage of digesters for each of the 87 CPA's under monitoring	Medium	Monitoring process is not complicated, but involvement of untrained personnel for BUS survey may give erroneous data	Following will be checked:- • Survey procedures • Selection of survey personnel • Trainings provided to the survey personnel (training modules, attendance sheet etc) • Cross check of BUS reports information with actual site data

C.2. Consideration of materiality in conducting the verification

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In line with Guidelines for Application of materiality in verification^{/4/}, a reasonable level of assurance is defined for the verification of the project by complete verification of all the values indicated in the emission reduction spreadsheet and the referred documents, at the document review stage and onsite visit.

Parameter	Verification approach	Error identified	Findings reference	Correction	Extrapolated error for population size (Qty and %)
P - The share of digesters operational, '%'	Acceptance sampling	Yes	CAR	Applicable	No Impact (Materiality threshold not exceeded)

The identified/selected materiality threshold for the PoA under current monitoring period is 5% as PoA is small scale in accordance with para 308 of CDM VVS for PoA, Version 2.0.

As per the on-site verification audit plan, visits to households were planned between 25/03/2019 to 30/03/2019. However, due to incessant rain on the last day (Day 6 of Team B comprising Dhading district) of the field visit, road accessibility to the areas of planned households was hampered, so these households were interviewed over phone on 02/04/2019. Apart from this deviation from the audit plan, no major revision to the overall plan was required.

SECTION D. Means of verification

D.1. Desk review

The verification was performed primarily based on the review of the monitoring report, PoA-DD, CPA-DDs, its corresponding validation report 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, paying particular attention to the frequency of measurements, and the QA/QC procedures, and an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reduction.

The monitoring report version 01 (hereinafter referred to as initial MR) submitted by the project participant and additional background documents related to the emission reductions are reviewed as an initial step of the verification process. The subsequent step involved the identification of corrective action requests and clarification requests (CAR and CL) which are presented in Appendix 4 of this report. As a result of these findings, the MR is revised to MR version 0~~3~~². A complete list of all documents and records reviewed is as attached in Appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 25/03/2019 to 01/04/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	The verification team conducted visits to the project site to confirm the information and to resolve issues identified in the document review. An on-site assessment was conducted as a part of verification activity and involved: 1) an assessment of the implementation and operation of the CDM programme of activity as per the PoA-DD and the CPA-DD's^{15/} 2) review of Monitoring Records including logbooks, annual surveys - sampling 3) verification of Biogas digesters - Maintenance records, operating hours details, record keeping customer complaints, Sustainable Development indicators 4) a review of information flows for generating, aggregating and reporting of the monitoring parameters 5) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan 6) a cross-check between information provided in the MR and data from other sources 7) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PoA-DD and the applied methodology 8) a review of calculations and assumptions made in determining the GHG data and ERs, and 9) an identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters	Digestors in following districts (Jhapa, Ilam, Sankhuwasabha, Sindhuli, Kavre, Mahottari, Dhading, Chitwan, Nawalparasi, Makwanpur, Bara, Rautahat and Udayapur) of Nepal	25/03/2019 to 01/04/2019	Mr A Prabu das Dr D Siddaramu Mr Sujan Adhikari

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Pokhrel	Prem Kumar	Sr. Program Officer AEPC	25/03/2019 to 01/04/2019	Performance of project activity - Project Implementation MR, CER sheets, Sampling, Monitoring, Data management and reporting, QA/QC systems, logistics, interactions with Biogas end users and Biogas companies, Internal quality Documentation, Record keeping, Customer complaints	Mr A Prabu das Dr D Siddaramu Mr Sujan Adhikari
2.	Rana	Thapa	AEPC	01/04/2019	Performance of project activity - Project Implementation, correctness of data captured in the Monitoring, Data management and reporting, QA/QC – Subsidy check list, double counting etc	
3.	Sitaram	Adhikari	Biogas digestors implementation Companies	25/03/2019 to 30/03/2019	Construction, Agreements, complaint management, Repairs, User trainings, spares availability, interactions with the end users, scheduled inspections	
	Krishna	Kumar				
	Manoj	Shreshta				
	Badri	Ghimire				
	Shekharaj	Poudel				
	Tarkumar	Karki				
	Prakash	Poudel				
4.	Rassu	Manandhar	AEPC	25/03/2019 to 01/04/2019	Status of digestors operation and its type, operating hours etc	
5.	Rijal	Neelam Sharma	Prakriti Consultants Pvt Ltd (BUS survey Firm)	01/04/2019	Modalities of user survey carried out, training to enumerators etc	
5.	69 Households (CPAs 1 to 7)	Sampled and non-sampled households	Digester households	25/03/2019 to 30/04/2019 (During on-site visit)	Status of Biogas digester operation and its usage, operation and maintenance, and availability of trained	

	5 households of CPA 2			02/04/2019 (Tele- phonic interview)	personnel, down times, (if any), reasons for non-usage, cattle availability, fuels used for cooking, no of persons in house, spares availability etc	
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D.4. Sampling approach

The PP had adopted the sampling approach as detailed in the registered PoA-DD for this monitoring period. PP has adopted stratified sampling approach with 90% confidence level and 10% margin of error. As required in the PoA-DD the PP has conducted the survey and the data from the survey conducted in 2017-18 has been adopted for emission reduction calculations for this monitoring period. The verification team checked the calculations done to calculate the minimum sample size and confirms that the calculations are in order.

The BUS data (expected proportion of operational plants) of 2016-17 for all the CPA's 1 to 7 has been referenced to calculate the sample size, which the verification team confirms is appropriate and conservative.

Even though the sample size calculated for each of the CPA's is in the range of 16 to 83, the PP to be conservative and to be more representative has considered a sample size of 135 for each CPA, for the verification period.

The Sampling approach as per the "Standard: Sampling and surveys for CDM project activities and programme of activities", including: (i) A random sampling for cases where the coordinating/managing entity did not apply a sampling approach for monitoring; (ii) An acceptance sampling or another sampling approach for cases where the coordinating/managing entity applied a sampling approach for monitoring.

The CME has adopted stratified random sampling consistent with the monitoring plan of the registered PoA-DD and respective CPA-DDs and so the verification team has adopted acceptance sampling approach. Based on the Standard for "Sampling and surveys for CDM project activities and programmes of activities" Version 07.0, with a AQL and UQL 0.5% and 20% respectively with 10% producer risk and 20% consumer risk the sample size is 8 with the acceptance number 0, therefore the size of the sample for each CPA required is 8. Mismatch of outcome of PP survey (as captured in BUS survey reports) and the DoE survey during site visit/tele-phonetic interview is noted as discrepancy. The values for AQL/UQL have been taken as per the standard even though the GHG emissions are more than 100,000 tCO₂e by applying professional judgement and also considering experiences from the previous verification audit of this PoA. Also the host country, Nepal being a least developed country (<http://unctad.org/en/Pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx>) the value of 20% for consumer risk is justified as per para 33 c "Sampling and surveys for CDM project activities and programmes of activities" Version 07.0. The Verification team analysed the webhosted monitoring report and on the basis of the data provided in it and considering the travel time, accounting for possible non-responses and climatic conditions, the verification team decided to check around 11-12 households for each CPA (with a combination of sample of sampled and non - sampled households).

Based on the analysis of the CDM monitoring report^{/15/}, ER sheet^{/14/} and BUS Survey reports^{/9/}, and by careful examination of the data provided in it, the verification team took the district and VDC level samples of the PP for the purpose of acceptance sampling. To have an effective travel schedule, the verification team selected the VDCs (Village development Council) with maximum samples (first 6 for each CPA) of PP and the districts with more VDCs representing the PP

samples are selected in such way that the sample of all CPAs are covered, it was also ensured that one Terai district and a hill district for each CPA is covered. The non-sample households representing sampled VDC (falling within the vicinity or locality of identified samples) as well as different VDC (other than the sampled VDC is selected) in a hill district and a Terai district which comes along the route of sampled districts are taken.

Apart from that one remote hill district was also selected as representation of all CPAs. The verification team randomly picked some households which are accessible during the travel (sample as well as non-sampled) apart from the originally selected VDCs to ensure randomness

In all the VDCs, the Verification team has randomly picked the sampled households by the PP as well as few non-sampled households for the verification. Following are the digester details that are visited/interviewed through phone:-

CPAs	Samples	Non-Sample
CPA 1	Terrai district (Chitwan) – 4, Hill district (Ilam) – 5 : Total 9	-
CPA 2	Terrai district (Jhapa) – 5, Hill district (Dhading) – 5# : Total 10	4
CPA 3	Terrai district (Rautahat) – 5, Hill district (Makwanpur) – 6 : Total 11	-
CPA 4	Terrai district (Chitwan & Nawalparasi) – 6, Hill district (Udayapur) – 4 : Total 10	-
CPA 5	Terrai district (Jhapa) – 4, Hill district (Kavre) – 5 : Total 9	-
CPA 6	Terrai district (Bara) – 5, Hill district (Sindhuli) – 4 : Total 9	2
CPA 7	Terrai district (Mahottari) – 4, Hill district (Ilam) – 4 : Total 8	2

Note: '#' refers conduct of audit through tele-phonetic interview

The DOE has accepted the results as presented in the monitoring survey reports, and recorded in the monitoring report with a reasonable level of confidence.

Sample size calculation

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

n	Number of elements to be sampled.
N	Total number of elements in the population
p	Proportion
z	Constant referring to the level of confidence (for this case 1.645 for 90% as per Guideline for Sampling and Surveys).
precision	Required precision (for this case 10% = 0.1 as per Guideline for Sampling and Surveys).

