




**Verification and certification report form for
CDM programme of activities
(version 02.0)**

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)	African Improved Cooking Stoves Programme of Activities UNFCCC PoA reference number: 5342	
Version number(s) of the PoA-DD(s) to which this report applies	Version 4.3	
Version number of the verification and certification report	043	
Completion date of the verification and certification report	236/401/20189	
Monitoring period number and duration of this monitoring period	Monitoring period number 05 25/10/2016 to 24/10/2017 (including both the days)	
Number and version number of the monitoring report to which this report applies	Monitoring report number: 2 Version number of the monitoring report: 23.0	
Coordinating/managing entity (CME)	Envirofit International Ltd.	
Host Parties	Host Parties of the PoA	Is this a host Party to a CPA covered in this report? (yes/no)
	Ghana	Yes
	Nigeria	No
	Liberia	No
Applied methodologies and standardized baselines	AMS II.G., version03, "Energy efficiency measures in thermal applications of non-renewable biomass"	
Mandatory sectoral scopes linked to the applied methodologies	3: Energy demand	
Conditional sectoral scopes linked to the applied methodologies, if applicable	Not applicable	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	5342-0001: 15,477 tCO ₂ e 5342-0002: 47,008 tCO ₂ e 5342-0003: 47,008 tCO ₂ e Total : 109,493 tCO ₂ e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	5342-0001: 15,477 tCO ₂ e 5342-0002: 0 tCO ₂ e 5342-0003: 151,842605 tCO ₂ e Total : 31,31927,082 tCO ₂ e	
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	Vikash Kumar Singh, Compliance Officer 	

SECTION A. Executive summary

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Introduction:

The Coordinating Managing Entity (CME), Envirofit International Ltd. has commissioned the DOE, Carbon Check (India) Private Ltd. (CC IPL) to perform an independent verification of the CDM Programme of Activities “African Improved Cooking Stoves Programme of Activities” in Ghana, Nigeria and Liberia (hereafter referred to as “Programme of Activities” or “PoA”) for the CPAs: 5342-0001, 5342-0002, and 5342-0003. The PoA helps in reducing the emission of greenhouse gases by distribution of the fuel-efficient cook stoves in individual households. The fuel-efficient cook stoves are replacing the traditional stoves that were being used in the baseline scenario.

During the current monitoring period although the three included CPAs (whose crediting period fall within this monitoring period) are being considered (5342-0001, 5342-0002 and 5342-0003) for verification, emission reductions are being claimed only for the first and third CPAs which are located in Ghana. CPA 5342-0002 has not been implemented yet, and hence no emission reductions for this CPA during the monitoring period are being claimed and neither will the ERs be claimed for the monitoring period in future. This was confirmed by reviewing the monitoring report /2/ and also during the on-site visit interviews. The CME is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activities. The CPA implementer for the CPA 5342-0001 is “The Centre of Energy, Environment and Sustainable Energy” (CEESD) and the CPA 5342-0003 is implemented by the CME itself, supported by the local entity CEESD.

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

Objective:

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

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

The objective of this verification was to verify and certify emission reductions reported for the “African Improved Cooking Stoves Programme of Activities” in the host country Ghana for the period 25/10/2016 to 24/10/2017.

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data, and used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and

presented in a concise and transparent manner. CCIPL's objective is to perform a thorough, independent assessment of the registered programme of activities.

In particular, the monitoring plan, monitoring report and the project's compliance with relevant UNFCCC and host Party criteria are verified in order to confirm that the 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/included CPA-DDs and approved monitoring methodology.

Scope:

The scope of the verification is:

- To verify the project implementation and operation with respect to the registered/included CPA-DD or approved revised CPA-DD
- To verify the implemented monitoring plan with the registered/included CPA-DD or approved revised CPA-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.

The verification comprises a review of the monitoring report over the monitoring period from 25/10/2016 to 24/10/2017 and based on the registered/included CPA-DDs in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by the CME.

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

The verification team assigned by the DOE concludes that the PoA-DD (Version 4.3, dated 07/06/2014 /B04/, Component Project Activities 5342-0001 and 5342-0003 as described in the registered CPA-DDs (Version 3.2, dated 27/11/2012 and Version 2, dated 22/10/2013 respectively) /B04/ and the Monitoring report (Version ~~2~~3.0, dated ~~31~~22/07~~1~~/2018~~9~~) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM Modalities & Procedures, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the requirements of CDM VVS for PoAs version 01.0 /B01-1/.

The component project activities were correctly implemented according to selected monitoring methodology, monitoring plan and the registered/included CPA-DDs. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the PoA has resulted in the ~~31,319~~27,082 tCO₂e emission reductions during the fifth (Monitoring report number 2) monitoring period.

CC IPL as a DOE is able 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/ Technical Expert	IR	Anand	Amit	CC IPL	X	X	X	X
2.	Team Member		Agarwalla	Sanjay Kumar	CC IPL	X			X
3.	Local Expert	EI	Wealth	Moses Dada	EI		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	Singh	Vikash Kumar	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	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/B04/.	The risk was mitigated by the training of the personnel involved in the data capture, calculation and by following the monitoring responsibilities. The training records were reviewed which was also confirmed during the on-site visit interviews. Verification team, based on the above, confirms that the risk is appropriately mitigated.
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	Medium	The data is recorded in the spreadsheets based on the raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and sales database and Stove	The identified risk was mitigated by managing access to the records. It was confirmed through interviews that the raw data is collected by the field personnel and then transmitted and stored electronically to the CME's

			<i>efficiency testing records.</i>	<i>office. The data quality control is maintained by the CME.</i>
3.	<i>Accuracy of the measuring equipment</i>	<i>Low</i>	<i>Check the calibration records for the measurement equipment used for efficiency test.</i>	<i>The risk due to accuracy of the measuring equipment was ensured by planning to check calibration certificates of the measuring equipment used for stove efficiency (water boiling tests).</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 § 307 of CDM VVS for PoAs, version 01.0 /B01-1/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 5% of 31,319 ~~27,082~~ tCO₂e which is equal to 1,566 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 1,566 tCO₂e is determined in line with para 307 (d) of CDM VVS for PoAs, version 01.0.

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

1. Monitoring system including the data input procedure (including relevant personnel and applicable template forms used)
2. Copy of the agreement between household and 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

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 on-site and off-site. Data flow was checked through comparison of data in hand written forms /5/, electronic database /6/ and ER sheet /4/. The competence 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 by means of on-site visit interviews.

The risks identified can be 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 of the personnel and during the on-site visit interviews. Further, data was crosschecked with the ER calculation spreadsheet /4/ and the raw data.

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 field personnel and then transmitted and stored electronically at CME’s office. The data quality control is maintained by the CME.

Accuracy of the measuring equipment: The risk due to inaccuracy in measurements was mitigated by reviewing calibration certificates of all the project equipment.

As no material errors, omissions or misstatements could be found, a reasonable level of assurance is achieved.

