




**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 6	
Completion date of the verification and certification report	05/03/2020	
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 1 Duration of the monitoring period: 30/11/2018 - 13/12/2018	
Number and version number of the monitoring report to which this report applies	Number: 1 Version number: 2.1	
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	885	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	611	
Name and UNFCCC reference number of the DOE	Carbon Check (India) Private Ltd. (E-0052)	
Name, position and signature of the approver of the verification and certification report	Amit Anand, CEO 	

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. (CC IPL) 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 CPA titled “Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001”. 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 CPA aims 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 CO₂ emissions. Ecoeye Co., Ltd., has 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 30/11/2018 to 13/12/2018 (including both the days).

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data and used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner. CC IPL’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-DD 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 30/11/2018 to 13/12/2018 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.

On-site visit 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) /B04/ and the Monitoring report (version 2.1, dated 05/03/2020) /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 on site visit the verification team confirms that the project activity has resulted in the 611 tCO₂e emission reductions during the first monitoring period.

CC IPL 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	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Verification findings

1.	Team Leader/ Verifier/ Technical Expert	IR	Dimri	Anubhav	CC IPL	X	X	X	X
2.	Local Expert	EI	Mensah	Isaac	CC IPL		X	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	Singh	Vikash Kumar	CC IPL
2.	Approver	IR	Anand	Amit	CC IPL

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	<i>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</i>	<i>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. The training records/07/ have been reviewed and the training responsibilities have also been confirmed during the on-site visit interviews.</i>
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	Medium	<i>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.</i>	<i>The identified risk has been 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.</i>
3.	Accuracy of the measuring equipment	Low	<i>Check the calibration records for the measurement equipment used for efficiency test.</i>	<i>The risk due to accuracy of the measuring equipment has been ensured by planning 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.</i>

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 5% of 611 tCO₂e which is equal to 31 tCO₂e.

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 31 tCO₂e 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 OSV 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 hand written 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 on-site visit. These records have been provided to the verification team by the PP. 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-DD /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-DD /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.

CC IPL 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: 22/01/2019 to 23/01/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PoA-DD, registered/ included CPA-DDs.	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah
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	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah
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	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah
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	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah
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	Kumasi and Sunyani, Ghana	22/01/2019 to 23/01/2019	Anubhav Dimri Isaac Mensah

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Mayr	Sebastian	Aera Group	22/01/2019 to 23/01/2019	Project implementation and operation, monitoring procedure, data and information flow, CER calculation and completeness of monitoring	Anubhav Dimri Isaac Mensah

					report, QA/QC Procedures, Stove Efficiency Tests procedures and records, Quality Assurance – Management and operating system, Monitoring surveys, stove efficiency tests	
2.	Agyei	Michael Yaw	Man and Man Enterprises	22/01/2019 to 23/01/2019	Monitoring procedure, QA/QC Procedures, Stove Efficiency Tests, Quality Assurance – Management and operating system, monitoring surveys	Anubhav Dimri Isaac Mensah
3.	Donker	Kenneth	TCC, KNUST	22/01/2019 to 23/01/2019	WBT test procedure, Calibration procedure and requirements,	Anubhav Dimri Isaac Mensah
4.	Nyanteh	Ernest Adu	Man and Man Enterprises	22/01/2019 to 23/01/2019	Monitoring Surveys	Anubhav Dimri Isaac Mensah
5.	Nicholas	Nyarko Kwadwo	Man and Man Enterprises	22/01/2019 to 23/01/2019	Monitoring Surveys	Anubhav Dimri Isaac Mensah

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-DD /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, WBT 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. 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 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/. 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 only CPA reported in the monitoring period, CPA 1 for the current monitoring period. The sample sizes have been calculated based on the expected

proportion values available from the monitoring of a Gold Standard PoA/B05-2/ being operated by the same manufacturer. 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 16 was determined for the parameter $N_{y,i,j}$ based on the required confidence interval/precision level of 90/10, this sample size was increased to 20 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 38. However, to account for the non-responses CME used a sample of 46 to meet the lower responses in accordance with the requirements of the sampling standard/B07/. CME has conducted the monitoring survey for 54 households for the monitoring parameters, which is more than the required sample size for both the parameters and also more than the minimum 30 required in accordance with the sampling guidelines/B08/ for proportion parameters.

The precision achieved for the parameter $N_{y,i,j}$ ($p_{op_stoves,y}$) is 3 % and thus within the limits of 10% required precision for the parameter. The precision achieved for the parameter μ_y is 9% and thus within the limits of 10% required precision for the parameter. 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 2 stoves. 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 monitoring of a Gold Standard PoA/B05-2/ being operated by the same manufacturer. The precision achieved for the parameter $\eta_{new,i,j}$ is 20 % and thus exceeds the limits of 10% required precision for the parameter. The required precision of the sample is not met and thus in accordance with the para 17 (b) (i) (a) of the Sampling Standard, version 07/B07/, lower bound of the value has been used for the emission reduction calculations. The option in (b) is eligible as the survey has been undertaken during the first two years of the crediting period in accordance with the para 17 (c) of the Sampling Standard, version 07/B07/.

The resultant applied sample size by the CME for the CPA1/02/ are summarized below:

Parameters	$N_{y,i,j}$ ($p_{op_stoves,y}$)	μ_y	$\eta_{new,i,j}$
Calculated Sample Size	16	38	1
Applying Oversampling	20	46	2
Applied Sample Size (to account for non-responses and outliers)	54	54	2
Precision achieved	3 %	9 %	20 % ¹

DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves 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. As per the sampling standard /B07/, DOE had identified 18 samples out of the PP's 54 samples for the parameter $N_{y,i,j}$ ($p_{op_stoves,y}$) and the parameter μ_y based on the AQL/UQL stated below. A sample of 18 is justified for the PoA since the PoA is located in a least developed country and meets the requirement of para 31 (c) of the Sampling Standard version 07/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 10 %. Acceptance number (c) thus determined for the sample is 1. A sample size of 18 households was chosen with no non-responses observed. All the identified 18 samples 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.

¹ The required precision of the sample is not met and thus in accordance with the para 17 (b) (i) (a) of the Sampling Standard, version 07, lower bound of the value has been used for the emission reduction calculations. The option in (b) is eligible as the survey has been undertaken during the first two years of the crediting period in accordance with the para 17 (c) of the Sampling Standard, version 07.

c=0) with the MR /02/ and the ER sheet /04/. Thus, PP's set of records has been accepted in line with § 30 of the sampling standard, version 07B07/.

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	01	01	00
Remaining forward action requests from validation and/or previous verifications	00	00	02
CPAs considered for verification and covered in this report	00	00	00
Programme of activities			
Compliance of the programme implementation with the registered PoA-DD	01	00	00
Implementation and operation of the management system	01	00	00
Post-registration changes			
• Corrections	00	00	00
• Inclusion of a monitoring plan	00	00	00
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents ²	00	00	00
• Changes to the programme design	00	00	00
• Addition of CPA inclusion template	00	00	00
• Change of coordinating/managing entity	00	00	00
• Changes specific to afforestation and reforestation activities	00	00	00
Component project activities			
Compliance of the CPA implementation with the included CPA design document	01	01	00
Post-registration changes			
• Temporary deviations from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	00	00	00
• Corrections	00	00	00
• Changes to the start date-of the crediting period	00	00	00
• Inclusion of a monitoring plan	00	00	00
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	00	00	00
• Changes to the project design	00	00	00
• Changes specific to afforestation and reforestation activities	00	00	00
Compliance of the registered monitoring plan with applied methodologies and standardized baselines	00	00	00
Compliance of monitoring activities with the registered monitoring plan			

² 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).

• Data and parameters fixed ex ante or at renewal of crediting period	00	02	00
• Data and parameters monitored	02	02	00
• Implementation of sampling plan	02	00	00
Compliance with the calibration frequency requirements for measuring instruments	01	00	00
Assessment of data and calculation of emission reductions or net removals			
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	05	01	00
• Calculation of project GHG emissions or actual net GHG removals by sinks	00	00	00
• Calculation of leakage GHG emissions	00	00	00
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	00	01	00
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	00	00	00
• Remarks on difference from estimated value in included CPA	00	00	00
Assessment of reported sustainable development co-benefits	00	00	00
Global stakeholder consultation	00	00	00
Others (please specify)	03	01	00
Total	14	08	02

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 CL 01 had been raised in this regard and have been resolved.
Conclusion	<p>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/.</p> <p>CC IPL, had made the version 1.0, dated 26/12/2018 of the monitoring report /01/, covering the monitoring period from 30/11/2018 to 13/12/2018 (both days inclusive) publicly available on 01/01/2019.</p> <p>This confirms compliance with the §337 and §338 of CDM VVS for PoAs, version 02.0 /B01-1/.</p>

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

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There are two forward action requests from the validation and have been raised in this report. Both the FARs have been closed by the project participant.

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	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	CL 02 had been raised in this regard and has been resolved.
Conclusion	As part of the site visit, 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/. 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

Means of verification	Document Review, Interview
Findings	CL 03 had been raised in this regard and has been resolved.
Conclusion	<p>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 OSV interview/observation 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 onsite interview 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., has financed the improved cooking stoves distributed to the households</p> <p>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 1 was</p>

confirmed during the site visit by the verification team. Following was confirmed during the site visit:

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:

Parameter	Ex-ante value in the CPA-DD	Actual operation for the reported monitoring period	Assessment by the verification team
Number of project devices of type i and batch j operating during year y ($N_{y,i,j}$)	298,897	15,120	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 98.15 % which is higher than the ex-ante estimates of 90%. The higher value of the operational stoves is justified as the monitoring period is only for 14 days and the stoves have been in operation for less than a year and thus mostly found operational. The values were cross-checked through the inspection during the on-site visit. 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 $N_{y,ij}$ is thus 15,120 and is less than the total stoves distributed in the CPA (i.e. 15,518). 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	0.86	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. 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. 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 ($\eta_{new,ij}$)	27.5 %	24.06 %	<p>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/.</p> <p>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.</p> <p>The required precision of the sample is not met for the parameter and thus in accordance with the para 17 (b) (i) (a) of the Sampling Standard, version 07, lower bound of the value has been used for the emission reduction calculations. The option in (b) is eligible as the survey has been undertaken during the first two years of the crediting period in accordance with the para 17 (c) of the Sampling Standard, version 07.</p>
	Net calorific value of the non-	0.015 TJ/tonne	0.015 TJ/tonne	The value of the monitoring parameter is the default

	renewable woody biomass used in project devices ($NCV_{biomass}$)			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 commissioning of batch j)	Date before beginning of crediting period (ex-ante purposes)	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/. This is deemed acceptable to the verification team.
	Actual date of commissioning of the project device. (Date of commissioning of project device i)	Date before beginning of crediting period (ex-ante purposes)	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	15,518	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	1.02	The value of the parameter number of project devices distributed per household is 1.02. Additional comment was added to the parameter in the revised approved

				CPA-DD/B04-2/. The change was made through post registration change (reference: 10430-PRC-002). The change was made in response to the clarification issues raised during the information and reporting check (Issue 3). 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

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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

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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