The sample size calculated for each CPA adopting the above formula is as follows
CPA-1 is 83, CPA-2 is 50, CPA-3 is 50, CPA-4 is 33, CPA-5 is 17, CPA-6 is 39 and CPA-7 is 16. However the PP has considered a sample size of 135 for the survey of each CPA.

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
General			
Compliance of the monitoring report with the monitoring report form	01	01	-
Remaining forward action requests from validation and/or previous verification	-	-	01-
CPA(s) considered for verification and covered in this report	-	-	-
Programme of activities			
Compliance of the programme implementation with the registered PoA-DD	-	-	-
Implementation and operation of the management system	-	02	-

Post-registration changes			
Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
Corrections	-	-	-
Inclusion of a monitoring plan	-	-	-
Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
Changes to the programme design or project design	-	-	-
Change of coordinating/managing entity	-	-	-
Changes specific to afforestation and reforestation activities	-	-	-
Component project activities			
Compliance of the CPA implementation with the included CPA design document	01	01	02
Post-registration changes			
Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
Corrections	-	-	-
Changes to the start date of the crediting period of component project activities	-	-	-
Inclusion of a monitoring plan	-	-	-
Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
Changes to the programme design of project design	-	-	-
Changes specific to afforestation and reforestation component project activities	-	-	-
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-		
Data and parameters fixed ex ante or at renewal of crediting period	-	-	-
Data and parameters monitored	02	-	-
Implementation of sampling plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
Calculation of baseline GHG emissions or baseline net GHG removals by sinks	-	-	-
Calculation of project GHG emissions or actual net GHG removals by sinks	-	-	-
Calculation of leakage GHG emissions	-	-	-
Summary of calculation of GHG emission reductions or net GHG removals by sinks	-	-	-
Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	-	-	-
Remarks on difference from estimated value in included CPA	-	-	-
Assessment of reported sustainable development co-	-	-	-

benefits			
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	04	04	032

SECTION E. Verification findings

E.1. General

E.1.1. Compliance of the monitoring report with the monitoring report form

Means of verification	As per GS requirement, the verification team has determined whether the monitoring report was completed using the valid version of the applicable monitoring report form. The verification team has checked whether all the sections of the monitoring report follows the guidelines provided in the template itself.
Findings	One CAR (CAR 04) and one CL (CL 04) is raised in this section.
Conclusion	PP has used the GS4GG MR template, Version 1.0 ^{32/} , for the current MR period. The verification team has concluded that the monitoring report is complete covering all the relevant sections meeting the verification requirement.

E.1.2. Remaining forward action requests from validation and/or previous verification

>> This is the fifth verification for the PoA and the verification team has reviewed the validation report/ previous verification reports and observed that there is no open issue i.e FARs was found from the validation/verification. The verification team has raised two forward Action Requests (FAR) during this verification process. And one FAR raised from previous GS performance review is also included.

E.1.3. CPA(s) considered for verification and covered in this report

Reference number of the specific-case CPA (GS) included in the GS PoA (3110) as of the end of this monitoring period	Is the specific-case CPA considered for this verification? (yes/no)	Version number of the registered PoA-DD to which the specific-case CPA complies with	Confirmation that a request for issuance including the specific-case CPA has been published for the previous monitoring period (Y/N)
3109	Yes	Rev.14 dated 05/09/2014	Y
3113	Yes	Rev.06 dated 31/01/2014	Y
3114	Yes	Rev.06 dated 31/01/2014	Y
3116	Yes	Rev.06 dated 31/01/2015	Y
3566	Yes	Rev.06 dated 31/01/2014	Y
6393	Yes	Rev.06 dated 31/01/2015	Y
6394	Yes	Rev.06 dated 31/01/2015	Y

Note: The PoA got transition to GS4GG on 01/08/2018^{31/}. The date of design certification are provided in brackets for the respective CPAs: CPA-1 (14/08/2015); CPA 2 (14/08/2015); CPA-3 (14/08/2015); CPA- 4 (14/08/2015); CPA-5 (24/12/2018); CPA-6 (24/12/2018); CPA-7 (24/12/2018)

E.2. Programme of activities

E.2.1. Compliance of the programme implementation with the registered programme design document

Means of verification	As per VVS-PoA version 2.0 ^{4/} , the verification team determined the
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	conformity of the actual project activity and its operation with the registered project design document. The 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 PoA-DD and CPA-DDs ^{/1/} are in place, and that the project participants have operated the CDM project activity as per the PDD ^{/1/} .																																																							
Findings	One CAR (CAR02) is raised in this section.																																																							
Conclusion	The verification team determines the conformity of the actual project activity and its operation with the approved project design document. The 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 PoA-DD and CPA-DDs^{/1/} are in place, and that the project participants have operated the CDM project activity as per the PoA-DD and CPA-DDs^{/1/}. <u>Project location:-</u> <table><tr><td>Host Country</td><td>Nepal</td></tr><tr><td>Region:</td><td>Various locations across Nepal</td></tr><tr><td>Project location address:</td><td>Nepal</td></tr><tr><td>Latitude:</td><td>North 26.20 degree to North 30.45 degree</td></tr><tr><td>Longitude:</td><td>East 80.07 degree to East 88.20 degree</td></tr></table> <u>Technical details of digesters:-</u> The technologies used in this CPAs are household biogas digesters with a sludge and gas holding capacity range of up to 10 m³. The different sizes of the digesters that are included in the programme are of 2, 4, 6, 8 and 10 m³. The programme uses only one uniform design i.e. GGC 2047 model across all the 7 CPAs, this is confirmed through physical inspections of the installed bio digesters, interview with the households and the technology suppliers. Further, the owners name, size of the plant, installation date and its operational status, ID number, utilisation of other fuels in the house were verified through interview and visual observation. This information is also verified to be in line with the biogas user survey report. Detail of CPAs implemented under Nepal Biogas Support Program PoA covered in this MR period:- <table><tr><th>Ref^{/1/}</th><th>CPA title</th><th>Number of Digesters^{/1/}</th><th>Construction Start Date</th><th>Construction End Date</th></tr><tr><td>9572-0001</td><td>Nepal Biogas Support Program- CPA 1</td><td>20,000</td><td>22/06/2007</td><td>18/03/2009</td></tr><tr><td>9572-0002</td><td>Nepal Biogas Support Program - CPA 2</td><td>19,927</td><td>19/03/2009</td><td>09/03/2010</td></tr><tr><td>9572-0003</td><td>Nepal Biogas Support Program - CPA 3</td><td>19,959</td><td>10/03/2010</td><td>19/02/2011</td></tr><tr><td>9572-0004</td><td>Nepal Biogas Support Program - CPA 4</td><td>19,970</td><td>20/02/2011</td><td>28/02/2012</td></tr><tr><td>9572-0005</td><td>Nepal Biogas Support Program - CPA 5</td><td>19,842</td><td>29/02/2012</td><td>23/05/2013</td></tr><tr><td>9572-0006</td><td>Nepal Biogas Support Program - CPA 6</td><td>18,504</td><td>24/05/2013</td><td>04/04/2014</td></tr><tr><td>9572-0007</td><td>Nepal Biogas Support Program - CPA 7</td><td>18,392</td><td>05/04/2014</td><td>31/12/2014</td></tr><tr><td>Total</td><td></td><td>136,594</td><td></td><td></td></tr></table> Contract^{/7/} signed between BSP Nepal and AEPC (as national service provider for installation of bio digesters in households across Nepal).	Host Country	Nepal	Region:	Various locations across Nepal	Project location address:	Nepal	Latitude:	North 26.20 degree to North 30.45 degree	Longitude:	East 80.07 degree to East 88.20 degree	Ref ^{/1/}	CPA title	Number of Digesters ^{/1/}	Construction Start Date	Construction End Date	9572-0001	Nepal Biogas Support Program- CPA 1	20,000	22/06/2007	18/03/2009	9572-0002	Nepal Biogas Support Program - CPA 2	19,927	19/03/2009	09/03/2010	9572-0003	Nepal Biogas Support Program - CPA 3	19,959	10/03/2010	19/02/2011	9572-0004	Nepal Biogas Support Program - CPA 4	19,970	20/02/2011	28/02/2012	9572-0005	Nepal Biogas Support Program - CPA 5	19,842	29/02/2012	23/05/2013	9572-0006	Nepal Biogas Support Program - CPA 6	18,504	24/05/2013	04/04/2014	9572-0007	Nepal Biogas Support Program - CPA 7	18,392	05/04/2014	31/12/2014	Total		136,594		
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Total		136,594																																																						

	database maintained by BSP Nepal (construction date information) and the construction progress report ^{/11/} issued by BSP Nepal to AEPC were reviewed for the implementation of the bio-digesters. Thus the verification team has concluded that the project activity was implemented and operated as per PoA-DD and CPA-DDs, and that all physical features of the project are in place.
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E.2.2. Implementation and operation of the management system

Means of verification	The verification team carried out onsite visits for the CPAs and interviewed key personnel and several households (sampled and non-sampled). Interviewees included the CME, project developer and the company who takes care of maintenance activity. It was established that the programme management system has been implemented and operated as described in the registered PoA-DD and CPA-DDs ^{/11/} .
Findings	Two CARs (CAR 01 and CAR 03) are raised in this section.
Conclusion	Based on document review, stakeholder interview, on-site verification, the verification team confirms the implementation and operation of the management system included in the registered PoA-DD and CPA-DDs ^{/11/} .

E.2.3. Post-registration changes

E.2.3.1. Corrections

>>

There are no corrections in this monitoring period.

E.2.3.2. Inclusion of a monitoring plan

>> Not applicable

E.2.3.3. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools

>> Not applicable

E.2.3.4. Changes to the programme design

>> Not applicable

E.2.3.5. Addition of CPA inclusion template

Not applicable

E.2.3.6. Change of coordination/managing entity

Not applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

>> Not applicable as the project does not involve afforestation and reforestation activity.