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 /1/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan /B04/ and monitoring methodology /B02/. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection: 18/07/2018 to 19/07/2018				
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/B04/, registered/included CPA-DDs/B04/.	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth
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/B04/	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth
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	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the CPA-DDs/B04/ and the selected methodology and corresponding tool(s), where applicable	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth
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	Ghana	18/07/2018 to 19/07/2018	Amit Anand Moses Dada Wealth

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			

1.	Ahiekpor	Julius	CEESD	18/07/2018 to 19/07/2018	Project implementation and operation, monitoring procedure, data and information flow, Roles and responsibility, Quality Assurance – Management and operating system, Sales/Distribution records, Survey records, Qualification and Training	Amit Anand Moses Dada Wealth
2.	Kotei	Benard	CEESD	18/07/2018 to 19/07/2018	Data and information flow, monitoring procedure, Sales/Distribution records, Survey records	Amit Anand Moses Dada Wealth
3.	Mensah	Issac	CEESD	18/07/2018 to 19/07/2018	Sales/Distribution records, Monitoring Survey and WBT	Amit Anand Moses Dada Wealth
4.	Lohia	Rohit	Envirofit	24/07/2018 (via skype)	Project implementation and operation, monitoring procedure, data and information flow, Roles and responsibility, Quality Assurance – Management and operating system, Sales/Distribution records, Survey records, Qualification and Training, CER calculation and completeness of monitoring report, compliance of monitoring plan with monitoring methodology and registered CPA-DDs.	Amit Anand

D.4. Sampling approach

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As assessed in above sections, emission reductions for only two implemented CPAs, 5342-0001, and 5342-0003, are being claimed for this monitoring period and the total population of the stoves under these two CPAs CPA 1 and CPA 3 are 9,375 and 5,866 respectively (total 15,241).

The four monitoring parameters to be monitored through the sampling plan are:

1. Efficiency of the system being deployed as part of the project activity (η_{new})
2. Stove Operation Fraction (SOF)
3. The fraction of end users that are still using baseline (replaced) stoves (f_{old})
4. The amount of woody biomass consumption that is consumed through the continued use of old stoves (μ_{old})

Simple random sampling across the two CPAs included in the PoA was applied by CME for selection of the monitoring samples with 95/10 confidence/precision for all four parameters for annual monitoring which is deemed acceptable as per the registered PoA-DD /CPA-DDs. Please refer to the section E.3.4.3 of this report on detailed assessment on sampling plan opted by the CME.

As per paragraph 24 of the Sampling Standard, version 07 /B07/, the verification team has to verify whether the project participants or the coordinating/managing entity have implemented the sampling and surveys according to the sampling plan in the registered monitoring plan. The verification includes determining:

- (a) Whether the required confidence/precision has been met;
- (b) Whether the selected sample was representative of the population.

In line with paragraph 25 of the Sampling Standard, the verification team has applied a sampling approach for on-site visits surveys as part of verification. Now as the CME had applied sampling approach, the verification team has chosen acceptance sampling in accordance with paragraph 27 of the sampling standard /B07/.

DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and it was confirmed that the WBT tests were conducted in their households. A sample size of 11 households was chosen (with no discrepant records). A sample size of 11 was required, based on an AQL of 0.5% and UQL of 20 %, the producer and consumer risk used was 10 % each. Acceptance number (c) thus determined for the samples is 0. It was observed that out of the 11 samples, all the 11 stoves were found to be operational which matched with the CME's records and hence no discrepant records were observed with the published MR /2/ and ER sheet /4/ and thus $c=0$. Thus, CME's set of records has been accepted in line with § 32 of the sampling standard, version 07 /B07/. For the SOF, f_{old} and μ_{old} parameters a common interview questionnaire was prepared and was used during the survey by the CME. Verification team has cross verified these sample documents during the on-site visit.

The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the PoA-DD/CPA-DDs /B04/. The CME has appropriately performed Simple Random Sampling procedure in line with the applied methodology. As the registered PoA-DD /B04/ mentions the option for Simple Random Sampling procedure, it is acceptable to the verification team.

The necessary confidence / precision of 95/10 each of the parameters is met. This has been cross verified by the verification team from the supporting documents submitted /4/.

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	00	00	00
Remaining forward action requests from validation and/or previous verification	00	00	00

CPA(s) considered for verification and covered in this report	00	00	00
Programme of activities			
Compliance of the programme implementation with the registered PoA-DD	00	00	00
Implementation and operation of the management system	00	00	00
Post-registration changes	00	00	00
<ul style="list-style-type: none"> Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline 	00	00	00
<ul style="list-style-type: none"> Corrections 	00	00	00
<ul style="list-style-type: none"> Inclusion of a monitoring plan 	00	00	00
<ul style="list-style-type: none"> Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools 	00	00	00
<ul style="list-style-type: none"> Changes to the programme design or project design 	00	00	00
<ul style="list-style-type: none"> Change of coordinating/managing entity 	00	00	00
<ul style="list-style-type: none"> 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	00	00
Post-registration changes	00	00	00
<ul style="list-style-type: none"> Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline 	00	00	00
<ul style="list-style-type: none"> Corrections 	00	00	00
<ul style="list-style-type: none"> Changes to the start date of the crediting period of component project activities 	00	00	00
<ul style="list-style-type: none"> Inclusion of a monitoring plan 	00	00	00
<ul style="list-style-type: none"> Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools 	00	00	00
<ul style="list-style-type: none"> Changes to the programme design of project design 	00	00	00
<ul style="list-style-type: none"> Changes specific to afforestation and reforestation component project activities 	00	00	00
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	00	00	00
Compliance of monitoring activities with the registered monitoring plan	00	00	00
<ul style="list-style-type: none"> Data and parameters fixed ex ante or at renewal of crediting period 	00	00	00
<ul style="list-style-type: none"> Data and parameters monitored 	02	01	
<ul style="list-style-type: none"> Implementation of sampling plan 	00	00	00
Compliance with the calibration frequency requirements for measuring instruments	00	00	00
Assessment of data and calculation of emission reductions or net removals	-	-	-
<ul style="list-style-type: none"> Calculation of baseline GHG emissions or baseline net GHG removals by sinks 	00	00	00
<ul style="list-style-type: none"> Calculation of project GHG emissions or actual net GHG removals by sinks 	00	00	00
<ul style="list-style-type: none"> Calculation of leakage GHG emissions 	00	00	00
<ul style="list-style-type: none"> Summary of calculation of GHG emission reductions or net GHG removals by sinks 	00	00	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) UNFCCC I & R query / Review comments	00	01	01 0
Total	03	02	01 0

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
Findings	-
Conclusion	<p>CME has used the Monitoring report form for CDM programme of activities, Version 02.0 /B03/. Verification team confirms that the latest available version of monitoring report template /B03/ has been used by the CME and the MR is in compliance of the monitoring report form and instructions therein /B03/.</p> <p>CC IPL, had made the version 1.0, dated 12/06/2018 of the monitoring report /1/, covering the monitoring period from 25/10/2016 to 24/10/2017 (both days inclusive) publicly available on 19/06/2018.</p> <p>This confirms compliance with the §337 and §338 of CDM VVS for PoAs, version 01.0 /B01-1/.</p>

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

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There are no forward action requests from validation and/or the previous (fourth) verification of the PoA.

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)
African Improved Cooking Stoves Programme of Activities CPA No. 00001 (Ghana) 5342-0001	Yes	06/12/2012	Version 4.3	Y
African Improved Cooking Stoves Programme of Activities CPA No. 00002 (Ghana) 5342-0002	Yes	21/10/2013		Y

African Improved Cooking Stoves Programme of Activities CPA 00003 (Ghana) 5342-0003	Yes	08/11/2013		Y
African Improved Cooking Stoves Programme of Activities CPA 00004 (Nigeria) 5342-0004	No	23/09/2014		Y
African Improved Cooking Stoves Programme of Activities CPA 00005 (Nigeria) 5342-0005	No	23/09/2014		Y
African Improved Cooking Stoves Programme of Activities CPA 00006 (Liberia) 5342-0006	No	31/12/2014		Y

CL 01 had been raised and satisfactorily closed. Please refer to Appendix 4 for further details.