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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	CAR 02 and CL 04 had been raised in this regard and have been resolved.																												
Conclusion	<p>The implementation status of the PoA and the component project activities is:</p> <table border="1"> <tr> <td>Co-ordinating and Managing entity/Project Participants:</td><td>AERA GROUP S.A.S.</td></tr> <tr> <td>Title of the PoA:</td><td>Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea</td></tr> <tr> <td>UNFCCC registration No:</td><td>10430</td></tr> <tr> <td>Applied Baseline and monitoring methodology:</td><td>AMS-II.G version 8/B02/</td></tr> </table> <table border="1"> <tr> <td>Title of the CPA:</td><td>Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea</td></tr> <tr> <td>CPA reference number:</td><td>10430-P1-0001-CP1</td></tr> <tr> <td>Date of inclusion:</td><td>30/11/2018</td></tr> <tr> <td>CPA start date:</td><td>20/10/2017</td></tr> <tr> <td>CPA start of operation:</td><td>04/06/2018</td></tr> <tr> <td>CPA implementer</td><td>Man and Man Enterprise; ECOEYE CO., LTD</td></tr> <tr> <td>Project Scale:</td><td>Small scale</td></tr> <tr> <td>Location of the CPAs:</td><td>Ghana</td></tr> <tr> <td>CPA crediting period:</td><td>30/11/2018 – 29/11/2025</td></tr> <tr> <td>Reported monitoring Period verified in this verification:</td><td>30/11/2018 to 13/12/2018 (First monitoring period)</td></tr> </table> <p>There is only one CPA under Verification. The CPA involves the distribution of improved cooking stoves in the host country Ghana. The coordinating/managing entity for the PoA is AERA GROUP S.A.S. The CPA implementers for the CPA 1 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 CPA/PoA are 15,518. The stoves are being manufactured by the Man and Man Enterprise.</p> <p>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 CPA is 4.53 MWh_{th}/year per stove. The total energy savings in the CPA is 70,297 MWh_{th} per</p>	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:	30/11/2018 to 13/12/2018 (First monitoring period)
Co-ordinating and Managing entity/Project Participants:	AERA GROUP S.A.S.																												
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Applied Baseline and monitoring methodology:	AMS-II.G version 8/B02/																												
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Reported monitoring Period verified in this verification:	30/11/2018 to 13/12/2018 (First monitoring period)																												

year. Thus the total energy savings from the CPA is less than the small scale threshold in the CPA-DD/B04/ and the methodology AMS-II.G, version 08/B02/.

The value of the ERs per unit of stove is 1.03 tCO₂e/year/04/. The value of the ERs per unit of stove calculated ex-ante is 1.39 tCO₂e/year/B04/. The value of the ERs per unit of stove is lower than the value determined ex-ante, it is due to higher proportion of operational stoves and lower usage of baseline stoves. The stove efficiency determined is lower than the ex-ante estimates/02//04/ as the lower bound value has been used for the parameter.

The component project activity was implemented and equipment installed as described in the registered/included CPA DD/B04/.

It was confirmed during the OSV 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). 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-DD/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)	1,004	611 The total emission reductions have reduced due to the removal of households with similar names to exclude for the households with multiple stoves and accounting for the lower bound of the stove efficiency.

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 site visit 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

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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	There are no findings on this section of the VR.
Conclusion	<p>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/.</p> <p>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/.</p> <p>The verification took cognizance of § 357 to § 359 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>

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	CAR 06 and CAR 08 had been raised in this regard and have been resolved.
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/.
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E.3.4.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CAR 05, CAR 07, CL 05 and CL 12 had been raised in this regard and have been resolved.
Conclusion	<p>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.</p> <p>The verification took cognizance of § 346, 347 I, 357 and 359 of CDM VVS for PoAs, Version 02.0 /B01-1/.</p>

E.3.4.3. Implementation of sampling plan

Means of verification	Document Review, Interview
Findings	CL 06 and CL 07 had been raised in this regard and have been resolved.
Conclusion	<p>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 has appropriately performed Simple Random Sampling procedure in line with the applied methodology and best suited for this type of project. As the registered PoA-DD /B04/ mentions the option for Simple Random Sampling procedure, it is acceptable to the verification team.</p> <p>The sampling survey has been carried out by the well-trained people of the CPA implementer, Man and Man Enterprises, training certificates of the personnel have been provided to the verification team /07/. The sampling survey has been carried out by the well-trained personnel of Man and Man Enterprises and AERA Group, and WBTs have been conducted by trained personnel of the third party, KNUST. A certificate for the competence of the institute 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. 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 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/. 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.</p> <p>CME has done a sampling for the PoA and the only CPA reported in the monitoring period, CPA 1 for the current monitoring period. The sample sizes have been calculated based on the expected proportion values available from the monitoring of a Gold Standard PoA/B05-2/ being operated by the same manufacturer. 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 16 was determined for the parameter $N_{y,i,j}$ based on the required confidence interval/precision level of 90/10, this sample size was increased to 20 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 38. However, to account for the non-responses CME used a sample of 46 to meet the lower responses in accordance with the</p>

requirements of the sampling standard/B07/. CME has conducted the monitoring survey for 54 households for the monitoring parameters, which is more than the required sample size for both the parameters and also more than the minimum 30 required in accordance with the sampling guidelines/B08/ for proportion parameters.

The precision achieved for the parameter $N_{y,i,j}$ ($p_{op_stoves,y}$) is 3 % and thus within the limits of 10% required precision for the parameter. The precision achieved for the parameter μ_y is 9% and thus within the limits of 10% required precision for the parameter. 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 2 stoves. 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 monitoring of a Gold Standard PoA/B05-2/ being operated by the same manufacturer. The precision achieved for the parameter $\eta_{new,i,j}$ is 20 % and thus exceeds the limits of 10% required precision for the parameter. The required precision of the sample is not met and thus in accordance with the para 17 (b) (i) (a) of the Sampling Standard, version 07/B07/, lower bound of the value has been used for the emission reduction calculations. The option in (b) is eligible as the survey has been undertaken during the first two years of the crediting period in accordance with the para 17 (c) of the Sampling Standard, version 07/B07/.

The resultant applied sample size by the CME for the CPA1/02/ are summarized below:

Parameters	$N_{y,i,j}$ ($p_{op_stoves,y}$)	μ_y	$\eta_{new,i,j}$
Calculated Sample	16	38	1
Applying	20	46	2
Applied Sample Size (to account for non-responses and outliers)	54	54	2
Precision achieved	3 %	9 %	20 % ³

DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves 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. As per the sampling standard /B07/, DOE had identified 18 samples out of the PP's 54 samples for the parameter $N_{y,i,j}$ ($p_{op_stoves,y}$) and the parameter μ_y based on the AQL/UQL stated below. A sample of 18 is justified for the PoA since the PoA is located in a least developed country and meets the requirement of para 31 (c) of the Sampling Standard version 07/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 10 %. Acceptance numbl(c) thus determined for the sample is 1. A sample size of 18 households was chosen with no non-responses observed. All the identified 18 samples 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/. Thus, PP's set of records has been accepted in line with § 30 of the sampling standard, version 07B07/.

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.

³ The required precision of the sample is not met and thus in accordance with the para 17 (b) (i) (a) of the Sampling Standard, version 07, lower bound of the value has been used for the emission reduction calculations. The option in (b) is eligible as the survey has been undertaken during the first two years of the crediting period in accordance with the para 17 (c) of the Sampling Standard, version 07.

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

Means of verification	Document Review, Interview
Findings	CL 08 had been raised in this regard and has been resolved.
Conclusion	<p>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.</p> <p>The verification took cognizance of section 10.2.6 of CDM VVS for PoAs, version 02 /B01-1/.</p>

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	CL 09, CL 10, CL11, CL 13, CL14 and CAR 03 had been raised in this regard and have been resolved.
Conclusion	<p>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.</p> <p>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.</p> <p>Emission reductions are calculated using the below equation:</p> $ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y \quad \text{Equation (1)}$ <p>Where:</p> <ul style="list-style-type: none"> i = Indices for the situation where more than one type of project device is introduced to replace the pre-project devices⁴ j = Indices for the situation where there is more than one batch of project device ER_y = Emission reductions during year y in t CO₂e $ER_{y,i,j}$ = Emission reductions by project device of type i and batch j during year y in t CO₂e LE_y = Leakage emissions in the year y

⁴ 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).

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

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 (f_{NRB}) values available on the CDM website ⁵ .
$NCV_{biomass}$	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
$N_{y,i,j}$	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

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

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: 611 tCO₂e

Total ER_y = 611 tCO₂e

⁵ Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/DNA/fNRB/index.html>

	<p>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/.</p> <p>The verification took cognizance of § 358 of CDM VVS for PoAs, version 02.0 /B01-1/.</p>
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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	<p>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.</p> <p>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/.</p>

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	<p>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-DD. The total number of ERs achieved during the monitoring period is 611 tCO₂e.</p> <p>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.</p> <p>The verification took cognizance of § 373 of CDM VVS PoAs, version 02 /B01-1/.</p>

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
10430-P1-0001-CP1	611	0	0	0	611	611
Total	611	0	0	0	611	611

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	CAR 04 had been raised in this regard and has been resolved.
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)
10430-P1-0001-CP1	885	611
Total	885	611

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

Means of verification	Document Review
Findings	There are no findings on this section of the VR.
Conclusion	<p>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 total ERs for the monitoring period are 611 tCO₂e and the ex-ante ERs for the monitoring period were 885 tCO₂e. The total ERs for the monitoring period is less than the estimated ex-ante.</p> <p>The monitored value of the ERs per unit of stove is 1.03 tCO₂e/year/02//04/. The value of ex-ante estimated ERs per stove is 1.39 tCO₂e/year. The value of monitored value is less than ex-ante estimated values as the value of proportion of operational stoves is higher than compared to the ex-ante estimates, the lower proportion of the usage of the baseline stoves and the decrease in the stove efficiency (due to lower bound values) has also lead to the decrease in the value of per unit ERs. Also at the same time the value of f_{NRB} has reduced from the ex-ante estimates.</p> <p>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/.</p>

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	<p>Not applicable</p> <p>The verification took cognizance of § 375 and 376 of CDM VVS PoAs, version 02 /B01-1/.</p>

E.3.8. Global stakeholder consultation

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

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

>>

Carbon Check (India) Private Ltd. has performed the first 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 UNFCCC ref number 10430 for the CPA titled "Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea" and UNFCCC reference number 10430-P1-0001-CP1. The verification team assigned by the DOE concludes that the Component Project Activities as described in the registered/included CPA-DD (CPA 1 – Version 1.8, 27/11/2018) and the Monitoring report (version 02.1, dated 05/03/2020)/02/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M & P, the modalities and procedures for

CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for programme of activities requirements version 02.0 /B01-1/.

Verification methodology and process:

The Verification team confirms the contractual relationship signed on 22/12/2018 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), including the monitoring plan and the corresponding validation report/s;
- Publication of the MR on the UNFCCC website (version 1.0, 26/12/2018) on 01/01/2019
- 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;
- On-site assessment (22/01/2019 – 23/01/2019)
- 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-DD. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on-site visit, the verification team confirms that the PoA has resulted in the 611 tCO₂e emission reductions during the first monitoring period.

