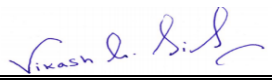
Verification and certification report form for CDM programme of activities

(Version 03.0)

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)	Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea (UNFCCC reference number: 10430)	
Version number(s) of the PoA-DD(s) to which this report applies	Version 2.0	
Version number of the verification and certification report	Version 3.0	
Completion date of the verification and certification report	07/10/2020	
Monitoring period number and duration of this morning period	Monitoring Period Number: 2 Duration of the monitoring period: 14/12/2018 - 13/12/2019[1]	
Number and version number of the monitoring report to which this report applies	Number: 1 Version number: 3.3	
Coordinating/managing entity (CME)	AERA GROUP S.A.S.	
Host Parties	Host Parties of the PoA	Is this a host Party to a CPA covered in this report? (yes/no)
	Ghana	Yes
Applied methodologies and standardized baselines	AMS-II.G.: "Energy efficiency measures in thermal applications of non-renewable biomass" (Version 08.0)	
Mandatory sectoral scopes	Sectoral Scope 3 – Energy Demand	
Conditional sectoral scopes, if applicable	N/A	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	93,597 tCO_2e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	71,934 tCO_2e	
Name and UNFCCC reference number of the DOE	Carbon Check (India) Private Ltd. (E-0052)	

[1] The webhosted version of the MR was uploaded with a monitoring period of 14/12/2018 to 31/12/2019, which was modified later during the verification by the CME. The change is in accordance with the §224 of the PCP for the PoAs, version 02/B01-3/ and does not require a new on-site inspection as the final date of the changed monitoring period is NOT after the date of the DOE's remote audit interviews.

Name, position and signature of the approver of the verification and certification report	Vikash Kumar Singh, Compliance Officer 

SECTION A. Executive summary

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Purpose, general description and location of the project activity:

The co-ordinating managing entity/project participant, AERA GROUP S.A.S., has commissioned the DOE, Carbon Check (India) Private Ltd. (CCIPL) to perform an independent verification of the CDM Programme of Activity "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea" in Ghana (hereafter referred to as "Programme of Activity" or "PoA") for the CPAs titled "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001" (UNFCCC reference number: 10430-P1-0001-CP1) and "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA002" (UNFCCC reference number: 10430-P1-0002-CP1). The PoA involves dissemination of improved cooking stoves to household users in Ghana. The PoA saves greenhouse gas emissions by replacing baseline stoves with improved cookstoves. The purpose of the PoA is to mitigate climate change and contribute to sustainable development in Ghana. The CPAs aim to reduce non-renewable wood fuel consumption and greenhouse gas (GHG) emissions of users in a designated area of Ghana by selling affordable Improved Cooking Stoves (ICSs) in replacement of traditional cooking stoves. An ICS combusts wood fuel more efficiently, i.e. requires less charcoal than a traditional stove. This reduces CO_2 emissions. Ecoeye Co., Ltd., and Korea Zinc Co., Ltd. have financed the improved cooking stoves distributed to the households.

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

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

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

The objective of this verification was to verify and certify emission reductions reported for the Programme of activities "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea" in the host country "Ghana" for the period 14/12/2018 to 13/12/2019 (including both the days).

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

In particular, the monitoring plan, monitoring report and the project's compliance with the relevant UNFCCC and host Party criteria are verified in order to confirm that the component project/s has/have been implemented in accordance with the previously registered/included component project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the registered PoA-DD/CPA-DDs and the approved monitoring methodology.

Scope of the verification:

The scope of the verification is:

- To verify the project implementation and operation with respect to the registered/approved revised PoA-DD.
- To verify the implemented monitoring plan with the registered PoA-DD or approved revised PoA-DD and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

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

Verification process:

The verification comprises a review of the monitoring report over the monitoring period from 14/12/2018 to 13/12/2019 and based on the registered/approved revised PoA-DD/CPA-DDs in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant.

Remote audit and stakeholders' interviews are also performed as part of the verification process.

Conclusion:

The verification team assigned by the DOE concludes that the PoA-DD (Version 2.0, dated 02/10/2019), CPA-DDs (CPA 1 - Version 2.0, 02/10/2019; CPA 2 – Version 2.0, dated 02/10/2019) /B04/ and the Monitoring report (version 3.3, dated 07/10/2020) /02/, meets all relevant requirements of the UNFCCC for CDM project activities/ programme of activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for programme of activities requirements version 02.0 /B01-1/.

The programme of activity was correctly implemented according to the selected monitoring methodology, monitoring plan and the registered PoA-DD/B04/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and remote audit, the verification team confirms that the project activity has resulted in the 71,934 tCO_2e emission reductions during the second monitoring period.

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

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

No.	Role	⊢ ⋟	Last name	First name		Involvement in

					Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Desk/document review	On-site inspection[2]	Interview(s)	Verification findings
1.	Team Leader/ Verifier/ Technical Expert	IR	Dimri	Anubhav	CCIPL	X		X	X
2.	Local Expert	EI	Mensah	Isaac	CCIPL			X	

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Agarwalla	Sanjay Kumar	CCIPL
2.	Approver	IR	Singh	Vikash Kumar	CCIPL

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.	Human Error: Recording and reporting of the information in the ER spreadsheet.	*Medium*	*All the ER spreadsheet data of the stoves, including sales database, determination of parameter for efficiency testing including data calculation. This includes all the parameters to be monitored ex-post as per the PoA-DD/CPA-DDs*	*The risk has been mitigated by reviewing the training/07/ of the personnel involved in the data capture, calculation and by following the monitoring responsibilities.*
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	*Medium*	*The data is recorded in the spreadsheets based on the raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and sales database and Stove efficiency testing records.*	*The identified risk shall be mitigated by reviewing the management of access to the records. It has been confirmed through interviews how the raw data is collected by the field personnel and then transmitted and stored electronically to the CME/CPA implementer's office. The data quality control has been checked*
3.	Accuracy of the measuring equipment	*Low*	*Check the calibration records for the*	*The risk due to accuracy of the measuring equipment shall be ensured by planning*

[2] On-site inspection was not carried out and instead remote audit was conducted by means of video and telephonic calls.

			measurement equipment used for efficiency test.	*to check calibration procedures/08/ of the measuring equipment used for stove efficiency (water boiling tests) and the QA/QC procedures followed by the laboratory including the capacity of the individuals and the laboratory/10/ to conduct WBTs.*

C.2. Consideration of materiality in conducting the verification

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The threshold of materiality was evaluated based on §13 of "Guideline: Application of materiality in verifications" Version 02.0 /B08/ and § 308 of CDM VVS for PoAs, version 02.0/B01-1/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 2% of 71,934 tCO_2e which is equal to 1,439 tCO_2e.

In planning the verification, verification team took cognizance of para 11 and 12 of the "Guideline: Application of materiality in verifications" Version 02.0 /B08/. A materiality threshold of 1,439 tCO_2e is determined in line with para 13(a) of "Guideline: Application of materiality in verifications" Version 02.0 /B04/.

Based on the above, activities in which risks were assessed were:

1. Monitoring system including the data input procedure
2. Copy of the agreement between household and the CME/ Project Participant (s) (origin of data)
3. Stove unique ID system
4. ER sheet (application of data)
5. Data flow
6. Data control procedures
7. Stove efficiency test (WBT) records/06/ and applicable QA/QC procedures/10/

In conducting the verification, DOE took cognizance of para 13-17 of the "Guideline: Application of materiality in verifications" Version 02.0 /B08/ and based on the input of data from different sources checked through sampling of records during the remote interviews observed that no records were found to have inconsistent data from hand written (Copy of the agreement between household and Project Participant) to the electronic monitoring database. Data flow was checked through comparison of data in handwritten forms, electronic database and ER sheet. The training records of the personnel involved in conducting the stove efficiency testing, recording of data and calculation of the emission reductions data has been checked by the verification team /07/.

The risks identified were mitigated through cross check with all sets of documents. The verification team performed the following checks in order to mitigate the effects of the above-identified sources of error:

Mitigation of Human error risks: The verification team mitigated the risk by checking the training records /07/ of the personnel during the remote audit. These records have been provided to the verification team by the CME. Furthermore, data was crosschecked with the ER calculation spreadsheet /04/, sales and monitoring database/04/ and the raw data questionnaire/05/. Verification team, based on the above, confirms that the risk is appropriately mitigated.

Mitigation due to error in Information system: Verification team by conducting interviews with the personnel responsible for such activities mitigated the risk due to error in information system. It was confirmed through interviews that the raw data is collected by the monitoring team and then transmitted and stored electronically to the CPA implementer's office.

Accuracy of the measuring equipment: The risk due to inaccuracy in measurements is assessed by reviewing calibration letter/08/ provided by the laboratory confirming all the project equipment being calibrated. The verification team has reviewed the dates of calibration and to check whether all equipment is being calibrated at regularly defined intervals as per the registered PoA-DD/CPA-DDs /B04/. The risk due to the QA/QC procedures is mitigated through the training/07/ of personnel involved in the WBT.

Based on the review of the PoA-DD/CPA-DDs /B04/, monitoring report /02/, emission reduction calculation spread sheet /04/ and the data provided and the assessment carried out above, CCIPL confirms with a reasonable level of assurance that the claimed emission reductions or removals are free from material errors, omissions or misstatements.

CCIPL confirms with a reasonable level of assurance that the claimed emission reductions or removals are free from material errors, omissions or misstatements.

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 /01/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection[3]: 21/05/2020 to 22/05/2020; 25/05/2020				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	An assessment of the implementation and operation of the registered project activity as per the registered PoA-DD, registered/ included CPA-DDs.	Remote Audit	25/05/2020	Anubhav Dimri Isaac Mensah
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Remote Audit	25/05/2020	Anubhav Dimri
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the CPA-DDs	Remote Audit	25/05/2020	Anubhav Dimri
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	Remote Audit	25/05/2020	Anubhav Dimri
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the CPA-DDs and the selected methodology and corresponding tool(s), where applicable	Remote Audit	25/05/2020	Anubhav Dimri

[3] The verification was conducted remotely by the verification team assigned by CCIPL i.e., the verification team leader and the local expert. The alternate measures were adopted in accordance with the communication from the UNFCCC secretariat for the COVID-19 pandemic (relaxation on the mandatory site visits). Based on the letter provided by the CME /11/ on the commitment under Korean Emission Trading Scheme (K-ETS), in accordance with the UNFCCC communication the site visit was not conducted even though one of the CPA verification (CPA002) is within the scope of §321 (a) of the VVS for the PoAs (version 02.0) /B01/.

6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Remote Audit	25/05/2020	Anubhav Dimri
7.	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	Remote Audit	25/05/2020	Anubhav Dimri
8.	Interview of the end-users regarding the following: • Consistency of the information as contained in Survey sheet • Baseline scenario of the household • the pre-project/baseline stove/s and its operation during the project scenario. • parallel use of any other stove and their fuel • source /storage of fuelwood/charcoal or any other fuel • number of meals cooked (along with family size of household) on project cook stove or any other baseline and/or stoves utilizing other fuel/s.	Remote Audit	21/05/2020 to 22/05/2020;	Anubhav Dimri Isaac Mensah

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Dunod	Alexandre	Aera Group	25/05/2020	Programme implementation and operation, monitoring procedure, data and information flow, QA/QC Procedures, Stove Efficiency Tests procedures and records, Quality Assurance – Management and operating system, Monitoring surveys, stove efficiency tests	Anubhav Dimri
2.	Flipo	Baptiste	Aera Group	21/05/2020 to 22/05/2020; 25/05/2020	CER calculation and completeness of monitoring report	Anubhav Dimri
3.	Agyei	Michael Yaw	Man and Man Enterprises	21/05/2020 to 22/05/2020; 25/05/2020	Monitoring procedure, QA/QC Procedures, Stove Efficiency Tests, Quality Assurance – Management and operating system,	Anubhav Dimri Isaac Mensah

					monitoring surveys, Monitoring personnel, Data recording personnel and production of stoves	
4.	Namoe	Rita	KNUST	27/05/2020	Interview with the WBT personnel to check the QA/QC procedures and the serial numbers of the stoves submitted to carry out the WBTs, Covid-19 situation impact on the access to KNUST campus during the months March 2020 to June 2020	Anubhav Dimri

D.4. Sampling approach

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The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the approved revised PoA-DD/CPA-DDs /B04/. The CME/PP has appropriately performed simple random sampling in accordance with the applied methodology/B02/ and the monitoring plan provided in the PoA-DD/B04/ and the CPA-DDs/B04/.

The sampling survey has been carried out by the well-trained personnel of Man and Man Enterprises and AERA Group and WBT tests were performed by KNUST (third party). Training certificates of the personnel has been provided to the verification team/07/. Monitoring parameters $N_{y,i,j}$ and μ_y are monitored through monitoring surveys by the monitoring personnel of CPA implementer. Monitoring parameter $\eta_{new,i,j}$ is monitored through conducting the water boiling tests to determine the efficiency of the installed stoves. Monitoring of the parameter ensures compliance to the para 41 of the methodology AMS-II.G, version 08/B02/. Verification team has checked the water boiling test records/06/ to confirm the test results. The thermal energy generated by the project technology has also been determined in the section C.1 of the MR/02/ and the ER sheet/04/ in order to comply with the para 24 of the methodology/B02/. Parameter μ_y monitors the adjustment to account for any continued use of pre-project devices during the year of the monitoring period. The monitoring of the parameter μ_y ensures the compliance to the requirements to the para 40 of the monitoring methodology, AMS-II.G, version 08/B02/. Parameter $N_{y,i,j}$ monitors Number of project devices of type i and batch j operating during year y. The value of the parameter is determined by multiplying all devices sold (N) with the proportion of cooking stoves found to be operating in a representative sample, i.e. $p_{op\_stoves,y}$. The value of the parameter $p_{op\_stoves,y}$ is determined through monitoring surveys.

CME has done a sampling for the PoA and the CPAs reported in the monitoring period, CPA 1 and CPA 2 for the current monitoring period. The sample sizes have been calculated based on the expected proportion values available from the previous monitoring period (MP1) /B05-2/. Monitoring period 1 (MP1) covered CPA1 only, however CME has justified the values used for CPA2 as well due to the same stove type distributed and neighbouring region/ province of the same host country. This is acceptable to the verification team since the estimates are based on result of previous studies

and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B06/. A sample size of 6 was determined for the parameter $N_{y,i,j}$ (CPA 001 and CPA002) based on the required confidence interval/precision level of 90/10, this sample size was increased to 57 (for CPA 001 (2018 vintage)) and 58 (CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) in order to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined for the parameter μ_y based on the required confidence interval/precision level of 90/10 is 45 (CPA 001 and CPA 002) each. However, to account for the non-responses CME used a sample of 57 for 2018 vintage and 58 for 2019 vintage to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined is more than 30 in both the cases and thus in accordance with the §14 of the sampling standard version 8/B07/, meets the minimum sample size requirement of 30 when the parameter of interest is a proportion.

The precision achieved for the parameter $N_{y,i,j}$ ($p_{op\_stoves,y}$) is 0 % (for CPA 001) and 4 % (for CPA 002) and thus within the limits of 10% required precision for the parameter. The precision achieved for the parameter μ_y is 8 % (for CPA 001) and 12 % (for CPA 002), the precision achieved for CPA 001 is thus within the limits of 10% required precision for the parameter. However, precision achieved for CPA 002 for the parameter μ_y is not within the limits and thus in accordance with the §40 of the methodology, AMS-II.G, version 8/B02/, upper bound has been applied to the value determined in a conservative manner.