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	-
Conclusion	<p>CC IPL by means of an on-site inspection and document review, assessed that all physical features (technology, project equipment, and monitoring and metering equipment) of the included CPAs in the registered PoA-DD are in place and that the coordinating/managing entity has operated the PoA and the CPAs as per the registered PoA-DD and the CPA-DDs.</p> <p>There are no deviations or proposed or actual changes in the implementation or operation of the PoA and the included CPAs.</p> <p>The verification team confirms actual operation of the CPAs and PoA implementation and operation in compliance with the registered PoA-DD / CPA-DDs in order to confirm the compliance of § 339, § 340 and § 341 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

E.2.2. Implementation and operation of the management system

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The PoA management system including the record-keeping system has been explained in 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. Verification team evaluated the management systems in place to implement the monitoring of the project activity. This included the roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system.</p> <p>As outlined in section D.7.2 of CPA-DDs /B04/ and section D of MR, monitoring is done by CEESD who is the CPA implementing entity for CPA-0001 and supports the CME in the implementation of CPA-0003. The monitoring data is further</p>

	<p>periodically checked by the CME to ensure there is no double counting.</p> <p>In order to ensure completeness and accuracy of monitoring information, electronic database is operated and maintained by the DO. This information is further maintained by the CME, who verifies the reported sales with the number of stoves produced by the manufacturer. Since the unique code inscribed on the cook stoves will correspond to its CPA, the occurrence of double counting is avoided. This provision for the avoidance of double counting as outlined in the PoA management system has been verified by means of review records of sales database /6/ and OSV interview/observation during the course of verification. This unique serial numbering system and the data from manufacturer were further cross-checked (on a sampling basis) during the site visit physical inspection.</p> <p>It was confirmed during the OSV and by checking the monitoring system that all the roles and responsibilities related to monitoring are fulfilled by representatives of CME and the CPA implementer.</p> <p>The responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan /B04/.</p> <p>The details about monitoring system have been provided in Section D of the monitoring report /2/. The data flow and management and reporting structure was also checked during the on-site visit.</p> <p>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 § 339 (a), § 346 (b) (iv) and § 346 of CDM VVS PoAs. Version 01.0 /B01-1/.</p>
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E.2.3. Post-registration changes

E.2.3.1. Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline

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

E.2.3.2. Corrections

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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.2.3.3. Inclusion of a monitoring plan

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

E.2.3.4. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools

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There are no permanent changes to the registered monitoring plan or permanent deviation of the monitoring from the applied methodology during the current monitoring period.

E.2.3.5. Changes to the programme design or project design

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There are no changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA.

E.2.3.6. Change of coordination/managing entity

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Not applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

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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	-	
Conclusion	The implementation status of the PoA and the component project activities is:	
	Co-ordinating and Managing entity/Project Participants:	Envirofit International Ltd.
	Title of the PoA:	African Improved Cooking Stoves Programme of Activities
	UNFCCC registration No:	5342
	Applied Baseline and monitoring methodology:	AMS-II.G, Version 03
	Title of the CPA:	African Improved Cooking Stoves Programme of Activities – CPA No. 00001 (Ghana)
	CPA reference number:	5342-0001
	Date of inclusion:	06/12/2012
	CPA implementer	Centre of Energy, Environment and Sustainable Energy (CEESD)
	Project Scale:	Small scale
	Location of the CPA:	Ghana
	CPA crediting period:	15/12/2012 to 14/12/2022
	Reported monitoring Period verified in this verification:	25/10/2016 TO 24/10/2017
	Title of the CPA:	African Improved Cooking Stoves Programme of Activities – CPA No. 00002 (Ghana)
	CPA reference number:	5342-0002
	Date of inclusion:	21/10/2013
	CPA implementer	Centre of Energy, Environment and Sustainable Energy (CEESD)
	Project Scale:	Small scale
	Location of the CPA:	Ghana
	CPA crediting period:	01/11/2013 to 31/10/2023
	Reported monitoring Period verified in this verification:	25/10/2016 TO 24/10/2017
	Title of the CPA:	African Improved Cooking Stoves Programme of Activities – CPA 00003 (Ghana)
	CPA reference number:	5342-0003
	Date of inclusion:	08/11/2013
	CPA implementer	Envirofit International Ltd.
	Project Scale:	Small scale
	Location of the CPA:	Ghana
	CPA crediting period:	01/12/2013 to 30/11/2023
	Reported monitoring	25/10/2016 TO 24/10/2017

Period verified in this verification:	
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During the reported monitoring period, only 5342-0001 and 5342-0003 were implemented and hence only these two CPAs were monitored. As a part of the site visit, the verification team was able to confirm that the Programme of activities and the component project activities' implementation are in accordance with the project description contained in the included CPA-DDs /B04/.

The implemented CPAs involve distribution and sales of fuel-efficient charcoal stoves by CEESD in individual households of Ghana. It was confirmed through the monitoring database /6/ that the CPAs involve distribution and installation of 9,375 and 5,866 stoves for 5342-0001 and 5342-0003 respectively till the end of the monitoring period.

The annual energy savings for the CPA 5342-0001 was found to be 88.03 GWh_{th} which is more than 60 GWh_{th}. The eligibility criterion 11 in the CPA-DD states, "*The maximum number of ICS will be determined in each CPA-DD depending on the technology used (excel sheet will be provided to show calculated energy savings). If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD*" /B04/. Accordingly, the CME has rightly capped the emission reductions for the CPA 5342-0001 to the estimated value in the CPA-DD for the monitoring period as 15,477 tCO₂e (as the energy savings crosses the limit of micro scale limit of 60 GWh_{th}) and this is deemed acceptable. For the CPA 5342-0003, annual energy savings was found to be 55.07 GWh_{th} which is less than 180 GWh_{th} (small scale limit) and thus the CPA remains under the small scale limit.

The stoves in the CPAs have been distributed across different locations in Ghana. As confirmed through the monitoring database provided /6/, first stove for the CPA 5342-0001 was distributed on 23/02/2012 and last stove on 08/11/2013; for the CPA 5342-0003 the first stove was distributed on 20/06/2012 and the last stove on 09/10/2017. All the stoves that were checked during verification survey were found to be working and with the serial number marked on the stoves.

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

It was confirmed during OSV that Envirofit International Ltd. is the Co-ordinating/Managing Entity for the PoA. The actual project activity is in line with the registered/included CPA-DDs.

The information (including data and variables) provided in the MR /2/ is in line with the details provided in the included/registered CPA-DDs /B04/.

The monitoring report /2/, reports for the fifth monitoring period (25/10/2016 - 24/10/2017) for three included CPAs (5342-0001, 5342-0002 and 5342-0003) in the PoA and CME is claiming emission reductions for the same monitoring period for rest three CPAs (5342-0004 and 5342-0005) through a separate MR. Thus this MR is the second batch MR applicable for the monitoring period. The reported monitoring report is a consecutive batch to be reported after the fourth monitoring period and is after the end date of the fourth monitoring period (25/10/2015 to 24/10/2016).

CCIPL's verification team considers the project description of the project contained in the registered PoA-DD and the CPA-DDs /B04/ to be complete and accurate. The CPA-DDs comply with the relevant methodology, tools, forms and guidance at the time of CPA-DDs submission for registration/inclusion.

In accordance with § 341 of CDM VVS for PoA, version 01 /B01-1/, the verification team confirms that there is no information (data and variables) in the current monitoring period that are different from that stated in the registered CPA-DDs which has caused an increase in the estimates of GHG emission reductions.

Verification team has assessed the project in order to check any proposed or actual changes to the project design in accordance with § 269 of CDM VVS for PoAs, Version 01.0. In the opinion of CCIPL, there is no change to the project design. CCIPL's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the registered PoA-DD.

