Verification and certification report form for CDM programme of activities

(Version 04.0)

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

BASIC INFORMATION			
Title and UNFCCC reference number of the programme of activities (PoA)	Nepal Biogas Support Program-PoA (UNFCCC no:9572)		
Version number(s) of the PoA-DD(s) to which this report applies	17.0		
Version number of the verification and certification report	1.1		
Completion date of the verification and certification report	01/06/2021		
Monitoring period number and duration of this morning period	First monitoring period under the renewed crediting period, 31/01/2020 to 31/12/2020		
Number and version number of the monitoring report to which this report applies	02 of 02, version no.02		
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 09)		
Mandatory sectoral scopes	Sectoral Scope 1: Energy Industries (renewable/non-renewable sources)		
Conditional sectoral scopes, if applicable	NA		
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	84,124 tCO_{2e}		
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	Amount before 1 January 2013	Amount from 1 January 2013 until 31 December 2020	Amount from 1 January 2021
	-	79,769 tCO_{2e}	-
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	 G.T.Kumar, Director		

SECTION A. Executive summary

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EPIC Sustainability Services Private Limited (EPIC) has been contracted by Alternative Energy Promotion Centre (AEPC) to undertake the first periodic verification under the renewed crediting period for the registered CDM programme of activity titled "Nepal Biogas Support Program-PoA" (UNFCCC reference number: 9572), covering 1 to 10 CPA's, this report includes CPA's 1 and 10. The objective of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 31/01/2020 to 31/12/2020[1] (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 for Programme of activities, Version 2.0/1/, employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generations of 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 validated and approved project design document PoA-DD/2/ version 17.0 dated 05/09/2019 (hereinafter referred to as PoA-DD), corresponding validation report/3/, CPA-DD's (CPA 1 to CPA 10), corresponding validation reports/4/, previous monitoring reports/5/ and its corresponding verification reports/6/. 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 for this project. This verification covers CPA-1 and CPA-10. 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 through interviews, 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 and the CPA-DD. Thus the verification team has concluded that the project activity was implemented and operated as per PoA-DD, and that all physical features of the project are in place and comply with para 270 to 273 of VVS-PoA.

The verification team, based on the interviews 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 31/01/2020 which is in line with the UNFCCC project webpage considering the end date of the previous monitoring period. The monitoring report for this monitoring period is reviewed for compliance with the monitoring plan of the PoA-DD and the CPA-DD's.

The project activity was registered by applying the small scale methodology AMS.I.E version 9.0 and the verification was carried out in accordance with the applied methodology. It was confirmed during the audit 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. 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

[1] CPA-10 was included on 18/05/2020. So, the monitoring period particularly for CPA-10 is starting from 18/05/2020 to 31/12/2020

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/document review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	D	Siddaramu	EPIC, Central office, Bangalore	√	-	√	√
2.	Technical Expert	ER	Sujan	Adhikari		√	-	√	√

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	Vijayaraghavan	Radhamadhavan	EPIC, Central office, Bangalore
2.	Approver	IR	G.T	Kumar	

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 spread sheets (including misstatements & omissions)	Medium	Likely human error during data transfer and ineffective QA/QC procedures	During document review and interview, 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 8 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

C.2. Consideration of materiality in conducting the verification

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In line with Guidelines for Application of materiality in verification (version 2.0)[7], 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 spread sheet and the referred documents, at the document review stage and audit

Parameter	Verification approach	Error identified	Findings reference	Correction	Extrapolated error for population size (Qty and %)
P - The share of digesters operational, "%"	Acceptance sampling	No	NA	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. The verification process i.e., the audit (interview over phone) was concluded without any deviation from the audit plan, no major revision to the overall plan.

SECTION D. Means of verification

D.1. Desk/document review

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The verification was performed primarily based on the review of the monitoring report[/8/], PoA-DD, CPA-DDs, its corresponding validation reports 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 version01[/8/] 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. 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: DD/MM/YYYY to DD/MM/YYYY				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.				
…				

No physical on-site inspection (with presence of the EPIC verification team) was conducted as part of the performed verification assessment due to raised travelling restrictions related to the COVID-19 pandemic, the EPIC verification team proposed audit by means of telephonic interview to APEC to as an alternative.

By taking into consideration all guidance and requirements of the CDM-EB agreed relaxing of the rule requiring mandatory on-site inspection by DOEs and extend the relaxation of mandatory site visits until 30/06/2021 (CDM at its 108th meeting, agreed to further extend the period in which DOEs may apply alternative measures of validation/verification to mandatory on-site inspections until 30 June 2021; https://cdm.unfccc.int/newsroom/latestnews/releases/2020/01041_index.html). EPIC verification team thus performed its document review and interviews with representatives of the project participant (of which details are included in Sections D.1 and D.3 respectively) by incorporating the following additional checking's/assessments as complementary auditing measures.

The previous concluded verification assessment for the project activity (i.e., 6th verification) was also performed by EPIC (monitoring period from 01/08/2018 to 30/01/2020), it is relevant to note that, as outlined in the verification report for this particular previously concluded CDM assessment, the appointed EPIC verification team previously performed a complete on-site inspection to the project site from 26/02/2020 to 05/03/2020. Thus, by taking into consideration guidance and requirements of the CDM-EB recently agreed relaxing of the rule requiring mandatory on-site inspection by DOEs as well as by taking into consideration principles and guidance from the CDM-VVS-PoA, it is reasonable to assume that related findings and observations previously gathered by the EPIC verification team while performing such on-site inspection to the project activity from 26/02/2020 to 05/03/2020 are, upon a certain limit, also representative and relevant in the context of the verification assessment for the considered monitoring period (for which a physical on-site inspection was not performed due to travelling restrictions associated the COVID-19 pandemic).