E.3. Component project activities

E.3.1. Compliance of the CPA implementation with the included CPA design document

Means of verification	As per VVS-PoA version 2.0 ^{/1/} , the verification team determined the conformity of the actual project activity and its operation with the registered project design document. The 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 PoA-DD and CPA-DDs ^{/1/} are in place, and that the project participants have operated the CDM project activity as per the PoA-DD ^{/1/} .
Findings	CL 01 and (FAR 01 and 02) are raised in this section.
Conclusion	The verification team determines the conformity of the actual project activity and its operation with the approved PoA-DD and CPA-DDs^{/1/}. CPA-1 to CPA-7 were also confirmed to be operational in accordance with the registered CPA-DDs, however a clarification is raised with respect to continuity of digestors (which are declared abandoned or can be put back into use) in the programme. <u>Assessment of double counting:</u> National Service Provider (NSP) registers all households that implement a digester under its BSP program, since the digester implementation, under the project, is done through subsidy scheme, BSP does not allow more than one digester to be implemented per household. Each digester implemented under the CPA is given a unique identification code (biogas digester code), the plant completion report also captures the GPS coordinates and the PoA database captures the details of the digestors along with the geographical identification. The registration procedure of the BSP database^{/8/} does not allow double entries, and the system rejects if the same unique code is entered twice. This has been demonstrated by the CME to the verification team. BSP database is the basis for the disbursement of the subsidy and thus remains a credible source to check double counting of digesters. Moreover, all the digesters implemented under all CPAs of the PoA are centrally maintained by the CME, thus the possibility of double counting of the digesters between and within CPAs is checked. It is also conformed from CME that, all the biogas digestors that are implemented under subsidy programme comes under BSP only. The verification team has also checked the unique identity number engraved on the pipe of digesters, for all the digestors visited during the site visit and found it to be consistent with the data base maintained. 1. CME clarified that those digestors that are 'abandoned or cannot be put back into use' will not be accounted for in ER calculations till the crediting period and it will be removed from the database during the 'crediting period renewal'. Similar approach is followed for the CME's other project activity titled "<i>Biogas Support Program - Nepal (BSP-Nepal) Activity-1</i>", UNFCCC no: 0136. Since the digester DGG00471 (Khagendra Kumar Khadka) of CPA-1 in Ilam district, was found to be abandoned during the DoE verification field visit, a FAR 01 is raised to check the ER calculations in the future verifications and to exclude the digester from the CME database at the time of 'crediting period renewal', if the status remains the same. For the current verification, both the DoE site visit and the BUS survey, conform that the digester DGG00471 is non-operational and

	it is not accounted in the ER calculations. 2. The provision to capture the status of digestors that are 'abandoned or cannot be put back into use' in the questionnaire will be implemented by the CME from the Monitoring period number 7, as the current monitoring period number is 5 and the BUS survey for Monitoring period number 6 is already completed by the CME. Hence FAR 02 is raised to check the questionnaire information. The verification team has, by means of a desk review and on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs^{/1/} are in place, and that the project participants have operated the CDM project activity as per the PoA-DD and CPA-DDs^{/1/}.
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E.3.2. Post-registration changes

E.3.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

>> Not applicable

E.3.2.2. Corrections

>> There are no corrections in this monitoring period, however during first periodic verification PRC correction related to information of distribution of biogas digesters across different ecological zones in CPA-1 was sought and the same was approved on 22nd June 2015 by CDM EB. In the corrections the number and identity of the digesters remain the same and no change in threshold and scale of the CPA is reported.

E.3.2.3. Changes to the start date of the crediting period

>> Not applicable

E.3.2.4. Inclusion of a monitoring plan

>> Not applicable

E.3.2.5. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodologies, standardized baseline, or other methodological regulatory documents

>> Not applicable

E.3.2.6. Changes to the project design

>> Not applicable

E.3.2.7. Changes specific to afforestation and reforestation activities

>> Not applicable as the project does not involve afforestation and reforestation activity.

E.3.3. Compliance of registered monitoring plan with applied methodologies and standardized baselines

Means of verification	As per VVS-PoA version 2.0 ^{/4/} , the verification team determined whether the registered monitoring plan is in accordance with the applied methodologies ^{/20/} including applicable tools.
Findings	There is no CAR/CL raised in this section.
Conclusion	The verification team was able to confirm that the monitoring plan contained in the validated PoA-DD is in accordance with the approved methodology applied by the project activity, i.e. AMS.I.E version 4.0 ^{/20/} and its applicable tools. The monitoring report for this monitoring period is in compliance with the monitoring plan of the PoA-DD/CPA-DD ^{/1/} . The project activity was registered by applying the small scale methodology AMS.I.E version 4.0 ^{/20/} and the verification was carried out in accordance with the applied methodology. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

E.3.4. Compliance of monitoring activities with the registered monitoring plan

E.3.4.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	As per VVS-PoA version 2.0 ^{/4/} , the verification team has determined whether all ex-ante parameters used for emission reduction calculation stated in the monitoring report are used appropriately as per the PoA-DD and CPA-DD ^{/1/} .
Findings	There is no CAR/CL raised in this section.
Conclusion	The following data and parameters fixed ex ante were checked by the verification team to be in line with registered CPA-DD (for CPA-1, CPA-2, CPA-3, CPA-4, CPA-5, CPA-6 and CPA-7s) ^{/1/} : • $NCV_{biomass}$ • $EF_{projected_fossil\ fuel}$ • $f_{NRB,y}$ • $Q_{NRB repl}$ • $N_{s,r}$

E.3.4.2. Data and parameters monitored

Means of verification	As per VVS-PoA version 2.0 ^{/4/} , 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.								
Findings	Two CLs (CL 02 and 03) are raised in this section.								
Conclusion	As per the registered monitoring plan, 'P' the share of digesters operational (based on the total number implemented using non-renewable biomass) is the only parameter that needs to be monitored. This parameter is the weighted average calculated value across all ecological zones obtained from annual biogas users survey. Survey procedures adopted in determining the monitored value is verified to be as per the applicable standards and relevant requirement. QA/QC procedures followed for the MR period is appropriate <table border="1" data-bbox="448 1845 1216 2056"> <thead> <tr> <th>CPA and its monitored value</th><th>Data source^{/9/}</th></tr> </thead> <tbody> <tr> <td>CPA-1: 89.69 %</td><td rowspan="5">BUS Report 2017/18</td></tr> <tr> <td>CPA-2: 82.63 %</td></tr> <tr> <td>CPA-3: 80.88 %</td></tr> <tr> <td>CPA-4: 73.72 %</td></tr> <tr> <td>CPA-5: 70.00 %</td></tr> </tbody> </table>	CPA and its monitored value	Data source ^{/9/}	CPA-1: 89.69 %	BUS Report 2017/18	CPA-2: 82.63 %	CPA-3: 80.88 %	CPA-4: 73.72 %	CPA-5: 70.00 %
CPA and its monitored value	Data source ^{/9/}								
CPA-1: 89.69 %	BUS Report 2017/18								
CPA-2: 82.63 %									
CPA-3: 80.88 %									
CPA-4: 73.72 %									
CPA-5: 70.00 %									

	CPA-6: 73.16 % CPA-7: 74.31 %		<i>Review of BUS (Biogas User Survey) report^{/9/}, ER sheet and MR confirms that the operational percentage values in BUS report and in ER sheet for CPA1 and 2 are different, clarification was raised in this regard.</i> <i>In the MR, under QA/QC procedures, it is indicated that Biogas user survey results are conservative – clarification is raised to explain the conservativeness</i> <u>Conclusion:</u> Review of BUS (Biogas User Survey) reports^{/9/} confirms that the values are correct, and it is further confirmed that the same values are applied in the revised ER spreadsheet (Version 21.0) and MR (Version 23.0). As per the QA/QC procedure for the parameter detailed in the registered PoA-DD, the internal quality control system shall sample 5% of the digesters that are newly implemented, 2.5% of the digesters that are in operation for two years and 2.5% of the digesters that are in operation for three years. <i>If, for the digesters listed in the CPA, the outcome of this survey is a lower percentage than the outcome of the operation report (as e.g. included to BUS), the lower of the two values is used. After the three-years after sales service is over, this value will depend on the performance report or other monitoring reports.</i> <i>Since the After Sales Service (ASS) period of three years is already over for CPA-1, CPA-2, CPA-3, CPA-4, CPA-5, CPA-6 and CPA-7 the values of the emission reduction monitoring survey (BUS) has been taken for emission reduction calculation.</i> Comparing the % of non-operational digesters in the QC report above^{/23/} with the Biogas Users' Survey Report^{/9/}, the BUS reported values is more conservative than that the QC report has reflected. Thus it is confirmed by the verification team that the QA/QC procedures as defined in the registered PoA-DD/CPA-DD^{/1/} are compiled for this monitoring period. Further, the conformation of replacing non-renewable biomass was also detailed in the MR, whose information is sourced from the BUS survey. The verification team accepts the information provided related to replacement of non-renewable biomass, on-site visit and interaction with the households conforms the same.
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E.3.4.3. Implementation of sampling plan

Means of verification	As per para 348 of VVS-PoA version 2.0 ^{/4/} , the verification team assessed whether the compliance of the sampling efforts and surveys with the registered sampling plan is in accordance with the "Guideline for sampling and surveys for CDM project activities and programme of activities" ^{/6/} version 4.0, if the PP had applied a sampling approach to determine data and parameters monitored.
Findings	No CAR/CL is raised in this section.
Conclusion	The parameter 'P', 'the share of digesters operational (based on the total number implemented using non-renewable biomass);' is determined

through sampling. Ex-post Monitored parameter through survey mainly includes identification of non-operational biogas plants and assessment of Non Renewable source of biomass.