In accordance with § 341 (c) of CDM VVS for PoAs, Version 01.0 /B01-1/, information (data and variables) provided in the monitoring report that are different from that stated in the registered CPA-DDs /B04/, have been assessed. The assessment is summarized below:

Parameter	Ex-ante value in the CPA-DDs	Actual operation for the reported monitoring period	Assessment by the verification team
Number of cook-stoves (N_{all})	CPA1- 4,500; CPA3- 14,607	CPA1- 9,375; CPA3- 5,866	<p>Verification team noted that the actual number of cook-stoves distributed under the CPA 1 is higher than the number indicated in the registered CPA DD and in case of CPA 3 it is lower /B04/. For CPA 1, the higher stoves is acceptable based on the following:</p> <ul style="list-style-type: none"> • CPA-DD does not restrict the number of cook stoves to 4,500 which is just an indicative value (as explained below) • The emission reductions from the project during the reported monitoring period are capped to the limit for micro scale limit of annual energy savings of 60 GWh¹. <p>Verification team further noted that the cook-stove numbers as indicated in the registered CPA DD is not a fixed number (thus this cannot be categorized under a design change) and this assessment has been based on review of following paragraphs of CPA DD:</p>

¹ The eligibility criterion 11 in the CPA-DD states, "The maximum number of ICS will be determined in each CPA-DD depending on the technology used (excel sheet will be provided to show calculated energy savings). If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD" /B04/.

				<p><i>"The CPA will have a maximum energy saving of less than or equal to 60 GWh_{th}/year, thus staying within the micro-scale threshold. Based on the <u>estimated energy savings</u>, it is envisaged that around 4,500 stoves will be distributed under the CPA."</i> (Refer Section A.2, of the registered CPA-DD, version 3.2 dated 27/11/2012).</p> <p>Moreover, verification team noted that the increase in number of stoves was also validated during the previous verifications.</p>
	Efficiency of the ICS (η_{new})	CPA1- 36.3%; CPA3- 31.4%	CPA1- 31.93%; CPA3- 31.91%	<p>The weighted average efficiency of the cook-stoves (η_{new}) monitored ex-post for the current monitoring period is less than the estimated ex-ante value for CPA 1 in the CPA-DD. Verification team based on its sectoral expertise confirms that decrease in efficiency in actual project condition is a realistic condition and thus this issue does not require further assessment, as it does not lead to increase in emission reductions.</p> <p>For CPA 3, the value is the weighted average efficiency of the cook-stoves (η_{new}) monitored ex-post for the current monitoring period in line with option 2 of paragraph 6 of the applied methodology /B02/. The verification team noted that the value applied in the CPA-DD is the lowest of the efficiencies of the stove models specified therein as sales projections were not known ex-ante. This is deemed acceptable.</p>
	Stove Operation Fraction (SOF)	0.95 (for both the CPAs)	0.8381	The monitored ex-post value of SOF for the current monitoring period are not higher than the

				ex-ante estimated values and are the actual monitored values during the current monitoring period and hence deemed acceptable.
	The amount of woody biomass consumption that is consumed through the continued use of old stoves (μ_{old})	CPA1- 217.8kg; CPA3- 218 kg	1,489 kg/year	The amount of woody biomass consumption that is consumed through the continued use of old stoves monitored ex-post for the current monitoring period is higher than the estimated ex-ante value in the CPA-DD and based on actual monitoring, this is acceptable to the verification team as it does not lead to increase of emission reductions. This is deemed acceptable.
	The fraction of end users that are still using baseline (replaced) stoves (f_{old})	0.1	0.1477	The fraction of end users that are still using baseline (replaced) stoves monitored ex-post for the current monitoring period is higher than the estimated ex-ante value in the CPA-DD and based on actual monitoring, this is acceptable to the verification team as it does not lead to increase of emission reductions. This is deemed acceptable.
	Calculated average stove operation years in the monitoring period ($Stove_{year}$)	1	CPA1- 0.7161 ; CPA3- 0.72198	$Stove_{year}$ monitored ex-post for the current monitoring period are either equal to or less than the estimated ex-ante value in the CPA-DDs which is deemed acceptable.
	Emission reductions per stove/year (tCO_2)	CPA1- 3.44; CPA3- 3.22	CPA1- 1.65 (actual ERs per stove is 2.74, but due to capping of energy savings to 60 GW_{th} as per the registered CPA-DD, the claimed ERs per stove is 1.65); CPA3- 21.7098	The ERs per stove is less than the ex-ante estimated values in the CPA-DDs.

	<p>In the opinion of CCIPL, there is no change to the project design. CCIPL's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the registered PoA-DD and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PoA-DD and registered/included CPA-DDs.</p> <p>The verification team took cognizance of § 339, § 340 and § 341 of the CDM VVS for PoA, version 01 /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 01 /B01-1/.</p>
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E.3.2. Post-registration changes

E.3.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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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

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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 of component project activities

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

E.3.2.4. Inclusion of a monitoring plan

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

E.3.2.5. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline, or other applied standards or tools

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There are no permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology.

E.3.2.6. Changes to the programme design or project design

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There are no changes to the programme design of the included CPA-DDs.

E.3.2.7. Changes specific to afforestation and reforestation component project activities

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Not applicable to the type of the programme of activity.

E.3.3. Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the registered CPA-DDs is in accordance with the approved methodology applied by the project activity, i.e. AMS-II.G (version 03) /B02/.</p> <p>The monitoring plan is in accordance with the approved methodology, AMS-II.G version 03 /B02/, applied by the component project activity and as provided in the CPA-DDs /B04/.The monitoring plan is in accordance with the approved</p>

	methodology, AMS-II.G, Version 03 /B02/, applied by the component project activities and as provided in the CPA-DDs /B04/.
	The verification took cognizance of § 342 to § 344 of CDM VVS for PoAs, Version 01.0 /B01-1/.

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

The monitoring has been carried out in accordance with the monitoring plan contained in the registered CPA-DDs /B04/. This conclusion has been made based on assessment below in section E.3.4.1, E.3.4.2 and E.3.4.3 below.

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>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 Annex 1 for detailed analysis of the ex-ante parameters.</p> <p>The verification took cognizance of § 345 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

E.3.4.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CL 02, CL 03 and CAR 01 had been raised and satisfactorily closed. Please refer to Appendix 4 for further details.
Conclusion	<p>The Verification team confirms that the Data and parameters monitored are in compliance with the registered CPA-DDs and the monitoring plan /B04/. A complete assessment of each of the monitored parameters has been provided in Annex 2 of the verification report.</p> <p>The verification took cognizance of § 345, § 346(c), §357 and §358 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

E.3.4.3. Implementation of sampling plan

Means of verification	Document Review, Interview		
Findings	-		
Conclusion	As mentioned in the above sections, only the CPAs 5342-0001 and 5342-0003 were implemented for which emission reductions are being claimed for this monitoring period. The total population of the stoves under these two CPAs, CPA 1 and CPA 3 are 9,375 and 5,866 respectively (total 15,241).		
	The four monitoring parameters required to be monitored through the sampling plan are:		
	5. The thermal efficiency of the ICS distributed (%) (η_{new})		
	6. The Stove Operating Fraction, i.e. the fraction of users using the ICS (SOF)		
	7. The fraction of stove users still using baseline (replaced) stoves (f_{old})		
	8. The amount of woody biomass that continues to be used in the replaced stoves (kg) (μ_{old})		
	Cross-CPA simple random sampling was applied for the two CPAs by CME for selection of the monitoring samples with 95/10 confidence/precision for all the four parameters for annual monitoring which is deemed acceptable as per the registered PoA-DD /CPA-DDs.		
	The number of samples for each of the parameters covered during the monitoring activity is as given below:		
	Parameter	Sample Size (n) required	Samples covered during monitoring

η_{new} (CH2200)	7	10
η_{new} (CH2300)	7	12
η_{new} (CH5200)	7	11
SOF	68	105
f_{old}	68	88
μ_{old}	7	13

As the actual sample size in all the cases was not less than either the calculated sample size or the minimum sample size as per the PoA-DD, the sample size covered by the CME was accepted.