Based on its accumulated expertise and experience not only with previous CDM verification assessments for the project activity, but also with CDM assessments for other similar project-based initiatives, it is EPIC opinion that objectives to be expected for a physical on-site inspection to the project site were sufficiently

reached by the EPIC verification team through (i) Tele call to the biogas households to check the operation status and conditions of the biogas plant on 06th to 07th 2021 and (ii) by consideration by the EPIC verification team of findings and observations from the last previously verification assessment for the project activity (including inter-alia, all findings and observations resulted from the previously performed physical on-site inspection to the project activity from 26/02/2020 to 05/03/2020).

In summary, by taking all above-presented aspects into account vis-à-vis applicable requirements established in CDM-VVS-PoA, version 02.0 and by also taking into account the CDM-EB recently agreed relaxing of the rule requiring mandatory on-site inspection by DOEs; EPIC's verification team judged that performing the above-described additional checking's/assessments (complementary auditing measures) instead of performing the physical on-site inspection to the project site is deemed acceptable and sufficient to have the overall quality and completeness of the performed verification assessment not being negatively affected.

EPIC did not conduct an on-site inspection; however as a means of verification[2], the alternative means were used for verifying the project.
To confirm the information and to resolve issues identified in the document review. The verification team had discussion with PP as a part of verification activity and involved:

- ✓ An assessment of the implementation and operation of the CDM programme of activity as per the PoA-DD/CPADD's
- ✓ A review of information flows for generating, aggregating and reporting of the monitoring parameters
- ✓ interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan
- ✓ A cross-check between information provided in the MR and data from other sources
- ✓ 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
- ✓ A review of calculations and assumptions made in determining the GHG data and ERs, and
- ✓ An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.
- ✓ A Local expert (Mr.Sujan Adhikari) was used to verify the information at ground level

[2] 322. For cases that are not referred to in paragraph 321 above, it is optional for the DOE to conduct an on-site inspection at verification. If the DOE does not conduct an on-site inspection as a means of verification, it shall describe the alternative means used and justify that they are sufficient for the purpose of verification.

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Pokhrel	Prem Kumar	Climate and Carbon Financing Expert, AEPC	06th – 07th April 2021	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	Dr.D.Siddaramu and Mr.Sujan Adhikari
2.	Thapa	Lawa Kumar	Socio economic, AEPC		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.	Rajal	Neelam Sharma	Consultant			
4.	70 Households (07 households from each of the 10 CPA)				Biogas plant operation & its capacity, operating hours, O&M, Non-working hours (if any, and reasons), etc	

D.4. Sampling approach

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The verification team used acceptance sampling approach for checking the operational status of the biodigestors. A sample size of 61 was required, based on an AQL of 0.5% and UQL of 0.5%, the producer risk used is 5% and consumer risk used was 5%. In accordance with the para table.2 on page no.13 of "Sampling and surveys for CDM project activities and programmes of activities", version 08.0[9]

However, the verification team contacted 70 households (07 households from each of the 10 CPAs) covering Hill, Terai and Remote Hill regions. All the contacted HHs was working fine and no discrepant records were observed with the published MR and survey sample records. Thus PP's set of records has been accepted.

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	-	-	-
Remaining forward action requests from validation and/or previous verifications	-	-	FAR01
CPAs 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	-	-	-

Post-registration changes	-	-	-
• Corrections	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents[3]	-	-	-
• Changes to the programme design	-	-	-
• Addition of CPA inclusion template	-	-	-
• 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	-	-	-
Post-registration changes	-	-	-
• Temporary deviations from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	-	-	-
• Corrections	-	-	-
• Changes to the start date-of the crediting period	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	-	-	-
• Changes to the project design	-	-	-
• Changes specific to afforestation and reforestation activities	-	-	-
Compliance of the registered monitoring plan with applied methodologies and standardized baselines	-	-	-
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	-	-	-
• 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	CL02 and CL03	-	-
• 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	-	-	-

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

• Remarks on difference from estimated value in included CPA	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)		-	-
1. Operational and non-operational percentage of biogas digestors	CL01	-	-
2. Double counting	CL04	-	-
3. Biogas user survey (questionnaires)	CL05 and CL08	-	-
4. Repair/maintenance work undertaken	CL06	-	-
5. Training to the field surveyors (Data enumerators)	CL07	-	-
6. Documents/Records	-	CAR01	-
Total	08	01	01

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 VVS-PoA version 2.0, 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	There is no CAR/CL raised in this section.
Conclusion	The verification team has concluded that the monitoring report was completed using the valid version (i.e., CDM-PoA-MR-FORM, version 04)[/10/] of the applicable monitoring report form and is followed the guidelines given in the template itself.

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

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This is the first periodic verification under the renewed crediting period and the verification team has reviewed the validation report and previous verification reports and observed that there is 01 open issue i.e., 01 FAR to be addressed. Verification team has not raised any FARs during this verification process.