The Biogas Users Survey (BUS) is carried out annually for each CPA, for the current MR period the survey is carried out for all the seven CPAs (01 to 07)

Sample size was determined using stratified random sampling in consistent with the monitoring plan of the registered PoA-DD, respective CPA-DDs (01 to 07), and the Guidelines for sampling and surveys for CDM project activities and programme of activities. The sampling was performed within the level of precision of 10% and a confidence level of 90%. The verification team has reviewed the sampling approach through onsite visit interview and by the review of the methodology followed by the surveying entity (Prakriti Consultants Pvt Ltd.). The sampling method adopted in all the individual survey of the 87 CPA's is verified to be in compliance with the guideline.

The sample size is calculated using stratified random sampling technique and the resulting sample are proportionately distributed among various sizes of the biogas plant belonging to each of the three strata i.e i) Hill, ii) Remote Hill and iii) Terai. First, the minimum sample required for each CPAs were calculated using the equation given in annex 4 of PoA-DD^{/1/} and then the samples were proportionately allocated for each stratum.

a) Sample size calculation^{/25/}

Sample size was calculated using equation given in annex 4 of PoA-DD^{/1/}, the value of 'p', (the proportion of biogas digester expected to be operational) is taken from the observed operational status of biogas plants in remote hills, hills and Terai, in the previous biogas user survey for each CPA. However, to avoid non-response and answer bias, the sample size is enlarged to 135 for each CPA, instead of the required minimum.

b) Allocation of samples

Samples are allocated in two different ways to maintain the representativeness within the CPA. First, samples are allocated proportionally to ecological belts and development regions¹ based on proportion of biogas installed in these two areas. Secondly, sample were allocated to size of biogas (i.e. 2, 4, 6, 8, 10 m³).

First samples were proportionately allocated to the cluster and later the distribution of samples among different size of the digester was ensured. Samples allocated in each development regions and ecological belts is also almost equivalent to the proportion of Biogas plants installed in each regions and belts.

c) Selection of districts and primary sampling units

One district from each cluster from the ecological zone/development region matrix was selected randomly while selecting the districts. The sample is drawn randomly and distributed proportionately to the number of digester per ecological zones, regions, and digester size. While selecting the primary sampling unit and households the CME has used "randbetween" function in Excel. The verification team has reviewed the screenshots for the same for the conformance.

¹ As AEPC is the government entity, it monitors the operational status and other socio-economic parameters of the PoA, and since the bio-digesters are implemented throughout Nepal, to make the sample more representative and get the more representative results, CME tried to capture information from all sizes of Biogas plants and the biogas from different development regions as well (this is not to be mistaken with the strata)

The samples in the development regions, size of digesters are adjusted for the ease of the accessibility and data collection by the CME, but this has been kept in-line with the minimum sample required for the CPA and the minimum proportionate sample for each stratum (Remote Hill, Hill and Terai). For instance, minimum sample required for each stratum of the CPA-1 are calculated as 1, 38 and 46 respectively for Remote Hill, Hill and Terai (as reviewed from sample calculation sheet). Number of sample adjusted for Remote Hill, Hill and Terai are 4, 58 and 73 respectively which comply with the minimum required sample for each stratum as per PoA-DD.

Thus, it is confirmed by the verification team that the CME has applied stratified random sampling approach for the current monitoring period, and this is verified to be as per the applied monitoring methodology and the PoA/CPA-DD.

The verification team has reviewed the correctness of the samples in the BUS report by the independent agency i.e Prakriti Consultants pvt ltd. for all the 78 CPA's for the current MR period. It is confirmed that the survey has been carried out as per EB Guidelines for sampling and surveys for CDM project activities and programme of activities. The age, educational qualifications, prior experience in conducting similar survey's and training to the enumerators, questionnaire used in the survey were verified by the verification team.

CPA	No of digesters ^{/1/}	Survey period	Total no of samples
CPA-1	20000	2017/18	135
CPA-2	19927		135
CPA-3	19959		135
CPA-4	19970		135
CPA-5	19842		135
CPA-6	18504		135
CPA-7	18392		135

As per the registered CPA-DD's the CPA implementer has to conduct biennial monitoring but they have done annual monitoring and adequately considered 135 samples.

Reliability and precision calculation^{/14/}:

The verification team has verified the sample size calculation spreadsheets with the monitored data, where the actual achieved precision is calculated against the guidelines outlined under "Standard for sampling and surveys for CDM project activities and programme of activities", and confirm that the calculation of achieved reliability was done correctly. The verification team confirmed from the sample size calculation spreadsheet that the required precision was kept 10% during sample size calculation.

The section 3.1 of the BUS (Biogas User Survey)^{/9/} 2017-18 for each of the CPAs are checked and found that the sampling error calculated by the survey firm is less than 10% for all the CPAs, which is the acceptable as the PP took 90/10 confidence level.

CPAs	Precision achieved (%) ^{/9/,/14/}	Is required precision achieved? (<10%)
CPA-1	4.7	Yes
CPA-2	6.0	Yes
CPA-3	7.0	Yes
CPA-4	8.2	Yes
CPA-5	9.3	Yes
CPA-6	8.7	Yes
CPA-7	8.1	Yes

From the above table, it is conformed that sampling was performed within the desired level of precision of 10% and a confidence level of 90%, for the monitored parameters, and therefore the survey results were directly used in the ER calculations.

Thus the verification team concluded that the sampling requirements are adequately met and accepted the results as presented in the monitoring BUS reports, but the value of operational percentage for CPA1 and 2 in the initial monitoring report is reviewed to be different from the BUS reports^{/9/} – this is raised as clarification. The CME has rectified the error and submitted the revised MR, which is reviewed to be consistent with the BUS survey and spreadsheets.

It is observed that, all the biogas digesters sold are registered under BSP Nepal database and their operational performance is monitored through field surveys of a random sample of the installed digesters in the households. The biogas production in the digester is not required to be metered. The number of digesters in operations is determined in terms of %, it is calculated by identifying the no of digesters that are operational against the no of digesters that are sold. This approach is verified to be as per the validated PoA-DD^{/1/} and CPA-DD's^{/1/}.

E.3.4.4. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Not applicable as there is no monitoring equipment involved as per the registered monitoring plan in the PoA-DD ^{/1/} and CPA-DD ^{/1/}
Findings	Not applicable
Conclusion	The project activity does not involve any monitoring instruments that require calibration, hence no further assessment is done.

E.3.5. Assessment of data and calculation of emission reductions or net removals

E.3.5.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	As per VVS-PoA version 2.0 ^{/4/} , the verification team assessed whether the data and calculations of baseline emission resulting from the PoA-DD ^{/1/} and CPA-DD ^{/1/} is correct. The verification team has checked whether calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the PoA-DD ^{/1/} and CPA-DD ^{/1/} .
Findings	CL 02 is raised in this section.
Conclusion	

	$ER_y = B_y \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected, fossilfuel} \cdot 0.95$
In which:	
ER_y	Emissions Reductions during the year y (tCO ₂ e)
B_y	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	Default value of fraction of non renewable biomass for Nepal, EB 67 Annex 22 "Default values of fraction of non-renewable biomass for Least Developed Countries and Small Island Developing States (version 01.0)". Use a value of fNRB 86%
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne . The value is according to the methodology AMS I.E.
$EF_{projected-fossilfuel}$	Emission factor for substitution of non renewable woody biomass by similar consumers. Use a value of 81.6tCO₂/TJ .
0.95	Leakage. As specified in para 10 (a) of AMS.I.E, By is multiplied by gross to net adjustment factor of 0.95 to account for leakage.
B _y is calculated as follows:	
$B_y = N_{sr} \times P \times Q_{NRB repl.}$	
In which:	
N_{sr}	The number of appliances. The parameter refers to the number of digesters in each size and category and is hence unit less.
P	Performance of digesters as the share of digesters implemented that is actually operational, determined through survey methods (%)
$Q_{NRB repl.}$	Average quantity of biomass replaced per appliance and year (tonnes/year)
The respective emission reduction^{/14/} (without accounting leakage) for each CPA is calculated as: CPA-1: 65392.32 t CO₂e CPA-2: 60024.30 tCO₂e CPA-3: 58,852.25 tCO₂e CPA-4: 53,669.65 tCO₂e CPA-5: 50,631.14 tCO₂e CPA-6: 49,532.92 tCO₂e CPA-7: 49,822.09 tCO₂e The total no of digesters percentage that were non-operational as per the BUS survey for the year 2017/18, for all the 7 CPAs, (212 out of 945 households surveyed) which works out to be 22.43%. The operational % observed by the verification team during the site visit is on the higher side, thus the value considered in each of the CPA's is deemed as conservative. Calculations, applied formulae and method for calculation of baseline emissions are in accordance with the registered monitoring plan and are in line with the requirements of the applied methodology. Further, the assessment of data and the calculation of baseline emission reduction in the MR^{/15/} and the CER excel sheet^{/14/} have been verified as per the set of supporting documents listed in Appendix 3. However, following clarifications were raised with respect to calculations of emission reductions:- • During on-site visit it was observed that few households are using LPG as supplementary fuel for cooking in addition to biogas – clarification is raised to PP whether it is accounted for in the emission reduction calculations. • Review of CER calculations reveal that the value of operational percentage of biogas digestors for CPA1 and 2 is not as per the BUS reports submitted	

	Hence, the verification team confirms that the baseline emissions ^{/15/} for the current monitoring period calculated as 387,745 tCO ₂ is in order
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E.3.5.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	As per VVS-PoA version 2.0 ^{/4/} , the verification team assessed whether the data and calculations of project emission resulting from the PoA-DD and CPA-DD is correct. The verification team has checked whether calculations of project GHG emissions have been carried out in accordance with the formulae and methods described in the PoA-DD and CPA-DD.
Findings	There is no CAR/CL raised in this section.
Conclusion	Non consideration of project emission for the project activity is as per the monitoring plan of validated PoA-DD ^{/1/} and CPA-DD's ^{/1/} .