For the monitoring parameters SOF, f_{old} , and μ_{old} , data were collected following a specially designed survey form. For thermal efficiency of the stoves WBTs (Water Boiling Tests) were conducted.

It was found that for all the parameters the confidence/precision of 95/10 was met.

DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and it was confirmed that the WBT tests were conducted in their households. A sample size of 11 households was chosen (with no discrepant records). A sample size of 11 was required, based on an AQL of 0.5% and UQL of 20 %, the producer and consumer risk used was 10 % each. Acceptance number (c) thus determined for the samples is 0. It was observed that out of the 11 samples, all the 11 stoves were found to be operational which matched with the CME's records and hence no discrepant records were observed with the published MR /2/ and ER sheet /4/ and thus $c=0$. Thus, CME's set of records has been accepted in line with § 32 of the sampling standard, version 07 /B07/. For the SOF, f_{old} and μ_{old} parameters a common interview questionnaire was prepared and was used during the survey by the CME. Verification team has cross verified these sample documents during the on-site visit.

The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the 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.

The necessary confidence / precision of 95/10 each of the parameters is met. This has been cross verified by the verification team from the supporting documents submitted /4/.

The verification took cognizance of § 347 of CDM VVS for PoAs, Version 01.0 /B01-1/.

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The stove efficiency testing has been determined by WBTs conducted in line with the guidance provided by the CME in the CPA-DDs /B04/ /15/. The monitoring equipment used for conducting the stove efficiencies by WBTs are thermometer, weighing machine and moisture meter. All the three monitoring equipment were newly bought and hence deemed duly calibrated and appropriate /12/. The appropriate QA/QC procedures have been followed for the monitoring parameters.</p> <p>The verification took cognizance of section 10.2.6 of CDM VVS for PoAs, version 01 /B01-1/.</p>

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

In line with the requirement of § 357 and 358 of CDM VVS for PoAs, Version 01.0/B01-1/, the verification team has reviewed the Monitoring report /2/ and ER spread sheets /4/ to check the arithmetic calculation of the emission reductions. The equation used for the calculation is compared with those provided in the registered CPA-DDs /B04/ and the methodology AMS-II.G, Version 03 /B02/. In response to the review comments raised by UNFCCC, CME has discounted the emission reductions for the households for which end user data has not been presented for this monitoring period.

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The equation for emission reduction calculation as provided in the monitoring report /2/ and confirmed with the registered PoA-DD / CPA-DDs /B04/ and the methodology AMS-II.G, version 03 /B02/ is:</p> $ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$ <p>Where:</p> <p>ER_y = Emission reductions during the year y in tCO_{2e}</p> <p>$B_{y,savings}$ = Quantity of biomass that is saved in tonnes</p> <p>$f_{NRB,y}$ = Fraction of biomass saved by the project activity in year y that can be established as non-renewable biomass using survey results, national or local statistics or other sources of information (fixed ex ante as 99%)</p> <p>$NCV_{biomass}$ = Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)</p> <p>$EF_{projected_fossilfuel}$ = Emission factor for the substitution of non-renewable biomass by similar consumer (Default value of 81.6 tCO₂/TJ).</p> $B_{y,savings} = B_{old} \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$ <p>B_{old} = Quantity of biomass used in the absence of the project activity in tonnes/year</p> <p>η_{old} = Efficiency of the system being replaced (fixed 10.1% ex ante)</p> <p>η_{new} = Efficiency of the system being deployed as part of the project activity (monitored ex post during the monitoring period)</p> $B_{old} = LAF \cdot N_{all} \cdot SOF \cdot \left(Q_{biomass} - \left(\frac{\mu_{old}}{1000} \cdot f_{old}\right)\right) \cdot Stove_{year}$ <p>LAF = Net to gross Adjustment factor (0.95) applied in accordance with paragraph 13 and 23 of AMS-II.G v. 03</p> <p>N_{all} = Total number of stoves installed (monitored ex post during the monitoring period)</p> <p>SOF = Stove Operation Fraction - % of stoves operating or replaced by equivalent in-service appliance (monitored ex post during the monitoring period)</p> <p>$Q_{biomass}$ = Average annual biomass consumption per appliance (4.36 tonnes / year fixed ex -ante).</p> <p>μ_{old} = Average amount of woody biomass consumption that is consumed through the continued use of old stoves (monitored ex</p>

	<p>post)</p> <p>f_{old} = Fraction of end users that are still using their replaced stoves during the monitoring period (monitored ex post during the monitoring period)</p> <p>$Stove_{year}$ = Calculated average stove operation years in the monitoring period (monitored ex post for the monitoring period)</p> <p>Using the above equations and the respective monitored and ex ante values, emission reduction values are as below:</p> <p>ER_y (5342-0001) = 15,477 tCO₂e</p> <p>ER_y (5342-0003) = 15,842,065 tCO₂e</p> <p>Total emission reductions for the monitoring period for the PoA</p> <p>ER_y = 31,319,27,082 tCO₂e</p> <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 /4/.</p> <p>The verification took cognizance of § 357 of CDM VVS for PoAs, version 01.0, § 389 and § 401 of VVS Version 09.0 /B01-1/.</p>
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E.3.5.2. Calculation of project GHG emissions or actual net GHG removals by sinks

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

E.3.5.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>Net-to-gross adjustment factors for leakage (fixed default values of 0.95 as per AMS II.G. version 03) /B02/ was 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.3.5.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The 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. The total number of ERs achieved during the monitoring period is 31,319,27,082 tCO₂e.</p> <p>In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DDs /B04/ for the current monitoring period.</p> <p>The verification took cognizance of § 357 of CDM VVS PoAs, version 01 /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
5342-0001	15,477	-	-	0	15,477	15,477
5342-0002	0	0	0	0	0	0
5342-0003	15,842,605	0	0	0	15,842,605	15,842,605
Total	31,319,27,082	0	0	0	31,319,27,082	31,319,27,082

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

Means of verification	Document Review
Findings	-
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 § 357 of CDM VVS for PoAs, version 01 /B01-1/.

Title and UNFCCC reference number of the CPA	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPAs during this monitoring period
5342-0001	15,477	15,477
5342-0002	47,088	0
5342-0003	47,088	15,842,605
Total	109,493	31,319,27,082

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

Means of verification	Document review
Findings	-
Conclusion	The actual achieved emission reductions are less than the ex ante estimated values in the CPA-DD.

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

Means of verification	Not applicable (as there are no sustainable development co-benefits required as per the registered CDM PoA-DD)
Findings	-
Conclusion	Not applicable The verification took cognizance of § 360 of CDM VVS PoAs, version 01 /B01-1/.

E.3.7. Global stakeholder consultation

Means of verification	Not applicable (as this is not first Monitoring report)
Findings	-
Conclusion	Not applicable (this is not first Monitoring report) The verification took cognizance of § 369 of CDM VVS PoAs, version 01 /B01-1/.

SECTION F. Internal quality control

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

SECTION G. Verification opinion

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Carbon Check (India) Private Ltd. (CC IPL) has performed the fifth (2nd Monitoring report) periodic verification of the registered CDM Programme of Activities “African Improved Cooking Stoves Programme of Activities” having UNFCCC reference number as 5342 for the three CPAs, 5342-0001, 5342-0002 and 5342-0003. The CPAs covered for this verification are the ones which have crediting period falling within this monitoring period. During the current monitoring period, although three included CPAs are being considered (5342-0001, 5342-0002 and 5342-0003), emission reductions are being claimed only for the first and third CPAs, which are located in Ghana. 5342-0002 has not been implemented and hence the CME is not claiming emission reductions for this CPA during the monitoring period and neither will the ERs for this CPA be claimed for the monitoring period in future. This was confirmed by reviewing the monitoring report /2/ and also during the on-site visit interviews.