A sample size of 1 (for both CPA 001 and CPA 002) was determined for the parameter $\eta_{new,i,j}$ based on the required confidence interval/precision level of 90/10. A sample of 2 was thus chosen to account for the non-responses and WBTs were conducted on 3 stoves of each vintage of each CPA. Since this parameter is a mean type and thus t-distribution calculations have been used in case of a sample size less than 30. The sample sizes have been calculated based on the mean and standard deviation values available from the previous monitoring period (MP1) /B05-2/. The precision achieved for the parameter $\eta_{new,i,j}$ is 10.1 % (2018 vintage – CPA 001), 5.2 % (2019 vintage – CPA 001), 3.1 % (2019 vintage – CPA 002) and thus only 2018 vintage for CPA 001 exceeds the limits of 10% required precision for the parameter, while 2019 vintage for CPA 001 and 2019 vintage for CPA 002 is within the 10 % limits. The required precision of the sample is not met and thus in accordance with the § 40 of the Sampling Standard, version 08/B07/, lower bound of the value has been used for the emission reduction calculations in a conservative manner.

DOE used sampling during verification for checking the operational status, the proportion of meals cooked on the project cookstoves, dates of commissioning of the project devices/ batches at the households, number of project devices in a household and to check if the WBT tests have been done for the households and all the households confirmed that the WBT tests were conducted for their households. Interviews were conducted with all the households for the stoves for whom WBTs were conducted and it was confirmed that the WBTs were performed on their stoves. The serial numbers of the stoves were also confirmed through interview with the KNUST laboratory personnel during a telephonic interview/D.3-4/. As per the sampling standard, version 08 /B07/, DOE had identified 8 samples (each) out of the PP's 57 (for CPA 001 (2018 vintage)) or 58 (CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) samples for the parameter $N_{y,i,j}$ ($p_{op\_stoves,y}$) and the parameter μ_y based on the AQL/UQL stated below. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household was also cross-checked.

A sample of 8 is justified for each CPA (batch) of the PoA based on the Table 2 provided in the sampling standard, version 08/B07/, since estimated volume of annual GHG emission reductions of the project activity or the PoA being verified is equal to or less than 100,000 tCO_2e and meets the requirement of para 39 (a) of the Sampling Standard version 08/B07/. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 5 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. A sample size of 8 households (for each CPA batch) was chosen with no non-responses observed. All the identified 8 samples (for each CPA batch) had the same operational status as reported in the sampling frame of the PP/CME and hence no discrepancy was found (i.e. c=0). The usage of baseline stoves (μ_y) is consistent with the usage reported in the monitoring report and monitoring surveys and hence no

discrepancy was found (i.e. c=0) with the MR /02/ and the ER sheet /04/. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household were also consistent with the monitoring database and sampling database respectively and hence no discrepancy was found (i.e. c=0). Thus, PP's set of records has been accepted in line with § 33 of the sampling standard, version 08/B07/.

DOE checked the water boiling test report/06/ with records of all the sampled stoves for the verification of the stove efficiency of the project stoves.

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	--	CAR 01 CAR 02	--
Remaining forward action requests from validation and/or previous verifications	--	--	FAR 01 FAR 02
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	CL 01 CL 09	--	--
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[4]	--	--	--
• 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	CL02	--	--
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	--	--	--

[4] 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).

Compliance of the registered monitoring plan with applied methodologies and standardized baselines	--	CAR 05	--
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	CL 03 CL 04	--	--
• Implementation of sampling plan	CL 05 CL 06	CAR 03	--
Compliance with the calibration frequency requirements for measuring instruments	CL 11	--	--
Assessment of data and calculation of emission reductions or net removals			
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	CL 07 CL 08	CAR 04	FAR 01
• 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	CL 10	--	--
Assessment of reported sustainable development co-benefits	--	--	--
Global stakeholder consultation	--	--	--
Others (please specify)	--	--	--
Total	11 CLs	05 CARs	03 FARs

SECTION E. Verification findings

E.1. General

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

Means of verification	Document Review, Interview
Findings	CAR 01 and CAR 02 had been raised in this regard and have been resolved. Please refer to Appendix 4 for further details.
Conclusion	CME has used the Monitoring report form for CDM programme of activities, Version 03.0 /B03/. Verification team confirms that the latest available version of PoA MR Form /B03/ has been used by the CME and the MR/02/ is in compliance of the monitoring report form with the relevant form and instructions therein /B03/. CCIPL, had made the version 1.0, dated 27/04/2020 of the monitoring report /01/, covering the monitoring period from 14/12/2018 to 31/12/2019 (both days inclusive) publicly available on 30/04/2019. The webhosted version of the MR was uploaded with a monitoring period of 14/12/2018 to 31/12/2019, which was modified later to 14/12/2018 to 13/12/2019 during the verification by the CME. The change is in accordance with the §224 of the PCP for the PoAs, version 02/B01-3/ and does not require a new on-site inspection as the final date of the changed monitoring period is **NOT** after the date of the DOE's remote audit interviews. This confirms compliance with the §337 and §338 of CDM VVS for PoAs, version 02.0 /B01-1/.

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

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There were two forward action requests from the validation both of which have been closed. There are no forward action requests from the previous verification.

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)
Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001 (UNFCCC reference number: 10430-P1-0001-CP1)	Yes	30/11/2018	Version 2.0	Y
Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA002 (UNFCCC reference number: 10430-P1-0002-CP1)	Yes	10/06/2019	Version 2.0	N

E.2. Programme of activities

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the report.
Conclusion	As part of the remote audit, the verification team was able to confirm that the implementation of Programme of Activity (PoA) and the Component Project Activity (CPA) is in accordance with the project description contained in the revised approved PoA-DD of 02/10/2019/B04/. A remote audit was conducted by CCIPL in accordance with the communication from CDM Executive Board to relax mandatory site visits by DOEs until 31 December 2020 because of COVID-19 /B05-4/. Based on the request letter/11/ from the CME provided on 27/05/2020 due to commitment for the Korean Offset Credits (KOCs) under the K-ETS, it was determined that the site visits cannot be postponed due to the CER delivery commitment by project participants/ CME. Accordingly, as prescribed in the communication from CDM EB, the steps provided in the §10.1.3 of the VVS for the PoAs, version 02/B01-1/, were followed: a) The document review was conducted in accordance with the §320 (a) of the VVS for the PoAs, version 02/B01-1/

b) As the site visit could not be performed by the verification team leader, following steps were undertaken to assess the requirements in the §320 (b) of the VVS for the PoAs, version 02/B01-1/:

I. an assessment of the implementation and operation of the included CPAs was done based on the review of the monitoring report and interviews with the CME, project participants and the end user households. The interviews were conducted through Whatsapp Calls, Skype Calls and Google meet applications and thus the project devices (Holy Cook stoves), monitoring database and the monitoring equipment was also checked by the verification team through web conferencing. The interviews with households were facilitated by the local expert through telephonic calls and images of the project devices taken.

II. A review of information flows for generating, aggregating and reporting the monitoring parameters was done based on the interviews with the CME/ PP representatives and CME provided a walkthrough of the monitoring system to the DOE verification team.

III. Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the registered monitoring plan – This was done based on the interviews with the personnel responsible for data collection and other monitoring personnel.

IV. Cross checks between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources – This was done based on the cross checks between different data sources including the ER sheet/04/, snapshot of the monitoring database, WBT records/06/ and sampling inspection records/04/.

V. A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the included CPA-DDs, the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents; - This was performed based on the letter provided from the laboratory confirming calibration of all the monitoring equipment used for WBT/08/ and the competence of monitoring personnel was checked based on the records provided/10/ /07/ and interviews.

VI. A review of calculations and assumptions made in determining the GHG data and GHG emission reductions or net anthropogenic GHG removals – Calculations in the ER sheet/04/ were checked, and the assumptions made in the CPA-DD/B04/ and MR/02/ were checked by the verification team.

VII. An identification of quality control and quality assurance procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters – The QA/QC procedures were checked through interviews with the CME/PP, WBT Personnel at KNUST Laboratory/10/ and the review system used by the CME was confirmed. The competency and training details of the monitoring personnel were also checked /07/.

c) The sampling approach was assessed in accordance with the §320(c) of the VVS for the PoAs, version 02/B01-1/, based on the sampling standard, version 08/B07/. Interviews with the end user households were facilitated by the local expert through telephonic calls/ WhatsApp video calls with the sampled households.

There are no deviations or proposed or actual changes in the implementation or operation of the PoA and the included CPA.

The verification took cognizance of § 259 and 260 of the CDM PS for PoAs (version 02.0) and §340 to 342 of the VVS for the PoAs (version 02.0) /B01/.

E.2.2. Implementation and operation of the management system

<table>
<tr><td>Means of verification</td><td>Document Review, Interview</td></tr>
<tr><td>Findings</td><td>CL01 and CL 09 had been raised in this regard and have been resolved. Please refer to Appendix 4 for further details.</td></tr>
<tr><td>Conclusion</td><td>The management system for the PoA including the record-keeping system has been explained in section C of the registered PoA-DD /B04/. During the course of verification, verification team based on review of provided documents and remote interviews has assessed this management system. This included the organisational chart, roles and responsibilities, data collection, transfer and aggregation procedures, training and capacity development for personnel /07/ and the institutes/10/, Procedures for technical review of inclusion of CPAs, procedure to avoid double counting, Records and documentation control process and Measures for continuous improvements of the PoA management system. The PoA monitoring system/B04/ was reviewed and it was found that the monitoring has been done in accordance with the provided system/05/. On the basis of remote interviews with the personnel of the CME involved in the project monitoring and data collection, inspection of monitoring database & equipment used and document review verification team can confirm that the responsibilities and authorities for monitoring and reporting are appropriate and effective for the project type and hence in accordance with the monitoring plan of the registered PoA-DD/B04/ and the applied monitoring methodology/B02/. Ecoeye Co., Ltd. and Korea Zinc Co., Ltd. have financed the improved cooking stoves distributed to the households. There were some personnel changes with respect to the data manager for the programme and the updated details of the personnel are provided in the section D of the MR/02/. All the details were confirmed through remote audit interviews with the CME representatives.

Recipient household of ICS have ceded the rights of all entitlement of CERs to the managing entity of the PoA, this has been cross-verified from the sample signed sales agreements /09/ with the end users. Operation of the ICSs in the CPA 001 and CPA 002 was confirmed during the remote audit by the verification team. Following was confirmed during the remote audit:
1. Stoves numbering system
2. Electronic monitoring system including input procedure
3. Actual implementation of the stoves
4. Household-representatives were interviewed regarding the usage of stove and the sampling for the monitoring parameters $N_{y,i,j}$ ($p_{op\_stoves,y}$), μ_y and $\eta_{new,i,j}$
5. Whether or not baseline technology was still in use
6. Process of data collection during installation of stove
7. Sales Agreements between households and CME/CPA implementer

Carbon Check's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the registered PoA-DD /B04/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PoA-DD /B04/ and registered/included CPA-DDs /B04/.

In accordance with § 359 c) of VVS for Programme of Activities, version 02/B01-1/, information (data and variables) provided in the monitoring report that are different from that stated in the registered CPA-DDs /B04/ were assessed. The assessment is summarized below:

<table>
<tr><th>Parameter</th><th>Ex-ante value in the CPA-DD</th><th>Actual operation for the reported monitoring period</th><th>Assessment by the verification team</th></tr>
<tr><td>Number of project devices of type i and batch j</td><td>298,897 (CPA001)
167,967 (CPA002)</td><td>36,895 (CPA001)
30,821 (CPA002)</td><td>The monitored value of the number of project devices of type i and batch j operating during year y are less than</td></tr>
</table>
</td></tr>
</table>

	operating during year y ($N_{y,i,j}$)			the ex-ante estimates as the project has been in implementation for less than a year and the ex-ante estimate was based on the complete crediting period of the CPA/B04/. The proportion of operational stoves ($p_{op\_stoves,y}$) observed during the monitoring is 100 % for CPA 001 and 96.55 % for CPA 002, which is higher than the ex-ante estimates of 90%. The higher value of the operational stoves is justified as the stoves have been in operation for less than a year and thus mostly found operational. The values were cross-checked through the remote interviews with the households during the remote audit. The value for the parameter $N_{y,i,j}$ is based on the ratio of operating stoves ($p_{op\_stoves,y}$), total stoves (N) and the fraction of the number of days a stove is used out of the total monitoring period. The resultant value of the parameter $N_{y,i,j}$ is thus 36,895 (for CPA001) and 30,821 (for CPA002) and is less than the total stoves distributed in the CPA (i.e. 59,121 for CPA 001 and 51,624 for CPA 002). This is deemed acceptable to the verification team.
	Adjustment to account for any continued use of pre-project devices during year y (μ_y)	0.80 (CPA001) 0.8780 (CPA002)	0.8645 for CPA001 0.6617 for CPA002	The monitored value for the parameter Adjustment to account for any continued use of pre-project devices during year y is higher than the ex-ante estimates for CPA 001 and lower for CPA 002. Based on the interviews, CME has justified that the increase in value is due to the lesser number of baseline/ alternative stoves in usage compared to the ex-ante estimates for CPA 001 and some of the users in CPA 002 continue to use baseline stoves in CPA 002, thus higher. However, some difference from the

				estimated values is expected. This is deemed acceptable to the verification team.
	Efficiency of the device of each type i and batch j implemented as part of the project activity ($\eta_{new,i,j}$)	29.5 % (CPA001) 30.0 % (CPA002)	29.26 % (for CPA 001) (Average of lower bound for CPA 001 2018 batch and CPA 001 2019 batch) 28.23 % (for CPA 002)	The Efficiency of the device of each type i and batch j implemented as part of the project activity monitored ex-post for the current monitoring period is lower than the estimated ex-ante value in the CPA-DD/B04/. The value of the efficiency is justified as it is based on the results available from the actual results/06/ conducted on the project stoves and the competency of the laboratory has been confirmed through the provided document/10/ on the capacity of the laboratory and the team conducting the tests. The required precision of the sample is not met for the parameter and thus in accordance with the § 40 of the methodology, AMS-II.G, version 8/B02/, lower bound of the value has been used for the emission reduction calculations.
	Net calorific value of the non-renewable woody biomass used in project devices ($NCV_{biomass}$)	0.015 TJ/tonne (CPA001) 0.015 TJ/tonne (CPA002)	0.015 TJ/tonne	The value of the monitoring parameter is the default provided in the methodology, ASM-II.G, version 08/B02/. PP has used the same value for the parameter as used in the ex-ante estimates. This is deemed acceptable as it does not lead to increase of emission reductions.
	To establish the date of commissioning, the Project Participant opts to group the devices in "batches" and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch (Date of	Date before beginning of crediting period (CPA001)	Excel spreadsheet provided to the DOE	The monitoring parameter uses the value of the date on which a batch of stoves is distributed by the CME. The sales date of each of the stove is provided in the stoves database workbook of the ER sheet/04/. The parameter is valid only for CPA 001 as it has been reported only in the CPA-DD for CPA 001/B04/. This is deemed acceptable to the verification team.

	commissioning of batch j)			
	Actual date of commissioning of the project device. (Date of commissioning of project device i)	Date before beginning of crediting period (CPA001) As per database (CPA002)	Actual date of commissioning of the project device	The monitoring parameter uses the value of the date on which the project device is commissioned. The sales date of each of the stove is provided in the stoves database workbook of the ER sheet/04/. This is acceptable to the verification team.
	Number of project devices distributed (N)	435,000 (CPA001) 270,000 (CPA002)	59,121 (CPA001) 51,624 (CPA002)	The number of distributed ICS in the CPA are lower than the ex-ante estimation as the ex-ante estimates are based on all the distributions during the crediting period. The reported values are based on distribution of stoves in one year of operation and hence lower than ex-ante estimations. The actual sales records/04/ have been checked by the verification team and the values reported are correct. This is acceptable to the verification team.
	Number of project devices distributed per household ($N_{d,HH}$)	1 (CPA001) 1 (CPA001)	1.05 (CPA001) 1.17 (CPA002)	The value of the parameter number of project devices distributed per household is 1.05 for CPA 001 and 1.17 for CPA 002. The values monitored from sales database were 1.03 for CPA 001 and 1.03 for CPA 002 for the parameter. However, CME has taken more conservative values as available from the inspection database (of monitoring surveys). All the households with more than 1 stove have been used to calculate the parameter. All stoves in the database divided by all unique stoves identified based on the combination of name, first name and address of the registered user (reference – column N stove database workbook of the ER sheet)/04/. The value has been cross-checked with the ER sheet/04/. This is acceptable to the verification team.