During the reported monitoring period only one CPA was registered. Emission reductions have been reported for the only CPA 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): 611 tCO₂e

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 ₂ e)	0	611

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

SECTION H. Certification statement

>>

Carbon Check (India) Private Ltd, the DOE, has performed the first 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-DD. 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 on-site that included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

The verification is based on:

- 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;
- Monitoring report(s) version(s) 1.0, 1.1, 1.1, 1.1, 2.0 and 2.1 dated 26/12/2018, 27/02/2019, 26/04/2019, 23/05/2019, 07/01/2020 and 05/03/2020 respectively.

This statement covers verification period from 30/11/2018 to 13/12/2018 (including both the days).

The DOE had raised 12 clarifications requests and 08 corrective action requests, all of which have been resolved by the CME.

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-DD are fairly stated.

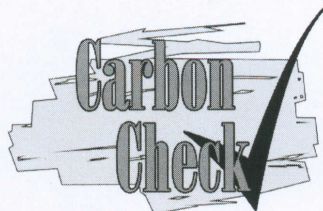
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 611 tCO₂e and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 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 ₂ e)	0	611

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Limit
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CAR	Corrective Action Request
CC IPL	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 ₂ e	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
MWh	Mega Watt Hour
MP	Monitoring Period
MR	Monitoring Report
PoA	Programme of Activities
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	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Expert ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

TA 1.1	<input checked="" type="checkbox"/>	TA 3.1	<input checked="" type="checkbox"/>	TA 5.2	<input type="checkbox"/>	TA 9.2	<input type="checkbox"/>	TA 13.2	<input type="checkbox"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input type="checkbox"/>	TA 8.1	<input checked="" type="checkbox"/>	TA 10.1	<input type="checkbox"/>	TA 14.1	<input type="checkbox"/>
TA 2.1	<input type="checkbox"/>	TA 5.1	<input type="checkbox"/>	TA 9.1	<input type="checkbox"/>	TA 13.1	<input checked="" type="checkbox"/>		


Mr. Vikash Kumar Singh
Compliance Officer


Mr. Amit Anand
CEO

Date of Approval
24/12/2019

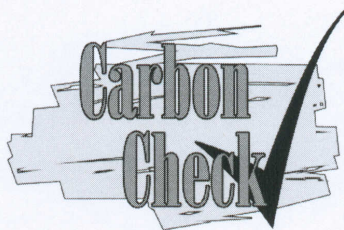
Valid Till
24/12/2020

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

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 Registered in India: U74930DL2012PTC232495
 Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
 Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301
 Tel: +91 120 4373114 | URL: www.carboncheck.co.in
 e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

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

For following functions:

Validator ☒ Team Leader ☒ Technical reviewer ☒
 Verifier ☒ Technical Expert ☒ Local Expert¹ ☒

In the following Technical Areas:

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

Mr. Amit Anand
CEO

Date of Approval
24/12/2019

Valid Till
24/12/2020

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26/12/2014	Initial Adoption
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24/12/2018	Annual Revision
24/12/2019	Annual Revision

¹ India, South Africa

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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 26/12/2018 Version 1.1 dated 27/02/2019 Version 1.1 dated 26/04/2019 Version 1.1 dated 23/05/2019 Version 2.0 dated 07/01/2020	CME
2	Aera Group	Final Monitoring Report	Version 2.1 dated 05/03/2020	CME
3	Aera Group	1. ER sheet with sales database corresponding to /01-1/ 2. ER sheet with sales database corresponding to /01-2/ 3. ER sheet with sales database corresponding to /01-3/ 4. ER sheet with sales database corresponding to /01-4/ 5. ER sheet with sales database corresponding to /01-5/	181226 190227 190426 190523 200107	CME
4	Aera Group	ER sheet with sales database corresponding to /02/	200304	CME
5	Aera Group	Monitoring Survey Questionnaires including the revised questionnaires	NA	CME
6	Aera Group	Efficiency Test Results: 1. Initial Water Boiling Tests 2. Water boiling tests conducted in response to the DVR finding	Dated 03/12/2018 Dated 05/02/2019 – 08/02/2019	CME
7	Aera Group	Training Certificates for monitoring personnel: 1. Ernest Nyanteh Adu 2. Michael Yaw Agyei	25/07/2018	CME
8	Kwame Nkrumah University of Science and Technology, Kumasi	Equipment Calibration confirmation	TCC/UNDP/C-LAB/VOL.2 dated 13/02/2019	CME
9	Man and Man Enterprises	Sample Stove sales agreement	Dated 20/10/2017	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	Dated 25/02/2019	CME
11	FAO	Calculation of fNRB: 1. 2015 FAO: Ghana Case Study 2. 2017 National REDD+ Secretariat, Forestry Commission: Ghana's National Forest Reference Level 3. IPCC 2006, Vol.4, Chapter 4 4. FAO Global Forest Resources Assessment 2000		CME
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; CPA-DD for 10430-P1-0001-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	=	Others

B06	UNFCCC	1. Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0 (Latest used by VT)	http://cdm.unfccc.int/	Others
B07	UNFCCC	1. Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 07.0 (Latest available at the time of the onsite visit used by VT)	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

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: 11/02/2019
Description of FAR				
<i>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.</i>				
CME response				Date: 27/02/2019
<i>As held on on June 15th 2017 and documented in registered/included “Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001”</i>				
Documentation provided by the CME				
https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/R71MGTX26FAZ93OE4BWKI80VSUPHCJ/view				
DOE assessment				Date: 13/03/2019
This FAR was raised at the time of the PoA registration (31/05/2018) and the CPA was included later on 30/11/2018. CME has conducted the local stakeholder consultation for the CPAs on June 15th 2017 at Tyco City Hotel in Sunyani, Ghana, from 8 am to 12 pm. The details of the local stakeholder consultation have been noted in the section E.1 of the registered/included CPA titled “Man and Man Enterprise Improved Cooking Stoves CDM Programme in Ghana supported by Republic of Korea – CPA001”. The validation opinion as provided by the validating DOE on the validated CPA DD has been noted by the verification team. FAR is closed.				

FAR ID	02	Section no.	E.1.2	Date: 11/02/2019
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: 27/02/2019
SC_{old} is “Used only if option 4 of AMS-II.G is applied for determining $B_{y,savings,i,j}$.” while CPA1-DD applies option 3 $\eta_{old,i,j}$ was determined at CPA-level at the time of inclusion				
Documentation provided by the CME				
https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/R71MGTX26FAZ93OE4BWKI80VSUPHCJ/view				
DOE assessment				Date: 13/03/2019

This FAR was raised at the time of the PoA registration (31/05/2018) and the CPA was included later on 30/11/2018. The validating DOE at the CPA inclusion has checked the parameters determined ex-ante in the section D.5.2 of the validation opinion.

CME has clarified that SC_{old} is not applicable to the CPA as CPA 1 applies option 3 provided in the para 20 of the monitoring methodology AMS-II.G, version 8.

CME has also clarified that $\eta_{old,i,j}$ was determined at CPA-level at the time of inclusion and this has been validated at the time of the inclusion by the validating DOE for the CPA. The validation opinion on the ex-ante values provided by the validating DOE has been checked by the verification team. Since, the value is based on the baseline survey literature and validated at the time of inclusion, it has been accepted by the verification team.

FAR is closed.

Table 2. CLs from this verification

CL ID	01	Section no.	E.1.1	Date: 11/02/2019
Description of CL				
<i>The version number of the PoA-DD as provided in the section A.1.1 and A.1.2 of the Monitoring Report does not match with the PoA-DD available on the CDM interface.</i>				
CME response				Date: 27/02/2019
<i>The version number has been corrected.</i>				
Documentation provided by the CME				
<i>Revised MR</i>				
DOE assessment				Date: 13/03/2019
The version number of the PoA-DD has been corrected on the cover page and section A.1.1 and A.1.2 of the Monitoring Report and matches with the PoA-DD available on the CDM interface. CL is closed.				

CL ID	02	Section no.	E.2.1	Date: 11/02/2019
Description of CL				
<i>In section C.1 of the MR it is stated that "...ICSs targeting households (and smaller institutions) are sold under this CPA". It needs to be clarified if the ICSs have been distributed in smaller institutions and how $B_{old,HH}$ is appropriate for those institutions.</i>				
CME response				Date: 27/02/2019
<i>Cook stoves under this CPA are only sold to households. This is underpinned by the sales agreement, which clearly mention household representatives as counterparties.</i>				
<i>The erroneous statement in the MR has been deleted.</i>				
Documentation provided by the CME				
<i>Revised MR</i>				
DOE assessment				Date: 13/03/2019
CME has corrected the statement provided in the section C.1 of the MR and has clarified that the cookstoves under the CPA are sold only to households. This has also been checked through a review of the sample sales agreements which confirm that the agreement is with a household. CL is closed.				

CL ID	03	Section no.	E.2.2	Date: 11/02/2019
Description of CL				
<i>In section D of the MR, roles of Monitoring Manager and Data Manager have been identified. It needs to be clarified if they are part of the monitoring team as identified in section B.1 of the MR and such personnel shall be identified.</i>				
CME response				Date: 27/02/2019
<i>The Monitoring Manager and Data Manager are indeed part of the monitoring team. They are supported by the CME (aera).</i>				
<i>Section D of the MR has been modified to provide the identities of those two roles.</i>				
Documentation provided by the CME				
<i>Revised MR</i>				
DOE assessment				Date: 13/03/2019
CME has identified the monitoring team, responsibilities and the identities of the identified roles. CL is closed.				

CL ID	04	Section no.	E.3.1	Date: 11/02/2019
Description of CL				

1. The number of stoves distributed in the CPA/PoA is not clear as 17,522 and 15,522 have been used interchangeably in the section E.3 of the MR.
2. It has been stated in the CPA-DD and the section C.1 of the MR that the stoves have been sold since 20/10/2017 in the CPA, however the earliest sales date of the stoves is in 2018 as per the stoves database workbook of the ER sheet. Also, it needs to be clarified how only vintage 2018 is applicable to the efficiency tests conducted.

CME response**Date:** 27/02/2019

1. 15,522 stoves have been distributed. The typo has been corrected.
2. Section C has been complemented by a footnote to clarify the situation:
The starting date "corresponds to the first formal sales agreement signed, which corresponds to a "test batch" and— for conservativeness - has not been taken account of in the database and emission reduction calculations. Effective start of distribution has been 4 June 2018."
Accordingly, efficiency tests are carried out for the 2018 batch only.

Documentation provided by the CME

Revised MR
first sales agreement from BA

DOE assessment**Date:** 13/03/2019

1. The value for the number of stoves distributed in the CPA/PoA has been corrected in the section E.3 of the MR and it has been clarified that 15,522 stoves have been distributed in the CPA/PoA. CL04.1 is closed.
2. PP has clarified that the starting date corresponds to the "test batch", however in the included CPA-DD there is no mention of the "test-batch", also it needs to be clarified how such start date meets the requirement of eligibility criterion 5 and how the start date determined at the time of CPA inclusion complies with the definition of "start date" as per the Glossary: CDM Terms, version 09.0. CL04.2 remains open.