E.1.3. CPAs considered for verification and covered in this report

Title and UNFCCC reference number of the CPA included in the PoA as of the end of this monitoring period	Is the CPA considered for this verification? (yes/no)	The date when the CPA was included	Version of the PoA-DD	Confirmation that a request for issuance including the CPA has been published for the previous monitoring period (Y/N)
Nepal Biogas Support Program - CPA 1: 20,000 digesters (9572-P2-0001-CP2)	Yes	04/08/2020	17.0	Y
Nepal Biogas Support Program – CPA 10: 10,589 digesters (9572 - P2-0011-CP1)	Yes	18/05/2020	17.0	N[4]

[4] This is 1st verification for CPA10

E.2. Programme of activities

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

<table>
<tr><td>Means of verification</td><td>The verification team determined 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 interviews, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs are in place, and that the PP/CME has operated the CDM project activity as per the registered PDD.</td></tr>
<tr><td>Findings</td><td>There is no CAR/CL raised in this section.</td></tr>
<tr><td>Conclusion</td><td>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 interviews, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs are in place, and that the project participants have operated the CDM project activity as per the PoA-DD and CPA-DDs. Biogas digestors are installed at various locations across Nepal.

Technical details of digesters:- The technologies used in this CPAs are household biogas digesters with a sludge and gas holding capacity range of up to 10 m^3 . The different sizes of the digesters that are included in the programme are of 2, 4, 6, 8 and 10 m^3. The programme uses only one uniform design i.e., GGC 2047 model across all the 2 CPAs, this is confirmed through physical inspections of the installed bio digesters, interview with the households and the technology suppliers. Further, the owner’s 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</th><th>CPA title</th><th>Number of Digesters</th><th>Construction Start Date</th><th>Construction End Date</th></tr>
<tr><td>9572-P2-0001-CP2</td><td>Nepal Biogas Support Program-CPA 1: 20,000 digesters[5]</td><td>19,999</td><td>22/06/2007</td><td>18/03/2009</td></tr>
<tr><td>9572-P2-0011-CP1</td><td>Nepal Biogas Support Program - CPA 10: 10,589 digesters[6]</td><td>10,589</td><td>13/07/2018</td><td>19/10/2019</td></tr>
<tr><td colspan="2">Total</td><td>30,588</td><td></td><td></td></tr>
</table>

Contract signed between BSP Nepal and AEPC/11/ (as national service provider for installation of bio digesters in households across Nepal), database maintained by BSP Nepal (construction date information) and the construction progress report 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 registered PoA-DD/CPA-DD’s. The verification team, based on the audit and document review, was able to conclude that the project activity has been implemented as per the PoA-DD/CPA-DD’s and that all physical features of the project are in place.</td></tr>
</table>

[5] This CPA has been renewed for next crediting period and the applicable methodology is AMS I.E Version 09. So, this CPA is included in 2nd monitoring report for this monitoring period.

[6] The applicable methodology for this CPA is AMS I.E Version 09. So, this CPA is included in 2nd monitoring report for this monitoring period to make the report consistant.

E.2.2. Implementation and operation of the management system

Means of verification	The verification team carried out audit 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.
Findings	There is no CAR/CL raised in this section.
Conclusion	Based on document review, interview of management personnel, stakeholder interview, the verification team confirms the implementation and operation of the management system included in the registered PoA-DD and CPA-DDs.

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 methodologies, standardized baselines, or other methodological regulatory documents

>>
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

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 version 2.0, 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 interviews, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs are in place, and that the project participants have operated the CDM project activity as per the PoA-DD.
Findings	There is no CAR/CL 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. CPA-1 and CPA-10 were also confirmed to be operational in accordance with the registered CPA-DDs. The verification team has, by means of a desk review and interviews, assessed that all

	physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs are in place, and that the project participants have operated the CDM project activity as per the PoA-DD and CPA-DDs. Assessment of double counting: 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 digestor implemented under the CPA is given a unique identification code (biogas digestor code), the plant completion report also captures the GPS coordinates and the PoA database[12] captures the details of the digestors along with the geographical identification. The registration procedure of the BSP database 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 and found it to be consistent with the data base maintained.

E.3.2. Post-registration changes

E.3.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

>>

There is no temporary deviation for this monitoring period to the registered monitoring plan or applied methodology or any methodological regulatory documents in the PoA-DD and CPA-DDs.

E.3.2.2. Corrections

>>

There are no corrections in this monitoring period

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 baselines, 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

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

Means of verification	The verification team determined whether the registered monitoring plan is in accordance with the applied methodology 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 PDD is in accordance with the small scale methodology AMS.I.E version 9.0/13/ and its applicable tools. The monitoring report for this monitoring period is in compliance with the monitoring plan of the PoA-DD/CPA-DD. The project activity was registered by applying the small scale methodology AMS.I.E version 9.0 and the verification was carried out in accordance with the applied methodology. It was confirmed through interviews 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	The verification team has determined whether all ex-ante parameters used for emission reduction calculation stated in the registered monitoring plan are used appropriately as per the registered PDD.
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 and CPA-10):

Parameter	Description	Value
$NCV_{biomass}$ TJ/tonne	Net calorific value of the non-renewable biomass that is substituted	0.0156 TJ/tonne, taken from IPCC/14/
$EF_{projected\_fossil\ fuel}$ tCO_2/TJ	Emission factor for the projected fossil fuel consumption in the baseline	81.6 tCO_2/TJ, taken from approved small scale methodology AMS I.E. (version 9.0)
$f_{NRB,y}$ %	Fraction of biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using nationally approved methods	86%, taken from "Default values of fraction of non-renewable biomass for Least Developed Countries and Small Island Developing States (version 01.0)" EB 67 Annex 22/15/
$Q_{NRBrepl}$ Tonne per year and appliance	Quantity of woody biomass that is substituted or displaced in tonnes per year and appliance	3.33 Calculated -As per paragraph 6 (a) of the methodology B_y *represents: The estimated average annual consumption of woody biomass per appliance (tonnes/year) derived from surveys or historic information.* -As per SSC WG clarification SSC 543 the estimate can be fixed ex-ante
$N_{s,r}$ Numbers	Number of digesters in each size category (in m^3) and region (Terai, Hill and, if available, Remote Hill or	Taken from CPA database (BSP Database). The registration procedure of the BSP database avoids double counting of digesters and the registration of digesters

		Mountain) implemented under the each CPAs	that have not been commissioned. The BSP database is the basis for subsidy disbursement. The data used to maintain this database is gathered according to defined procedures, making it a reliable source of information.