E.3.5.3. Calculation of leakage GHG emissions

Means of verification	As per VVS-PoA version 2.0 ^{/4/} , the verification team assessed whether the data and calculations of leakage emission resulting from the PoA-DD and CPA-DD is correct. The verification team has checked whether calculations of leakage GHG emissions have been carried out in accordance with the formulae and methods described in the PoA-DD and CPA-DD.
Findings	There is no CAR/CL raised in this section.
Conclusion	The PP has adopted a leakage factor of 5% of the baseline emissions as per the adopted methodology. The verification team confirms that the value adopted and the calculations are in order, except for CPA1 and 2 where CL is raised with respect to the application of different operational % of digestors. Refer section E.3.5.1 above. The respective leakage emission for each CPA is calculated as: CPA-1: 3269.62 tCO₂e CPA-2: 3001.22 tCO₂e CPA-3: 2,942.61 tCO₂e CPA-4: 2,683.48 tCO₂e CPA-5: 2,531.56 tCO₂e CPA-6: 2,467.65 tCO₂e CPA-7: 2,491.10 tCO₂e Hence, the verification team confirms that the leakage emissions^{/15/} for the current monitoring period calculated as 19,387 tCO₂ is in order

E.3.5.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	As per VVS-PoA ^{/4/} version 2.0, the verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of GHG emission reduction have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	There is no CAR/CL raised in this section.
Conclusion	The verification team analysed all factors and issues that constitute the basis for emission reductions from the project activity for the current monitoring period. The verification team checked the formulae and data used in the emission reduction calculations and confirms that the same are

	correct. No lack of evidence and missing data were detected during this monitoring period. The verification team confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report. According to the registered PoA-DD^{/1/} and registered monitoring plan^{/1/} as explained in sec E.3.5.1 to E.3.5.3 above, no project emissions are associated with the project activity. Therefore, the net emission reductions ER = 368,354 tCO₂e^{/15/}
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Specific-case CPA reference number (GS)	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e)		
				Results achieved in the period up to 31 December 2012	Results achieved in the period from 1 January 2013 onwards	Results achieved in the entire monitoring period
9572-0001	65,392.32	0	3,269.62	0	62,122	62,122
9572-0002	60,024.30	0	3,001.22	0	57,023	57,023
9572-0003	58,852.25	0	2,942.61	0	55,909	55,909
9572-0004	53,669.65	0	2,683.48	0	50,986	50,986
9572-0005	50,631.14	0	2,531.56	0	48,099	48,099
9572-0006	49,352.92	0	2,467.65	0	46,885	46,885
9572-0007	49,822.09	0	2,491.10	0	47,330	47,330
Total	3,87,745	0	19,387	0	3,68,354	3,68,354

Vintage wise CERs

CPA	2017	2018	Total
CPA-1	26040	36082	62122
CPA-2	23903	33120	57023
CPA-3	23436	32473	55909
CPA-4	21372	29614	50986
CPA-5	20162	27937	48099
CPA-6	19653	27232	46885
CPA-7	19840	27490	47330
Total	1,54,406	2,13,948	3,68,354

E.3.5.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA

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.
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Findings	There is no CAR/CL raised in this section
Conclusion	The verification team analysed the emission reductions reported during the subject monitoring period in comparison with the estimate in the registered CPA-DD, and found that the ex-ante determined value is on the higher side in comparison to the actual realised value.

CPA reference number (GS)	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPA(s) during this monitoring period
9572-0001	61,889	62,122
9572-0002	66,236	57,023
9572-0003	66,329	55,909
9572-0004	66,397	50,986
9572-0005	65,883	48,099
9572-0006	61,565	46,885
9572-0007	61,191	47,330
Total	449,490	368,354

E.3.5.6. Remarks on difference from estimated value in included CPA

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	There is no CAR/CL raised in this section
Conclusion	The ex-ante determined value is on the higher side in comparison to the actual value, this variation is due to the reported lesser operational status of the bio digesters in all the 7 BUS reports.

E.3.6. Assessment of reported sustainable development co-benefits

Means of verification	NA
Findings	NA
Conclusion	NA

E.3.7. Global stakeholder consultation

Means of verification	As per VVS-PoA version 2.0 ^{4/} , the verification team assessed whether the GSCP comments are received for the first Monitoring report.
Findings	NA
Conclusion	NA

SECTION F. Internal quality control

After the completion of assessment by the verification team all the relevant documentation is submitted to a qualified, Independent Technical reviewer as part of EPIC' internal quality control system. A Technical reviewer team is appointed to review the draft final verification report (Draft FVR). The comments made by the Technical reviewer team are taken into consideration and incorporated in the final FVR. The technical reviewer team assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were closed satisfactorily by the verification team with justification. The technical review process can also raise issues in this regard which is resolved further by the verification team to the satisfaction of the technical reviewer. The technical reviewer team either accepts or rejects the report made by the verification team. The final report (after resolutions of all findings) is then submitted to the Head-operations for review and approval.

SECTION G. Verification opinion

EPIC Sustainability Services Private Limited (EPIC) has been contracted by AEPC to undertake the third periodic independent verification of the registered CDM programme of activity titled “Nepal Biogas Support Program-PoA” (GS ref no: 3110, UNFCCC reference number: 9572). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 01/08/2017 to 31/07/2018 (first and last day included) covering CPAs 1 to 7; and to verify that the data reported are complete and transparent.

The verification team determines the conformity of the actual project activity and its operation with the registered project design document. EPIC 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 PoA-DD^{/1/} and CPA-DDs^{/1/} (CPA 01 to 07) are in place, and that the project participants have operated the CDM project activity as per the registered PoA-DD and CPA-DDs^{/1/}. Thus the verification team has concluded that the project activity was implemented and operated as per registered PoA-DD and CPA-DDs^{/1/}, and that all physical features of the project are in place.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been implemented as per the approved PoA-DD and CPA-DDs^{/1/}. The start date of this monitoring period is 01 August 2017 which is in line with the UNFCCC project webpage^{/1/} considering the end date of the previous monitoring period.

The monitoring report for this monitoring period is in compliance with the monitoring plan of the approved PoA-DD and CPA-DDs^{/1/}. The project activity was registered by applying the small scale methodology AMS I-E version 4.0^{/20/} and the verification was carried out in accordance with the applied methodology. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

The management of project participants is responsible for the preparation and reporting of GHG emissions data, and the reported GHG emission reduction on the basis set out within the project monitoring plan. The development and maintenance of records and reporting procedures in accordance with the monitoring plan, including the calculation and determination of GHG emission reduction from the project is the responsibility of the management of the project. It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring Report.

EPIC's 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. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

The verification team has planned and performed the work to obtain the information and explanations that is considered necessary to provide sufficient evidence for it to give reasonable assurance that the amount of calculated GHG emission reductions for this monitoring period were fairly stated.

Project title ^{/1/} :	Nepal Biogas Support Program-PoA
UNFCCC ref ^{/1/} no:	9572
PoA-DD ^{/1/}	Version 14, dated 13/01/2013
Monitoring report ^{/15/}	Version ~~23~~ .0, dated ~~30~~ ~~1~~ ~~1~~ 08/2019; 05 th verification for the PoA

Methodology verification ^{/20/} :	used for	AMS.I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User (version 04)
Applicable period ^{/15/} :	monitoring	01/08/2017 to 31/07/2018 (including both days)
Emissions verified ^{/14/} :	reductions	368,354 tCO ₂ e

SECTION H. Certification statement

>> EPIC Sustainability Services Private Limited (EPIC has carried out the fifth verification of the emission reductions that have been reported for the PoA titled “Nepal Biogas Support Program-PoA” (UNFCCC reference number: 9572), covering CPA 01 to CPA 07 for the 01/08/2017 to 31/07/2018.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

EPIC takes responsibility for issuance of an independent verification statement on the reported GHG emission reductions from the project activity.

The verification was done on the basis of the baseline and monitoring methodology AMS-I E, Version 4.0^{/20/}, the validated PoA-DD and CPA-DD's^{/1/} and the monitoring report (version 0~~23~~.0)^{/15/} dated ~~30~~1~~10~~8/2019. The verification included checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and the collection of evidence supporting the reported data.

The emission reductions are calculated correctly and EPIC could certify that the emission reductions from the CDM PoA 9572 “Nepal Biogas Support Program-PoA” during the period 01/08/2017 to 31/07/2018 is 368,354 tonnes of CO₂^{/14/} equivalent.

Appendix 1. Abbreviations

Abbreviations	Full texts
AEPC	Alternative Energy Promotion Centre
AMS	Approved Methodology Smallscale
BSP	Biogas Support Program
BSP-Nepal	Biogas Sector Partnership - Nepal
BUS	Biogas User Survey
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reductions
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CME	Coordinating Managing Entity
CPA	Component Project Activity
CR	Clarification Request
DOE	Designated Operational Entity
ESSPL	EPIC Sustainability Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gases
GPS	Global Positioning System
GS	Gold Standard
GS4GG	Gold Standard for Global Goals
IPCC	Intergovernmental Panel on Climate Change
LPG	Liquefied Petroleum Gas
MoV	Means of Verification
NRB	Non Renewable Biomass
NREDC	Nepal Renewable Energy Development Company Pvt. Ltd.
NRREP	National Rural & Renewable Energy Programme
NSP	National Service Provider
PCP	Project Cycle Procedure
PDD	Project Design Document
PoA	Programme of Activities
PP	Project Participant
PS	Project Standard
QA/QC	Quality Assurance/Quality Control
RSC	Regional Service Centre
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

The following validation team has been assigned to carry out the verification of the project.