CME response**Date:** 21/03/2019

2. As per comment, footnote 8 is revised to clarify as follows:
This corresponds to the first formal sales agreement signed (stove ID CDM.MM.CPA001.11). Only one stove was distributed on this date for test purposes and no emission reduction is claimed for this stove. No other stoves have been distributed in 2017. Effective start of distribution has been on 4 June 2018. As per validated and included CPA1, the start date of the CPA is 20/10/2017, the sales date of the first ICS, which is after the start date of the PoA and after the date of the local stakeholder consultation. The start date meets the requirement of eligibility criterion 5, which mentions "Document evidence such as order of first sale of ICSs or first sales agreement signed" as possible supporting document evidence for the start date.
The inclusion report of CPA1 concludes on page 23 that "The start date has been determined in accordance with the definition of the start date in "Glossary: CDM terms". Thus, the para 202, VVS for PoA2.0 was followed."

Documentation provided by the CME

Revised MR.

DOE assessment**Date:** 15/04/2019

2. CME has clarified that only one stove was distributed in the year 2017 as a test stove and no other stoves were distributed in the year 2017. The stove distributed in the year 2017 has not been used in the monitoring database to claim emission reductions and thus no stoves for the vintage year 2017 are applicable to the PoA. CL04.2 is closed.

CL ID	05	Section no.	E.3.4.2	Date:	11/02/2019
Description of CL					
<ol style="list-style-type: none"> 1. The value used for the parameter $NCV_{biomass}$ in the section E.2 of the MR does not match with value as per the Measurement methods and procedures for the parameter provided in the section B.5.1 of the CPA-DD. It needs to be clarified what fuel type is applicable to the ICSs distributed in the CPA. 2. The value for the parameter $N_{y,i,j}$ in section E.2 of the MR does not match with the product of $\rho_{op_stoves,y}$ and N provided in the ER sheet. 					
CME response					Date:
					27/02/2019

<p>1. $NCV_{biomass}$ in section E.2 of the MR is 0.015 TJ/tonne. Section B.5.1 of the registered CPA-DD mentions the same value. Baseline woody biomass consumption is expressed in wood fuel equivalent, as per fixed ex-ante $B_{old,HH}$ parameter. Accordingly, Baseline woody biomass consumption was multiplied with conversion factor M_{wood} to charcoal factor whereas the fuel type applicable to the ICSs distributed in the CPA is charcoal, as checked during OSV.</p> <p>2. $N_{y,i,j}$ in section E.2 of the MR has been replaced by the correct number, which is now 15,124.</p>	
Documentation provided by the CME	
Revised MR	
DOE assessment	Date: 13/03/2019
<p>1. CME has clarified that 0.015 TJ/tonne has been used in the CPA-DD as well. However, “Measurement methods and procedures” for the parameter and the section 6.1 of the monitoring methodology, AMS-II.G, version 08, provide a value of 0.029 TJ/tonne for charcoal fuel. Since, the cookstoves used in the project activity use charcoal as the fuel, it needs to be clarified why that value has not been used when the fuel type used is “charcoal”. CL 05.1 remains open.</p> <p>2. The value of the parameter $N_{y,i,j}$ in section E.2 of the MR has been corrected. CL 05.2 is closed.</p>	
CME response	Date: 05/04/2019
<p>1. The $NCV_{biomass}$ value is used to determine the “energy saving per stove” as well as to determine ER_y, i.e. baseline emissions.</p> <p>The value of 0.015 TJ/tonne is used in accordance with the CPA-DD, which determines $B_{old, HH}$ based on wood fuel equivalent (cf. page 8 of CPA-DD, based on overall mean biomass households consumption data from literature). Consequently, the corresponding 0.015 TJ/tonne is used and not the value for charcoal, which would neither be consistent nor conservative</p> <p>The CPA validation opinion already concluded “The Monitoring parameters considered in the project are in line with the requirement of applied methodologies AMS II.G, version 8. The MR has been revised accordingly. Also, the monitoring procedures considered for the parameters are verified to be appropriate and feasible.” (p. 20)</p>	
Documentation provided by the CME	
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DOE assessment	Date: 15/04/2019
<p>1. CME has clarified that the value for $NCV_{biomass}$ has been used in accordance with the page 8 of the CPA-DD and to be consistent with the formula for the calculation of the ER_y, the value for $NCV_{biomass}$ has been used. CL 05.1 is closed.</p>	

CL ID	06	Section no.	E.3.4.3	Date: 11/02/2019
Description of CL				
<p>1. In section E.3 of the MR, it is not clear if 95/10 or 90/10 confidence interval/precision level is applicable to the sample calculated.</p> <p>2. The basis of the proportion used for the sample size calculation needs to be provided.</p> <p>3. In Table 4 and 5 sample size is not provided.</p>				
CME response				Date: 27/02/2019
<p>1. Section E.3 has been modified to clarify and apply 90/10 confidence interval/precision level consistently.</p> <p>2. The sample size calculation has been added to the ER calculations. Please see comments in sheet Sample Size calculation for references used.</p> <p>3. All cells in table 4 and 5 have been completed.</p>				
Documentation provided by the CME				
Revised MR & ER sheet				
DOE assessment				Date: 13/03/2019
<p>1. CME has corrected the confidence interval/precision level in the section E.3 of the MR and is consistent, a confidence interval/precision level of 90/10 has been used due to annual frequency of sampling and monitoring. However, the sample size for the parameter μ_y (Table 4) is not met in the sampling conducted. It is also not clear if 82 households (as per the cell J8 of the sample size workbook of the ER sheet) is met through the sampling efforts. CL06.1 remains open.</p> <p>2. The comments in sample size workbook of the ER sheet are not available. The reason for the expected proportion used has been provided as previous MR results. Since, this is the first periodic</p>				

verification of the CPA/PoA, it is not clear how previous monitoring results are available. CL06.2 remains open.

3. The cells in table 4 and 5 have been completed by the CME. CL06.3 is closed.

CME response	Date: 05/04/2019
<ol style="list-style-type: none"> 1. It is clarified that – in fact – empirical values from GS1385 Man and Man Enterprise Improved Cooking Stoves Programme in Ghana - VPA1 have served to determine not only the standard deviation and mean efficiency but also μ_y (pre-project devices use) and $pop_{stoves,y}$ as estimates for the sample size calculation. GS1385 - VPA1 is the almost identical sister cook stove programme implemented by Man & Man distributing the same kind of ICSs to urban households in Ghana. Consequently, the reference has been considered <u>most relevant and first choice</u> for determining the sample size as per option (a) of para (5) of Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 04.0 (result of previous studies). The minimum sample size of 46 after oversampling has thus been met since 54 monitoring surveys have been carried out. The references have been added as comments in the workbook of the ER sheet. 2. The basis for calculating the proportion has been added in the ER sheet, as per above. The comments are available in cells F6, F8, F11, and F12 in sample size workbook of the ER sheet. 	
Documentation provided by the CME	
Revised ER sheet.	
DOE assessment	Date: 15/04/2019
<ol style="list-style-type: none"> 1. CME has clarified that the values for the calculation of the sample size in the ER sheet are based on a similar project implemented by the stove manufacturer under the Gold Standard program. The value for expected proportion have been averaged for all the values for the previous monitoring periods. PP has provided reference of para 5 (a) of the Sampling Guidelines version 4, however the referred paragraph does not provide any statement on the calculation of sample size. It is also stated that the sample size of 54 has been used based on oversampling, it needs to be clarified if the CME has used a confidence interval/precision level of 90/10 or 95/10. CL 06.1 remains open. 2. CME has provided the comments in the sample size workbook of the ER sheet for the justification of the expected proportion, standard deviation and mean used for the calculation of the sample size. PP has provided reference of para 5 (a) of the Sampling Guidelines version 4, however the referred paragraph does not provide any statement on the calculation of sample size. CL 06.2 remains open. 	
CME response	Date: 16/04/2019
<ol style="list-style-type: none"> 1. To clarify, “of Appendix 1” has been inserted in each reference. It is clarified that 90/10 sample size is used due to annual monitoring of the parameters in according with AMS-II.G. para 40, i.e. minimum sample is 46. The corresponding cells have been framed in the ER sheet, workbook “sample size”. 2. To clarify, “of Appendix 1” has been inserted in each reference. The resulting minimum sample size based on 90/10 confidence interval/precision level due to annual monitoring as per AMS II.G have been framed in the ER sheet, workbook “sample size”. <p>The line for 95/10 confidence interval/precision level is removed as not applicable, to avoid confusion.</p>	
Documentation provided by the CME	
Revised ER	
DOE assessment	Date: 17/04/2019
<ol style="list-style-type: none"> 1. PP has corrected the reference of Appendix 1 in the sample size workbook of the ER sheet. PP has also clarified that confidence interval/precision level of 90/10 has been used for the calculation of the sample size, which produces a sample size of 46. PP needs to clarify why a sample size of 54 has been used for the calculations. CL06.1 remains open. 2. PP has corrected the reference of Appendix 1 in the sample size workbook of the ER sheet. CL06.2 is closed. 	
CME response	Date: 18/04/2019

1. The surveyors were overdoing and have accidentally carried out 8 more surveys than they were supposed to. CME decided not to invest in an effort to reduce the sample randomly ex-post but to keep these surveys in the sample since the reliability of the sample-based estimates can only increase with the sample size (cf. footnote 7 of Standard "Sampling and surveys for CDM project activities and programmes of activities, Version 07.0").

Documentation provided by the CME

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DOE assessment**Date:** 26/04/2019

1. CME has justified the reason for more surveys done than the required sample size and the sample size chosen is in compliance with the Standard "Sampling and surveys for CDM project activities and programmes of activities, Version 07.0".

CL is closed.

CL ID	07	Section no.	E.3.4.3	Date: 11/02/2019
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Description of CL

1. In cell C9 of the stoves efficiency workbook of the ER sheet a sample size of 9 has been used for the monitoring parameter stove efficiency ($\eta_{new,i,j}$). However, in section E.2 and E.3 of the MR it is stated that sampling has been done using 3 stoves.
2. The stove numbers have not been provided for the stoves used for efficiency testing.
3. PP has used 3 stoves for monitoring of the efficiency and provided reference of option 3 as per the monitoring methodology AMS-II.G, version 08: "However, the following simplified approach may be used, when the efficient cook-stoves are produced by a manufacturer with a **good quality management system** in place to ensure that the individual equipment produced do not vary beyond the range of acceptance limits (e.g. characteristics such as materials, critical dimensions):
 - (i) Conduct a sample test on three cook stoves with three tests conducted for each stove;
 - (ii) If the standard deviation of the nine test results indicated above is very small and 90/10 precision requirement is met (in this case, the value of the t-distribution for 90 per cent confidence shall be used instead of Z value), the efficiency determined is acceptable, otherwise more sample tests would be required until 90/10 precision is met". The quality management system used for the manufacturer of the stove needs to be provided.
4. Monitoring report did not present evidence that there is a QA/QC system in place to ensure the teams carrying out the measurements and generating primary data are performing under standard procedures. This shall be provided in the context of all the monitoring parameters determined through sampling.