E.3.4.2. Data and parameters monitored

Means of verification	The verification team has determined whether the registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan.
Findings	There is no CAR/CL 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/15/. 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. **CPA and its monitored value** / **Source** CPA 1 - 86.81% CPA10 - 83.53% / BUS Report 2020/16/ As per the QA/QC procedure for the parameter detailed in the registered PoA-DD and CPA-DD's, "The Internal Quality Control system samples 5% of the digesters that are newly implemented, 2.5% of the digesters that are two year in operation and 2.5% of the digesters that have been operational for three years as part of the Internal Quality Control System". Survey of the households were conducted during the month of October November 2020 and the enumerators were trained on structured questionnaire. Enumerators were mobilized in a group of two persons. Having accumulated the data collected during the survey, the consultant analyzed the data using appropriate tools and prepared the "Biogas User Survey" report for individual CPAs. Conclusion: Review of BUS (Biogas User Survey) reports confirms that the values are correct, and it is further confirmed that the same values are applied in the ER spread sheet/17/ and MR (Version 01)/8/. 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. 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. Since the After Sales Service (ASS) period of three years is already over for all the CPA's the values of the emission reduction monitoring survey (BUS) has been taken for emission reduction calculation. It is confirmed by the verification team that the QA/QC procedures as defined in the registered PoA-DD/CPA-DD 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, interviews with the households confirms the same.

E.3.4.3. Implementation of sampling plan

Means of verification	The verification assessed whether the compliance of the sampling efforts and surveys with the registered sampling plan in accordance with the Guideline for sampling and surveys for CDM project activities and programme of activities"/18/ version 4.0, if PP had applied a sampling approach to determine data and

	parameters monitored.
Findings	There is no CAR/CL 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 eight CPAs (1 and 10) Sample size was determined using stratified random sampling in consistent with the monitoring plan of the registered PoA-DD, respective CPA-DDs (1 and 10), 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 interview and by the review of the methodology followed by the surveying entity (Prakriti Consult (P) Ltd.). The sampling method adopted in all the individual survey of the 2 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 and then the samples were proportionately allocated for each stratum. a) Sample size calculation - Sample size was calculated using equation given in annex 4 of PoA-DD, 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 99 (CPA1) and 86 (CPA10) 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 regions 1 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 m^3). 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. 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 48 respectively for Remote Hill, Hill and Terai (as reviewed from sample calculation sheet). Number of sample adjusted for Remote Hill, Hill and Terai are 1, 44 and 54 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 “Prakriti Consult (P) Ltd.” for all the 2 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’s	Total no of Biogas Plants installed	Weighted average operational status	Survey period	Samples surveyed
CPA-1	19,999	86.81%	October/ November 2020	99
CPA-10	10,589	83.53%		86

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

Reliability and precision calculation:

The verification team has verified the sample size calculation spread sheets 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 spread sheet that the required precision was kept 10% during sample size calculation.

The section 3.1 of the BUS (Biogas User Survey) 2019-20 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.

CPA’s	Precision achieved (%)	Is required precision achieved? (<10%)
CPA-1	6.3	Yes
CPA-10	7.8	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.

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 and CPA-DD's.

E.3.5. 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 and CPA-DD
Findings	There is no CAR/CL raised in this section.
Conclusion	The project activity does not involve any monitoring instruments that require calibration; hence no further assessment is done.

E.3.6. Assessment of data and calculation of emission reductions or net removals

E.3.6.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of baseline emission resulting from the registered PDD 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 registered monitoring plan.
Findings	CL02 and CL03 were raised in this section.
Conclusion	In line with AMS-I.E. version 09, para 20, the emission reductions for the project activity under a CPA are calculated as the following: $BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\_fuel}$ Equation (1) Where: BE_y = Baseline emissions during the year y in t CO_{2e} B_y = Quantity of woody biomass that is substituted or displaced in tonnes $f_{NRB,y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (f_{NRB})[7] $NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne) $EF_{projected\_fossil\ fuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 63.7 t CO_2/TJ[8] As per para 21, By is determined by using Following option (a) Calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project activity (tonnes/household/year); $B_y = N_{HH} \times (BC_{BL,HH,y} - BC_{PJ,HH,y})$ Equation (2) Where: N_{HH} = Number of households in the project activity, number $BC_{BL,HH,y}$ = Average annual consumption of woody biomass per household before the start of the project activity, tonnes/household/year $BC_{PJ,HH,y}$ = If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per household in the pre-project devices during the project activity, tonnes/household/year Considering the leakage of 5%, leakage emission is calculated as: $LE_y = 0.05 * BE_y = 1874$ tCO_{2eq}. Project Emission is considered as zero as this is not applicable. So, ex-ante emission reduction for this monitoring period is calculated as: $ER_y = BE_y - PE_y - LE_y$ Based on the number of days in the monitoring period, ex-ante emission reduction is proportionately calculated for the monitoring period. The emission reduction (without accounting leakage) for each CPA are: CPA-1: 59,930 tCO_2e CPA-10: 24,194 tCO_2e

[7] Default values endorsed by designated national authorities and approved by the Board are available at (CDM website)

[8] This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO_2/TJ) and 91 per cent for LPG (63.0 t CO_2/TJ).