	The verification team confirms that the monitoring management system of the CDM PoA is in place, with the responsibilities properly identified and in place. This confirms the compliance of § 340 (a), § 32 (b) (iv) and § 347 (b) (iv) of CDM VVS PoAs. Version 02.0 /B01-1/.

E.2.3. Post-registration changes

E.2.3.1. Corrections

>>
There are no corrections applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.\

E.2.3.2. Inclusion of a monitoring plan

>>
There are no inclusions of monitoring plan to the registered programme of activities has been approved by the Board during this monitoring period.

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

>>
PRC-10430-001 was approved on 15/12/2019 for the changes in the PoA-DD.
The changes are detailed in the section B.2.3 of the MR/02/.

E.2.3.4. Changes to the programme design

>>
There are no changes to the programme design or project design applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

E.2.3.5. Addition of CPA inclusion template

>>
There is no addition of CPA inclusion template in the PoA.

E.2.3.6. Change of coordination/managing entity

>>
Not applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

>>
Not applicable to the type of the programme of activity.

E.3. Component project activities

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	The implementation status of the PoA and the component project activities is:

Co-ordinating and Managing entity/Project Participants:	AERA GROUP S.A.S.
Title of the PoA:	Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea
UNFCCC registration No:	10430

Applied Baseline and monitoring methodology:	AMS-II.G version 8/B02/

Title of the CPA:	Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea
CPA reference number:	10430-P1-0001-CP1
Date of inclusion:	30/11/2018
CPA start date:	20/10/2017
CPA start of operation:	04/06/2018
CPA implementer	Man and Man Enterprise; ECOEYE CO., LTD
Project Scale:	Small scale
Location of the CPAs:	*Ghana*
CPA crediting period:	30/11/2018 – 29/11/2025
Reported monitoring Period verified in this verification:	14/12/2018 to 13/12/2019 (Second Monitoring Period)

Title of the CPA:	Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA002
CPA reference number:	10430-P1-0002-CP1
Date of inclusion:	10/06/2019
CPA start date:	22/02/2019
CPA start of operation:	22/02/2019
CPA implementer	Man and Man Enterprise; ECOEYE CO., LTD
Project Scale:	Small scale
Location of the CPAs:	*Ghana*
CPA crediting period:	10/06/2019 – 09/06/2026
Reported monitoring Period verified in this verification:	14/12/2018 to 13/12/2019 (Second monitoring period for the PoA) 10/06/2019 to 31/12/2019 for the CPA002.

There are two CPAs (10430-P1-0001-CP1 and 10430-P1-0002-CP1) under Verification. The CPAs involve the distribution of improved cooking stoves in the host country Ghana. CPA001 (10430-P1-0001-CP1) is located in the Brong Ahafo region of the host country Ghana and CPA002 (10430-P1-0002-CP1) is located in the Eastern region of the host country Ghana. The coordinating/managing entity for the PoA is AERA GROUP S.A.S. The CPA implementers for the CPA 001 and CPA 002 are Man and Man Enterprise and ECOEYE CO., LTD. The technology type used under this CPA is the Jiko-type ICS. It is distributed under the brand name “Holy cook” by the CPA implementer, Man and Man Enterprise. This is in accordance with the para 340 (a) of the VVS for the PoAs, version 02.0/B01-1/ and the CPA is reported in this batch in the monitoring report. The numbers of stoves deployed under each CPA has been confirmed through the review of the sales database /04/. The verified /04/ total number of stoves deployed (implemented) under the CPA001 are 59,121 and under CPA002 are 51,624. The stoves are being manufactured by the Man and Man Enterprise.

As per the registered CPA-DDs /B04/, the CPA qualifies as a microscale project type II which CDM units aims to achieve energy savings at a scale of no more than 600 MWh per year, which is equivalent to 1,800 MWh_{th} of annual energy savings per appliance. The annual thermal energy savings from the CPA001 and CPA 002 is 6.93 MWh_{th}/year per stove and 6.52 MWh_{th}/ year per stove respectively. Thus the total energy savings from the CPA is less than the microscale threshold in the CPA-DDs/B04/ and the methodology AMS-II.G, version 08/B02/.

The value of the ERs per unit of stove in CPA001 is 1.52 tCO_2e/year. The value is higher compared to the ex-ante estimates of 1.39 tCO_2e/year for first year and 1.32 tCO_2e/year for second year. The values for CPA 001 are higher than ex-ante estimates and CME has stated that it is due to higher monitored value of $p_{op\_stoves,y}$

and $\mu_{,y}$. The value of ERs per unit of stove in CPA002 is 0.98 tCO_2e/year /04/ and is less than ex-ante estimates of 1.65 tCO2e/year/04/ in CPA002. The stove efficiency determined is lower than the ex-ante estimates for CPA 001 (due to lower bound value) and CPA 002/02//04/.

The component project activities were implemented, and equipment installed as described in the registered/included CPA DD/B04/.

It was confirmed during the remote audit that AERA GROUP S.A.S. is the Coordinating/ Managing Entity for the PoA and Man and Man Enterprise and ECOEYE CO., LTD are the CPA implementers for CPA 1 (10430-P1-0001-CP1) and CPA 2 (10430-P1-0002-CP1). The actual project activity is in line with the registered/ included CPA-DDs /B04/.

The information (including data and variables) provided in the MR /02/ is in line with the details provided in the included/registered CPA-DDs/B04/.

Verification Team summarizes *major* changes for the CPA/s between webhosted Monitoring Report and final version of Monitoring Report for submission as follows:

Subject	Webhosted Monitoring Report (MR) /1-1/	Verified Monitoring Report /2/
Changes		
CER calculations (amount of emission reduction)	77,376	71,934

Carbon Check's verification team considers the project description of the project contained in the approved revised PoA-DD /B04/ and CPA-DD /B04/ to be complete and accurate. The CPA-DD complies with the relevant methodology/B02/, tools, forms and guidance at the time of CPA-DD submission for registration/inclusion.

Carbon Check's verification team considers the CPA description of the project contained in the registered CPA-DDs/4/ to be complete and accurate. The CPA-DDs complies with the relevant methodology, tools, forms and guidance at the time of CPA-DDs' submission for registration/inclusion. The CPA has been implemented in accordance with the registered CPA-DDs/04/.

In summary, the monitoring period is reasonable and the operation of the CPAs is in accordance with the registered CPA-DDs. The verification team took cognizance of § 340, 341 and 342 of the CDM VVS for PoA, version 02 /B01-1/ to conduct the verification and conducted a remote audit in accordance with the § 320 and 321 of the CDM VVS for PoA, version 02 /B01-1/.

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 are no temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline during the monitoring period.

E.3.2.2. Corrections

>>
There are no corrections applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

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

>>
There are no changes to the start date of the crediting period for the CPA.

E.3.2.4. Inclusion of a monitoring plan

>>
There are no inclusions of monitoring plan to included CPA-DD.

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

>>
PRC-10430-002 was approved on 16/12/2019 for the changes in the CPA-DD.
The changes are detailed in the section C.3.5 of the MR/02/.

E.3.2.6. Changes to the project design

>>
There are no changes to the project design applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

E.3.2.7. Changes specific to afforestation and reforestation activities

>>
Not applicable to the type of the programme of activity.

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

Means of verification	Document Review, Interview
Findings	CAR 05 had been raised in this regard and has been resolved. Please refer to Appendix 4 for further details.
Conclusion	The verification team is able to confirm that the monitoring plan contained in the registered CPA-DDs /B04/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-II.G, version 08 /B02/. The monitoring plan is in accordance with the approved methodology, AMS-II.G, Version 08 /B02/, applied by the component project activities and as provided in the CPA-DD /B04/. The verification took cognizance of § 357 to § 359 of CDM VVS for PoAs, Version 02.0 /B01-1/.

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	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	Verification team confirms that the Data and parameters fixed ex ante are in compliance with the registered CPA-DDs /B04/ and the monitoring plan. Please refer Appendix 5 for detailed analysis of the ex-ante parameters. The verification took cognizance of § 360 and 372 of CDM VVS for PoAs, Version 02.0 /B01-1/.

E.3.4.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CL03 and CL04 had been raised in this regard and have been resolved. Please refer to Appendix 4 for further details.
Conclusion	The Verification team confirms that the Data and parameters monitored are in compliance with the registered CPA-DDs and the monitoring plan. A complete

	assessment of each of the monitored parameters has been provided in Appendix 6 of the verification report. The verification took cognizance of § 346, 347 (c), 357 and 359 of CDM VVS for PoAs, Version 02.0 /B01-1/.

E.3.4.3. Implementation of sampling plan

Means of verification	Document Review, Interview
Findings	CL05, CL06 and CAR 03 had been raised in this regard and have been resolved. Please refer to Appendix 4 for further details.
Conclusion	The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the approved revised PoA-DD/CPA-DDs /B04/. The CME/PP has appropriately performed simple random sampling in accordance with the applied methodology/B02/ and the monitoring plan provided in the PoA-DD/B04/ and the CPA-DD/B04/. The sampling survey has been carried out by the well-trained personnel of Man and Man Enterprises and AERA Group, and WBT tests were performed by KNUST (third party). Training certificate of the personnel has been provided to the verification team/07/. Monitoring parameters $N_{y,i,j}$ and μ_y are monitored through monitoring surveys by the monitoring personnel of CPA implementer. Monitoring parameter $\eta_{new,i,j}$ is monitored through conducting the water boiling tests to determine the efficiency of the installed stoves. Monitoring of the parameter ensures compliance to the para 41 of the methodology AMS-II.G, version 08/B02/. Verification team has checked the water boiling test records/06/ to confirm the test results. The thermal energy generated by the project technology has also been determined in the section C.1 of the MR/02/ and the ER sheet/04/ in order to comply with the para 24 of the methodology/B02/. Parameter μ_y monitors the adjustment to account for any continued use of pre-project devices during the year of the monitoring period. The monitoring of the parameter μ_y ensures the compliance to the requirements to the para 40 of the monitoring methodology, AMS-II.G, version 08/B02/. Parameter $N_{y,i,j}$ monitors Number of project devices of type i and batch j operating during year y. The value of the parameter is determined by multiplying all devices sold (N) with the proportion of cooking stoves found to be operating in a representative sample, i.e. $p_{op\_stoves,y}$. The value of the parameter $p_{op\_stoves,y}$ is determined through monitoring surveys. CME and CPA implementer has not exercised the option provided in the CPA-DD/B04/ and the footnote 12 of the MR to use the drop of rate of loss in efficiency from the first batch's representative sample. This is deemed appropriate as actual results from monitoring of different batches have been used by the CME. CME has done a sampling for the PoA and the CPAs reported in the monitoring period, CPA 1 and CPA 2 for the current monitoring period. The sample sizes have been calculated based on the expected proportion values available from the previous monitoring period (MP1) /B05-2/. Monitoring period 1 (MP1) covered CPA1 only, however CME has justified the values used for CPA2 as well due to the same stove type distributed and neighbouring region/ province of the same host country. This is acceptable to the verification team since the estimates are based on result of previous studies and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B06/. A sample size of 6 was determined for the parameter $N_{y,i,j}$ (CPA 001 and CPA002) based on the required confidence interval/precision level of 90/10, this sample size was increased to 57, 58 and 58 (for CPA 001 (2018 vintage), CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) in order to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined for the parameter μ_y based on the required confidence interval/precision level of 90/10 is 45 (CPA 001 and CPA 002). However, to account for the non-responses CME used a sample of 57 for 2018 vintage and 58 for 2019 vintage to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined is more than 30 in both the cases and thus in accordance with the §14 of the sampling standard version 8/B07/, meets

	the minimum sample size requirement of 30 when the parameter of interest is a proportion. The sampling activity was carried out by the CPA implementer on 07/02/2020 (for CPA001) and 04/02/2020 (for CPA002). Based on the remote interviews, it was confirmed by the CME that 5 surveyors were involved in conducting the interviews and due to the familiarity of the households managed to complete the interviews during the mentioned dates. This is acceptable to the verification team as CPA implementer used a set of different teams to interview and based on own experience during previous monitoring periods confirms that it is possible to complete the surveys within a period of 2 days. The water boiling tests for the determination of efficiency of the stoves were carried out by the KNUST personnel from the period 27/06/2020 to 07/07/2020 for both CPA001 and CPA002. Based on the interview with the WBT personnel at KNUST, it was confirmed that the tests were done at a later date as compared to when they were received by KNUST due to the Covid-19 situation in the host country Ghana and restrictions imposed in KNUST campus during the period March to June 2020. The precision achieved for the parameter $N_{y,i,j}$ ($p_{op\_stoves,y}$) is 0 % (for CPA 001) and 4 % (for CPA 002) and thus within the limits of 10% required precision for the parameter. The precision achieved for the parameter μ_y is 8 % (for CPA 001) and 12 % (for CPA 002), the precision achieved for CPA 001 is thus within the limits of 10% required precision for the parameter. However, precision achieved for CPA 002 for the parameter μ_y is not within the limits and thus in accordance with the §40 of the methodology, AMS-II.G, version 8/B02/, upper bound has been applied to the value determined. A sample size of 1 (for both CPA 001 and CPA 002) was determined for the parameter $\eta_{new,i,j}$ based on the required confidence interval/precision level of 90/10. A sample of 2 was thus chosen to account for the non-responses and WBTs were conducted on 3 stoves of each vintage of each CPA. Since this parameter is a mean type and thus t-distribution calculations have been used in case of a sample size less than 30. The sample sizes have been calculated based on the mean and standard deviation values available from the previous monitoring period (MP1) /B05-2/. The precision achieved for the parameter $\eta_{new,i,j}$ is 10.1 % (2018 vintage – CPA 001), 5.2 % (2019 vintage – CPA 001), 3.1 % (2019 vintage – CPA 002) and thus only 2018 vintage for CPA 001 exceeds the limits of 10% required precision for the parameter, while 2019 vintage for CPA 001 and 2019 vintage for CPA 002 is within the 10 % limits. The required precision of the sample is not met and thus in accordance with the § 40 of the Sampling Standard, version 08/B07/, lower bound of the value has been used for the emission reduction calculations in a conservative manner. DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves, dates of commissioning of the project devices/ batches at the households and to check if the WBT tests have been done for the households and all the households confirmed that the WBT tests were conducted for their households. Interviews were conducted with all the households for the stoves for whom WBTs were conducted and it was confirmed that the WBTs were performed on their stoves. The serial numbers of the stoves were also confirmed through interview with the KNUST laboratory personnel during a telephonic interview/D.3-4/. As per the sampling standard, version 08 /B07/, DOE had identified 8 samples (each) out of the PP's PP's 57 (for CPA 001 (2018 vintage)) or 58 (CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) samples for the parameter $N_{y,i,j}$ ($p_{op\_stoves,y}$) and the parameter μ_y based on the AQL/UQL stated below. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household was also cross-checked. A sample of 8 samples for each CPA is justified for the PoA based on the Table 2 provided in the sampling standard, version 08/B07/ since estimated volume of annual GHG emission reductions of the project activity or the PoA being verified is equal to or less than 100,000 tCO_2e and meets the requirement of para 39 (a) of the Sampling Standard version 08/B07/. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 5 % and consumer

	risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. A sample size of 8 households (for each CPA batch) was chosen with no non-responses observed. All the identified 8 samples (for each CPA batch) had the same operational status as reported in the sampling frame of the PP/CME and hence no discrepancy was found (i.e. c=0). The usage of baseline stoves (μ_y) is consistent with the usage reported in the monitoring report and monitoring surveys and hence no discrepancy was found (i.e. c=0) with the MR /02/ and the ER sheet /04/. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household were also consistent with the monitoring database and sampling databased respectively and hence no discrepancy was found (i.e. c=0). Thus, PP's set of records has been accepted in line with § 33 of the sampling standard, version 08/B07/. DOE checked the water boiling test report/06/ with records of all the sampled stoves for the verification of the stove efficiency of the project stoves.