CME response**Date:** 27/02/2019

1. The number of was referring to 3x3 tests. New tests have been performed on two stoves from this PoA (3 tests per stove) as per sample size calculation, and found statistically representative. The ER sheet and Section E.2 have been corrected as per new stove tests results and DOE comment.
2. Stove ID numbers have now been provided in the ER sheet and section E.2.
3. It is clarified,
 - the provided reference of option 3 in the MR refers to the paragraph 20 of AMS II.G (Water boiling test)
 - as already specified in section E.1 of the MR, $\eta_{new,i,j}$ is measured based on "Sampling and monitoring is implemented per batch (age class)" and with "90/10 precision" under QA/AC procedures of the parameter table of the MR, which implicitly refers to option 2 in the parameter table of $\eta_{new,i,j}$ in AMS II.G.:

"2. Alternatively, manufacturer specifications on efficiency based on water boiling test (WBT) may be used. The sampling test of stoves by such certification bodies/agents or manufacturers shall be conducted following a 90/10 precision in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities"
 - "Annual monitoring as default option c) is chosen to adjust for the loss in efficiency as per paragraph 25 of AMS II.G":

"(c) Determine⁹ the rate of efficiency drop for a representative sample of the first batch of project decide i in year y and assume that same rate of loss in efficiency..."
 - "Tests are performed by third parties and cross-checked with manufacturer information, if available", as CPA-DD. In this case: KNUST Technology & Consultancy Center, a partner of the Global Alliance for Clean Cookstoves.

The parameter table of efficiency in the MR has been updated to clarify accordingly.

4. QA/QC procedures have been defined in the registered CPA-DD as per AMS II.G and the Project Standard. Accordingly, Section D of the MR reflects the QA/QC system in place in combination of QA/QC procedures for each parameter described in section E.2 of the MR. Section D of the MR mentions further details.
QA/QC compliance for the Institutional/Personnel capacity for WBTs is provided.
The monitoring team has been trained in all relevant aspects relating to their role and as per CPA-DD. The team is further very aware of CDM (monitoring) requirements due to implementation of monitoring plan of VPA1 under Gold Standard Programme "GS1385 Man and Man Enterprise Improved Cooking Stoves Programme in Ghana" (fifth verification ongoing), which also applies AMS II.G and a very similar monitoring plan.

Documentation provided by the CME

Revised MR & ER sheet;

QA/QC compliance for the Institutional/Personnel capacity for WBTs (pending).

Training certificates of monitoring team.

Stove test results

DOE assessment**Date:** 13/03/2019

1. CME has clarified that 9 tests was a reference to 3 tests on 3 stoves each (3x3). The sample size has been recalculated by the CME. It has been noted that a mean of 0.3 has been used even though the ex-ante value of the efficiency of the stoves was 29.5% (27.5% after considering loss during the crediting period). The reason for the same shall be provided. A standard deviation of 0.016 has been provided with a link to a GS project. It needs to be clarified how this is relevant to the PoA/CPA sampling. CL 07.1 remains open.
2. CME has provided the Stove ID numbers for the stoves used for efficiency testing in the section E.2 of the MR. CL 07.2 is closed.
3. CME has clarified that option 2 as per the Data/Parameter Table 11 of the section 6.1 of the methodology AMS-II.G, version 08 has been used. Option 2 as per the table is not applicable to the PoA/CPA. CL 07.3 is closed.
4. The monitoring surveys are done in the supervision of Mr Michael Yaw Agyei and Mr Ernest Nyanteh Adu, both of whom are trained in conducting the sampling surveys. The certificates have been provided to the verification team. The QA/QC compliance of the personnel/institution responsible for WBTs has not been provided. CL 07.4 remains open.

CME response**Date:** 05/04/2019

1. Please refer to CL6.

4. The QA/QC compliance of the personnel/institution responsible for WBTs is provided herewith.

Documentation provided by the CME

QA/QC compliance for the Institutional/Personnel capacity for WBTs

DOE assessment**Date:** 15/04/2019

1. PP has provided comment in the ER sheet with a reference to a GS project, however the value thus obtained has not been provided in the comment and also it is not clear how the value for vintage 4 of the GS project is comparable with the vintage 1 of the reported PoA. CL 07.1 remains open.
4. The QA/QC compliance of the institution has not been provided to the verification team. CL 07.2 remains open.

CME response**Date:** 16/04/2019

1. It is clarified that the applied standard deviation refers to the 2018 age group, i.e. stoves, which have distributed very recently, i.e. an age group comparably to vintage 1 of the reported VPA. "Age group 2018" has been inserted in each reference of the workbook sample size to clarify.
2. The QA/QC compliance of the institution is submitted herewith.

Documentation provided by the CME

Revised ER

Capacity of the c-lab scanned.pdf

DOE assessment**Date:** 17/04/2019

1. CME has clarified that the standard deviation for the calculation of sample size of efficiency of stoves has been used based on 2018 age group stoves, this corresponds to a comparable vintage of stoves distributed under the CPA of the PoA. CL 07.1 is closed.
2. The QA/QC compliance of the institution has been provided and based on the certificate provided, it is confirmed that the C-LAB (Cook Stove Testing and Expertise Laboratory) at the Kwame Nkrumah University in Kumasi was commissioned in March 2015 and the staff of the laboratory were trained by Approvecho Research Centre USA to conduct the Water Boiling Tests.

CL is closed.

CL ID	08	Section no.	E.3.4.4	Date: 11/02/2019
Description of CL				
<i>In section E.3 of the MR, for WBT it is stated that "In the absence of protocol and local/national requirements, manufacturer's specifications apply. If not applicable, calibration is done at the beginning of the test campaign, verified on a weekly basis, and reported in the monitoring report." It needs to be clarified if any calibration has been conducted for the monitoring equipment used in the WBTs.</i>				
CME response				Date: 27/02/2019
Manufacturers' specifications do apply, therefore no calibration at each beginning of test campaign. (cf. Calibration letter from stove testing lab: « not require further calibration as per installer's recommendation »)				
Documentation provided by the CME				
<i>Calibration letter from stove testing lab</i>				
DOE assessment				Date: 13/03/2019
<i>In the section B.5.2 of the registered/included CPA-DD, it is stated that "Specifications of the calibration frequency for the measuring equipments. In cases where neither the selected methodology, nor the Board's guidance specify any requirements for calibration frequency for measuring equipments, project participants shall ensure that the equipments are calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used." It needs to be clarified if the same has been followed in the calibration for the equipment used for measurement.</i>				
CME response				Date: 05/04/2019
As per calibration letter from stove testing lab, manufacturer specifications implicitly apply and no further calibrations are required, as per installer recommendation (Aprovecho Research Center).				
Documentation provided by the CME				
DOE assessment				Date: 15/04/2019x
CME has clarified that the manufacturer specifications are implicitly applied and no further calibrations are required for the equipment as per the recommendation of the installer of the equipment at the laboratory. CL is closed.				

CL ID	09	Section no.	E.3.5.1	Date: 11/02/2019
Description of CAR				
<i>For the calculation of baseline emissions, the values from the monitoring surveys workbook of the ER sheet are used to calculate the value of parameter μ_y. However, for stove numbers 3689 and 3191- Stove operating is no and still the frequency is 3 for the stove.</i>				
CME response				Date: 27/02/2019
<i>3689 seems to have been a faulty data transcription from survey sheet to workbook. The 'no', has been replaced by 'yes'. As for 3191, the survey sheet suggests that the stove hasn't been used recently. The 'no' is thus justified. Consequently, M&M frequency has been conservatively modified to 0. The other stove continues to be taken into account, which is conservative.</i>				
Documentation provided by the CME				
<i>Revised ER sheet</i>				
DOE assessment				Date: 13/03/2019

CME has clarified that for the stove 3689, the error is due to the faulty data transcription from the survey sheet. This has been confirmed through the review of the Monitoring Survey sheet for the stove 3689. For the stove 3191 since even the monitoring survey sheet provides a value of 3, it needs to be clarified how CME determined that the value noted was incorrect and whether any follow up interviews were conducted with the monitoring personnel or the end user. It needs to be clarified how this is not a systematic error, a root cause analysis and corrective action needs to be provided for the same in addition to the corrections done for the identified errors.

CME response **Date:** 05/04/2019

For stove 3191, the user has been called to clarify and a human error in the data collection during survey implementation detected: The stove has been used recently, i.e. the figure of 2 has been inserted in the monitoring surveys workbook for M&M stove use whereas recent use is kept at zero for conservativeness. The MR has been revised accordingly for all affected parameters and sections.

Such inconsistencies (whether rooted in distraction or habit) will be better screened and corrected through a check-call-system when spotted thanks to the current implementation of an electronic interface for end-user data and surveys inputs, which will allow for automatic data control.

Documentation provided by the CME

Revised MR.

DOE assessment **Date:** 15/04/2019

CME has stated that the stove user was contacted again by the CME and a revised survey was conducted due to the incorrect survey sheet filled for the user. The revised survey sheet has been provided to the verification team. The usage of the stove has been taken as 0 conservatively by the CME.

CL is closed.

CL ID	10	Section no.	E.3.5.1	Date: 11/02/2019
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Description of CAR

There are more than one household with the same telephone number in the sales database (e.g. Stove ID 330 and 1820, 1224 and 2798, 780 and 565, 3454 and 1798 etc.). It needs to be clarified how multiple households have the same telephone number.

CME response **Date:** 27/02/2019

There are 100 stove IDs out of 15,522 entries (=0.64%), which are concerned by double entries. As it can be seen from the database, many of these double entries refer to multiple purchases by one and the same person (e.g. same family name and/or first name and same address). In other cases, members of the same household indicate the same phone number because they live in the same house and one of them does not own a phone (frequent situation in peri-urban areas in Ghana where several families share the same house and don't afford a different phone per family). This is supported by the fact, that shared phone users share the same address, too!

Multiple M&M stove use in one household is monitored via $N_{d,HH}$.

Documentation provided by the CME

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DOE assessment **Date:** 13/03/2019

CME has clarified that there are households with multiple stove and it is monitored via parameter $N_{d,HH}$ as per the para 22 of the methodology AMS-II.G, version 08. However, the emission reductions have not accounted for the parameter and in cell C66 of the 'monitoring surveys' workbook of the ER sheet a value of 1.00 has been used for the parameter.

CME response **Date:** 05/04/2019

$N_{d,HH}$ amounts to 1.0 based survey results of 54 users, i.e. none of the users surveyed had an additional M&M stove at home.

While this is a statistically plausible and likely result, 33 users have been removed from the user database: Users with 1) identical telephone number and family name with another user 2) identical telephone number with another user but no family name in user data base 3) identical telephone number with another user and family name in the column 'first name' of the database (indicating an error of data collection).

The MR has been revised to take account of the new total of stoves distributed.

Documentation provided by the CME

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DOE assessment **Date:** 16/04/2019

CME has clarified that no households were found to be using more than one project stove during the monitoring survey.

CME has also deleted the cells with identical data sets to account for duplicate users (if any). The MR has been revised to account for the total stoves in the database.

CL is closed.