	The total no of digesters percentage that were non-operational as per the BUS survey for the year 2019/20, for all the 2 CPAs, (27 out of 185 households surveyed, which works out to be 14.59%. The operational % observed by the verification team during the audit 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 and the CER excel sheet have been verified as per the set of supporting documents listed in Appendix 3. Hence, the verification team confirms that the baseline emissions for the current monitoring period calculated as 79,769 tCO_2 is in order

E.3.6.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of project emission resulting from the registered PDD 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 registered monitoring plan.
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 and CPA-DD's.

E.3.6.3. Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of leakage emission resulting from the registered PDD 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 registered monitoring plan.
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. The respective leakage emission for each CPA is calculated as: **CPA UNFCCC reference number** / **Leakage GHG emissions (tCO_2e)** 9572-P2-0001-CP2 / 3,103 9572-P2-0011-CP1 / 1,094 **Total** / **4,197** Hence, the verification team confirms that the leakage emissions for the current monitoring period calculated as **4,197** tCO_2 is in order

E.3.6.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the 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 and registered monitoring plan 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 = 79,769 tCO_{2e}

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_2e)	Leakage (tCO_2e)	GHG emission reductions or net GHG removals by sinks (tCO_2e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
9572-P2-0001-CP2	62,079.00	0	3,103	0	58,976	58,976
9572-P2-0011-CP1	21,887.00	0	1,094	0	20,793	20,793
Total	**83,966**	**0**	**4,197**	**0**	**79,769**	**79,769**

E.3.6.5. 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.
Findings	There is no CAR/CL raised in this section.
Conclusion	The total number of ERs achieved during the monitoring period is 79,769 tCO2e. In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD for the current monitoring period.

Title and UNFCCC reference number of the CPA	Actual values achieved by the CPAs during this monitoring period	Value estimated in ex ante calculation in the included CPA-DD(s)
9572-P2-0001-CP2	58,976	59930
9572-P2-0011-CP1	20,793	24194
Total	**79,769**	**84,124**

E.3.6.6. 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 9 BUS reports. Since the actual values are less than ex-ante values no further explanations is deemed necessary.

E.3.7. Assessment of reported sustainable development co-benefits

Means of verification	NA
Findings	NA
Conclusion	NA

E.3.8. Global stakeholder consultation

Means of verification	The project MR was webhosted on UNFCCC website
Findings	There is no CAR/CL raised in this section.
Conclusion	The project MR was webhosted on UNFCCC website, no comments were received during this period (https://cdm.unfccc.int/PoAIssuance/mon_db/poamon298787331/viewMR)

SECTION F. Internal quality control

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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

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EPIC Sustainability Services Private Limited (EPIC) has been contracted by AEPC to undertake the first periodic verification under the renewed crediting period for the registered CDM programme of activity titled “Nepal Biogas Support Program-PoA” (UNFCCC reference number: 9572). The objectives of this verification are to verify and certify emission reductions reported for programme of activity for the monitoring period of 31/01/2020 to 31/12/2020 (first and last day included) covering CPAs 1 and 10; 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 audits, assessed that all physical features of the proposed CDM project activity proposed in the registered PoA-DD and CPA-DDs (CPA 1 and 10) are in place, and that the project participants have operated the CDM project activity as per the registered PoA-DD and CPA-DDs. Thus the verification team has concluded that the project activity was implemented and operated as per registered PoA-DD and CPA-DDs, and that all physical features of the project are in place.

The verification team, based on audit and document review, was able to conclude that the project activity has been implemented as per the approved PoA-DD and CPA-DDs. The start date of this monitoring period is 31/01/2020 which is in line with the UNFCCC project webpage 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. The project activity was registered by applying the small scale methodology AMS I-E version 9.0 and the verification was carried out in accordance with the applied methodology. It was confirmed during the audit 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.

SECTION H. Certification statement

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EPIC Sustainability Services Private Limited (EPIC has carried out the first periodic verification under the renewed crediting period for the emission reductions that have been reported for the PoA titled “Nepal

Biogas Support Program PoA" (UNFCCC reference number: 9572), covering CPA 1 and CPA 10 for the 31/01/2020 to 31/12/2020. 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 9.0, the validated PoA-DD and CPA-DD's and the monitoring report, version 2.0[/8.1/] dated 01/06/2021.

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 31/01/2020 to 31/12/2020 is 79,769 tonnes of CO_2 equivalent.

Appendix 1. Abbreviations

Abbreviations	Full texts
AEPC	Alternative Energy Promotion Centre BSP Biogas Sector Partnership
BUS	Biogas User Survey
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CME	Coordinating Managing Entity
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
CL	Clarification Request
DOE	Designated Operational Entity
ESSPL	EPIC Sustainability Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gases
IPCC	Intergovernmental Panel on Climate Change
MoV	Means of Verification
NA	Not applicable
NRB	Non Renewable Biomass
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PS	Project Standard
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS-PoA	Validation and Verification Standard-Programme of Activities

Appendix 2. Competence of team members and technical reviewers

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

Name	Dr D Siddaramu	Mr. Sujan Adhikari	Mr. Vijayaraghavan Radhamadhavan
Role	Team Leader Auditor	Host country expert	Technical Reviewer
Competence in relevant sectors	Sector 1 and Sector 13	Sector 1 and Sector 13	Sector 1 and Sector 13
Responsibility	Document review, audit, DVR preparation, DVR resolution Document review, DVR preparation, DVR resolution, FVR preparation	Document review, visit to APEC office, discussion with CME/HH	Technical Review

Dr. D Siddaramu, is a M.Sc., Ph.D in Environmental Science, with over 17 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 & analysing environmental samples and conducting socioeconomic surveys; data analysis. He has undergone extensive training on CDM validation and verification and is a qualified auditor in accordance with procedures of EPIC sustainability services Pvt. Ltd.