E.3.5. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Document Review, Interview
Findings	CL11 had been raised in this regard and has been resolved. Please refer to Appendix 4 for further details.
Conclusion	Sales and distribution database/04/ has been used to record the stove details by the CME and a monitoring survey of the installed stoves based on sampling basis. The stove efficiency also needs to be checked. The stove efficiency testing has been done by WBTs conducted in line with the guidance provided by the CME in the CPA-DD/B04/. The WBTs have been performed by trained personnel of the efficiency test laboratory in KNUST, a science and technology University located in Kumasi, Ghana. The laboratory has been set up by UNDP and Approvecho Research Center, USA (http://aprovecho.org). The equipment has been calibrated in accordance with the installer guidelines and confirmed in the letter/08/ provided to the verification team. Capacity of the laboratory and the credentials of the personnel involved in WBT/10/ have been provided to the verification team thus the QA/QC compliance of the monitoring parameter is confirmed. The verification took cognizance of section 10.2.6 of CDM VVS for PoAs, version 02 /B01-1/.

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	Document Review, Interview
Findings	CAR04 had been raised in this regard and has been resolved. FAR01 has been raised and shall be checked during the next periodic verification. Please refer to Appendix 4 for further details.
Conclusion	In line with the requirement of § 357 and 358 of CDM VVS for PoAs, Version 02.0, the verification team has reviewed the Monitoring report and ER spread sheet to check the arithmetic calculation of the emission reductions. The equation used for the calculation is compared with those provided in the registered CPA-DD /B04/ and the methodology AMS-II.G, Version 08 /B02/ and found to be in correct. The equations for baseline emissions as provided in the monitoring report /02/ were confirmed with the registered CPA-DD /B04/ and the methodology AMS-II.G, version 08 /B02/ and found to be correct. Emission reductions are calculated using the below equation: $ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y$ Equation (1)

Where:

i = Indices for the situation where more than one type of project device is introduced to replace the pre-project devices[5]

j = Indices for the situation where there is more than one batch of project device

ER_y = Emission reductions during year *y* in t CO_2e

$ER_{y,i,j}$ = Emission reductions by project device of type *i and* batch *j* during year *y* in t CO_2e

LE_y = Leakage emissions in the year *y*

$$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel}$$

Equation (2)

Where:

$B_{y,savings,I,j}$	Quantity of woody biomass that is saved in tonnes per cook stove of type i and batch j during year y
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass using survey methods or government data or default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website[6].
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne, based on the gross weight of the wood that is 'air-dried')
$EF_{projected\_fossilfuel}$	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ
$N_{y,,jj}$	Number of project devices of type i and batch *j* operating during year y
μ_y	Adjustment to account for any continued use of pre-project devices during the year y when applying equations 6 and 8 (fraction). Use 1.0 in other cases

$$B_{y,savings,i,j} = B_{old,i,j} \times (1 - \frac{\eta_{old,i,j}}{\eta_{new,i,j}})$$

Equation (3)

Where:

$\eta_{old,i,j}$	Efficiency of the old devices being replaced by project devices of type *i* and batch j.
$\eta_{new,i,j}$	Efficiency of the project device *i* and batch j

$B_{old,i,j}$ is determined as follows:

$$B_{old,i,j} = B_{old,HH} \div N_{d,HH}$$

Equation (4)

Where:

$B_{old,HH}$ = Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices (tonnes/household/year)

$N_{d,HH}$ = Number of project devices per household (number)

	$B_{old,i,j}$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. From the above equation and the parameter values, emission reductions are calculated as: 10430-P1-0001-CP1: 55,895 tCO_2e 10430-P1-0002-CP1: 16,039 tCO_2e Total ER_y = 71,934 tCO_2e The verification team confirms that the calculation of baseline emission and emission reductions is in accordance with the applied methodological equation and the registered CPA-DDs. Calculations have been checked and confirmed from the ER spread sheet /04/. The verification took cognizance of § 358 of CDM VVS for PoAs, version 02.0 /B01-1/.

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and the CPA-DDs /B04/.

E.3.6.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	Net-to-gross adjustment factors for NRB leakage (L_{NRB}) and for PoA leakage (L_{PoA}) (fixed default values of 0.95 as per AMS-II.G version 8 /B02/ were applied to the project activity to calculate Emission Reductions of this Monitoring Period. Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from registered CPA-DDs /B04/.

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from registered CPA-DDs/B04/. The total number of ERs achieved during the monitoring period is 71,934 tCO_2e. In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD/B04/ for the current monitoring period. The verification took cognizance of § 373 of CDM VVS PoAs, version 02 /B01-1/.

Title and UNFCCC reference	Baseline emissions or baseline	Project emissions or actual net	Leakage (tCO_2e)	GHG emission reductions or net GHG removals by sinks (tCO_2e)

[5] *For example, in some instances, full replacement of the pre-project device would require the implementation of more than one project device (e.g. one stove suitable for cooking and the other stove suitable for cooking/boiling water).*

[6] *Default values endorsed by designated national authorities and approved by the Board are available at* http://cdm.unfccc.int/DNA/fNRB/index.html

number of the CPA	net GHG removals by sinks (tCO_2e)	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
Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001 (UNFCCC reference number: 10430-P1-0001-CP1)	55,895	0	0	0	55,895	55,895
Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA002 (UNFCCC reference number: 10430-P1-0002-CP1)	16,039	0	0	0	16,039	16,039
Total	71,934	0	0	0	71,934	71,934

E.3.6.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA

Means of verification	Document Review
Findings	There are no findings on this section of the VR.
Conclusion	Comparison of the actual GHG emission reductions with the estimates in the included specific CPAs is given in the below table. The verification team took cognizance of § 358 of CDM VVS for PoAs, version 02 /B01-1/.

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)
Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001 (UNFCCC reference number: 10430-P1-0001-CP1)	55,895	75,233
Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA002 (UNFCCC reference number: 10430-P1-0002-CP1)	16,039	18,364
Total	71,934	93,597

E.3.6.6. Remarks on difference from estimated value in included CPA

Means of verification	Document Review
Findings	CL10 had been raised in this regard and has been resolved. Please refer to Appendix 4 for further details.
Conclusion	Verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DDs/B04/ for the current monitoring period. The total ERs for the monitoring period are 71,934 tCO_2e and the ex-ante ERs for the monitoring period were 93,597 tCO_2e. The total ERs for the monitoring period is less than the estimated ex-ante. The value of the ERs per unit of stove in CPA001 is 1.52 tCO_2e/year. The value is higher compared to the ex-ante estimates of 1.394 tCO_2e/year for first year and 1.32 tCO_2e/year for second year. The values for CPA 001 are higher than ex-ante estimates and CME has stated that it is due to higher monitored value of $p_{op\_stoves,y}$ and $\mu_{,y}$. The value of ERs per unit of stove in CPA002 is 0.98 tCO_2e/year /04/ and is less than ex-ante estimates of 1.65 tCO2e/year/04/ in CPA002. The stove efficiency determined is lower than the ex-ante estimates for CPA 001 (due to lower bound value) and CPA 002/02//04/. The verification took cognizance of § 270 and 271 of the CDM Project Standard for the PoAs version 02/B01-2/ and § 341 of the VVS for the PoAs version 02/B01-1/.

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

Means of verification	Not Applicable
Findings	There are no findings on this section of the VR.
Conclusion	Not applicable The verification took cognizance of § 375 and 376 of CDM VVS PoAs, version 02 /B01-1/.

E.3.8. Global stakeholder consultation

Means of verification	Not Applicable
Findings	There are no findings on this section of the VR.
Conclusion	No comments have been received from any global stakeholders during the monitoring period. The verification took cognizance of § 391 of CDM VVS PoAs, version 02 /B01-1/.

SECTION F. Internal quality control

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

SECTION G. Verification opinion

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Carbon Check (India) Private Ltd. has performed the second periodic verification of the registered CDM Programme of Activities "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea" and UNFCC ref number 10430 for the CPAs titled "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001" (UNFCCC reference number: 10430-P1-0001-CP1)and "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA002" (UNFCCC reference number: 10430-P1-0002-CP1). The verification team assigned by the DOE concludes that the Component Project Activities as described in the registered/included CPA-DDs (CPA 1 - Version 2.0, 02/10/2019; CPA 2 – Version 2.0, dated 02/10/2019) and the Monitoring report (version 3.3, dated 07/10/2020)/02/, meets all relevant requirements of the UNFCCC for CDM programme of activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M & P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for programme of activities requirements version 02.0 /B01-1/.

Verification methodology and process:

The Verification team confirms the contractual relationship signed on 29/04/2020 between the DOE, Carbon Check (India) Private Ltd. and the Co-ordinating Managing Entity/ Project Participant, (AERA GROUP S.A.S.). The team assigned to the verification meets the Carbon Check (India) Private Ltd.'s internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and Carbon Check procedures and requirements.

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

- Reviewing the registered/ revised approved PoA-DD (Version 2.0, 02/10/2019), registered/included/ revised approved CPA DD (CPA 1 - Version 2.0, 02/10/2019; CPA 2 – Version 2.0, dated 02/10/2019), including the monitoring plan and the corresponding validation report/s;
- Publication of the MR on the UNFCCC website (version 1.0, 27/04/2020) on 30/04/2020
- Desk review of the validation report, MR and other relevant documents including documents related to the component project activities in emission reductions
- Review of the applied monitoring methodology (AMS-II.G, version 08);
- Review of any CMP and EB decisions, clarifications and guidance;
- Remote assessment (21/05/2020 – 25/05/2020)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The component project activity was correctly implemented according to the selected monitoring methodology, monitoring plan and the registered/included CPA-DDs. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and remote audit interviews, the verification team confirms that the PoA has resulted in the 71,934 tCO_2e emission reductions during the second monitoring period.

During the reported monitoring period two CPAs were registered. Emission reductions have been reported for both the CPAs in the Monitoring report. The emission reductions have been claimed for

CPA 1 (UNFCCC reference number: 10430-P1-0001-CP1):
Verified emission reductions (CPA 1): 55,895 tCO_2e

CPA 2 (UNFCCC reference number: 10430-P1-0002-CP1):
Verified emission reductions (CPA 1): 16,039 tCO_2e

The break-up of emission reduction upto 31st December 2012 and 1st January 2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (tCO_2e)	0	71,934

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

SECTION H. Certification statement

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Carbon Check (India) Private Ltd, the DOE, has performed the second periodic verification of the registered Programme of Activities "UNFCCC Registration Number 10430", "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea" in Ghana. The aim of the PoA is to mitigate climate change and contribute to sustainable development in Ghana. The component project activities of the Programme of Activity are designed to generate emission reductions by distribution of the fuel-efficient cook stoves in Ghana. The fuel-efficient cook stoves are replacing the baseline fossil fuels-based stoves in common use (baseline scenario).

The CME and the CPA implementers are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activity. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the component projects. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PoA-DD/ CPA-DDs. The verification is carried out in-line with the VVS requirements, version 02/B01-1/.

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

— PoA-DD version 2.0, dated 02/10/2019/B04/;
— CPA-DD included in the registered PoA and its monitoring plan/B04/.
— Approved monitoring methodology AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass", version 08;
— Validation report /B04/ for the PoA and CPA/s;
— Verification report /B11/ for the previous monitoring period (monitoring period 1);
— Monitoring report(s) version(s) 1.0, 2.0, 2.0, 3.0, 3.2 and 3.3 dated 27/04/2020, 31/07/2020, 10/09/2020, 18/09/2020, 02/10/2020 and 07/10/2020 respectively.

This statement covers verification period from 14/12/2018 to 13/12/2019 (including both the days).

The DOE had raised 11 clarifications requests and 05 corrective action requests, all of which have been resolved by the CME. One forward action request has been raised and shall be checked at the time of the next periodic verification.

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

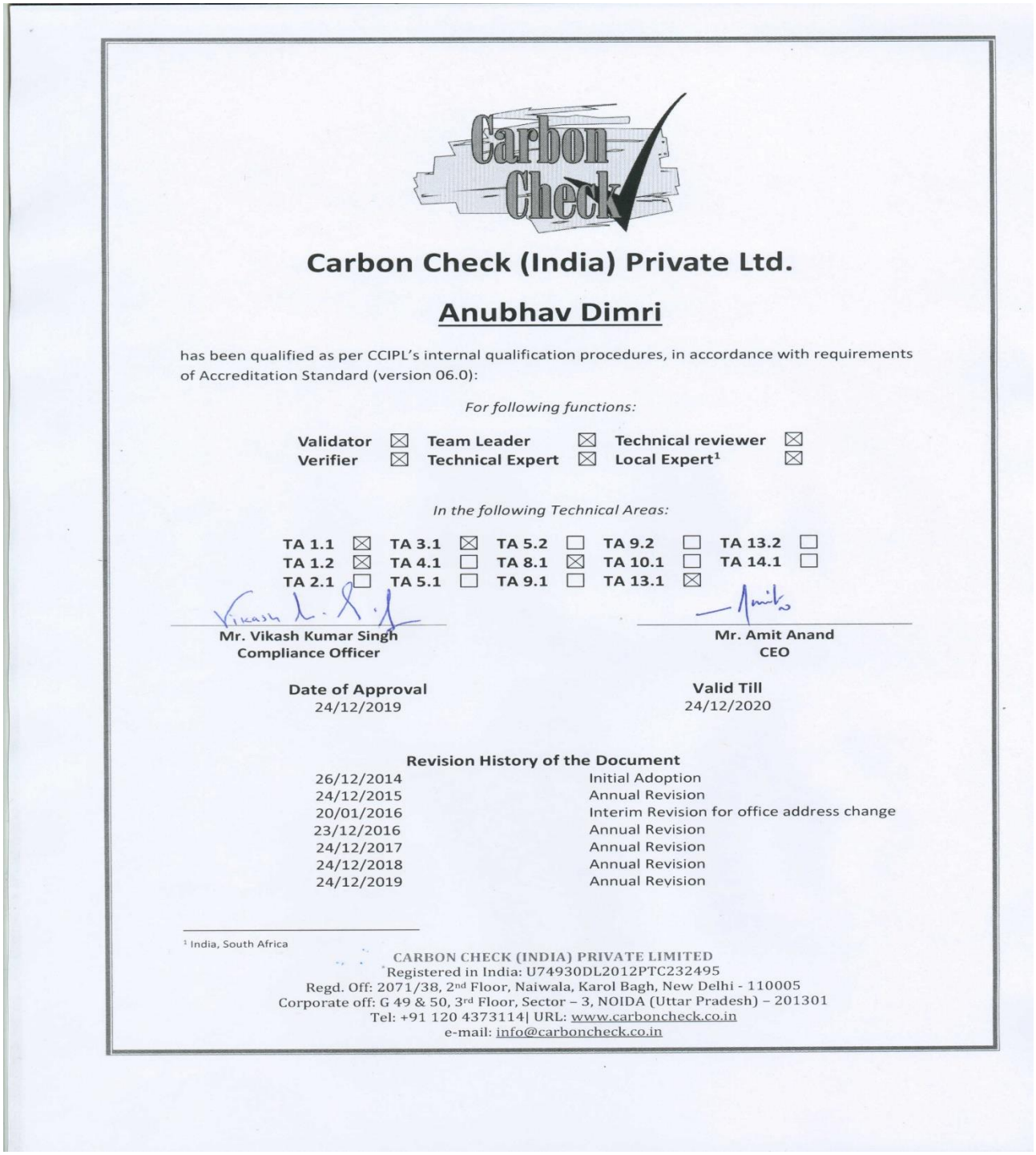
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 71,934 tCO_2e and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as provided below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (tCO_2e)	0	71,934

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Limit
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CAR	Corrective Action Request
CCIPL	Carbon Check (India) Private Ltd.
CER	Certified Emission Reduction
CL	Clarification Request
CME	Co-ordinating and Managing entity
CPA	Component Project Activity
CPA-DD	Component Project Activity Design Document
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DR	Document review
DOE	Designated Operational Entities
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
FA	Final Approval
FAR	Forward Action Request
FVR	Final verification Report
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
I	Interview
IPCC	Intergovernmental Panel on Climate Change
IR	Internal resource
KNUST	Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
LSC	Local Stakeholder Consultation
MWh	Mega Watt Hour
MP	Monitoring Period
MR	Monitoring Report
PoA	Programme ofActivities
PoA-DD	Programme of Activities Design Document
PP	Project Participant
OSV	On Site Visit
QC/QA	Quality control /Quality assurance
RMP	Revised Monitoring Plan
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Limit
VVS	Validation and Verification Standard
WBT	Water boiling test

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Anubhav Dimri

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

For following functions:

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

In the following Technical Areas:

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

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2019

Valid Till
24/12/2020

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision

[1] India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
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Carbon Check (India) Private Ltd.