The verification team assigned by the DOE concludes that the PoA-DD (Version 4.3, dated 07/06/2014), Component Project Activities 5342-0001 and 5342-0003 as described in the registered CPA-DDs (Version 3.2, dated 27/11/2012 and Version 2, dated 22/10/2013 respectively) /B04/ and monitoring report (Version 2.0, dated 31/22/07/1/20189) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM Modalities & Procedures, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the requirements of CDM VVS for PoAs version 01.0 /B01-1/.

Verification methodology and process

The Verification team confirms the contractual relationship signed on 06/06/2018 between the DOE, Carbon Check (India) Private Ltd. and the CME, Envirofit International Ltd. The team assigned to the verification meets the CC IPL’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 CC IPL procedures and requirements.

The verification has been performed as per the requirements described in the VVS version 09.0 and constitutes the review and completion of the following steps:

- Reviewing the registered PoA-DD (version 4.3, date 07/06/2014), the registered CPA-DDs for 5342-0001 and 5342-0002 (Version 3.2, dated 27/11/2012 and Version 2, dated 22/10/2013 respectively) /B04/ including the monitoring plan and the corresponding validation reports /B04/;
- Publication of the MR (version 1.0, 12/06/2018) /1/ on the UNFCCC website on 19/06/2018
- Desk review of the validation report, MR and other relevant documents including documents related to the projects activities in emission reductions
- Review of the applied monitoring methodology (AMS-II.G, version 03) /B02/;
- Review of any CMP and EB decisions, clarifications and guidance /B05/;
- On-site assessment (18/07/2018 – 19/07/2018)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The component project activities were correctly implemented according to selected monitoring methodology, monitoring plan and the registered/included CPA-DD/s. 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 ~~31,319~~27,082 tCO₂e emission reductions during the fifth (Monitoring report number 2) monitoring period.

Verified emission reductions for the PoA: ~~31,319~~27,082 tCO₂e.

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

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO₂e)	0	31,319 <u>27,082</u>

Break up of emission reductions CPA wise:

5342-0001; 15,477 tCO₂e

5342-0002: 0 tCO₂e

5342-0003: ~~15,842~~605 tCO₂e

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

SECTION H. Certification statement

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Carbon Check (India) Private Ltd., the DOE, has performed the verification of the registered Programme of Activities, UNFCCC Registration Number 5342, "African Improved Cooking Stoves Programme of Activities" for the three CPAs 5342-0001, 5342-0002, and 5342-0003. The component project activities are designed to generate emission reductions by distribution of the fuel-efficient cook stoves in individual households. The fuel-efficient cook stoves are replacing the traditional stoves that were being used in the baseline scenario.

The CME is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activities. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the component project/s. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PoA-DD/CPA-DDs. The verification is carried out in-line with the requirements of the CDM VVS for PoAs, version 01.0 requirements /B01-1/.

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

The verification is based on:

- PoA-DD version 4.3 dated 07/06/2014;
- CPA-DD/s included in the registered PoA and its monitoring plan for the monitoring period 25/10/2016 to 24/10/2017.
- Approved monitoring methodology AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass", version 03;
- Validation report /B04/ for the PoA and CPA/s;
- Monitoring report(s) version(s) 1.0, dated 12/06/2018; ~~and~~ version 2.0, dated 31/07/2018 and version 3.0, dated 22/01/2019;

This statement covers verification period from 25/10/2016 to 24/10/2017.

The DOE had raised 03 clarifications and 02 corrective action requests, all of which have been resolved by the CME. One FAR has been raised which need to be resolved during next verification. Please refer to Appendix 4 for further details.

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

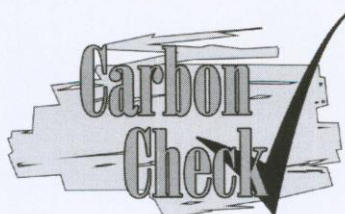
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to ~~31,319~~27,082 tCO₂ equivalent and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO ₂ e)	0	31,319 <u>27,082</u>

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
MP	Monitoring Period
MWh	Mega Watt Hour
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
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.

Amit Anand

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

For following functions:

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

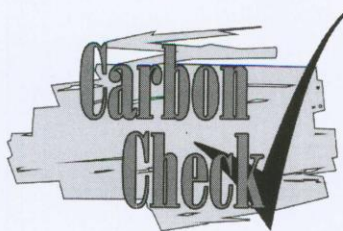
Mr. Vikash Kumar Singh
Compliance Officer

Date of Approval	Valid Till
24/12/2018	23/12/2019

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

¹ India, South Africa

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



Carbon Check (India) Private Ltd.

Sanjay Agarwalla


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

For following functions:

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


Mr. Vikash Kumar Singh
Compliance Officer


Mr. Amit Anand
CEO

Date of Approval
24/12/2018

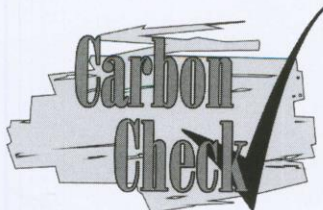
Valid Till
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¹ India

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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 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 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 checked="" type="checkbox"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input checked="" type="checkbox"/>	TA 8.1	<input 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. Amit Anand
CEO

Date of Approval
24/12/2018

Valid Till
23/12/2019

Revision History of the Document

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

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 e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Envirofit	- <u>Webhosted Monitoring report</u> - <u>Monitoring report</u>	Version 1.0, dated 12/06/2018 <u>Version 2.0, dated 31/07/2018</u>	CME
2	Envirofit	Final Monitoring report	Version 2 3.0, dated 31/07/2018 <u>9</u>	CME
3	Envirofit	Emission reduction calculation spread sheets for the three CPAs (5342-0001, 5342-0002 and 5342-0003) corresponding to /1/	-	CME
4	Envirofit	Emission reduction calculation spread sheets for the three CPAs (5342-0001, 5342-0002 and 5342-0003) corresponding to /2/		CME
5	Envirofit	CPA Monitoring Survey Records	-	CME
6	Envirofit	CPA distribution records including evidence for the dates of distribution	-	CME
7	Envirofit	Evidence for the stove specifications distributed under the two CPAs including their efficiency (CH2200, CH2300 and CH5200)	-	CME
8	Envirofit	Proof of Carbon Credits waiver by End user	-	CME
9	Envirofit	Sample stoves sales receipt	-	CME
10	CEESD	Training records of CEESD personnel on following aspect: <ul style="list-style-type: none"> Overview of UNFCCC registered monitoring plan and procedures Understanding of water boiling tests Handling and use of measuring instruments Conducting water boiling tests using EPT Protocol Data recording & Archiving Introduction to project technology Understanding the monitoring survey questionnaires Evaluating user response and feedback Assessing usage (observation / interview) 	Certificate dated 16/03/2018 & 09/02/2018	CME
11	UNFCCC	Letter from UNFCCC dated 29/04/2014, reference number 343_INQ-01496_Carbon Check_Response- Allowing Carbon Check to perform verification of the PoA and CPA 5342-0001, 5342-0002 and 5342-0003.	343_INQ-01496_Carbon Check_Response	CME
12	Envirofit	Water boiling test records	-	CME
13	Envirofit	Evidence for the purchase of new monitoring equipment for WBT (moisture meter, thermometer and weigh scale)	-	CME
14	Envirofit	Evidence for random number	-	CME