Name	Mr. Sujan Adhikari	Mr. A. Prabu Das	Dr D Siddaramu	Dr G Vishnu Nikkam
Role	Host country expert	Auditor-Team Leader	Auditor	Technical Reviewer
Competence in relevant sectors	Sector 1 and Sector 13 including TA 1.1	Sector 1 and Sector 13 including TA 1.1. and TA 13.1	Sector 1	TA 3.1 & TA 1.1
Responsibility	Document review, onsite, DVR preparation, DVR resolution	Document review, DVR preparation, DVR resolution, FVR preparation	Document review, onsite, DVR preparation, DVR resolution	Technical review

Mr. A Prabu Das, holds a Master of Technology degree in Energy Conservation and Management and Bachelor of Technology Degree in Petro-chemical Technology. He is a certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has around 11 years of work experience in Design of biomass Power plants, preparing Techno Economic Feasibility Reports (TEFR), carrying out energy audits, of which last eight years have been in CDM/GS/VCS consultancy and validation/verification services. He has participated in the validation / verification of various CDM/VCS/GS/GHG and sustainability projects globally. He is a qualified approved GS auditor as per GS requirements.

Mr. Sujan Adhikari, has 10 years of experience working in the field of renewable energy technologies in various capacities. He has been extensively involved in project planning, installation and execution of biogas and solar PV projects. He has served as Energy Head in implementing energy projects such as large size biogas plants and as Project coordinator to design/implement/coordinate waste to energy (biogas), micro-small hydro projects (100kW to 7MW) in Nepal. He has led multi-disciplinary team of Engineers, Sociologists and Environmental experts assigned to conduct pre-feasibility, feasibility studies and design of waste to energy (biogas), hydropower projects. He is a qualified Technical Expert under CDM validation and verification services for Sectoral Scope 1 in accordance with procedures of EPIC Sustainability Services Pvt. Ltd.

Dr. D Siddaramu, is a M.Sc., Ph.D in Environmental Science, with over 15 years of experience. A qualified Clean Development Mechanism (CDM) Lead Auditor, successfully registered more than 30 projects with United Nations Framework Convention on Climate Change (UNFCCC) and Verified Carbon Standard registry (VCS) registry; well versed with both National and International legal regime. Has hands on experience in Environmental Impact Assessment (EIA) studies pertaining to different Ecosystem; monitoring, collection & analyzing environmental samples and conducting socio-economic surveys; data analysis. He is a qualified approved GS auditor as per GS requirements.

Dr. G. Vishnu, holds a Masters and Doctorate in Environmental Science. He has around 12 years of experience in the field of research and consultancy related to water, wastewater, solid waste management systems, implementation of new, Cleaner Production technologies and biomass assessment studies. He has more than eight years' experience in validation verification of more than seventy CDM, projects and has undergone extensive training on GHG validation and verification. He is a qualified approved GS auditor as per GS requirements.

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP for PoA-DD/CPA-DD And DoE for Validation reports	Registered POA-DD and included CPA-DDs for CDM project: "Nepal Biogas Support Program-PoA", UNFCCC PoA project reference no 9572 and its corresponding validation reports	1	Publicly available
2	UNFCCC	CDM Project Standard – PoA (Version 2.0)	2	Publicly available
3	UNFCCC	CDM Project Cycle Procedure – PoA (Version 02.0)	3	Publicly available
4	UNFCCC	CDM Validation and Verification Standard – PoA (Version 02.0)	4	Publicly available
5	BSP-Nepal	Plant Completion report (generated by Oracle software or applicable one) by BSP Nepal that includes GPS co-ordinates, technical details of digesters; details of end user/owner, construction date, total cost, subsidy no.; plant code/unique ID	5	CME
6	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programme of activities (version 04.0)	6	Publicly available
7	CME	Contract for the operation of the AEPC/NRREP NSP/RSC signed between AEPC and BSP Nepal for conducting the service of National Service provider for AEPC	7	CME
8	CME	Database maintained by BSP Nepal for all the Biodigestors including CPA-1 to CPA-7	8	CME
9	CME	Biogas User's Survey for the year 2017-18 for CPA-1 to CPA-7	9	CME
10	CME	Biogas plant owners/user's booklet issued by AEPC	10	CME
11	CME	Plant Handover form signed by Bio digester owner Construction progress report and Plant completion progress report by BSP Nepal to AEPC	11	CME
12	CME	Emission reduction right transfer/sales agreement between Biodigester owner and Construction company	12	CME
13	CME	ISO Certificates covering the MR period	13	CME
14	CME	ER sheet Version 1.0	14	CME
15	CME	MR Version 23.0	15	CME
16	CME	Organisation Chart for the personnel involved in the GHG monitoring system	16	CME
17	BSP-Nepal	Quality Standard manual prepared by BSP Nepal for the construction of Biodigester in Nepal	17	CME
18	Prakriti consultants pvt ltd	Survey Questionnaire used by survey agency for the BUS Survey for CPAs covering the MR period	18	CME
19	CME	Records for Training provided by AEPC person and consultant team (responsible for BUS Survey) to the enumerators	19	CME
20	UNFCCC	AMS.I.E. Switch from Non-Renewable Biomass for	20	CME

		Thermal Applications by the User (version 04)		
21	CME	Subsidy Delivery Mechanisms 2010 Subsidy Delivery Mechanism, 2073 (Nepali)	21	CME
22	CME	RFP-Biogas User's survey_Biogas PoA	22	CME
23	CME	QC&M_Report_FY2073-74 QC&M_Report_FY2074-75_BSPN	23	CME
24	CME	Agreement between AEPC-NRREP and BSPN as NSP	24	CME
25	CME	Sample calculation and sample allocation sheet	25	CME
26	CME	Screenshots of sample selection using "randbetween" function	26	CME
27	CME	Registered GS PoA-DD and included CPA-DDs for CDM project: "Nepal Biogas Support Program- PoA" , GS PoA project reference no 3110 and its corresponding validation reports	27	Publicly available
28	CME	Gold standard passports for the GS PoA and Included CPAs (01 - 07)	28	Publicly available
29	GS	Gold Standard For The Global Goals Safeguarding Principles & Requirements, Version 1.1 Gold Standard For The Global Goals Principles & Requirements, Version 1.1 GS Toolkit Ver 2.2, Gold Standard requirements ver 2.2, GS Annex I, GS Annex W	29	Publicly available
30	Nepal renewable Energy Development Company Pvt. Ltd. (NREDC)	Biogas Training reports (Biogas Mason Training: Biogas Technician Level-1 and Biogas Supervisor Training: Biogas Technician Level-2)	30	CME
31	GS	Transition Review under Gold Standard for the Global Goals	31	CME
32	GS	Gold standard for the global goals Monitoring report template, version 1.0	32	GS
<u>33</u>	<u>CME</u>	<u>CPA1-DD titled "Nepal Biogas Support Program - CPA 1: 20,000 digesters" ver 15 dated 05/09/2014</u>	<u>33</u>	<u>CME</u>

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

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

FAR ID	01	Section no.	Annex 1	Date: 01/10/2019
Description of FAR				
<u>CME to report the mason trainings provided during the monitoring period and submit the related evidence</u>				
CME response				Date: 07/11/2019DD/MM/YYYY
<u>As clarified in the previous reviews, PD conducts the mason trainings as and when needed to maintain that there is sufficient manpower in the market. During this monitoring period also, mason training was conducted for which the training reports are attached for the reference. CME will report on the mason training provided during for the future review as well.</u>				
Documentation provided by the CME				
<u>Mason training reports</u>				
DOE assessment				Date: 08/11/2019DD/MM/YYYY
<u>The verification team has reviewed the document titled "Report on conducting 2 batches of "Biogas Mason Training (Biogas Technician Level-1)" prepared by Nepal Renewable Energy Development Company Pvt. Ltd (NREDC), wherein it is detailed that two batches of training at two different venues between 30th May to 06th June 2018 and 8th to 15th June 2018, comprising of 50 participants in total was carried out. The same report also details the names of the participants. The validation team reviewed the training requirement and purpose of training as mentioned in the report, and considered the conduct of mason training is as per the GS requirement and accepted</u>				
<u>FAR 01 Closed for this verification, and shall be reviewed in subsequent verifications</u>				

Table 2. CLs from this verification

CL ID	01	Section no.	E.3.1	Date: 27/04/2019
Description of CL				
<i>Clarify the following with respect to the periodical survey of digestors:-</i>				
a) Actions taken by the AEPC on those digestors that are reported as non-operational during the BUS survey b) Whether those digestors that are found to be abandoned or cannot be put back into use, will continue to be included into the PoA (for eg:- During the field visit it was observed that the digester DGG00471 was found to be abandoned and the owner has shifted his home to a different location) c) Filled in questionnaires report the working status of digestors, but provision to capture those digestors that are found to be abandoned or cannot be put back into use is not provided				
CME response				Date: 29/05/2019