Sanjay Agarwalla

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

For following functions:

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

In the following Technical Areas:

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

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval	**Valid Till**
24/12/2019	24/12/2020

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Aera Group	1. Webhosted Monitoring Report 2. Monitoring Report 3. Monitoring Report 4. Monitoring Report 5. Monitoring Report	Version 1.0 dated 27/04/2020 Version 2.0 dated 31/07/2020 Version 2.0 dated 10/09/2020 Version 3.0 dated 18/09/2020 Version 3.2 dated 02/10/2020	CME
2	Aera Group	Final Monitoring Report	Version 3.3 dated 07/10/2020	CME
3	Aera Group	1. ER sheet and Inspection records corresponding to /01-1/ 2. ER sheet and Inspection records corresponding to /01-2/ 3. ER sheet and Inspection records corresponding to /01-3/ 4. ER sheet and Inspection records corresponding to /01-4/	-- -- -- --	CME
4	Aera Group	ER sheet corresponding to /02/	--	CME
5	Aera Group	Monitoring and Sales Database	NA	CME
6	Aera Group	Efficiency Test Results: 1. Water Boiling Tests		CME
7	Aera Group	Training Certificates for monitoring personnel: 1. Baidoo Grace 2. Jackson – Etuah Sandy 3. Agyemang Opoku Michael	NA	CME
8	Kwame Nkrumah University of Science and Technology, Kumasi	Equipment Calibration confirmation	22/07/2020	CME
9	Man and Man Enterprises	Sample Stove sales agreement	NA	CME
10	Kwame Nkrumah University of Science and Technology, Kumasi	QA/QC Procedures: Capacity of the laboratory and the credentials of the personnel involved in WBT		CME
11	Aera Group	Request from the CME for exemption of the on-site visit along with the CER commitment document	Dated 27/05/2020	CME
12	Man and Man Enterprises	Replacement records of after sales service stoves	2018/2019	CME
13.	Aera Group	Local Stakeholder Consultation: 1. Invitation Letters 2. Attendance Sheet	NA	CME

		3. Minutes of Meeting 4. LSC Presentation 5. LSC Evaluation Forms 6. Photographs 7. Newspaper LSC Invitation of 24/10/2018		
B01	UNFCCC	1. Validation and Verification Standard for PoAs, version 02.0 2. Project Standard for PoAs, version 02.0 3. Project Cycle Procedure for PoAs, version 02.0	http://cdm.unfccc.int/	Others
B02	UNFCCC	Applied baseline and monitoring methodology, AMS-II.G, version 08	http://cdm.unfccc.int/	Others
B03	UNFCCC	Instructions for filling out the monitoring report form for CDM programme of activities version 03.0	http://cdm.unfccc.int/	Others
B04	UNFCCC	1. Registered PoA-DD (version 1.7 dated 27/07/2018) and corresponding validation report; CPA-DD for 10430-P1-0001-CP1: (version 1.8 dated 27/11/2018) and corresponding validation report; 2. Revised Approved PoA-DD (version 2.0 dated 02/10/2019) and corresponding validation report; 3. CPA-DD for 10430-P1-0001-CP1: (version 2.0 dated 02/10/2019) and corresponding validation report; 4. CPA-DD for 10430-P1-0002-CP1: (version 2.0 dated 02/10/2019) and corresponding validation report;	http://cdm.unfccc.int/	Others
B05	Web sites	Websites: 1. http://cdm.unfccc.int/ 2. https://goldstandard.org/ 3. https://www.ipcc.ch 4. Covid 19 Exemption	--	Others
B06	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of	http://cdm.unfccc.int/	Others

		activities, Version 04.0 (Latest used by VT)		
B07	UNFCCC	Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 08.0	http://cdm.unfccc.int/	Others
B08	UNFCCC	Guideline: Application of materiality in verifications" Version 02.0	http://cdm.unfccc.int/	Others
B09	PCIA/ Global Alliance for Clean Cookstoves	The Water Boiling Test, version 4.2.3	https://cleancookstoves.org	Others
B10	UNFCCC	Methodological Tool: Calculation of the fraction of non-renewable biomass, version 02.0	http://cdm.unfccc.int/	Others
B11	UNFCCC	Monitoring Report (version 2.1, dated 05/03/2020), Verification Report (Version 2.0, dated 05/03/2020) and ER sheet for MP1	http://cdm.unfccc.int/	Others

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.**	E.1.2	**Date:** 15/05/2020
Description of FAR				
The local stakeholder consultations will be conducted at CPA-level. The local stakeholder consultation details to be verified during 1st request for issuance for each CPA.				
CME response				**Date:** 04/06/2020
As already validated during CPA2 inclusion by KBS validation team – section E of the CPA-DD and supportive documents for the LSC undertaken on 24/10/2018 for CPA2				
Documentation provided by the CME				
170612 - Non Technical Summary - MMCDMPOA - (ID 3968) eastern *22 10 2018_Man and Man CDM PoA PowerPoint Presentation- Eastern LSC* *181024 - LSC Invitation Letter - MMCDMCPA2 - (ID 7474)* *181024 - LSC Minutes - MMCDMCPA2 - Agenda (ID 7471)* *Summary of Questions and answers* *Evaluation of the Meeting* *List of Participants of the LSC in Eastern* *+ pictures*				
DOE assessment				**Date:** 04/08/2020
CME has provided the local stakeholder consultation details carried out including the attendance sheets, list of the questions raised, minutes of meeting and the invitation details (in the newspaper article). The LSC was conducted on 24/10/2018. The same has also been checked by the CPA inclusion validating DOE during the CPA inclusion. FAR 01 is closed.				

FAR ID	02	**Section no.**	E.1.2	**Date:** 15/05/2020
Description of FAR				
There are parameter fixed ex-ante $\eta_{old,i,j}$ and SC_{old} to be determined at CPA level to be checked by the verifying DOE at the time of first issuance request.				
CME response				**Date:** 04/06/2020
As already validated during CPA2 inclusion by KBS validation team – who have checked the source of the data and found acceptable.				
Documentation provided by the CME				

KBS Validation Report 05.06.2019
DOE assessment **Date:** 04/08/2020
The values for the ex-ante parameter $\eta_{old,i,j}$ have been determined at the CPA level and SC_{old} is not applicable as the CPAs involve determination of stove efficiency from WBT and not CCT. The value of the ex-ante parameter $\eta_{old,i,j}$ has been checked by the validating DOE at the time of the CPA inclusion. The validating DOE has confirmed the appropriateness of the sources and values in the section D.5.2 of the CPA inclusion validation report/ opinion. FAR 02 is closed.

Table 2. CLs from this verification

CL ID	01	**Section no.**	E.2.2	**Date:** 15/05/2020
Description of CL				
In section C.1 of the MR (footnote 9), the start date of distribution has been provided as 22 June 2019, however it is noticed that the stoves have been distributed from 22/02/2019, stove numbers such as 789, 862 etc.				
CME response				**Date:** 04/06/2020
The date has been corrected in the MR, the correct start date of distribution is indeed 22 February 2019.				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** DD/MM/YYYY
The start date of the distribution of the stoves for CPA 2 has been updated in the section C.1 of the MR (footnote 9). The correct start date for the distribution of the stoves in CPA 2, 22/02/2020 is consistent with the start date provided in the registered/ included CPA-DD. CL01 is closed.				

CL ID	02	**Section no.**	E.3.1	**Date:** 15/05/2020
Description of CL				
1. User Type (e.g. household) is not provided in the monitoring database (ER sheet) in accordance with the section B.5.2 of the CPA-DD. *2. "Document evidence on training schedules, sessions and trainers is recorded and reflected in the monitoring reports" is not provided in accordance with the section B.5.2 of the CPA-DD.*				
CME response				**Date:** 04/06/2020
1. User type has been reflected in the monitoring database (only households in the whole PoA so far). *2. Training certificates have now been provided to the DOE (for stove manufacturing, monitoring surveys and data entry).*				
Documentation provided by the CME				
Training certificates				
DOE assessment				**Date:** 04/08/2020
1. The User Type has been reflected in the monitoring database for CPA 1 and CPA 2. However, the source of information is not clear, i.e. User Type is a "Household". CL02.1 remains open. 2. The training certificates for the personnel trained have been provided to the verification team. However, the details on training are not provided in the section B.1 of the MR. CL02.2 remains open.				
CME response				**Date:** 10/09/2020
1. Sales agreements explicitly ask the name of the household representative. A sample of sales agreements is provided as evidence documents. 2. Training details have been provided in section B.1 of the MR.				
Documentation provided by the CME				
Sample of sales agreements *Revised MR*				

DOE assessment	Date: 14/09/2020

1. CME has clarified that the User Type recorded in the monitoring database is based on the stove sales agreements. Sample sales agreements have been shared with the verification team to confirm that the User Type is recorded in the sales agreements. CL02.1 is closed.
2. CME has provided the training details in the section B.1 of the MR. The training certificates of the personnel were also provided to the verification team. CL02.2 is closed.

CL ID	03	Section no.	E.3.4.2	Date: 15/05/2020

Description of CL

1. *Based on the calculation method provided for the parameter ηnew,i,j in the section E.2 of the MR and the statement provided in the stoves efficiency workbook of the ER sheet "Until WBTs can be carried out at KNUST -under lockdown so far-, the most conservative value has been chosen based on recent tests (both for CDM & GS) carried out on similar batches." It is not clear if the water boiling tests have been performed to monitor the parameter in accordance with the registered monitoring plan.*

2. *CME shall provide the third party WBT results/ report to the verification team along with the calibration details and competency of the thirty party personnel.*

3. *In the cell E16 of the CER calculation workbook in ER sheet, the source of the value is not clear for the stove efficiency. It needs to be justified how the applied value is acceptable in accordance with the monitoring plan provided in the CPA-DD.*

CME response	Date: 30/07/2020

1. *Due to Covid-19 context and lockdown measures taken in Ghana, KNUST was closed during few weeks in April and May. Then, WBT have finally been performed between June 27 and July 7 on 9 different stoves.*
   Corresponding results have been provided in the MR and WBT reports sent as evidence document.
2. *WBT reports, WBT results Excel sheets for the 9 stoves tested, letter of calibration and the CV of the person who performed the WBT have been sent as evidence documents.*
3. *In line with the answer to CL03.1, the efficiency values used in the ER calculation sheet have been updated with the actual WBT results. Thus, source of the value indicated in the cell E16 is now referring to the CPA1 vintage-weighted efficiency value calculated in the "stoves efficiency" tab.*

Documentation provided by the CME

Revised MR
WBT reports
WBT results Excel sheets for the 9 different stoves tested
KNUST letter of calibration
CV of Rita Namoe (Graduate Assistant, Materials Engineering Department, KNUST)

DOE assessment	Date: 04/08/2020

1. CME has clarified that due to Covid-19 situation, the WBT tests were delayed and were conducted between June 27 and July 7. In the reply, it is stated that 9 stoves were tested, however it is not clear in accordance with the 'Measurement methods and procedures' for parameter $\eta_{new,i,j}$ provided in the section B.5.1 of the CPA-DD which of the options has been selected and the compliance with the methodology requirements also needs to be confirmed. CME shall also justify the increase in the efficiency values determined compared to the ex-ante estimates. Also, note that the calculations for the samples has not been presented in internationally recognizable format. CL03.1 remains open.
2. CME has provided the WBT reports, calculation sheets, letter from the laboratory confirming that the equipment does not require calibration and the credentials/ CV of the person responsible for conducting the WBTs as supporting evidence. CL03.2 is closed.
3. CME has updated the results available from the WBT tests conducted for the stoves distributed in the PoA. CL03.3 is closed.

CME response	Date: 10/09/2020

1. As stated in the MR, Option 2 of the AMS-II.G. methodology has been used for measuring $\eta_{new,I,j}$ parameter. An additional sentence has been added to the section B.5.1., as specified in the CPA-DD for this parameter (Measurement methods and procedures).
   As stated in footnotes 20 and 21 of the MR, $\mu_{,y}$ ex-ante estimates correspond to the average values over crediting period considering loss of efficiency (27.5% for CPA001 and 28.0% for CPA002), where a greater value has been considered for new stoves (29.5% for CPA001 and 30.0% for CPA002). Thus, efficiency values determined during this monitoring period (29.26% for CPA001 and 28.23% for CPA002) are lower than ex-ante estimated values for new stoves.

Documentation provided by the CME

Revised MR

DOE assessment	Date: 14/09/2020

1. CME has clarified that Option 2 of the Data / Parameter table 11 of the section 6.1 of the methodology, AMS-II.G, version 08.0 has been used. This is in accordance with the option provided in the methodology and the section B.5.1 of the CPA-DDs. CME has also clarified that the monitored value of efficiency is less than the greater value that has been considered for new stoves and the values stated 27.5 % for CPA001 and 28.0 % for CPA002 correspond to the average values over the crediting period. CL03.1 is closed.
2. Closed.
3. Closed.

CL ID	04	Section no.	E.3.4.2	Date: 15/05/2020

Description of CL

In section E.2 of the MR, for monitoring parameters Ny,i,j, μ_y, ηnew,i,j,it is not clear if the parameters have been monitored at an annual or biennial frequency as the monitoring period is from 14/12/2018 to 31/12/2019.

CME response	Date: 04/06/2020

The corresponding parameters have been monitored at an annual frequency. Corresponding precisions have been given in the section E.2 of the revised MR and Monitoring period has been modified accordingly (from 14/12/2018 to 13/12/2019) in all documents.