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.

Mr. R. Vijayaraghavan holds BE in Mechanical Engineering, M. Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 15 years of working experience in energy sector including 9 years as validator. He has successfully completed around hundred CDM, VCS/GS projects. He has been qualified as Technical Reviewer for Sectoral Scope 1 and 13.

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UNFCCC	Validation and Verification Standard for Programme of activities, Version 2.0	1	UNFCCC
2	PP	PoA-DD	2	PP
3	DoE	PoA validation report	3	Third party
4	PP	CPA-DD's (CPA 1 to CPA 10)	4	PP
5	DoE	10 CPA validation reports	5	Third party
6	DoE	Previous verification reports	6	Third party
7	UNFCCC	Guidelines for Application of materiality in verification (version 2.0)	7	UNFCCC
8	PP	Monitoring report, version01 (Initial)	8	PP
8.1	PP	Monitoring report, version02 (Final)	8.1	PP
9	UNFCCC	Sampling and surveys for CDM project activities and programmes of activities", version 08.0	9	UNFCCC
10	UNFCCC	CDM-PoA-MR-FORM, version 04	10	UNFCCC
11	PP	Contract signed between BSP Nepal and AEPC	11	PP
12	PP	PoA database	12	PP
13	UNFCCC	AMS.I.E version 9.0	13	UNFCCC
14	IPCC	IPCC data base	14	Third party
15	UNFCCC	Default values of fraction of non-renewable biomass for Least Developed Countries and Small Island Developing States (version 01.0) EB 67 Annex 22	15	UNFCCC
16	Third party	Annual biogas users survey / BUS Report 2019/20	16	Third party
17	PP	ER spread sheet	17	PP
18	UNFCCC	Guideline for sampling and surveys for CDM project activities and programme of activities, version 4.0	18	UNFCCC
19	PP	MoU between households and PP for ownership of GHGs	19	PP
20	Third party	Filled in Questionnaires	20	Third party
21	PP	Document to support Technical life of biogas digesters	21	PP
22	PP	Training records of field staff/enumerators	22	PP

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

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

FAR ID	01	**Section no.**	Document Review	**Date:** 03/05/2021
Description of CL				
As no site visit has been performed during the validation of the renewal of crediting period and all validation of technical data of equipment has been done based on documents, pictures and interview, the verifier shall reconfirm the technical data (Reference: FAR01 dated 10/06/2019 from "Validation report form for renewal of CDM programme of activities period" version 2.0Aa, dated: 17/09/2019)				
Project participant response				**Date:** 13/05/2021
The FAR was raised during the crediting period renewal of the PoA. The PoA was registered on 31st January 2013. The CPAs are basically included retroactively after the construction of the biogas digesters. Even after the review by the DOE for the crediting period renewal, verification of the 9 CPAs under the PoA was done by the DOE in 2020. Before that 5 consecutive verifications of the PoA was conducted and the issuance for 6th consecutive verification was also completed with the issuance of CERs. Since no any technologies were added in the 9 CPAs included before crediting period renewal of the PoA, CME is in the opinion that the technical data for this monitoring period need not to be verified again and again. For the CPA-10 that was included after the crediting period renewal of the PoA was also validated by DOE and included in the PoA. Since then no new technologies were added, the FAR has been met already. The verifying DOE has also verified the technology during verification based on the specification provided in the registered PoA-DD and CPA-DDs. Moreover, the technical data of the equipment's are also provided in detail in registered PoA-DD. Since only one design, GGC2047 biogas model has been used in the PoA, the quality standard of the biogas digester is also attached for the review (See SD#1).				
Documentation provided by project participant				
SD#1 Quality Standard Manual_BSP Nepal				
DOE assessment				**Date:** 15/05/2021
The clarification by PP/CME is acceptable, the technical details of Bio-digestors were checked and the details match with that presented in CPA-DD. Hence accepted, hence closed.				

Table 2. CL from this verification

CL ID	01	**Section no.**	Document Review	**Date:** 03/05/2021
Description of CL				
PP/CME to clarify, how and on what basis is the the value of operational and non-operational percentage of biogas digestors are arrived.				
Project participant response				**Date: 13/05/2021**
The percentage of digester operational in year y is obtained through the user survey. As the survey is perception survey, users under the sample selected from stratified sampling approach were asked whether the biogas is operational throughout. Also, the physical condition of the biogas digesters and the stoves whether the stove is burning or not were checked by the enumerators in the field. These parameters determine the operational status. Based on the operational status in three strata (Hills, Remote Hills and Terai), the stratified proportion was calculated for individual CPA as specified in para 63 (eq.6) of the "Guidelines for sampling and surveys for CDM project activities and programme of activities" Annex 5, EB 69". The biogas which was non-operational throughout the year is taken conservatively as non-operational along with those which were found non-operational during the field survey. Same approach has been practiced since its first monitoring as per the PoA-DD. Please see section 3.1 of Biogas User Survey Reports for individual CPAs for detail. Also, see section E.3 of the monitoring report for sampling.				
Documentation provided by project participant				