1.	<i>Though the ownership of the biogas plant is with biogas users, AEPC through the biogas installation company monitor the biogas regularly within the warrantee period. If the digester was found non-operational during the biogas user survey, AEPC requests those biogas users through different means to repair and use the biogas. So, during the field verification in Sankhuwasabha district, it was found that the biogas is operational during verification which was reported as non-operational in biogas user survey.</i>	
2.	<i>The digester that are found to be abandoned or cannot be put back into use will not continue to be included to calculate the emission reduction achieved till the crediting period of particular interest. The biogas is completely dismantled/washed away by flood or landslide, that cannot be re-used which will be removed permanently from the database during crediting period renewal. This was done before in case of Biogas Support Program - Nepal (BSP-Nepal) Activity-1 (UNFCCC Ref. 0136). See the page 4 of the registered PDD of the same. For the case of the sold out of the land or house, there is always chance to resume the use by others. If any plants found abandoned, that will be monitored regularly whether it is in operation and will not continue to be included for the emission reduction calculation. As mentioned in the CL 1 above, the digester DGG00471 (Khagendra Kumar Khadka) belongs to CPA-1 in Ilam district. As the Biogas User Survey has revealed that this is not operational, this is not accounted for ER calculation in this monitoring period. This will not be accounted for the emission reduction calculation for the coming monitoring periods as well if the biogas is not in operation in next MP as well.</i>	
3.	<i>There was no such provision and practice in previous monitoring as the monitoring parameters is only to check whether the biogas is operational and the confirmation of the NRB use. Biogas User Survey of the next MP (2018/19) is already completed for the PoA. This issue will be addressed from next monitoring (2019/20) during the user survey to account whether the biogas are continuously operational or if they cannot be put back into operational.</i>	
Documentation provided by the CME		
Nil		
DOE assessment		Date: 01/08/2019
1.	Explanation provided by the CME on the steps taken on those bio-digestors that are found to be non-operational, during BUS survey, is found to be acceptable. Further, it was also evident from site visit that the digester that was reported as non-operational during BUS survey, was found to be in operational status during DoE verification field visit	
2.	CME clarified that those digestors that are 'abandoned or cannot be put back into use' will not be accounted for in ER calculations till the crediting period and it will be removed from the database during the 'crediting period renewal'. Similar approach is followed for the project activity titled "Biogas Support Program - Nepal (BSP-Nepal) Activity-1", UNFCCC no: 0136. Since the digester DGG00471 (Khagendra Kumar Khadka) of CPA-1 in Ilam district, was found to be abandoned during the DoE verification field visit, this CL 01 is closed and FAR 01 is raised to check the ER calculations in the future verifications and to exclude the digester from the CME database at the time of 'crediting period renewal'	
3.	The provision to capture the status of digestors that are 'abandoned or cannot be put back into use' in the questionnaire will be implemented by the CME from the Monitoring period number 7, as the current monitoring period number is 5 and the BUS survey for Monitoring period number 6 is already completed by the CME. Hence the CL 01 is closed and FAR 02 is raised to check the questionnaire information	
CL 01 Closed		

CL ID	02	Section no.	E.3.4.2 & E.3.5.1	Date: 27/04/2019
Description of CL				
From the field visit to the households, it is observed that recently few households use LPG as a supplement fuel for cooking in addition to biogas, CME to clarify whether it is accounted for in the emission reduction calculations				
CME response				Date: 29/05/2019
<i>From the field visit to the household it can be evidenced that the first priority of the Biogas users are always biogas as it is free of cost. The bio-digesters are designed to provide the gas to meet the households' daily needs. In accessible areas, it was found that few household kept the LPG as back-up when there is some functions and required to cook more food than as usual. Also, though the baseline is non-renewable biomass, CME opted to use default emission factor (81.6 tCO_{2eq}/TJ) given in AMS I.E (version 4) which accounts the 50% coal, 25% Kerosene and 25% LPG rather than using the default emission factor of fuel-wood (which is 112 tCO₂/TJ, See the table 1.4 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories). Since the default value used has already accounted the same and use of LPG as a back-up is negligible, it is not accounted separately the use of LPG as back-up during emission reduction calculation. CME is in the opinion that the calculation is conservative.</i>				
Documentation provided by the CME				
IPCC Guideline: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf				
DOE assessment				Date: 01/08/2019
During the field visit it was observed that few households had LPG cylinders for cooking purpose, interview with household members revealed that LPG was mainly used as only back-up and during festivals/functions/special occasions, where more people visit the house, and when the food has to be prepared more than the usual quantity. Interview also conformed that the use of LPG cylinders in those households were generally in the range of 1 to 1.5 domestic LPG cylinder per year, which conformed that the LPG use was only back-up and not used on regular basis. It is acknowledged that the biogas digestors in the PoA are of varying sizes (i.e. 2, 4, 6, 8, 10m³) and it is designed to meet the household's daily needs. Further, the ER calculations consider the default emission factor value of 81.6 tCO_{2eq}/TJ, as per AMS I.E (version 4), wherein 50% coal, 25% Kerosene and 25% LPG is accounted rather than using the default emission factor of fuel-wood (which is 112 tCO₂/TJ, refer table 1.4 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories). Since the emission factor accounts for 25% LPG, and the observed LPG use in the PoA was only for few households and that too only as back-up, the impact on ER can be considered as negligible. The verification team accepts the explanation provided by the CME for the closure of this issue. <u>CL 02 Closed</u>				

CL ID	03	Section no.	E.3.4.2	Date: 27/04/2019
Description of CL				
Following clarification is raised with respect to the monitored parameter “P’, Share of digesters operational”, - As per registered PoA-DD/CPA-DDs, measurement methods require to reconfirm the use of non-renewable biomass but it is not reported in the MR - In QA/QC procedures, it is indicated that Biogas user survey results are conservative – CME to clarify the conservativeness				
CME response				Date: 29/05/2019

a) The confirmation of the use of non-renewable biomass is now included in section D.2 of revised MR.	
b) The biogas survey results revealed that minimum non-operational biogas in any CPA is above 10% in all CPAs in this monitoring period. The QA/QC report applied for in 2073/74 and 2074/75 revealed that maximum non-operation of the biogas is 5.4%. So the value achieved in Biogas User Survey is conservative to the QA/QC survey applied.	
Documentation provided by the CME	
a) MR_PoA 9572_MP5_V2_Trackchange.doc/MR_PoA 9572_MP5_V2_Clean.doc b) i) QC&M_Report_FY2073-74.pdf ii) QC&M_Report_FY2074-75_BSPN.pdf	
DOE assessment	Date: 01/08/2019
1. Revised MR now reconfirms the use of non-renewable biomass, and this information is consistent with BUS survey reports	
3. The explanation provided by the CME is found to be acceptable by the verification team.	
<u>CL 03 Closed</u>	

CL ID	04	Section no.	E.3.4.2	Date: 27/08/2019
Description of CL				
Clarify how the information provided in sec B.2.1 of the MR is relevant under the temporary deviations				
CME response				Date: 30/08/2019
Temporary deviation is not applicable as all are similar CPAs under the same PoA , hence it is removed				
Documentation provided by the CME				
Revised MR				
DOE assessment				Date: 03/09/2019
The CME has removed the contents under the temporary deviations in the revised MR, the verification team accepts the submission as it considered that the information provided is not relevant.				
<u>CL 04 Closed</u>				

Table 3. CARs from this verification

CAR ID	01	Section no.	E.2.2	Date: 27/04/2019
Description of CAR				
Random review of filled in survey questionnaires reveal that the information in questionnaire is not as per the PoA database for eg: MEC05157, the size of digestors is reported as 10m ³ whereas as per the PoA database it is 6 m ³ , and for MSG0024 the date of construction is reported as 26/03/2010 in filled-in questionnaire but the filled in survey sheet indicates 28/03/2010. Similar observations are made in few other questionnaires as well. CME to explain the effectiveness of the QA/QC process followed in relation to conduct of survey and assessment of its results				
CME response				Date: 29/05/2019

The information put in the questionnaires are all based on perception of the household using biogas. The actual installation date and size of the digesters are the ones incorporated in the commissioning report which is reflected in the registered database for each CPA and validated by the DOE during inclusion. See the database of all CPAs under UNFCCC link under PoA (9572). Further, the main parameter of interest during monitoring is percentage of digester operational and the confirmation of use of NRB which is visible in the site for calculating the emission reduction and confirming the use of NRB. The emission reduction calculation and the confirmation of NRB in the case of this PoA is not associated with the size of the bio-digester. So, there might be some typo error in filled in survey questionnaire on size and date but this deviation has no any impact on ER calculation and confirmation of NRB for this monitoring period. Those typo errors will closely be rectified from next monitoring.	
Documentation provided by the CME	
Nil	
DOE assessment	Date: 01/08/2019
The process of including the household digester into the PoA is a rigorous one, where various levels of checks are performed during the inclusion. The release of subsidy to the digestors is after careful review of information captured on the ground, and is again cross checked for correctness of data. So the information captured in the PoA database is final. The parameter of interest to ER calculation is the operational status and the confirmation of the use of NRB, hence the typographical information error in the survey questionnaire does not impact the ER calculations and the use of NRB. Further, the CME has explained that it will be set right in future monitoring. <u>CAR 01 Closed</u>	

CAR ID	02	Section no.	E.2.1	Date: 27/04/2019
Description of CAR				
Role of BSP Nepal to the PoA and its present status to be explained				
CME response				Date: 29/05/2019
The current role of the BSP Nepal to the PoA is to provide basically the technical support in implementation as a national service provider for biogas promotion and the Quality assurance and control of the biogas. The output for the BSP-Nepal is planned annually. BSP Nepal is still supporting AEPC for the quality control and quality assurance of the biogas technology and promotional activities. The framework agreement of AEPC with BSP-Nepal is attached with this response.				
Documentation provided by the CME				
Agreement between AEPC-NRREP and BSPN as NSP.pdf				
DOE assessment				Date: 01/08/2019
The explanation provided by the CME is inline with the evidence submitted and the information in the registered documents. <u>CAR 02 Closed</u>				

CAR ID	03	Section no.	E.2.2	Date: 27/04/2019
Description of CAR				
CME to explain the process of availing the services of third party agencies for conducting users survey, and the specific instructions provided to them, if any, in terms of selecting the VDCs/districts for the survey				