Documentation provided by the CME

Revised MR
Revised ER calculation Excel sheet

DOE assessment	Date: 06/08/2020

CME has revised the monitoring period for the PoA and the monitoring period is from 14/12/2018 to 13/12/2019. CME has also confirmed that the parameters are monitored at annual frequency. CL04 is closed.

CL ID	05	**Section no.**	E.3.4.3	**Date:** 15/05/2020
Description of CL				
In section E.3 of the MR, the dates of the surveys are provided as 07/12/2019 and 04/02/2019 and in section E.2 of the MR, it is stated that the parameter was monitored between 16/11/2019 and 28/11/2019. It needs to be clarified how the observed results are applicable for the complete monitoring period when the surveys and tests have been performed before the end date of the monitoring period.				
CME response				**Date:** 30/07/2020
The sentence has been corrected in section E.3 of the MR to give the actual survey dates: 07/02/2020 for CPA1 surveys and 04/02/2020 for CPA2 surveys. For section E.2 ($\eta_{new,i,j}$ parameter), and as per response given for CL03, the sentence has been modified with actual WBT dates: "These WBT were carried out by the Cookstove Testing and Expertise Laboratory of the Kwame Nkrumah University of Science and Technology (TCC – KNUST) between 27/06/2020 and 07/07/2020."				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 06/08/2020
CME has rectified the statement provided in the section E.3 of the MR with regards to the monitoring survey and WBT dates. The correct dates have been provided and the dates have been cross-checked from the monitoring survey forms and the WBT test results. CL05 is closed.				

CL ID	06	**Section no.**	E.3.4.3	**Date:** 15/05/2020
Description of CL				
In table 7 in the section E.3 of the MR, the ex-ante value for ηnew,i,j parameter does not match with the CPA-DD.				
CME response				**Date:** 04/06/2020
Ex-ante values for ηnew,i,j parameter have been corrected and footnotes have been added as a reminder of the ex-ante values considered in the CPA-DDs.				
Documentation provided by the CME				
Revised MR.				
DOE assessment				**Date:** 05/08/2020
The ex-ante values for the parameter *ηnew,i,j* has been corrected in the section E.3 of the MR and a footnote added to reflect the discrepancy in the value of the parameter. CL06 is closed.				

CL ID	07	**Section no.**	E.3.6.1	**Date:** 15/05/2020
Description of CL				
In the cell E24 of the CER calculation workbook in ER sheet, the proportion of households who switched from firewood to charcoal has been provided. Also, it is stated in the section B.4.1 of the CPA-DD that "Project activities switching from baseline device using firewood to efficient project device using charcoal or switching from firewood to efficient project device using briquette shall take into account the leakage effects related to the charcoal or briquette production. *Efficient project devices are improved charcoal cooking stoves which replace traditional charcoal stoves so-called coal pots, thus no firewood to charcoal switch leakage are to be accounted for."* *As per the CPA-DD, the households with firewood as the baseline fuel need to be justified in this context.*				
CME response				**Date:** 30/07/2020

Even the CPA-DD stated that "Efficient project devices are improved charcoal cooking stoves which replace traditional charcoal stoves so-called coal pots, thus no firewood to charcoal switch leakage are to be accounted for.", we added a question in monitoring surveys in order to verify the type of fuel used before buying M&M stove, as specified in section I.6.1 of the PoA-DD (Leakage emissions) and in accordance with AMS-II.G ver.8.0 (section 5.3. Leakage):
*"**Monitoring surveys will inquire about the replaced cookstove which will allow to determine ex-post the proportion of households that switched from firewood**, and apply the default value of 0.030 tCH4/t to their charcoal consumption thermally equivalent to the baseline fuel consumption Bold,HH (in accordance with "AMS-III.BG: Emission reduction through sustainable charcoal production and consumption)".*

Therefore, with this additional question in monitoring surveys, we found with monitoring surveys that:
- *4 out of the 115 CPA001 interviewed households (3.48%) used firewood before buying project stoves.*
- *No interviewed CPA002 interviewed households were using other fuel than charcoal before buying a project stove.*

Thus, the proportion of HH who switched from firewood to charcoal has been provided in CER calculation workbook in ER sheet and a sentence explains the approach in the Monitoring Report (Section F.3):
"For CPA001, another leakage emission has been considered as monitoring surveys revealed some households (3.5% of the sample) switched from firewood baseline stoves to project stoves. Thus, in accordance with "AMS-III.BG: Emission reduction through sustainable charcoal production and consumption", the default value of 0.030 tCH4/t has been applied to their charcoal consumption thermally equivalent to the baseline fuel consumption Bold,HH."

The approach is conservative and respects the PoA-DD as well as the methodology applied for this PoA.

Documentation provided by the CME	
-	
DOE assessment	**Date:** 06/08/2020
CME has provided the leakage calculation due to switch from firewood to charcoal. However, it is not clear how the approach is appropriate to the switch and the conservativeness also needs to be justified.	
CME response	**Date:** 03/09/2020
As a conservative approach, we decided to discount CPA001 ERs with the proportion of HH who switched from firewood to charcoal (3.5%). Therefore, 2,014 tCO2 have been discounted, as shown in the revised ER calculation Excel sheet.	
Documentation provided by the CME	
Revised MR *Revised ER calculation Excel sheet*	
DOE assessment	**Date:** 15/09/2020
CME has proposed the conservative approach and are not claiming emission reductions for the households where firewood was found to be baseline fuel. Since, this leads to conservative estimation of emission reductions, it has been accepted by the verification team. CL07 is closed.	

CL ID	08	**Section no.**	E.3.6.1	**Date:** 15/05/2020
Description of CL				
In the cell A70 of the CER calculation workbook in ER sheet, year prorata value of 104.9% has been determined. It needs to be clarified how the value can be more than 100 %. Also, the significance of the value needs to be clarified.				
CME response				**Date:** 04/06/2020
As the Monitoring period has been modified from 14/12/2018 to 13/12/2019 (cf. CL 04), the year prorata value is now equal to 100%. *This value enables to consider the monitoring period length for each CPA in the ex-post ER calculation.*				
Documentation provided by the CME				

Revised ER calculation Excel sheet
DOE assessment **Date:** 06/08/2020
CME has revised the value in the cell A70 of the CER calculation workbook, the number signifies the proportion of days in the total monitoring period for each CPA. CL08 is closed.

CL ID	09	**Section no.**	E.2.2	**Date:** 15/05/2020
Description of CL				
Based on the interviews with the CME and the CPA implementers, it was determined that the Data Manager for the PoA has changed during the monitoring period. CME shall update the information in the section D of the monitoring report.				
CME response				**Date:** 04/06/2020
The name of the Data Manager for the PoA has been changed accordingly in the MR.				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 05/08/2020
The details of the Data Manager have been updated in the section D of the monitoring report and is consistent with the details checked during the remote interviews. CL09 is closed.				

CL ID	10	**Section no.**	E.3.6.6	**Date:** 15/05/2020
Description of CL				
The source of the emission reductions calculated from each unit of stove in the monitoring period and ex-ante values for CPA001 and CPA002 as provided in the section F.6 of the MR is not clear. Also, the ex-ante value of 1.25 tCO2 per year is less than the 1.47 tCO2 per year for CPA001.				
CME response				**Date:** 04/06/2020
Emission reductions calculated in the monitoring period are clearly given in the lines 80 and 81 of the CER Calculation sheet in the ER calculation Excel file. *Emission reductions calculated ex-ante have been revised to conform to the ER ex-ante calculation Excel sheet approved for CPA001 and CPA002.* *Comparisons have also been revised accordingly.*				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 06/08/2020
CME has clarified that the values reported in the section F.6 of the MR are calculated in the cells C80 and C81 of the CER calculation workbook of the ER sheet. The values have been cross checked by the verification team. CL10 is closed.				

CL ID	11	**Section no.**	E.3.5	**Date:** 15/05/2020
Description of CL				
The water boiling test records, details on the monitoring equipment and the competency of the individual/ institution responsible to carry out the efficiency tests is not clear.				
CME response				**Date:** 30/07/2020
As per CL03, stove efficiency values have been revised accordingly to the WBT performed by KNUST in June-July 2020. *WBT reports, WBT results Excel sheets for the 9 stoves tested, letter of calibration and the CV of the person who performed the WBT have been sent as evidence documents.*				
Documentation provided by the CME				

Revised MR *WBT reports* *WBT results Excel sheets for the 9 different stoves tested* *KNUST letter of calibration* *CV of Rita Namoe (Graduate Assistant, Materials Engineering Department, KNUST)*
DOE assessment **Date:** 06/08/2020
CME has provided the WBT test records and the data sheets for calculation of efficiency. The tests have been conducted at the Kwame Nkrumah University of Science and Technology by a qualified tester. The CV of the tester has been provided to the verification team. The letter provided from the laboratory confirms that the equipment used does not require calibration. CL11 is closed.

Table 3. CARs from this verification

CAR ID	01	**Section no.**	E.1.1	**Date:** 15/05/2020
Description of CAR				
In accordance with the §339 of the VVS for the PoAs, version 02, following instructions in the monitoring report form have not been complied with: 1. *Specific CPA titles in the section A.1.2 of the PoA MR are not consistent with the UNFCCC interface.* 2. *In section B.1 of the MR, indicate in accordance with the instruction text: "Indicate whether a sampling approach was applied for monitoring of a group of CPAs or each CPA covered in this monitoring report"* 3. *All the numbers have not been presented with internationally recognized format for decimals, such as value of the parameter ηnew,i,j in the section E.2 of the MR, values provided in the section E.3 of the MR and the values provided in the section F.6 of the MR.*				
CME response				**Date:** 04/06/2020
1. *CPA titles have been changed to be consistent with the UNFCCC interface* 2. *Modification has been brought to section B.1 accordingly, considering a sampling approach for monitoring each CPA covered in the monitoring report.* 3. *Corresponding values have now been presented with internationally recognized format for decimals.*				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 06/08/2020
1. Specific CPA titles have been revised by the CME and are consistent with the UNFCCC interface. CAR 01.1 is closed. 2. CME has clarified that the sampling approach was applied for monitoring each CPA covered in the monitoring report (i.e., CPA1 and CPA2). The sample size calculation has thus been provided separately for both the CPAs. CAR 01.2 is closed. 3. All the numbers presented in the MR have still not been presented in internationally recognizable format, such as numbers in section E.2 of the MR. CAR 01.3 remains open.				
CME response				**Date:** 13/08/2020
3. Corrections have been brought to present all the numbers in section E.2 with internationally recognized format for decimals.				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 14/09/2020

1. Closed.
2. Closed.
3. The format of the numbers presented in the MR has been corrected to the internationally recognizable format. CAR01.1 is closed.

CAR ID	02	Section no.	E.1.1	Date: 15/05/2020
Description of CAR				
In section C.3.5 of the MR, effective approval date of the PRC has been provided as 15 December 2019, which doesn't match with the PRC interface page.				
CME response				**Date:** 04/06/2020
The approved date of PRC has been modified as 19 December 2019.				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 06/08/2020
In section C.3.5 of the MR, the effective approval date of the PRC has been revised to 19/12/2019, the revised date is consistent with the PRC interface page. CAR 02 is closed.				

CAR ID	03	Section no.	E.3.4.3	Date: 15/05/2020
Description of CAR				
1. *The value of expected proportion, expected mean and expected standard deviation shall be justified for the sample size calculation of the proportion type and mean type parameters (for both CPA1 and CPA2).* 2. *The sample size determined for the monitoring parameter μ,y is 68 before oversampling and 82 after oversampling for CPA001. However, sample size used by the CME for the parameter is 57 for 2018 vintage and 58 for 2019 vintage. The sampling activity undertaken shall be justified in accordance with the provisions of the sampling standard, version 08.* 3. *During the remote surveys by the verification team, it was noticed that the household size for Stove ID 10020 (Irene Tenkorang) is 5 and the household size provided in the monitoring results is 10. CME shall clarify the actual size for the household.*				
CME response				**Date:** 30/07/2020
1. *The values of expected proportion, mean and standard deviation for both CPA1 and CPA2 have been corrected to reflect monitoring survey and WBT outcomes from the previous CDM verification.* 2. *As a consequence of the precedent answer, the minimum sample size calculated for the monitoring parameter μ,y is 45 (54 after oversampling). Therefore, a minimum of 54 households to be interviewed for each age group were given as an objective to the team in charge of the survey. The interviewers could survey a population of 115 project stove users (57 for 2018 age group and 58 for 2019 age group), which meets the minimum sample size after oversampling.* *Also, the required precision is met for both age groups.* 3. *After verification call, it was found that Irene Tenkorang (Stove ID 10020) is a hairdresser and she cooks for both her family (5 people) and her workers (5 employees), that is why the total figure is 10.* *It may appear that household size question is found not really understood by the interviewed person. Then, the question asked to interviewees during monitoring surveys corresponds to the number of people eating in the household (relying on the same cookstove).* *Ghanaian households may comprise very specific patterns (common courtyard – sometimes with people from the same family-, people eating dishes prepared by their neighbors, relatives, or at work, etc.). Thus, household size may be different than the number of people eating in the household, in some specific cases, as for Irene Tenkorang.*				
Documentation provided by the CME				
Revised MR				

DOE assessment	Date: 06/08/2020

1. CME has used the values of expected proportion, mean and standard deviation for the calculation of sample size based on the results of monitoring period 1. CME shall also justify how the values for CPA 1 (from monitoring period 1) are appropriate for the CPA 2. Also, it is not clear if the requirements from §14 of the sampling standard, version 8 have been complied by the sample size calculated for the proportion parameter pop stoves,y. CAR03.1 remains open.
2. CME has clarified that the sample size calculated are achieved for each vintage in the CPA001. CAR 03.2 is closed.
3. CME has clarified that for the reported household, the number represents the number of persons eating in the household and has been cross-checked from the monitoring survey sheet as well. Since, the most relevant parameter is the persons eating in the household and it was an isolated case, the justification provided by the CME has been accepted. CAR 03.3 is closed.

CME response	Date: 10/09/2020

1. The values of expected proportion, mean and standard deviation for first monitoring period of the CPA1 have been used as an estimation the CPA2 sampling plan calculation of this monitoring period. Indeed, as the project proponent is disseminating the same product (Jiko-type ICS) for the same user type (households) in a neighboring region of the same country, it could be expected cooking patterns to be the same.

   §14 of the sampling standard is respected, as the sample size for $p_{op\ stoves,y}$ is calculated at 6, but as written in section E.3.b. “The monitoring of pop stoves,y and μ,y is based on the same sample, which is the sample with the larger sample size of the two”. Therefore, the minimum sample considered is 45, as calculated for the parameter μ,y. Thus it is respecting the minimum of 30 samples specified in the paragraph 14 of the Standard: Sampling and surveys for CDM project activities and programmes of activities: “If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion.”

Documentation provided by the CME

Revised MR

DOE assessment	Date: 14/09/2020

1. CME has clarified that the values of expected proportion, mean and standard deviation for first monitoring period of the CPA 1 have been used as an estimation for the CPA2 due to the same product (Jiko-type ICS) for the same user type (households) in a neighboring region of the same country. Thus, the used values are justified for the applicable population. With regards to the sample size for the parameter $p_{op\ stoves,y}$, CME has responded that the calculated sample size for the parameter was 6, but the considered sample size is 45, which is more than the minimum sample size of 30 required to meet the §14 of the sampling standard, version 08. CAR03.1 is closed.
2. Closed.
3. Closed.