SD#2.1 FR_BUS 2019.20_CPA_1 SD#2.2 FR_BUS 2019.20_CPA_2 SD#2.3 FR_BUS 2019.20_CPA_3 SD#2.4 FR_BUS 2019.20_CPA_4 SD#2.5 FR_BUS 2019.20_CPA_5 SD#2.6 FR_BUS 2019.20_CPA_6 SD#2.7 FR_BUS 2019.20_CPA_7 SD#2.8 FR_BUS 2019.20_CPA_8 SD#2.9 FR_BUS 2019.20_CPA_9 SD#2.10 FR_BUS 2019.20_CPA_10 The Guidelines for sampling and surveys for CDM project activities and programme of activities: https://cdm.unfccc.int/filestorage/r/n/S9J6CIEN84WGU1KQBA2MRFH0ZO5LX3.pdf/eb69_repan05.pdf?t=SXF8cTdtcnRnfDB4ZCXR4ZdBpaBweDumUd67
DOE assessment **Date:** 15/05/2021
The clarification by PP/CME on what basis is the the value of operational and non-operational percentage of biogas digestors are arrived is acceptable. The same has been detailed in the registered PoA-DD. Hence CL01 is closed

CL ID	02	**Section no.**	Document review	**Date:** 03/05/2021
Description of CL				
If any household/s found non-working during the survey. Clarify how this is being taken into account in the user survey and in ER calculations?				
Project participant response				**Date: 13/05/2021**
The operational status of the biogas digesters are based on the biogas user survey using stratified random sampling approach as stipulated in PoA-DD. As per PoA-DD, CPA wise monitoring is stipulated. The emission reduction calculation for this monitoring period are based on the operational percentage of the biogas. The non-operational biogas households are counted as non-operational in the biogas user survey. Since the values for the operational percentage of biogas digesters are only considered for the emission reduction calculation, CME hereby confirms that the non-operational biogas plants are not considered in the ER calculation conservatively using the principle of sampling and survey. Please see the ER calculation sheet for the reference.				
Documentation provided by project participant				
2.1 Monitoring Report No 1_ER Calculation sheet_PoA 9572_MP-7_V1 2.2 Monitoring Report No 2_ER Calculation sheet_PoA 9572_MP-7_V1				
DOE assessment				**Date:** 15/05/2021
The clarification by PP/CME on the non-working biodigestors and the confirmation that these biodigestors not used for ER calculations is acceptable. Hence CL02 is closed.				

CL ID	03	**Section no.**	Document review	**Date:** 03/05/2021
Description of CL				
As the availability of biogas is low during cold seasons and/or other season, clarify how this is accounted in the emission reduction calculations.				
Project participant response				**Date: 13/05/2021**

The availability of Biogas is less during cold season. While in the field visit, the people has also mentioned that even in the cold season, their requirement of cooking food for their particular family has been met by the gas which is designed for and the less gas is generally last for only one month. So, for the additional food if they have to cook during the winter, they sometime need alternate fuel for cooking. Since biogas digesters are designed for the cooking food for the family and accordingly "Quantity of woody biomass that is substituted or displaced" is fixed-ex-ante for the CPAs 2 to CPA-9, CME is in the opinion that this has been considered in annual average woody biomass that is substituted or displaced and not necessary to account this event separately while doing emission reduction calculation. Same approach had been followed in last 5 verifications of this PoA. While renewing the crediting period of PoA, the quantity of woody biomass that is used in the baseline ($BC_{BL,HH,y}$) is fixed ex-ante whereas the quantity of woody biomass that is used during project activity by pre-project device ($BC_{PJ,HH,y}$) is provided as monitoring parameters. So, this value also accounts the use of woody biomass during winter to meet additional energy requirement. This is applicable for CPA-1 and CPA-10 during this crediting period. So, CME is in the opinion that this has been accounted appropriately for the ER calculation in this monitoring period in-line with the registered PoA-DD and as practiced in last 6 monitoring periods. Please see ER calculation sheet for these parameters in detail.
Documentation provided by project participant
2.1 Monitoring Report No 1_ER Calculation sheet_PoA 9572_MP-7_V1 2.2 Monitoring Report No 2_ER Calculation sheet_PoA 9572_MP-7_V1
DOE assessment **Date:** 15/05/2021
The clarification by PP/CME on the availability of biogas low during cold seasons on how this is accounted in the emission reduction calculations is accepted. Hence CL03 closed

CL ID	04	**Section no.**	Document review	**Date:** 03/05/2021
Description of CL				
What are the procedure adopted to avoid double counting				
Project participant response				**Date: 13/05/2021**
The actual information of the digesters and other information are 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). To avoid double counting, the name of the biogas owner along with address and the unique dome gas pipe number for the Biogas is provided for each biogas. Since all the biogas digesters are bundled in the CPAs retroactively and also validated by the validating DOE and also verified by the verifying DOE in previous verifications, the database provided for the CPAs are unique (with unique ID for each biogas) in its identity. So, drawing the sample from each CPA avoids the double counting due to already set database and the unique ID of the biogas plants. Please see the database of the CPAs.				
Documentation provided by project participant				
SD#3. Database_PoA Also check database for each CPA in PoA website under UNFCCC: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/7BSCYZMH2U05TWXFJKELND18PRQ96O/viewCPAs				
DOE assessment				**Date:** 15/05/2021
The clarification and procedure adopted to avoid double counting by means of unique ID for each biogas plant is accepted and hence CL04 is closed.				