CME response	Date: 29/05/2019
CME has transparent third party hiring process following the Government of Nepal's Public Procurement Act/Rules. AEPC first prepare the Request for Proposal (RFP) Document in the given format clearly mentioning the objective and scope of the task, qualification of the teams that will be involved, evaluation criteria for the proposal and the clear instruction to follow the requirements stipulated in PoA-DD, CPA-DD and associated sampling and survey guidelines. Then the public notice will be published in national news paper requesting the proposal from interested eligible third party consulting firms. Based on the criteria, and provision mentioned in the RFP document, the task will be completed. The RFP for availing the services of third party for this monitoring period is attached with this response.	
Documentation provided by the CME	
RFP-Biogas User's survey_Biogas PoA.pdf	
DOE assessment	Date: 01/08/2019
The verification team has reviewed the RFP document for availing the third party agency for the BUS (Biogas User Survey), this was used for the current monitoring period. The objective and scope of the task, qualification of the survey teams, evaluation criteria for the proposal and the clear instruction to follow the requirements stipulated in PoA-DD, CPA-DD and associated sampling and survey guidelines, are detailed in the RFP. Since the AEPC, being a government entity, the process of hiring the third party services are transparent adhering to <i>Government of Nepal's Public Procurement Act/Rules</i> . Further, during the on-site visit the verification team has interviewed the BUS survey team to conform the process followed. <u>CAR 03 Closed</u>	

CAR ID	04	Section no.	E.2.2	Date: 27/08/2019
Description of CAR				
The date of project design certification and Start date of crediting period is not consistent across all the sections of the MR				
CME response				Date: 30/08/2019
The dates are revised accordingly and is inline with section A.4 of the MR				
Documentation provided by the CME				
Revised MR				
DOE assessment				Date: 03/09/2019
The revised MR is reviewed to be correctly indicating the design certification date and start date of C.P of all the included 7 CPA's. <u>CAR 04 Closed</u>				

Table 4. FARs from this verification

FAR ID	01	Section No.	E.3.1	Date: 01/08/2019
Description of FAR				

The digester DGG00471 (Khagendra Kumar Khadka) of CPA-1 in Ilam district, was found to be abandoned during the DoE verification field visit for Monitoring period no: 05, it shall not be accounted for in the ER calculations in the future verifications and it has to be excluded from the CME database at the time of 'crediting period renewal', if the status remains the same at that point of time	
CME response	Date: 07/08/2019
<i>As mentioned above, CME agree on the FAR and will implement accordingly.</i>	
Documentation provided by the CME	
<i>Nil</i>	
DOE assessment	Date: DD/MM/YYYY

FAR ID	02	Section No.	E.3.1	Date: 01/08/2019
Description of FAR				
The provision to capture the status of digestors that are 'abandoned or cannot be put back into use' in the user survey questionnaire will be implemented by the CME and it shall be reviewed from the Monitoring period number 7				
CME response				Date: 07/08/2019
<i>As mentioned above, CME agree on the FAR and will implement accordingly.</i>				
Documentation provided by the CME				
<i>Nil</i>				
DOE assessment				Date: DD/MM/YYYY

Annex 1

Assessment of monitored SDG Indicators:

During the on-site inspections the verification team has randomly selected households (surveyed and non-surveyed) for the 7 CPA's (See **Sec D.4** above for the sample selection by the verification team), the number of respondents for all the SDG indicators as discussed below are the same. BUS Survey is carried out as part of the CDM plus GS survey requirement, focussing the carbon and all the SDG related indicators. Survey is done by third party independent entity (Prakriti Consultants Pvt Ltd) at annual frequency.

S.No	SDG Indicator	Parameter	Value (from BUS survey)	Assessment on SDG indicators and mitigation measures
1	7.1.2 Proportion of population with primary reliance on clean fuels and technology	P The share of digesters operational	CPA-1: 89.69 % CPA-2: 82.63 % CPA-3: 80.88 % CPA-4: 73.72 % CPA-5: 70.00 % CPA-6: 73.16 % CPA-7: 74.31 %	Please refer to sec E.3.4.2 and E.3.4.3 above for detailed assessment of this indicator
2	3.9.1 Mortality rate attributed to household and ambient air pollution	Users' perception on reduction in indoor air pollution	CPA 1: 97% CPA 2: 93% CPA 3: 96% CPA 4: 100% CPA 5: 100 % CPA 6: 100 % CPA 7: 100 %	The BUS survey report submitted by the PP is the basis for the reported results. During the on-site inspections the verification team has randomly selected households (surveyed and non-surveyed) for the 7 CPA's, and through interview with the residents and by visual observation it is concluded that the air quality has considerably improved after the implementation of the project activity. Respondents expressed that Smoke, suspended air particles are reduced, incidents of eye irritation, cough are avoided in comparison to the traditional mode of cooking involving firewood. Because of the relatively clean mode of cooking, eye infections and other respiratory related diseases are reduced to a large extent. Since the biogas are piped to the stove and with greater control over the cooking, the instances of fire hazard are minimised. The verification team is convinced that the reported conclusion arrived for the MR period is acceptable
		Reduction in health problem	Values are captured for each of the 7 CPAs under the following heads: 1) Eye infection, 2) Respiratory diseases, 3) Cough and 4) Fire related injury (refer sec D.2 of MR)	
3	3.9.1 Mortality rate attributed to household and ambient air pollution	User's perception in Time saving for the cooking (reduce exposure to indoor air pollution)	The values are in the order – Men, Women and Children CPA 1: 57%, 100%, 22% CPA 2: 67%, 90%, 59% CPA 3: 71%, 99%, 27% CPA 4: 87%, 100%, 38% CPA 5: 47%, 99%, 40% CPA 6: 48%, 100%, 9% CPA 7: 49%, 90%, 40%	During the on-site inspections the verification team has interviewed the randomly selected households for assessing this parameter requirement. All users positively confirmed saving in time compared to baseline scenario. Therefore, the conclusions of the monitoring team are deemed to be correct
4	7.1.2	Users'	The values are in	During the on-site inspections the verification

	Proportion of population with primary reliance on clean fuels and technology	perception on time saving due to project for firewood collection	the order – Men, Women and Children CPA 1: 58%, 99%, 10% CPA 2: 88%, 100%, 70% CPA 3: 80%, 99%, 31% CPA 4: 99%, 100%, 29% CPA 5: 47%, 100%, 14% CPA 6: 48%, 97%, 10% CPA 7: 49%, 87%, 32%	team has interviewed the randomly selected households for assessing this parameter requirement. All users positively confirmed saving in time compared to baseline scenario. Therefore, the conclusions of the monitoring team are deemed to be correct
		Trainings for masons	Biogas technician training - level 2 and Biogas mason training-level 1 for 50 participants each were provided	Not applicable, since the biogas digesters of all the 7 CPAs are already implemented, the monitoring of the training to the masons who constructed the digesters is not required. But the training to the mason is provided by AEPC/respective biogas companies etc to the biogas technician. For the current monitoring period, 2 biogas technician training (level 2) for 50 persons and 2 biogas mason training (level 1) for 50 participants were conducted at two different venues between 30th May to 06th June 2018 and 8th to 15th June 2018 to maintain the sufficient manpower in the market as part of the CMEs on-going exercise in promoting biogas technology. The verification team has reviewed the training reports ^{/30/} and interacted with biogas companies and beneficiaries and attained conformance
5	3.9.3 Mortality rate attributed to unintentional poisoning	Users' perception on reduction in use of chemical fertilizers and use of bio-slurry	Values are captured for each of the 7 CPAs under the following heads: 1) Farm Yard Manure, 2) Bio-slurry 3) Urea 4) DAP and 5) Potash (refer MR)	All the respondents of the household confirmed that the slurry is used as fertiliser (organic manure) in their own farm, and the productivity of the crop has increased considerably. And the marginal farmers and those who doesn't own the farm land the slurry is sold. During site visit, the verification team has visually checked the application of slurry as manure to the farm land. It is also observed the slurry is used as manure at the frequency ranging from 3 to 6 months. The use of chemical fertiliser is on reducing trend due to the application of bio-slurry
	4.3.8 Safeguarding Principle	Impact on Crop Productivity	CPA-1: 77 % CPA-2: 59 % CPA-3: 56 % CPA-4: 95 % CPA-5: 51% CPA-6: 56 % CPA-7: 72%	
6	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation	Improved access to sanitation services	Toilet with biogas digesters CPA 1: 81% CPA 2: 85% CPA 3: 81% CPA 4: 79% CPA 5: 95 % CPA 6: 73 %	It was observed that the users without toilet access initially, preferred to have the toilet constructed along the biogas digesters. Those users that had existing toilet facility had their facility connected to the digesters, wherever it was technically feasible for the construction. It was also observed that connection of the toilet with the digesters is related to cultural and

	and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)		CPA 7: 82 %	societal belief. In general it is accepted that the sanitation level of the users has improved by the project activity
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The verification team confirms that no changes to the validated SDG parameters have occurred that may have an impact on Gold Standard qualification of this project activity. It is also further confirmed that the project has achieved the mitigation/compensation measures as per the validated monitoring plan.

Grievances Mechanism

The CME has given telephone numbers of the AEPC office (toll free no) and the relevant stakeholders such as biogas promoters association central and regional offices to contact directly and record their grievances.

Also in APEC website a provision for online contact and complaint logging is available and the contact information of the officials concerned is given. During the site visit the households indicated that during the warranty period the biogas companies were responsible for repair works and attended well. Usually majority of the grievances were minor repair works (eg-knob failure, worn out/corrosion of the burner) which were attended in First in First Out basis by the local trained personnel along with the spare parts.

No grievance existed from previous monitoring period that required further follow-up action, also interview with the CME management and the sampled household conform that No legal disputes/contest has arisen during the current monitoring period.

Thus it can be conformed that the CME is having a grievance addressable mechanism to respond to the stakeholders concern.

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