		generator for sampling		
15	Envirofit	WBT conducting methodology for the cook stoves	-	CME
16	Envirofit	Monitoring survey questionnaire template	-	CME
17	Envirofit	CME Manual for the PoA along with Organization Structure	-	CME
18	Different university/professional institutes	Competence records of the personnel who conducted WBT & Surveys	-	CME
B01	UNFCCC	1. Validation and Verification Standard for PoAs, version 01.0 2. Project Standard for PoAs, version 01.0 3. Project Cycle Procedure for PoAs, version 01.0	http://cdm.unfccc.int/	Others
B02	UNFCCC	Applied baseline and monitoring methodology, AMS-II.G, version 03.0	http://cdm.unfccc.int/	Others
B03	UNFCCC	Instructions for filling out the monitoring report form for CDM programme of activities, version 02.0	http://cdm.unfccc.int/	Others
B04	UNFCCC	Registered PoA-DD (version 4.3 dated 07/06/2014); CPA-DD for 5342-0001: (Version 3.2, dated 27/11/2012); CPA-DD for 5342-0003: (Version 2, dated 22/10/2013); and corresponding validation reports.	http://cdm.unfccc.int/	Others
B05	Web sites	Websites: http://cdm.unfccc.int/	==	Others
B06	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0	http://cdm.unfccc.int/	Others
B07	UNFCCC	Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 07.0	http://cdm.unfccc.int/	Others
B08	UNFCCC	Guideline: Application of materiality in verifications" Version 02.0	http://cdm.unfccc.int/	Others
B09	UNFCCC	Monitoring Reports and Verification Reports of the previous monitoring periods for the PoA 5342	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	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
-				

Table 2. CLs from this verification

CL ID	CL 01	Section no.	E.3.1	Date: 25/07/2018
Description of CL				
Titles of the CPA-DDs are incorrect in section A.1.2 of the MR.				
CME response				Date: 31/07/2018
The title of CPAs have been corrected in section A.1.2 of the MR. Also, the reference number of the CPAs have been revised in the MR to be consistent with PoA page on UNFCCC.				
Documentation provided by the CME				
CDM PoA 5342 MP#5 Ghana MR ver 2.0 31072018				
CDM PoA 5342 MP#5 Ghana ER calculator ver 2.0 31072018				
DOE assessment				Date: 06/08/2018
CME has provided revised MR with correct titles of the CPA-DDs. CL is closed.				

CL ID	CL 02	Section no.	E.3.4.2	Date: 25/07/2018
Description of CL				
Survey forms for stove serial numbers EC1J008319 and EC1J067716 could not be found in the submitted documents. CME is requested to provide the missing survey forms.				
CME response				Date: 31/07/2018
The Surveys forms for EC1J008319 and EC1J067716 are being submitted				
Documentation provided by the CME				
Survey Record for EC1J008319 and EC1J067716				
DOE assessment				Date: 06/08/2018
CME has submitted the missing survey forms. CL is closed.				

CL ID	CL 03	Section no.	E.3.4.2	Date: 25/07/2018
Description of CL				
CME is requested to provide the evidence of competence and training for the monitoring team and details of the monitoring equipment along with calibration status.				
CME response				Date: 31/07/2018
The competency documents of staff involved in monitoring and the details of monitoring equipment are being submitted.				
Documentation provided by the CME				
Weighing Scale Ohaus Aviator 2000 Manual/specification sheet				
Thermometer Omega HT-L13 Manual/specification sheet				
Moisture Meter Voltcraft FM-200 Manual/specification sheet				
Qualification / Training Records of the monitoring team				
DOE assessment				Date: 06/08/2018
CME has provided the competency related documents, training records of the monitoring team and evidence for the newly purchased monitoring equipment. CL is closed.				

Table 3. CARs from this verification

CAR ID	CAR 01	Section no.	E.3.4.2	Date: 25/07/2018
Description of CAR				
The monitoring data and the corresponding calculations for the current monitoring period are not based on the monitored data for this monitoring period. CME needs to provide the MR and ER spread sheet based on the monitored data for the current monitoring period.				
CME response				Date: 31/07/2018
The ER volume stated in the MR version 1.0 are the ex-ante ER numbers, mentioned on account of oversight. The MR has been revised to state the correct ER volume corresponding to the monitoring data submitted (ER calculator and original monitoring survey and WBT records)				
Documentation provided by the CME				
CDM PoA 5342 MP#5 Ghana MR ver 2.0 31072018 CDM PoA 5342 MP#5 Ghana ER calculator ver 2.0 31072018				
DOE assessment				Date: 06/08/2018
CME has submitted ER sheet and revised MR based on the actual monitored data. All the monitored data and subsequent ER calculations have been checked and found to be correct. Hence the CAR is closed.				

CAR ID	02	Section no.	Completeness check	Date: 25/10/2018
Description of CAR				
Some households are observed having more-than-one stoves as per the "CPA Distribution Data", e.g. customer name "ADWOA BOATEMAA" in ASAFO. However, it is observed that the ex-ante parameter $Q_{biomass}$ (i.e. 4.36 Tonne/year/stove, annual average biomass consumption per appliance) was determined assuming one cook stove per household, since it was based on biomass consumption at household level (i.e. 4.36 Tonne/year/stove = household charcoal consumption of 726kg/year/household * wood-to-charcoal conversion factor of 6). Given the fact above, the DOE shall provide information on how it has verified the appropriateness of applying 4.36 tonne/year/stove in determining the emission reductions.				
CME response				Date: 25/10/2018
<p>More than one ICS on a single user name need not necessarily indicate them being in the same household, despite having the same user name, address and contact detail. It is a feature of last-mile distribution programmes in frontier markets that retailers of cookstoves must respond the nature of demand – that is, would a retailer refuse a sale of 15 cookstoves to the representative of a group of buyers because that representative cannot provide personal data of each of the end users? The answer is of course no, but this does not mean that the cookstoves are not valid for crediting under the CPA, because:</p> <ol style="list-style-type: none"> Often, people buy additional ICS units to give it to their immediate relatives as gift, resulting in more than one ICS on a given name. Groups of end-users buy together via a single representative, for additional discounts (bulk order discounts), at the point of retail and hence multiple stoves might be listed on a single given name in the database despite being distributed to different households in the neighbourhood. In case of donor / sponsored programs, the ICS are disseminated to different users but are owned by the donor / sponsor hence bear a common name in the database. In case of rented living / slum developments, the ICS might be bought by landlords for a number of their quarters each of which will have one stove. Hence the stove ownership lies with the landlord, but the usage is in different households. In such cases, the database may list the ICS with the landlord as the owner of the ICS. In some cases, the end user may not wish to share their private details and hence instead share the detail of the local representative like village head or the retailer from whom they have purchased the stove. <p>In all the above cases, although the actual end user is not listed in the database, it is possible to track them uniquely via the ICS serial number and contacting the buyer / owner.</p> <p>There are also checks on this in the monitoring plan. Page 47 of the PoA-DD, under the monitoring parameter table for N_{all} refers to discounting additional stoves found in a sampled household, at the time of monitoring, from the population. At the time of monitoring, the PP checks if there are multiple ICS in use in each sampled household and the presence of any additional stove is recorded. If the sampled households are found using more than one ICS, then the percentage of users found having more than one ICS in their household is used to discount such multi-use scenarios from the total stove population, ensuring that only ICS per household is credited.</p> <p>Please refer the ER Calculator, tab "Survey Data". In columns I:M, presence of more than one ICS in the sampled household is being monitored and if applicable, the same is being used to discount the total number</p>				

of ICS (N_{all}) in the tab "MP#5 ER Calculations", cell C29 and D29 for CPA01 and CPA03 respectively. Thus, monitoring ensures that only 1 stove is credited per household as specified in registered monitoring plan.