CAR ID	04	Section no.	E.3.6.1	Date: 15/05/2020

Description of CAR

1. *The names of the households in the monitoring survey do not match with the stoves database, such as for stove ID 6045, 15059, 5358 etc.*

2. *The values for the monitoring parameters have been calculated based on different batches in the monitoring surveys CPA1 workbook, however a simple average of the values has been done (such as cell K118) and an average value has been used for the calculation of the ERs. It needs to be clarified why a weighted average value has not been used in the cell O70 of the CER calculation workbook of the ER sheet.*

3. *The significance of the Tableau suivi ECOEYE workbook in the ER sheet is not clear.*

CME response	Date: 04/06/2020

1. This case can appear if a stove was bought by another member of the household than the interviewed person.
Thus, a part of the names responded in the monitoring survey can be different from those provided in the stoves database.

2. A weighted average value is considered in the CER calculation tab, as the μ,y value used for this tab (cell E32 and O70) is coming from the weighted average value calculated in cell D128 of the "monitoring surveys CPA1" tab.
To avoid misunderstandings, the average mean which was visible in the cell K118 of the "monitoring surveys CPA1" workbook has been erased.

3. The "Tableau suivi ECOEYE" workbook has been hidden, as it is not useful during the verification process.

Documentation provided by the CME

Revised ex-post calculation Excel sheet.

DOE assessment	Date: 06/08/2020

1. CME is requested to check the details for the mentioned households to check for the correct reason for the difference in names and propose a corrective action to avoid the discrepancy for future monitoring surveys. CAR 04.1 remains open.
2. CME has corrected the values and now weighted average value is being considered in the CER calculation workbook. CAR 04.2 is closed.
3. The redundant workbook has been hidden by the CME in the ER sheet. CAR 04.3 is closed.

CME response	Date: 13/08/2020

1. After phone calls, we found the following explanations for differences between the monitoring survey and the stoves database:
    - Concerning stove ID 6045, it is in fact the same person (Fati Alhassan in the monitoring survey, Mame Fati in the stoves database). In Ghana, Mame means "Mother", so every woman can be called Mame meaning she is a mother.
    - Stove ID 15059: Owusuah Ama is the rightful owner of the ICS but Zuayera is the current user of the ICS. Zuayera is the person who was interviewed during the monitoring survey and that is why her name appears on the survey sheet.
    - Stove ID 5358: Mirekuah Lizy bought the stove at Sunyani but gave it to Mariam Sina, living at Techiman. That is why there are changes in both locations and names.
      This type of case can appear when people buy the stoves for their relatives (wifes, friends, family members). Sometime also, people change their location from one town to another due the nature of their business or any other personal reason. All these factors can lead to changes in names and locations, especially stoves that have been used for more than a year.

   Project proponent suggests to add a question in the future monitoring surveys to specify who bought the stove initially (in case interviewee is not the one who bought the stove). This would help to figure out the majority of cases, where the survey respondent and the person who bought the stove are different.

Documentation provided by the CME

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DOE assessment	Date: 14/09/2020

1. Based on the follow up interviews, CME has determined the reasons for the discrepancy in the names during the interviews. In order to avoid the situation during the subsequent periodic verifications, CME has proposed to include a question in the monitoring survey questionnaire to the check the details of the person who bought the stove initially and to check if the interview respondent is same/ different from the household records available. FAR 01 has been raised in this regard. CAR 04.1 is closed.
2. Closed.
3. Closed.

CAR ID	05	**Section no.**	E.3.3	**Date:** 15/05/2020
Description of CAR				
In accordance with the Data / Parameter table 19 provided in the section 6.1 of the methodology, monitoring parameter 'Date of commissioning of batch j' has not been provided in the section B.5.1 of the CPA-DD.				
CME response				**Date:** 04/06/2020
The corresponding parameter has been removed from the section E.2. of the monitoring report.				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 06/08/2020
CME has deleted the *Data / Parameter table 19 provided in the section 6.1 of the methodology, monitoring parameter 'Date of commissioning of batch j'* from the monitoring report. However, it is noted that the parameter is reported in the section B.5.1 of the CPA-DD (for CPA 1) and not in CPA 2. CME shall accordingly report the parameter, consistent with the registered/included CPA-DD.				
CME response				**Date:** 13/08/2020
The corresponding parameter has been included again in the section E.2. of the monitoring report, mentioning only CPA001.				
Documentation provided by the CME				
Revised MR				
DOE assessment				**Date:** 14/09/2020
CME has clarified on the situation with regards to the parameter *'Date of commissioning of batch j'* and clarified that is applicable for CPA 1 only as it is reported in the section B.5.1 of the CPA-DD (for CPA 1) and not reported in the section B.5.1 of the CPA-DD (for CPA 2). CAR 05 is closed.				

Table 4. FARs from this verification

FAR ID	01	**Section No.**	E.3.6.1	**Date:** 14/09/2020
Description of FAR				
Few discrepancies in the usernames were found during the DOE interviews with the household. CME conducted follow up with the households and to report the correct household names and the reason for difference. In order to avoid the situation during the subsequent periodic verifications, CME has proposed to include a question in the monitoring survey questionnaire to the check the details of the person who bought the stove initially and to check if the interview respondent is same/ different from the household records available. FAR 01 has been raised in this regard.				
CME response				**Date:** 15/09/2020
We confirm we will add a question in the monitoring survey questionnaire for next monitoring periods in order to get the details of the person who bought the stove initially. This will enable to check if the interview respondent is same/ different from the household records available.				
Documentation provided by the CME				
-				
DOE assessment				**Date:** 15/09/2020
The applicable changes in the monitoring survey questionnaire shall be checked during the next periodic verification.				

Appendix 5. Data and parameters fixed ex ante

Data/Parameter	**$B_{old,p}$** Annual quantity of woody biomass that would have been used per person in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices.
Default values used:	180 kg/capita/year
Purpose of data	Baseline emission calculation
Source and Verification of the source	UN Food & Agriculture Organization (FAO 2017): The Charcoal Transition. Greening the charcoal value chain to mitigate climate change and improve local livelihoods. p. 139 (http://www.fao.org/3/a-i6935e.pdf). The value is cross verified from the revised approved CPA-DDs/B04/.

Data/Parameter	**$N_{p,HH}$** Average number of persons served per household prior to project implementation
Default values used:	4.0
Purpose of data	Baseline emission calculation
Source and Verification of the source	Table 2.1 of Ghana Statistical Service 2014: Ghana Living Standards Survey Round 6 (GLSS 6). Main report. The value is cross verified from the revised approved CPA-DDs/B04/.

Data/Parameter	**$B_{old,HH}$** Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices
Default values used:	4.32 tonnes/household/year
Purpose of data	Baseline emission calculation
Source and Verification of the source	Determined ex ante at CPA-level Cross verified from the revised approved CPA-DDs/B04/

Data/Parameter	**$B_{old,i,j}$** Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j
Default values used:	4.11 tonnes/household/year (CPA001) 3.68 tonnes/household/year (CPA002) ($B_{old,i,j}$ is calculated as $B_{old,HH} / N_{d,HH}$) $N_{d,HH}$= 1.05 for CPA001, $N_{d,HH}$= 1.17 for CPA002.
Purpose of data	Baseline emission calculation
Source and Verification of the source	Determined ex ante at CPA-level Cross verified from the revised approved CPA-DDs/B04/

Data/Parameter	$\eta_{old,i,j}$ Efficiency of the device being replaced
Default values used:	18%
Purpose of data	Baseline emission calculation
Source and Verification of the source	Ghana case study – Growing Inclusive Markets (UNDP, 2010) Cross verified from the revised approved CPA-DDs/B04/

Data/Parameter	$EF_{projected\_fossilfuel}$ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers
Default values used:	81.6 tCO_2/TJ
Purpose of data	Baseline emission calculation
Source and Verification of the source	AMS-II.G (Ver. 8)/B02/

Data/Parameter	$m_{wood}/ m_{charcoal}$ Conversion factor wood/charcoal
Default values used:	6 kg biomass/kg charcoal
Purpose of data	Baseline emission calculation
Source and Verification of the source	AMS-II.G (Ver. 8)/B02/

Data/Parameter	$Leakage_{adj}$ Net to gross adjustment factor to account for leakages
Default values used:	0.95
Purpose of data	Baseline emission calculation
Source and Verification of the source	AMS-II.G. (Ver. 08)/B02/

Data/Parameter	$f_{NRB,y}$ Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Default values used:	0.9884
Purpose of data	Baseline emission calculation
Source and Verification of the source	FAO and IPCC data and other sources of information (as per Information note: Default values of fraction of non-renewable biomass for least developed countries and small island developing states, version 01.0 (EB 67, Annex 22)). The value is cross verified from the revised approved CPA-DDs/B04/.

Appendix 6. Data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	$N_{y,i,j}$
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual (Once for this monitoring period)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the electronic database of the stoves distributed and the monitoring surveys.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the monitored database /04/ and monitoring survey questionnaires/05/ were checked during the remote interviews.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with the monitored database /04/ and monitoring survey questionnaires/05/. The data was then verified against the sample households checked during the remote audit. The monitored value of the number of project devices of type i and batch j operating during year y are less than the ex-ante estimates as the project has been in implementation for less than a year and the ex-ante estimate was based on the complete crediting period of the CPA/B04/. The proportion of operational stoves ($p_{op\_stoves,y}$) observed during the monitoring is 100 % for CPA 001 and 96.55 % for CPA 002, which is higher than the ex-ante estimates of 90%. The higher value of the operational stoves is justified as the stoves have been

	in operation for less than a year and thus mostly found operational. The values were cross-checked through the remote interviews with the households during the remote audit.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter. The monitoring surveys have been conducted by the trained personnel of the CPA implementer, Man and Man Enterprises/07/ under the supervision of the CME.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	**Assessment/ Observation by the DOE**
Data / Parameter: (as in monitoring plan of CPA-DD):	μ_y
Measuring frequency/Time Interval:	Annual monitoring
Reporting frequency:	Annual monitoring (Once for this monitoring period)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the monitoring surveys.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.

If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the monitored database /04/ and monitoring survey questionnaires/05/ were checked during the remote interviews.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with the monitored database /04/ and monitoring survey questionnaires/05/. The data was then verified against the sample households checked during the remote audit. The monitored value for the parameter Adjustment to account for any continued use of pre-project devices during year y is higher than the ex-ante estimates for CPA 001 and lower for CPA 002. Based on the interviews, CME has justified that the increase in value is due to the lesser number of baseline/ alternative stoves in usage compared to the ex-ante estimates for CPA 001 and some of the users in CPA 002 continue to use baseline stoves in CPA 002, thus higher. However, some difference from the estimated values is expected.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter. The monitoring surveys have been conducted by the trained personnel of the CPA implementer, Man and Man Enterprises/07/ under the supervision of the CME.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	$\eta_{new,i,j}$ Efficiency of the device of each type i and batch j implemented as part of the project activity
Measuring frequency/Time Interval:	Annual Monitoring
Reporting frequency:	Annual (Once for this monitoring period)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	The WBTs have been conducted by a third party, KNUST Technology & Consultancy Center, a partner of the Global Alliance for Clean Cookstoves. According to the letter/08/ provided by the third party, KNUST test center was established by the Aprovecho Research Center with state-of-the art automated equipment funded by UNDP, no further calibration of electronic scales or thermocouples is applicable.

Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA as the WBTs are conducted by a third party.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA as the WBTs are conducted by a third party.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA as the WBTs are conducted by a third party.
Company performing the calibration (internal or external calibration):	KNUST Technology & Consultancy Center (External calibration)
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA as the WBTs are conducted by a third party.
Is (are) calibration(s) valid for the whole reporting period?	Yes, in accordance with the letter provided by the third party/08/.
If applicable, has the reported data been cross-checked with other available data?	The reported data has been cross-checked with the WBT test records/06/, ER sheet /04/ and MR /02/.
How were the values in the monitoring report verified?	The value for the reported data was verified against the WBT test records /06/. The Efficiency of the device of each type i and batch j implemented as part of the project activity monitored ex-post for the current monitoring period is marginally higher than the estimated ex-ante value in the CPA-DD/B04/. The value of the efficiency is justified as it is based on the results available from the actual results/06/ conducted on the project stoves and the competency of the laboratory has been confirmed through the provided document/10/ on the capacity of the laboratory and the team conducting the tests.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC process are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter. The WBTs were conducted in a state-of-the-art laboratory set up by Aprovecho Research Center/10/. Based on the capacity of the laboratory and the credentials of the personnel involved in WBT/10/, it is confirmed that the appropriate QA/QC procedures have been followed by the CME for the WBTs.

In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. The data has been monitored in accordance with the registered monitoring plan.

Monitoring Parameter Requirement	**Assessment/ Observation by the DOE**
Data / Parameter: (as in monitoring plan of CPA-DD):	$NCV_{biomass}$
Measuring frequency/Time Interval:	Yearly
Reporting frequency:	Yearly (Once for this monitoring period)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the methodology, AMS-II.G, version 08/B02/ and 2006 IPCC Guidelines for National Greenhouse Gas Inventories/B05-3/.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the ER sheet /04/.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with methodology, AMS-II.G, version 08/B02/ and 2006 IPCC Guidelines for National Greenhouse Gas Inventories/B05-3/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter.

In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	**Assessment/ Observation by the DOE**
Data / Parameter: (as in monitoring plan of CPA-DD):	Date of commissioning of batch j
Measuring frequency/Time Interval:	Fixed and recorded at the time of commissioning/ distribution of the last project device in the batch.
Reporting frequency:	Fixed and recorded at the time of commissioning/ distribution of the last project device in the batch.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the values recorded in the monitoring database/04/.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the ER sheet /04/.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with the monitoring database/04/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter.

In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	**Assessment/ Observation by the DOE**
Data / Parameter: (as in monitoring plan of CPA-DD):	Date of commissioning of project device i
Measuring frequency/Time Interval:	Recorded at the time of commissioning/distribution of project devices
Reporting frequency:	Recorded at the time of commissioning/distribution of project devices
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the values recorded in the monitoring database/04/.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the ER sheet /04/.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with the monitoring database/04/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter.

In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	**Assessment/ Observation by the DOE**
Data / Parameter: (as in monitoring plan of CPA-DD):	N
Measuring frequency/Time Interval:	Recorded at the time of commissioning/distribution of project devices
Reporting frequency:	Recorded at the time of commissioning/distribution of project devices
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the electronic database of the stoves distributed and the monitoring surveys.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the ER sheet/04/.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with the monitoring database/04/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter.

In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	**Assessment/ Observation by the DOE**
Data / Parameter: (as in monitoring plan of CPA-DD):	$N_{d,HH}$
Measuring frequency/Time Interval:	Recorded at the time of commissioning/distribution of project devices
Reporting frequency:	Recorded at the time of commissioning/distribution of project devices
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the monitoring parameter. The parameter is determined based on the electronic database and internal records. Only one cooking stove per household is registered in the electronic database. If a household purchases more than one cooking stoves, monitoring surveys of sampled kitchens' stoves in use will account for any additional project device and be reflected in adjustment factor $N_{d,HH}$.
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross checked with the ER sheet/04/ and the monitoring survey questionnaires/05/.
How were the values in the monitoring report verified?	The values mentioned in the MR have been cross checked with the monitoring database/04/.