CL ID	05	**Section no.**	Document review	**Date:** 03/05/2021
Description of CL				
What are the QA/QC procedures adopted by CME/PP to check the accuracy/effectiveness and conservativeness of the Biogas user survey conducted.				
Project participant response				**Date: 13/05/2021**

Being a government entity, CME always put its effort to provide the neutral, unbiased and accurate results from the user survey as the outcome of the survey is not only for CDM/GS but to report the socio-economic impacts of Biogas in the society. Before conducting the survey, CME follows competitive process to select appropriate third party consultants for the survey and selection process is very rigorous. After selection of the consultants, CME discuss with the consultant and provides the feedback on questionnaires and jointly involved in orientation to the enumerators. In between, CME keeps close coordination with consultant. Once the draft report is received, few sample households are checked through phone call to know if the information provided in the questionnaires are correct and the visit of the survey team. CME also checks if the survey met the given reliability/precision. In this way, the Biogas User Survey reports are finalized. Same approach has been followed for the previous monitoring of the PoA.
Documentation provided by project participant
N/A
DOE assessment **Date:** 15/05/2021
The QA/QC procedures adopted by CME/PP to check the accuracy/effectiveness and conservativeness of the Biogas user survey conducted is acceptable. Hence CL05 is closed

CL ID	06	**Section no.**	Document review	**Date:** 03/05/2021
Description of CL				
Where there any repair/maintenance work undertaken during the monitoring period, if so provide details.				
Project participant response				**Date: 13/05/2021**
Minor repair/maintenance work required is done locally by users\'s themselves or local technicians. If there are any major repair/maintenance is required, users generally put the grievances and AEPC request the biogas company for it. CME confirms that there was no major repair/maintenance required during monitoring period as no grievances were filed/registered.				
Documentation provided by project participant				
N/A				
DOE assessment				**Date:** 15/05/2021
The clarification by PP on repair/maintenance work of biogas plant is accepted, hence CL06 is closed.				

CL ID	07	**Section no.**	Document review	**Date:** 03/05/2021
Description of CL				
User survey was conducted during the month of October/November 2020, but training to the field surveyors (Data enumerators) was done on 21 March 2020.				
Project participant response				**Date: 13/05/2021**
The orientation to the enumerators were provided in March 2020 before the lockdown in the country was started. But due to the lockdown, the survey could not be conducted immediately. But when the situation was relaxed a bit, the refresher orientation was given to the enumerators on 30 September 2020 before sending them to the field. Please see SD#4 for the attendance sheet for the enumerators for the reference.				
Documentation provided by project participant				
SD#4_Refresher_BUS_Attendance sheet				
DOE assessment				**Date:** 15/05/2021
The clarification by PP on training of data enumerators is accepted, hence CL07 is closed.				

CL ID	08	**Section no.**	MR	**Date:** 03/05/2021
Description of CL				

Under subsection (d) of Section E.3 (page no.17), it is mentioned that "…….*In order to assure the quality of data collected, the questionnaires were pre-tested prior to their introduction in the field.*" Clarify, 1. What and how the questionnaires were pre-tested prior to their introduction in the field. 2. Any error/corrections identified and 3. Was there any correction in the questionnaires of the current monitoring period? If so submit the questionnaires highlighting the portions corrected/revised

Project participant response	**Date: 13/05/2021**
1. For the quality assurance/quality control of the survey, this is the standard approach to minimize the inconsistency and correct the questionnaires if any during orientation. The enumerators during the orientation are taken to nearby biogas users household and show how the responses are filled in. This is dummy exercise only and part of the orientation. 2. For the quality assurance/quality control of the survey, this is the standard approach to minimize the inconsistency in the questionnaires filled in by enumerators. But in this monitoring period, no such inconsistency was observed during the review of draft report as this is the seventh periodic survey done for the Biogas PoA. *3.* As mentioned above, this is the standard approach to be followed during the survey. No inconsistency was observed in this monitoring period.	
Documentation provided by project participant	
N/A	
DOE assessment	**Date:** 15/05/2021
The clarification is accepted, hence CL08 is closed	

Table 3. CAR from this verification

CAR ID	01	**Section no.**	Document review	**Date:** 03/05/2021
Description of CAR				
The PP to submit the following records/documents for verification 1) Technical data of Biogas digestors 2) Grievance mechanism records				
Project participant response				**Date: 13/05/2021**
1. The technical data for the biogas digesters are also included in the registered PoA-DD. However the quality standard of the biogas digester that includes the technical data is also attached for the review (See SD#1). 2. The Nepal Biogas Support Programme-PoA has a grievance mechanism and is also uploaded in AEPC's website publicly both in Nepali and English Language. See SD#5 for detail. The technical issues are generally addressed by the owners and/or the local companies. Since no any grievances are received, the records are not available for this monitoring period.				
Documentation provided by project participant				
SD#1 Quality Standard Manual_BSP Nepal SD#5_Notice for Grievance Mechanism for Biogas PoA Also published in: https://www.aepc.gov.np/uploads/docs/l-b-b-aa-b-b-1544451317.pdf				
DOE assessment				**Date:** 15/05/2021
The requested documents are submitted, checked and found ok, hence CAR01 is closed				

Table 1. FARs from this verification

FAR ID	Nil	**Section No.**		**Date:** 15/05/2021
Description of FAR				
NA				
CME response				**Date:** DD/MM/YYYY
Documentation provided by the CME				
DOE assessment				**Date:** DD/MM/YYYY

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Document information

Version	*Date*	*Description*
04.0	6 April 2021	Revision to: • Reflect the "Clarification: Regulatory requirements under temporary measures for post-2020 cases" (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM validation and verification standard for programmes of activities" (CDM-EB93-A08-STAN); • Make structural and editorial improvements.
02.0	29 December 2017	Revision to align with the requirements of the "CDM validation and verification standard for programme of activities" (version 01.0).
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