CL ID	11	Section no.	E.3.5.1	Date: 15/03/2019
Description of CAR				
<p>The calculation for the monitoring parameter fNRB has been presented in the 'fNRB' workbook of the ER sheet. Following clarifications have been raised with regards to the calculations:</p> <ol style="list-style-type: none"> 1. It is not clear if the calculations for H (total consumption of wood) have been done in accordance with the para 13 (equation 3) of the Methodological tool: Calculation of the fraction of non-renewable biomass, Version 1.0. 2. The reason for excluding other wooded land from the calculations is not provided. 3. In accordance with the para 18 of the tool (fNRB) version 1.0, the estimation of the extent of forest areas, other wooded land areas, and protected areas have not been made in accordance with the suggested reference for the calculation of RB. 4. It shall be justified why the values from Table 4.9 of the Chapter 4 of the IPCC2006, Vol.4, uses values only for the 20-year interval period. 				
CME response				Date: 05/04/2019
<ol style="list-style-type: none"> 1. As per version 2.0 of the tool, "the overall consumption for woody biomass", shall be estimated "using one of the following options: (a) Official statistics or reports or peer-reviewed literature; (b) Based on the number of households and other consumers of woody biomass in the country or region (H) or project area (Bold,total) as per the procedure in paragraph 12 or 13 of the tool. Option (a) is chosen. 2. The parameters seems to be included in Fforest,i as no specific data is available for "other wooded land" in the used and other sources. 3. As per tool, FAO 2015, official statistics or project-specific survey data may be used as a reference, i.e. not preventing the use of other sources. The country's REDD+ forest reference levels submitted to the UNFCCC (https://redd.unfccc.int/submissions.html) provide latest values and are in line with para. 18 of the tool, v.2. <p>No specific data is available for <i>protected areas</i> in the used and other sources. The application of a value of zero is conservative.</p> <ol style="list-style-type: none"> 4. Over the past decades, Ghana was marked by deforestation with very little reforestation, i.e. remaining forest is mostly > 20 years old or primary forest (cf. page 8 and Table 9, of NATIONAL REDD+ SECRETARIAT/FORESTRY COMMISSION 2017, https://redd.unfccc.int/files/ghana_national_reference_level_01.01_2017_for_unfccc-yaw_kwakye.pdf). The values for the 20-year interval period are also conservative. 				
Documentation provided by the CME				
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DOE assessment				Date: 15/04/2019
<ol style="list-style-type: none"> 1. CME has justified that the values used are in accordance with the Option (a) of the para 12 of the tool 30: Calculation of the fraction of non-renewable biomass, version 02. CL 11.1 is closed. 2. CME has clarified that since no specific data is available for other wooded land, data has not been provided for the same. CME has also stated that the "parameters seems to be included in Fforest,i", it needs to be clarified on what basis CME has provided the statement. CL 11.2 remains open. 3. CME has clarified that in accordance with the para 18 of the Tool 30, version 2, CME has used the data from country's REDD+ forest reference levels submitted to the UNFCCC and no specific data is available for protected areas thus conservative value of 0 has been used. CL 11.3 is closed. 4. CME has justified that in last 20 years there has been very less reforestation and also that the values for the 20-year interval period are conservative, thus the value has been accepted by the verification team. CL 11.4 is closed. 				
CME response				Date: 16/04/2019

2. As clarified, no specific data is available in any of the used reports. The absence of data is explained in the "Global Forest Resources Assessment 2014, Country Report Ghana", p.10: "Original data do not allow for identifying areas of other wooded land. Any such areas are included within the categories of forest and other land."

According to page 9 of the same report, tier 2 data source is used for determining other wooded land, which is "Full cover mapping / remote sensing or old NFI (more than 10 years ago)." Land cover maps are also applied in the REDD+ report for recording Activity data for deforestation (p. 65), for which similar data reporting is assumed.

A comment has been inserted in cell E28 of the workbook.

Documentation provided by the CME

Revised ER sheet

DOE assessment

Date: 17/04/2019

2. CME has provided the reference for the use of the value based on the statement in the Global Forest Resources Assessment 2014, Country Report Ghana". CL11.2 is closed.

CL ID	12	Section no.	E.3.4.2	Date:	02/01/2020	
Description of CL						
<i>In section E.2 of the MR, the value for the parameter $N_{y,i,j}$ and N has increased from last submitted version of the MR. The reason for the increase in the value shall be provided.</i> <i>Also, the reason for increase of 'Total population size' used for the monitoring parameter $\eta_{new,i,j}$ shall be provided.</i>						
CME response				Date:		03/01/2020
<i>Initially, the few multiple stoves of single users had been conservatively excluded from the database to maintain the ex-ante value of $N_{d,HH}=1$. The value was conservatively rechecked (QA/QC) via the monitoring survey.</i> <i>However, as per IRC concern not all multiple stoves had been excluded thoroughly from the database shedding light on the overall approach, which was finally considered not to be fully in line with AMS II.G. Accordingly, a PRC was suggested and approved on 15 December 2019.</i> <i>As a consequence, all previously excluded multiple stoves were reincluded and $N_{d,HH}$ is now thoroughly and only determined via the database entries. This leads to higher values of $N_{y,i,j}$ and N, as well as a higher value of the discount factor $N_{d,HH}$.</i>						
Documentation provided by the CME						
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DOE assessment				Date:		06/01/2020
CME has clarified that the multiple stoves of single users had been excluded from the database and have been added back due to the PRC made to the PoA/CPA and the parameter $N_{d,HH}$ is now thoroughly and only determined via the database entries in accordance with the revised approved CPA-DD and the Data / Parameter table 21 of the methodology, AMS-II.G, version 8. However, it has been noted that all the details of the households including 'customer name' (first name/ last name) and 'Contact details of customer' are not provided in the sales/distribution database in accordance with the section B.5.2 of the CPA-DD.						
CME response				Date:		07/01/2020
For identification of a costumer, CME requires at least the name (or first name) and in addition, an address and/or telephone number. All database entries have at least an address. However, four stoves have been identified in the database with an address but without any name (neither name, nor first name) (database entries #4982, #5147, #10189, #11131). All 4 stoves have now been deleted from the database. As per above determination of $N_{d,HH}$ is revised based on First Name, Name and address/town (instead of telephone) to take due account of users who didn't provide any telephone number (e.g. stove CDM.MM.CPA001.3865) in accordance with section B.5.2 in the CPA-DD. $N_{d,HH}$ becomes 1.02. MR is revised accordingly.						
Documentation provided by the CME						
Revised MR Revised ER calculations						
DOE assessment				Date:		08/01/2020
CME has provided the reason for the increase in the values of the parameters $N_{y,i,j}$ and N from the last submitted version of the MR. All, the households with same name and telephone number have been treated as the same household and $N_{d,HH}$ calculated for such households. The overall value of $N_{d,HH}$ is 1.02.						

CL ID	13	Section no.	E.3.6.1	Date: 04/03/2020
Description of CL				
The emission reduction spreadsheet (CER calculation workbook, Cell E18) indicates the stoves distributed under the CPA as 15,518 units. The emission reduction calculation has applied a value of 16,513 units (CER calculation workbook, Cell E32) which was calculated based on the length of the monitoring period. The CME/DOE shall provide information to clarify the applied value considering that the applied methodology requires $N_{y,i,j}$ is based on the actual distributed units.				
CME response				Date: 04/03/2020
The cut-off date in the stove database' was referencing to 14/12/2018 from an obsolete version, when the actual cut-off date as retained in the 'CER calculation' worksheet accounted for 13/12/2018, i.e. the day before the first monitoring surveys; both have been harmonized to 13/12/2018 as per published Monitoring Report so that the $N_{y,i,j}$ indeed shows less than the total Stoves under CPA (15,518). This actual number of distributed units is translated into the equivalent number of full-used stoves over the MP crediting days (15,405) – as some stoves were distributed during the period thus not used for its full 14 days – and adjusted by operational monitoring ratio pop_stoves_y , resulting in 15,120 operating devices during the (full) monitoring period.				
Documentation provided by the CME				
Revised ER sheet and MR				
DOE assessment				Date: 05/03/2020
CME has clarified that the incorrect referencing to 14/12/2018 from an obsolete version of the stove database workbook has been corrected. In cell L2 of the stove database workbook an external reference was used, which has been corrected to provide the correct end date of the monitoring period, i.e. 13/12/2018. The value for the parameter $N_{y,i,j}$ is thus revised and is based on the ratio of operating stoves (pop_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 15,120 and is less than the total stoves distributed in the CPA (i.e. 15,518).				

CL ID	14	Section no.	E.3.6.1	Date: 04/03/2020
Description of CL				
The emission reduction spreadsheet (stove database, cells O1/O2) indicate that 15,518 stoves were sold to 15,208 households indicating that some households have more than one project stove. An adjustment factor (i.e. calculated as stoves sold/HH users =1.02) to represent the Number of project devices per household ($N_{d,HH}$). The DOE to provide information on how it verified this approach complies with paragraph 20 and 21 (AMS-II.G. ver. 08) which require application of equation (6) for one device and equation (9) for more than one device per household.				
CME response				Date: 04/03/2020
The adjustment factor $N_{d,HH}$ (line 27 of the CER worksheet) is already applied in the CER calculations through equation (9) $Bold_{i,j} = Bold_{HH} \div N_{d,HH}$ as per cell J41! Then this adjusted $Bold_{i,j}$ feeds back into equation (6) in cell G41.				
Documentation provided by the CME				
-				
DOE assessment				Date: 05/03/2020
It has been noticed that there are some fields entered after the cutoff date of the monitoring period which are listed in the stove database. CME shall clarify on the same.				
CME response				Date: 05/03/2020
Post cut-off date fields have been removed from the stove database as they relate to the next monitoring period only.				
Documentation provided by the CME				
Revised ER sheet and MR				
DOE assessment				Date: 05/03/2020
CME has removed/ deleted the post cutoff date fields from the ER sheet, the total number of unique household users for the monitoring period has marginally increased due to the fact that some household included in the monitoring period were found duplicates with the households beyond the monitoring period. This approach is acceptable as these households had only one stove till the end of the reported monitoring period, i.e. 30/11/2018 to 13/12/2018. CME has calculated the value for the parameter $N_{d,HH}$ as 1.02 as the number of stoves sold/ HH user. The value has been calculated based on the total number of stoves distributed in the CPA (cell O1 of the stove database workbook). This is based on the total stoves in the CPA (column A – A6 to A15523) for the stoves distributed up to 05/12/2018 (prior to the end date of the monitoring period, i.e. 13/12/2018). The value for				

the household users (unique household users) has been determined in the cell O2 of the stove database workbook. This is based on a counter check in the column N of the workbook (for same/similar households determined from column M of stove workbook (to identify each unique household). Paragraph 20 of the methodology, AMS-II.G, version 08 provides Equation 6 as:

$$B_{y,savings,i,j} = B_{old,i,j} \times \left(1 - \frac{\eta_{old,i,j}}{\eta_{new,i,j}}\right) \quad \text{Equation (6)}$$

And Paragraph 22 of the methodology, AMS-II.G, version 08 provides Equation 9 as:

$$B_{old,i,j} = B_{old,HH} \div N_{d,HH} \quad \text{Equation (9)}$$

Thus, $B_{old,i,j}$ is determined in the cell J41 and J50 of the CER calculation workbook calculated the value in accordance with the equation 9 of the methodology, AMS-II.G, version 08.

The parameter $B_{y,savings,i,j}$ is calculated in accordance with the paragraph 20 and equation 6 of the methodology, AMS-II.G, version 08 in the cell G41 and G50 of the CER calculation workbook along with the product of leakage factor.