Documentation provided by the CME

Not applicable

DOE assessment

Date: 26/10/2018

The clarification provided by the CME against the clarification request by UNFCCC has been reviewed by the verification team. It is deemed acceptable with the valid reasons that it is not necessary that more than one ICS being reflected in the database in the same name means that it is being used by the same end user. On page 47 of PoA DD "For example, if at the CPA-level it is assumed ex-ante that there is only one baseline stove being used per household, but a second ICS is found during monitoring, one of the two ICS will be excluded from the database. This way there will be no double-counting of emissions reductions". CME has rightly followed this during the monitoring process. While doing the monitoring sampling survey, the presence of more than one ICS in the same household is monitored, duly recorded and reported. It has been checked by the verification team in the ER calculation spread sheet that presence of any second ICS in the same household in the surveyed samples is discounted proportionately from the whole population. Hence the CAR is closed.

Table 4. FARs from this verification

FAR ID	FAR 01	Section No.	Review comment by UNFCCC	Date: 23/01/2018
Description of FAR				
The verifying DOE shall confirm the end user data base for the whole population presented during the next verification.				
CME response				Date: DD/MM/YYYY
-				
Documentation provided by the CME				
-				
DOE assessment				Date: DD/MM/YYYY
-				

Annex 1: Data and parameters fixed ex ante

Parameter	Annual average biomass consumption per appliance (Q_{biomass})
Data unit:	tonnes/year
Default values used:	4.36
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass. ($f_{\text{NRB},y}$)
Data unit:	Fraction
Default values used:	0.99
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Net calorific value of the non-renewable biomass that is substituted ($\text{NCV}_{\text{biomass}}$)
Data unit:	TJ/tonne
Default values used:	0.015
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Emission factor for the substitution of non-renewable biomass by similar consumers ($\text{EF}_{\text{projected fossilfuel}}$)
Data unit:	tCO ₂ /TJ
Default values used:	81.6
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Efficiency of the system being replaced (fraction) (η_{old})
Data unit:	Fraction
Default values used:	0.101
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Net to gross adjustment factor to account for leakages (LAF)
Data unit:	Fraction
Default values used:	0.95
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Annex 2: Data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE												
Data / Parameter: (as in monitoring plan of CPA-DD):	Efficiency of the system being deployed as part of the project activity (η_{new})												
Measuring frequency/Time Interval:	Annual												
Reporting frequency:	Annual												
Reported value:	<table> <tr> <th>Stove model</th><th>%</th></tr> <tr> <td>CH2200</td><td>32.58%</td></tr> <tr> <td>CH2300</td><td>31.74%</td></tr> <tr> <td>CH5200</td><td>33.36%</td></tr> <tr> <td>Weighted Average for CPA0001</td><td>31.93%</td></tr> <tr> <td>Weighted Average for CPA0003</td><td>31.91%</td></tr> </table>	Stove model	%	CH2200	32.58%	CH2300	31.74%	CH5200	33.36%	Weighted Average for CPA0001	31.93%	Weighted Average for CPA0003	31.91%
Stove model	%												
CH2200	32.58%												
CH2300	31.74%												
CH5200	33.36%												
Weighted Average for CPA0001	31.93%												
Weighted Average for CPA0003	31.91%												
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes												
Details of monitoring equipment:	<p>The stove efficiency testing has been determined by WBTs conducted in line with the guidance provided by the CME in the CPA-DDs /B04/ /15/. The monitoring equipment used for conducting the stove efficiencies by WBTs are thermometer, weighing scale and moisture meter. These equipment were newly bought by the CME and deemed appropriate /13/.</p> <p>QA/QC procedures stated in MR comply with CPA-DDs.</p>												
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?	CPA-DDs do not specify the accuracy of the monitoring equipment (thermometer, mass balance and moisture meter). Verification team confirms that the accuracy of the monitoring equipment as stated in the MR represent good monitoring practice based on sectoral expertise.												
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA												
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?	Please see the above comment												
Company performing the calibration(internal or external calibration):	NA												
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA												
Is (are) calibration(s) valid for the whole reporting period?	NA												
If applicable, has the reported data been cross-checked with other available data?	The data has been cross-checked with the WBT test documents /12/. For the stove efficiency parameter, WBT have been performed and this has been checked by the verification team with the related spreadsheets. Furthermore, the verification team has cross checked all the raw data input records in the WBT calculation spread sheets including the calculation procedure for the sampled households and found them to be correct. All the raw data forms												

	for the WBT carried out for efficiency parameter were checked by the verification team and thus no sampling of data is required.
How were the values in the monitoring report verified?	NA
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. As the monitoring parameter under consideration is determined by standardized test procedures (WBT), the QA/QC and calibrations are at the test conduction by the measuring team for WBT. Accordingly, the verification team has focused on abilities, qualifications and recognition of involved personnel and institutions of the measuring team involved in the WBT. The WBT has been carried by the CEESD. The WBT has been carried out by the well-trained personnel of the CEESD and training certificate of the personnel has been provided to the verification team in this respect /10/. The training content /10/ has also been provided to the verification team. The verification team based on on-site visit interviews and review of competency documents /18/ and training records /10/ confirms that the team was qualified to carry out the WBT in line with the protocol.
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

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Total number of stoves installed (N_{all})
Measuring frequency/Time Interval:	Continuous
Reporting frequency:	Yearly
Reported value:	CPA0001: 9,375 CPA0003: 5,866
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Sales database
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?	An electronic sales database has been maintained for the project activity /6/
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
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. QA/QC procedures stated in MR comply with CPA-DDs.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole	NA

reporting period?	
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the monitoring database /6/ and sample households and the hard copy records /9/ were also checked during the OSV.
How were the values in the monitoring report verified?	NA
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.
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

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through sampling (SOF)
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	0.8381
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from the monitoring survey of samples /5/
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
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA.
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. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with monitoring survey records /5/ and the ER sheet /4/
How were the values in the monitoring report verified?	The values in the monitoring report were compared against the values in ER sheet
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. The

of emission reductions and are necessary QA/QC processes in place?	sampling survey has been carried out by the well-trained personnel of the CEESD and training certificate of the personnel has been provided to the verification team in this respect /10/. The training content /10/ has also been provided to the verification team. The verification team based on on-site visit interviews and review of competency documents /18/ and training records /10/ confirms that the team was qualified to carry out the monitoring surveys.
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.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	The amount of woody biomass consumption that is consumed through the continued use of old stoves (μ_{old})
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	1,489 kg/year
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from monitoring survey of samples /5/
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
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
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. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR has been compared with monitoring survey records /5/ and the ER sheet /4/
How were the values in the monitoring report verified?	NA
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.
In case only partial data are available because activity levels or non-activity	NA

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):	The fraction of end users that are still using baseline (replaced) stoves (f_{old})
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	0.1477
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from monitoring survey of samples /5/
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
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
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. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with monitoring survey records /5/ and the ER sheet /4/
How were the values in the monitoring report verified?	NA
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.
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

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Calculated average stove operation years in the monitoring period ($Stove_{year}$)
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	CPA0001: 4.000.716

	CPA0003: 0.72198
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Calculated value based on stove installation database
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
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA.
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. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with CPA distribution database /6/ and the ER sheet /4/
How were the values in the monitoring report verified?	Yes, reported data in MR has been compared with CPA distribution database /6/ and the ER sheet /4/
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.
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.

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Document information

Version	Date	Description
02.0	29 December 2017	Revision to align with the requirements of the "CDM validation and verification standard for programme of activities" (version 01.0).
01.0	5 June 2015	Initial publication.

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