	The number of project devices distributed per household is 1.05 for CPA 001 and 1.17 for CPA 002 as all the households with similar names found in the database have been accounted as duplicates and accounted under the parameter. The values monitored from sales database were 1.03 for CPA 001 and 1.03 for CPA 002 for the parameter. However, CME has taken more conservative values as available from the inspection database (of monitoring surveys).
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The appropriate QA/QC procedures have been followed for the monitoring parameter.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Appendix 7. Assessment of Monitoring parameters monitored through sampling/surveys

Sl. No.	Checklist Questions	Assessment
1.	Does the Monitoring Report apply sampling for determination of ex-post monitoring parameters?	Yes, the PP has applied simple random sampling for the monitoring paramaters. Monitoring parameters $N_{y,i,j}$ and μ_y are monitored through monitoring surveys. Monitoring parameter $\eta_{new,i,j}$ is monitored through conducting the water boiling tests to determine the efficiency of the installed stoves.
2.	Is the applied sampling plan in accordance with the sampling plan proposed in the registered PoA-DD/ PDD?	Yes, the applied sampling plan is in accordance with the sampling plan proposed in the registered PoA-DD/CPA-DD/B04/.
3.	List the parameters determined through sampling and respective parameters of interest. In situations where the monitoring of a parameter is based on data, which is being recorded only once at the time of implementation/distribution particularly for distribution projects, where there are large/dispersed number of project technology, the VV team shall assess the accuracy of such data/information during the onsite verification through document review and where applicable through acceptance sampling. [The assessment of implementation status of distribution projects or projects having dispersed and large number of components, it is pertinent that the VV Team shall assess that all physical features (technology, project equipment, and monitoring and metering equipment) of the included CPAs/projects are as specified in the included CPA-DDs/PDD. In cases where the households/users are no longer using the project technology or have voluntarily left the project, it is important for VT to	Parameters determined through sampling and respective parameters of interest are: • Number of project devices of type i and batch j operating during year y ($N_{y,i,j}$) • Adjustment to account for any continued use of pre-project devices during year y ($\boldsymbol{\mu}_y$) • Efficiency of the device of each type i and batch j implemented as part of the project activity ($\eta_{new,i,j}$) The parameters 'Date of commissioning of project device i', 'Date of commissioning of batch j' and '$N_{d,HH}$' are recorded only once at the time of implementation/distribution. Parameters 'Date of commissioning of project device i' and 'Date of commissioning of batch j' and '$N_{d,HH}$' were verified by the DOE through acceptance sampling. Parameter '$NCV_{biomass}$' uses a default value and the value was cross-checked from the IPCC Guidelines/B05-3/ The PoA involves distribution projects or projects having dispersed and large number of components (improved cookstoves), there were no households in CPA001 that had drop-outs. This is consistent with the previous monitoring period as well (MP1), the only household that was marked not in operation was due to interviewer's mistake as noted in the ER sheet for MP1/B11/ and no household was found with drop out for CPA001. There were two households with drop out from CPA002 and were considered as a part of assessment of sampling requirements, including acceptance sampling by the verification team of the DOE.

	assess CME/PP's QA/QC procedures with regards to handling of its database and where applicable consider those dropped out from technology as a part of assessment of sampling requirements, including acceptance sampling by DOE.]	
4.	Is the sample size calculated in accordance with the formula presented in the registered PoA-DD/PDD?	Yes, the sample size calculated is in accordance with the formula presented in the registered PoA-DD/CPA-DD/B04/.
5.	Are the assumptions used for calculation of sample size appropriate and correct? P.S.: Provide assessment on appropriateness of value of proportion (p), standard deviation (STDEV) or variance (v) used for calculation of sample size.	Parameter $N_{y,i,j}$ monitors Number of project devices of type i and batch j operating during year y. The value of the parameter is determined by multiplying all devices sold (N) with the proportion of cooking stoves found to be operating in a representative sample, i.e. $p_{op\_stoves,y}$. The value of the parameter $p_{op\_stoves,y}$ is determined through monitoring surveys. This is acceptable to the verification team since the estimates are based on result of previous studies and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B06/. A sample size of 6 was determined for the parameter $N_{y,i,j}$ (CPA 001 and CPA002) based on the required confidence interval/precision level of 90/10, this sample size was increased to 57 (for CPA 001 (2018 vintage)) and 58 (for CPA 001CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) in order to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined for the parameter μ_y based on the required confidence interval/precision level of 90/10 is 45 (CPA 001 and CPA 002). However, to account for the non-responses CME used a sample of 57 (for CPA 001 (2018 vintage)) and 58 (for CPA 001CPA 001 (2019 vintage) and CPA 002 (2019 vintage) to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined is more than 30 in both the cases and thus in accordance with the §14 of the sampling standard version 8/B07/, meets the minimum sample size requirement of 30 when the parameter of interest is a proportion. Parameter μ_y monitors the total operating fraction of the stoves in the monitoring period. The monitoring of the parameter μ_y ensures the compliance to the requirements to the para 40 of the monitoring methodology, AMS-II.G, version 08/B02/. The value of the expected proportion for the parameter μ_y is determined through results from the previous monitoring period (MP1). This is acceptable to the verification team since the estimates are based on result of previous studies and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B06/. The sample size determined for the parameter μ_y based on the required confidence interval/precision level of 90/10 is 45 (CPA 001 and CPA 002). However, to account for the non-responses CME used a sample of 57 (for CPA 001 (2018 vintage)) and 58 (for CPA 001CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined is more than 30 in both the cases and thus in accordance with the §14 of the sampling standard version 8/B07/, meets the minimum sample size requirement of 30 when the parameter of interest is a proportion.

<table>
<tr><td></td><td></td><td>Monitoring parameter $\eta_{new,i,j}$ is monitored through conducting the water boiling tests to determine the efficiency of the installed stoves. Monitoring of the parameter ensures compliance to the para 41 of the methodology AMS-II.G, version 08/B02/. The value of the mean and variance for the sample size calculations for the parameter $\eta_{new,i,j}$ is determined through results from the previous monitoring period. This is acceptable to the verification team since the estimates are based on result of previous studies and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B06/. A sample size of 1 was determined for the parameter $\eta_{new,i,j}$ based on the required confidence interval/precision level of 90/10. A sample of 2 was thus chosen to account for the non-responses and WBTs were conducted on 3 stoves of each vintage of each CPA. Since this parameter is a mean type and thus t-distribution calculations have been used in case of a sample size less than 30 in accordance with the § 13 of the sampling standard, version 08/B07/ for mean value parameters.

The same is deemed acceptable as per the PoA-DD/CPA-DD/B04/.</td></tr>
<tr><td>6.</td><td>What are the sample sizes obtained for the parameters being monitored? Is the determined sample size deemed adequate for the parameter of interest being monitored?

P.S.: If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student's t-distribution shall be used if the resulting sample size is less than 30.

[While assessing the sampling effort by the PP/CME particularly the sample size, the VV Team shall make sure that the reliability criteria (confidence level and precision) should be as per the requirement of the applied methodology. Only when there is no specific guidance in the applied methodology for the sampling requirements, the confidence/precision as stated in the sampling standards should be considered. As a rule of thumb it is to be always</td><td>The determined sample sizes are presented below:
<table>
<tr><th>Parameters</th><th colspan="2">$N_{y,i,j}$ ($p_{op\_stoves,y}$)</th><th colspan="2">μ_y</th><th colspan="2">$\eta_{new,i,j}$</th></tr>
<tr><th></th><th>CPA 001</th><th>CPA 002</th><th>CPA 001</th><th>CPA 002</th><th>CPA 001</th><th>CPA 002</th></tr>
<tr><td>Calculated Sample Size</td><td>6</td><td>6</td><td>45</td><td>45</td><td>1</td><td>1</td></tr>
<tr><td>Applying Oversampling</td><td>8</td><td>8</td><td>54</td><td>54</td><td>2</td><td>2</td></tr>
<tr><td>Applied Sample Size (to account for non-responses and outliers)</td><td>57 (2018 batch)

58 (2019 batch)</td><td>58 (2019 batch)</td><td>57 (2018 batch)

58 (2019 batch)</td><td>58 (2019 batch)</td><td>3 (2018 batch)

3 (2019 batch)</td><td>3 (2019 batch)</td></tr>
<tr><td>Reliability Precision achieved</td><td>0 % (2018 batch)

0 % (2019 batch)</td><td>4 % (2019 batch)</td><td>10 % (2018 batch)

8 % (2019 batch)</td><td>12 % (2019 batch)</td><td>10.1 % (2018 batch)

5.2 % (2019 batch)</td><td>3.1 % (2019 batch)</td></tr>
</table>

The sample size determined are appropriate for the PoA/B04/. The confidence interval and precision levels are in accordance with the §40 of the methodology, AMS-II.G, version 08/B02/ and lower bounds have been applied in case reliability precision is not achieved.</td></tr>
</table>

<table>
<tr><td></td><td>kept in mind that the sampling requirements in the applied methodology shall take precedence.]</td><td></td></tr>
<tr><td>7.</td><td>Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort?

P.S.: If there is more than one parameter to be estimated in a CDM project activity, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen for the sampling effort with one common survey, or the sampling effort and survey is repeated for each of the parameters. A random sub-sample within the common survey is allowed as long as: (i) the reliability specification (e.g. 90/10 confidence/precision for small-scale CDM project activities and 95/10 for large scale CDM project activities) is achieved for each individual parameter; and (ii) the random sub-sample is consistent with the design of the survey and the corresponding sample size calculation.</td><td>PP has oversampled and it was found that for all the parameters, the respective confidence/precision (90/10) was met. The reliability precision is provided for each parameter in the table provided for item 6.</td></tr>
<tr><td>8.</td><td>Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?</td><td>Yes, the assumed response rate is reasonable (appropriate and correct) for the determination of samples to be surveyed for the parameter of interest.</td></tr>
<tr><td>9.</td><td>Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?</td><td>Yes, verification based on review of sample taken and remote audit interview/observation confirms that sample selected by the CME for determination of the monitored parameters are random. It can be considered as representative of the population.</td></tr>
<tr><td>10.</td><td>Has minimum target level of precision been achieved based on estimates from the actual samples?</td><td>No, the minimum target level of precision has not been achieved for all the parameters and lower bound values have been applied in accordance with the §40 of the methodology AMS-II.G, version 08/B02/ for such cases.

<table>
<tr><th rowspan="2">Parameters</th><th colspan="2">$N_{y,i,j}$ ($p_{op\_stoves,y}$)</th><th colspan="2">μ_y</th><th colspan="2">$\eta_{new,i,j}$</th></tr>
<tr><th>CPA 001</th><th>CPA 002</th><th>CPA 001</th><th>CPA 002</th><th>CPA 001</th><th>CPA 002</th></tr>
</table>
</td></tr>
</table>

		Calculated Sample Size | 6 | 6 | 45 | 45 | 1 | 1 **Applying Oversampling** | 8 | 8 | 54 | 54 | 2 | 2 **Applied Sample Size (to account for non-responses and outliers)** | 57 (2018 batch) 58 (2019 batch) | 58 (2019 batch) | 57 (2018 batch) 58 (2019 batch) | 58 (2019 batch) | 3 (2018 batch) 3 (2019 batch) | 3 (2019 batch) **Reliability Precision achieved** | 0 % (2018 batch) 0 % (2019 batch) | 4 % (2019 batch) | 10 % (2018 batch) 8 % (2019 batch) | **12 % (2019 batch)** | **10.1 % (2018 batch)** 5.2 % (2019 batch) | 3.1 % (2019 batch) This has been checked and confirmed by reviewing the sample size calculation presented in the ER sheet /04/ provided by the CME.
11.	In case the minimum target level of precision has not been achieved based on estimates from the actual samples, please specify the approach adopted by PP to reach the required precision and also justify the appropriateness of the adopted approach in accordance with the applied methodology or paragraph 18 of Sampling and surveys for CDM project activities and programmes of activities (Version 08.0).	The minimum target levels of precision are not met for each of the parameters and lower bound values have been applied in accordance with the §40 of the methodology AMS-II.G, version 08/B02/ for such cases, and thus appropriate measures are taken for mean type and proportion type parameters for sample size calculations.
12.	Has VT applied acceptance sampling to verify that the results of sampling efforts undertaken by PP for determination of ex-post parameters. If yes, please provide a detailed justification of the approach adopted including information on (but not limited to): (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level	DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves, , dates of commissioning of the project devices/ batches at the households, number of project devices in a household and to check if the WBT tests have been done for the households and all the households confirmed that the WBT tests were conducted for their households. Interviews were conducted with all the households for the stoves for whom WBTs were conducted and it was confirmed that the WBTs were performed on their stoves. The serial numbers of the stoves were also confirmed through interview with the KNUST laboratory personnel during a telephonic interview/D.3-4/. As per the sampling standard, version 08 /B07/, DOE had identified 8 samples (each) out of the PP's 57 (for CPA 001 (2018 vintage)) or 58 (CPA 001 (2019 vintage) and CPA 002 (2019 vintage) respectively) samples samples for the parameter $N_{y,i,j}$ ($p_{op\_stoves,y}$) and the parameter μ_y based on the AQL/UQL stated below. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household was also cross-checked. A sample of 8 is justified for each CPA batch of the PoA based on the Table 2 provided in the sampling standard, version 08/B07/, since estimated volume of annual GHG emission reductions of the project

	(e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample	activity or the PoA being verified is equal to or less than 100,000 tCO2e and meets the requirement of para 39 (a) of the Sampling Standard version 08/B07/. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household was also cross-checked. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 5 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. A sample size of 8 households (for each CPA batch) was chosen with no non-responses observed. All the identified 8 samples (for each CPA batch) had the same operational status as reported in the sampling frame of the PP/CME and hence no discrepancy was found (i.e. c=0). The usage of baseline stoves (μ_y) is consistent with the usage reported in the monitoring report and monitoring surveys and hence no discrepancy was found (i.e. c=0) with the MR /02/ and the ER sheet /04/. The dates of commissioning of the project devices/ batches at the households and number of project devices in a household were also consistent with the monitoring database and sampling database respectively and hence no discrepancy was found (i.e. c=0). Thus, PP's set of records has been accepted in line with § 33 of the sampling standard, version 08/B07/. DOE checked the water boiling test report/06/ with records of all the sampled stoves for the verification of the stove efficiency of the project stoves.
13.	Are the procedures for the selected survey and data collection method unambiguously defined and do they adequately provide for minimizing non-sampling errors?	Verification team based on remote audit interviews and review of documented procedure /02//04/ confirms that the selected survey and data collection method is unambiguously defined. This also adequately ensure minimizing non-sampling errors.
14.	Have potential sources of bias inherent in the selected data collection method, such as self-selection and under-coverage, been anticipated? Have mechanisms for mitigating these been considered?	Review of sampling records, monitoring questionnaires /05/ and remote audit interviews with the Personnel conducted Surveys does not reveal any sources of bias inherent in the selected data collection.
15.	Is the quality control and assurance strategy adequate?	Verification team based on review of provided documents /05/ and remote audit interviews confirms that the quality control and assurance strategy is adequate.
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	The verification team has focused on abilities, qualifications and recognition of involved personnel in survey. During the remote audit, it was confirmed that the team was qualified as confirmed by remote audit interviews and trained /07/ to carry out surveys and WBTs conducted by qualified institution/10/.
17.	Does the PP have a process in place to ensure data quality is maintained to a high standard? This should include: a) Are the personnel trained and experienced? b) What is the level of supervision and	Verification team based on review of provided documents /05/, /07/ and remote audit interviews confirms the following: ✓ the personnel involved in the surveys are trained and experienced. ✓ there exists a standardized system for data entry and analysis to produce final result.

	guidance provided to staff? c) Is there a standardized system for data entry and analysis to produce final result? d) Is there a system or process in place to minimize the introduction of errors? e) Is there a system in place to ensure all collected data is processed; f) Are quality checks performed on data entered, for example range checks, g) inconsistency checks, checking of subsamples of data by supervisors; h) is there a system to check for errors, record and report errors reported and document the remedial action taken; i) What is the level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion?	✓ there exist a system or process in place to minimize the introduction of errors. ✓ there exists a system in place to ensure all collected data is processed. ✓ there exists a quality checks of data entered.

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Document information

Version	*Date*	*Description*
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.

Version	*Date*	*Description*
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).
01.0	5 June 2015	Initial publication.

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