Thus, the approach used by the PP for calculation is in accordance with the paragraph 20 and 22 of the methodology, AMS-II.G. ver. 08. Paragraph 21 of the methodology AMS-II.G. ver. 08 is not applicable as CCT (Controlled cooking test) is not applicable to the CPA.

Table 3. CARs from this verification

CAR ID	01	Section no.	E.1.1	Date: 11/02/2019
Description of CAR				
<i>Monitoring report does not comply with the para 353 of the VVS for the PoAs version 02:</i>				
<ol style="list-style-type: none"> <i>In accordance with the para 8 of the General Instructions of the monitoring report form (CDM-PoA-MR-FORM) all the numbers have not been presented in internationally recognized format (such as z-value in section E.3 of the MR, precision values in section E.2 of the MR).</i> <i>On the cover page of the MR, the number of the monitoring report is not provided.</i> 				
CME response				Date: 27/02/2019
<ol style="list-style-type: none"> <i>All numbers are now presented in an international recognized format.</i> <i>The number of the MR is now provided.</i> 				
Documentation provided by the CME				
<i>Revised MR</i>				
DOE assessment				Date: 13/03/2019
<ol style="list-style-type: none"> <i>The numbers presented in the monitoring report comply with the para 8 of the General Instructions of the monitoring report form (CDM-PoA-MR-FORM). CAR01.1 is closed.</i> <i>The number of the MR is provided as 10430-MP1-MRP1. The monitoring report number shall be provided in accordance with the instructions to complete the monitoring report form, CDM-PoA-MR-FORM. CAR 01.2 remains open.</i> 				
CME response				Date: 05/04/2019
<i>2. The number of the MR has been revised to 1. The cover page has been revised accordingly.</i>				
Documentation provided by the CME				
<i>Revised MR.</i>				
DOE assessment				Date: 15/04/2019
<i>2. The monitoring report number has been updated on the cover page and has been provided in accordance with the instructions to complete the monitoring report form, CDM-PoA-MR-FORM. CAR 01.2 is closed.</i>				

CAR ID	02	Section no.	E.3.1	Date: 11/02/2019
Description of CAR				
<i>The annual thermal energy savings from the CPA has not been provided in the section C.1 of the MR to demonstrate that the CPA is within the small-scale/micro-scale limit for a Type-II project activity.</i>				
CME response				Date: 27/02/2019
<i>A phrase has been inserted in section C.1 indicating the annual thermal energy savings and confirming that the CPA limits are not exceeded.</i>				
Documentation provided by the CME				
<i>Revised MR</i>				

DOE assessment	Date: 15/03/2019
The annual thermal savings from each stove has been provided in the section C.1 of the MR, however total thermal savings from the CPA/PoA during the monitoring period is not provided.	
CME response	Date: 05/04/2019
As per eligibility criteria 8, the small-scale/micro sale limit of the CPA is defined as "The nominal energy savings of each ICS shall be lower than 600 MWh/unit, which is equivalent to 1,800 MWh _{th} /unit." The requirements of "Description of implemented CPAs" do not ask for further detail either. As per request, a statement has been inserted in section C.1 of the MR: "Total energy savings are 108,280 MWh _{th} per year."	
Documentation provided by the CME	
Revised MR.	
DOE assessment	Date: 16/04/2019
Annual thermal savings from each stove has been provided in the section C.1 of the MR and the total thermal savings from the CPA has also been provided. The Total thermal savings are 108,280 MWh _{th} per year and are less than 180 GWh _{th} per year for a small-scale project activity. CAR is closed.	

CAR ID	03	Section no.	E.3.5.1	Date: 11/02/2019
Description of CAR				
<i>The calculation of baseline emissions has been done using 15 days in the ER sheet even though there are only 14 days in the monitoring period.</i>				
CME response				Date: 27/02/2019
<i>14 days corresponds to the effective monitoring period. The ER sheet and relevant sections of the MR have been modified accordingly.</i>				
Documentation provided by the CME				
Revised MR & ER sheet				
DOE assessment				Date: 15/03/2019
The ER sheet and the MR has been modified and the emission calculation has been done based on 14 days of the monitoring period. CAR is closed.				

CAR ID	04	Section no.	E.3.5.5	Date: 11/02/2019
Description of CAR				
<i>In accordance with the para 270 and 271 of the Project Standard for the PoAs version 02, CME shall provide the comparison of the emission reductions achieved by each operational unit with the registered CPA-DD in order to explain any increase that might been achieved at the individual unit level or at the CPA level.</i>				
CME response				Date: 27/02/2019
<i>The ER sheet and Section F.6 of the MR has been revised and the updated fnrb value taken into account. As a result, section F.6 is not applicable anymore since emission reductions during the monitoring period do not exceed ex-ante calculations anymore.</i>				
Documentation provided by the CME				
Revised MR & ER sheet				
DOE assessment				Date: 15/03/2019
In accordance with the para 270 and 271 of the Project Standard for the PoAs version 02, CME shall provide the comparison of the emission reductions achieved by each operational unit with the registered CPA-DD and the underlying value of the parameters for any increase or decrease in the values.				
CME response				Date: 05/04/2019
The comparison has been inserted and a little comment added on the increase per stove.				
Documentation provided by the CME				
DOE assessment				Date: 16/04/2019
CME has provided comparison of the per unit ERs with the ex-ante estimates and provided the underlying reasons for the increase in the value in the section F.6 of the MR. CAR is closed.				

CAR ID	05	Section no.	E.3.4.2	Date: 02/01/2020
Description of CAR				
<i>IRC Finding: The CPA-DD (page 17) indicates that the parameter Fraction of woody biomass saved by the project activity (fNRB) will be monitored on annual basis whereas the applied methodology (AMS-II.G. ver. 08, parameter Table 5) requires that this parameter value is fixed ex-ante.</i>				

CME response	Date: 03/01/2020
As per revised registered CPA-DD (after PRC approved on 15 December 2019) (p.13), the parameter fNRB is now fixed ex-ante (at PoA-DD level). Cf. Appendix 7 of CPA-DD for details.	
Documentation provided by the CME	
-	
DOE assessment	Date: 06/01/2020
The parameter Fraction of woody biomass saved by the project activity (fNRB) has been changed to ex ante parameter and the value is determined ex ante. The IRC findings is thus not applicable.	

CAR ID	06	Section no.	E.3.4.1	Date: 02/01/2020
Description of CAR				
<p><i>IRC Finding:</i> The CPA-DD (page 8) shows that the annual quantity of woody biomass that would have been used in the household in the absence of the project activity (Bold = 4.2 tons of wood/HH) is calculated from annual average fuel consumption of two stoves (i.e. firewood and charcoal consumption per household). However, the CPA-DD (pages 10) indicates that the project stoves will displace traditional charcoal stoves only. The CME/DOE shall provide information to clarify how the Bold (based on two baseline fuels) is also applicable for project stoves (which displace only charcoal stove).</p>				
CME response				Date: 03/01/2020
<p>A PRC has been introduced in this respect (and approved on 15 December 2019), to "reflect better the actual situation and objective of the CPA1 and CPA2, namely to replace inefficient charcoal stoves by efficient charcoal stoves." Bold now captures charcoal consumption only. Cf. Appendix 7 of CPA-DD for details.</p>				
Documentation provided by the CME				
-				
DOE assessment				Date: 06/01/2020
A PRC has been made to the PoA-DD and CPA-DD and the values estimated in the section B.4.1 of the CPA-DD (page 8) is calculated as 4.32 tonnes/household/year. The value has been calculated based on charcoal consumption and thus is applicable to the CPA.				

CAR ID	07	Section no.	E.3.4.2	Date: 02/01/2020
Description of CAR				
<p><i>IRC Finding:</i> The monitoring report (page 16) indicates a monitored value of one (1) stove per household for the parameter number of project devices distributed per household (Nd,HH). The CPA-DD (page 9) states that several ICSs may be used by the same household but only one will be included into the CPA. However, the excel sheet stove database workbook indicates that some households have more than one stove (e.g. stoves database, cells B5650-B5653 (Abiba) has 4 stoves, B8838-B8839 (Phillip) has 2 stoves etc.) and all have been considered for emission reduction calculation. The DOE shall report how it verified compliance with the registered CPA-DD.</p>				
CME response				Date: 03/01/2020
<p>A PRC has been introduced in this respect (and approved on 15 December 2019), to bring the generic CPA-DD in line with AMS II.G. The mentioned multiple stoves above have now been identified and are now discounted in the ER calculations via discount factor $N_{d,HH}$. Cf. Appendix 7 of CPA-DD for details.</p>				
Documentation provided by the CME				
-				
DOE assessment				Date: 06/01/2020
A PRC has been made to the registered PoA-DD and CPA-DD and the parameter number of project devices distributed per household (Nd,HH) is monitored based on the user database. The value of the parameter thus determined in the monitoring period is 1.02. Households with same name and address/ location have been treated as same entities and thus number of project devices distributed per household (Nd,HH) is monitored accordingly.				

CAR ID	08	Section no.	E.3.4.1	Date: 02/01/2020
Description of CAR				

<p><i>In section E.1 of the MR, all the parameters ($B_{old,p}$, $N_{p,HH}$) listed in the revised approved CPA-DD are not listed in the MR.</i></p> <p><i>In section E.1 and F.1 of the MR, for parameter $B_{old,i,j}$, the value applied is not consistent with the revised approved CPA-DD. The value in additional comments for $N_{d,HH}$ is also not consistent with the revised approved CPA-DD.</i></p>	
CME response	Date: 03/01/2020
<p><i>$B_{old,p}$ and $N_{p,HH}$ are fixed ex-ante and purely serve as factors to calculate $B_{old,HH}$, which is fixed ex-ante as well. $B_{old,HH}$ is listed in the MR.</i></p> <p><i>$B_{old,p}$ and $N_{p,HH}$ are readed in section E.1, as per request.</i></p> <p><i>$B_{old,i,j}$ is determined as $B_{old,HH} \div N_{d,HH}$ with $B_{old,HH}$ being determined ex ante and $N_{d,HH}$ monitored.</i></p> <p><i>Accordingly the ex-ante value of $N_{d,HH} = 1$ becomes 1.02 during the first monitoring period, which leads to a $B_{old,i,j}$ value different to $B_{old,i,j}$ value in the CPA-DD. The approach is consistent with AMS II.G which lists $B_{old,HH}$ as ex-ante parameter and $N_{d,HH}$ as monitored parameter, and has been part of the PRC approved on 15 December 2019.</i></p>	
Documentation provided by the CME	
Revised MR.	
DOE assessment	Date: 07/01/2020
<p>In section E.1 of the MR, parameters $B_{old,p}$, $N_{p,HH}$ have been listed in accordance with the revised approved CPA-DD.</p> <p>CME has also stated that the value of the ex-ante parameter $B_{old,i,j}$ has changed due to having a monitored parameter in the calculation for the parameter.</p> <p>The parameters have also been listed as ex-ante/ monitored parameters in the methodology AMS-II.G, version 8 and thus the proposed calculation has been accepted in accordance with the Data / Parameter table 4 of section 5.4 of the methodology AMS-II.G, version 8. The parameters are consistent with the methodology AMS-II.G, version 8 and the revised approved CPA-DD.</p>	

Table 4. FARs from this verification

FAR ID	xx	Section No.		Date: DD/MM/YYYY
Description of FAR				
CME response				Date: DD/MM/YYYY
Documentation provided by the CME				
DOE assessment				Date: DD/MM/YYYY

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 parameter was added during the post registration change (10430-PRC-002). The value is cross verified from the revised approved CPA-DD/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 parameter was added during the post registration change (10430-PRC-002). The value is cross verified from the revised approved CPA-DD/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-DD/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:	4.24 tonnes/household/year (B _{old,i,j} is calculated as B _{old,HH} / N _{d,HH}) N _{d,HH} = 1.02
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-DD/B04/

Data/Parameter	η_{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-DD/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 parameter was changed from monitored parameter to ex-ante parameter during the post registration change (10430-PRC-002). The value is cross verified from the revised approved CPA-DD/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:	At least once every two years (biennial)
Reporting frequency:	At least once every two years (biennial) (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 OSV.
How were the values in the monitoring report verified?	<p>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 site visit.</p> <p>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 ($p_{\text{pop_stoves},y}$) observed during the monitoring is 98.15 % which is higher than the ex-ante estimates of 90%. The higher value of the operational stoves is justified as the monitoring period is only for 14 days and the stoves</p>

	have been in operation for less than a year and thus mostly found operational. The values were cross-checked through the inspection during the on-site visit.
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?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.</p> <p>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.</p>
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:	At least once every two years (biennial)
Reporting frequency:	At least once every two years (biennial) (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 OSV.
How were the values in the monitoring report verified?	<p>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 site visit.</p> <p>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. 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.</p>
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?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.</p> <p>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.</p>
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:	NA as the WBTs are conducted by a third party.

Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	
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?	<p>The value for the reported data was verified against the WBT test records /06/.</p> <p>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/.</p> <p>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.</p>
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?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC process are in place.</p> <p>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.</p>
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 as no households have been found in the database or during sampling survey with more than 1 project stove. All the households with identical names have been deleted from the database conservatively to account for duplicates in response to the CL 10.
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	NA. Full data is available for the monitoring period.

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?	
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Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	$f_{NRB,y}$
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 FAO and IPCC data (as far as possible) and national statistics. Methodological Tool, Calculation of the fraction of non-renewable biomass, version 02.0/B10/ is used to determine the value of the parameter.
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?	CME has calculated the value for the fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass and the value determined is less than the ex-ante estimates. The parameter has been calculated in accordance with the Methodological Tool: Calculation of the fraction of non-renewable biomass, version 02/B10/. In accordance with the para 11 (a) of the tool/B10/, the overall consumption of the woody biomass has been estimated based on the total removals obtained from

	<p>official statistics, i.e. FAO 2015 report for Ghana/11-1/, forest area and other wooded land obtained from 2017 National REDD+ Secretariat, Forestry Commission: Ghana's National Forest Reference Level/11-2/. The Net annual increment (MAI) has been obtained from the FAO Global Forest Resources Assessment 2000/11-3/ as no other latest data is available for the parameter.</p> <p>H has been calculated using equation (4) of the tool/B10/. Renewable biomass has been calculated in accordance with the para 15 of the fNRB tool, version 02/B10/.</p>
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?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.</p> <p>The appropriate QA/QC procedures have been followed for the monitoring parameter.</p>
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 parameters. 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.	Parameters determined through sampling and respective parameters of interest are: <ul style="list-style-type: none"> • 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 (μ_y) • Efficiency of the device of each type i and batch j implemented as part of the project activity ($\eta_{new,i,j}$)
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. Pop_stoves,y . The value of the parameter Pop_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 16 was determined for the parameter $N_{y,i,j}$ based on the required confidence interval/precision level of 90/10, this sample size was increased to 20 in order to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sampling surveys was done with 54 samples and is more than 30 sample size. This is in accordance with the § 13 of the Sampling Standard, version 07/B07/ as the parameter of interest is a proportion parameter. Simple random sampling was applied by the PP for selection of the monitoring samples with 90/10 confidence / precision level.

		<p>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 other Gold Standard project by the same CPA implementer. 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 38. However, to account for the non-responses CME used a sample of 46 to meet the lower responses in accordance with the requirements of the sampling standard/B07/. CME has conducted the monitoring survey for 54 households for the monitoring parameters, which is more than the required sample size for both the parameters and also more than the minimum 30 required in accordance with the § 13 of the sampling standard, version 07/B07/ for proportion parameters.</p> <p>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 other Gold Standard project by the same CPA implementer. 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 2 stoves. 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 07/B07/ for mean value parameters.</p> <p>The same is deemed acceptable as per the PoA-DD/CPA-DD/B04/.</p>
6.	What are the sample sizes obtained for the parameters being monitored? Is the determined	The determined sample sizes are presented below:

	<p>sample size deemed adequate for the parameter of interest being monitored?</p> <p>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.</p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>$N_{y,i,j}$ ($p_{op_stoves,y}$)</th> <th>μ_y</th> <th>$\eta_{new,i,j}$</th> </tr> </thead> <tbody> <tr> <td>Calculated Sample Size</td> <td>16</td> <td>38</td> <td>1</td> </tr> <tr> <td>Applying Oversampling</td> <td>20</td> <td>46</td> <td>2</td> </tr> <tr> <td>Applied Sample Size (to account for non-responses and outliers)</td> <td>54</td> <td>54</td> <td>2</td> </tr> <tr> <td>Reliability Precision achieved</td> <td>3 %</td> <td>9 %</td> <td>20 %⁶</td> </tr> </tbody> </table> <p>The sample size determined are appropriate for the PoA/B04/.</p>	Parameters	$N_{y,i,j}$ ($p_{op_stoves,y}$)	μ_y	$\eta_{new,i,j}$	Calculated Sample Size	16	38	1	Applying Oversampling	20	46	2	Applied Sample Size (to account for non-responses and outliers)	54	54	2	Reliability Precision achieved	3 %	9 %	20 % ⁶
Parameters	$N_{y,i,j}$ ($p_{op_stoves,y}$)	μ_y	$\eta_{new,i,j}$																			
Calculated Sample Size	16	38	1																			
Applying Oversampling	20	46	2																			
Applied Sample Size (to account for non-responses and outliers)	54	54	2																			
Reliability Precision achieved	3 %	9 %	20 % ⁶																			
7.	<p>Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort?</p> <p>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.</p>	<p>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.</p>																				
8.	<p>Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?</p>	<p>Yes, the assumed response rate is reasonable (appropriate and correct) for the determination of samples to be surveyed for the parameter of interest.</p>																				
9.	<p>Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?</p>	<p>Yes, verification based on review of sample taken and on-site inspection 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.</p>																				
10.	<p>Has minimum target level of precision been achieved based on estimates from the actual samples?</p>	<p>Yes, the minimum target level of precision been achieved based on estimates from the actual samples.</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>$N_{y,i,j}$ ($p_{op_stoves,y}$)</th> <th>μ_y</th> <th>$\eta_{new,i,j}$</th> </tr> </thead> <tbody> </tbody> </table>	Parameters	$N_{y,i,j}$ ($p_{op_stoves,y}$)	μ_y	$\eta_{new,i,j}$																
Parameters	$N_{y,i,j}$ ($p_{op_stoves,y}$)	μ_y	$\eta_{new,i,j}$																			

⁶ The required precision of the sample is not met and thus in accordance with the para 17 (b) (i) (a) of the Sampling Standard, version 07, lower bound of the value has been used for the emission reduction calculations. The option in (b) is eligible as the survey has been undertaken during the first two years of the crediting period in accordance with the para 17 (c) of the Sampling Standard, version 07.

		<table border="1"> <tr> <td>Calculated Sample Size</td><td>16</td><td>38</td><td>1</td></tr> <tr> <td>Applying Oversampling</td><td>20</td><td>46</td><td>2</td></tr> <tr> <td>Applied Sample Size (to account for non-responses and outliers)</td><td>54</td><td>54</td><td>2</td></tr> <tr> <td>Precision achieved</td><td>3 %</td><td>9 %</td><td>3 %</td></tr> </table> <p>This has been checked and confirmed by reviewing the sample size calculation presented in the ER sheet /04/ provided by the CME.</p>	Calculated Sample Size	16	38	1	Applying Oversampling	20	46	2	Applied Sample Size (to account for non-responses and outliers)	54	54	2	Precision achieved	3 %	9 %	3 %
Calculated Sample Size	16	38	1															
Applying Oversampling	20	46	2															
Applied Sample Size (to account for non-responses and outliers)	54	54	2															
Precision achieved	3 %	9 %	3 %															
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 17 of Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).	Yes. The minimum target levels of precision are met for each of the parameters and in accordance with the § 13 of the sampling standard, version 07/B06/, appropriate measures are taken for mean type and proportion type parameters for sample size calculations.																
12.	<p>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):</p> <ul style="list-style-type: none"> (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level (e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) <p>Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample</p>	DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves and to check if the WBT tests have been done in the households and all the households confirmed that the WBT tests were conducted in their households. As per the sampling standard /B07/, DOE had identified 18 samples out of the PP's 54 samples for the parameter $N_{y,i,j} (p_{op_stoves,y})$ and the parameter μ_y based on the AQL/UQL stated below. A sample of 18 is justified for the PoA since the PoA is located in a least developed country and meets the requirement of para 31 (c) of the Sampling Standard version 07/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 10 %. Acceptance number (c) thus determined for the sample is 1. A sample size of 18 households was chosen with no non-responses observed. All the identified 18 samples 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/. Thus, PP's set of records has been accepted in line with § 30 of the sampling standard, version 07B07/.																
13.	Are the procedures for the selected survey and data collection method unambiguously defined	Verification team based on on-site inspection interviews and review of documented procedure /02//04/ confirms that the selected																

	and do they adequately provide for minimizing non-sampling errors?	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 on-site inspection 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 on-site inspection interviews confirms that the quality control and assurance strategy is adequate.
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	The verification team has focused on abilities, qualifications and recognition of involved personnel in survey. During the on-site visit it was confirmed that the team was qualified as confirmed by on site inspection interviews and trained /07/ to carry out surveys 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: <ul style="list-style-type: none"> a) Are the personnel trained and experienced? b) What is the level of supervision and guidance provided to staff? c) Is there a standardized system for data entry and analysis to produce final result? d) Is there a system or process in place to minimize the introduction of errors? e) Is there a system in place to ensure all collected data is processed; f) Are quality checks performed on data entered, for example range checks, g) inconsistency checks, checking of subsamples of data by supervisors; h) is there a system to check for errors, record and report errors reported and document the remedial action taken; i) What is the level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion? 	Verification team based on review of provided documents /05/, /07/ and on-site inspection interviews confirms the following: <ul style="list-style-type: none"> ✓ the personnel involved in the surveys are trained and experienced. ✓ there exists a standardized system for data entry and analysis to produce final result. ✓ there exist a system or process in place to minimize the introduction of errors. ✓ there exists a system in place to ensure all collected data is processed. ✓ there exists a quality checks of data entered.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for programmes of activities” (CDM-EB93-A08-STAN);• Make structural and editorial improvements.
02.0	29 December 2017	Revision to align with the requirements of the “CDM validation and verification standard for programme of activities” (version 01.0).
01.0	5 June 2015	Initial publication.
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