



**Verification and certification report form for
CDM programme of activities
(Version 03.0)**

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

BASIC INFORMATION

Title and UNFCCC reference number of the programme of activities (PoA)	5342: African Improved Cooking Stoves Programme of Activities	
Version number(s) of the PoA-DD(s) to which this report applies	4.3	
Version number of the verification and certification report	2.0	
Completion date of the verification and certification report	06/11/2019	
Monitoring period number and duration of this morning period	Sixth Monitoring Period MP:25/10/2017-30/06/2019	
Number and version number of the monitoring report to which this report applies	MR number: 1.0 MR version: 3.0	
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 ver 3.0: Energy efficiency measures in thermal applications of non-renewable biomass Standardized baseline: NA	
Mandatory sectoral scopes	Sectoral scope: 3: Energy demand	
Conditional sectoral scopes, if applicable	NA	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	30,636 tCO ₂ e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	2,855 tCO ₂ e	
Name and UNFCCC reference number of the DOE	E0066: Earthood Services Private Limited	

Name, position and signature of the
approver of the verification and certification
report

A handwritten signature in blue ink, appearing to read 'Dr. Kaviraj Singh', is written over a light blue rectangular background.

Dr. Kaviraj Singh
Managing Director

SECTION A. Executive summary

The aim of the PoA is the distribution of improved biomass cookstove in Ghana, Nigeria and Liberia. Thus, PoA through the distribution aims at reducing the GHG emissions by replacing the less efficient non-renewable biomass based cookstove with more efficient one.

In the absence of the PoA non-renewable biomass (wood and charcoal) is used as fuel in the traditional three stone cookstoves. The distributed stove has better efficiency; thus, it provides same amount of energy with less fuel consumption and also releases less the GHG emission.

This verification covers stove distribution in Ghana for three CPAs i.e. 5342-P1-0013-CP1, 5342-P1-0014-CP1, 5342-P1-0015-CP1.

The verification team confirms that the total emission reductions achieved under this monitoring period 25/10/2017 – 30/06/2019 (inclusive of both days) are 2,855 tCO₂e.

Scope of verification:

The verification is an independent and objective review, of ex-post determination of the monitored reductions in GHG emissions, by the DOE. The verification includes the implementation and operation of the PoA as set out in the revised accepted PoA-DD & CPA-DDs viz., 5342-P1-0013-CP1, 5342-P1-0014-CP1, 5342-P1-0015-CP1 in the monitoring period.

The verification tests the data and assertions set out in the monitoring report prepared for this monitoring period by the CMEs and is based on the following:

- (i) The approved methodology AMS-II.G ver 3.0: Energy efficiency measures in thermal applications of non-renewable biomass/6/ applied in the PoA-DD/1/ & CPA-DDs/2,3,4/
- (ii) The registered and revised accepted PoA-DD & CPA-DDs and monitoring plan/1,2,3,4/
- (iii) UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords
- (iv) The CDM Validation and Verification Standard (VVS) for PoA version 2.0/9/
- (v) The CDM Project Standard (PS) for PoA /7/ and Project Cycle Procedure (PCP) for PoA version 2.0 /8/
- (vi) Relevant decisions, guidance and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activity's reported emission reductions

The verification has considered both quantitative and qualitative aspects on stated/reported emission reductions. The monitoring report (all versions) and corresponding supporting documentation was assessed in accordance with the rules defined by UNFCCC, as appropriate to the PoA. The verification is not meant to provide any consulting or recommendations to the CME/others. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

Verification Process:

The verification process is conducted as per internal CDM Quality Manual, which includes the following steps;

- a) Contract with CME and appointment of verification team and technical review team (refer Section B.1 and B.2 of this report)
- b) Completeness check of Monitoring Report
- c) Publication of Monitoring Report at UNFCCC website
- d) Desk review (refer Section D.1 of this report) of Monitoring Report and corresponding ER sheet by verification team and planning of onsite audit (including sampling approach (refer Section D.4 of this report) to be applied)
- e) On site audit (refer Section D.2 of this report) (physical implementation of CPAs and interview with relevant stakeholders) by verification team consistent of Team Leader and all Technical Experts, as a minimum
- f) Follow up activities e.g., interviews (refer Section D.3 of this report)
- g) Reporting and closure of findings (CARs/CLs/FARs) and preparation of draft verification report (refer Section D.5 of this report)

- h) Independent technical review (refer Section F of this report) of the draft verification report and final/revised documentation (e.g., Monitoring Report, corresponding ER sheet and corresponding supporting evidences)
- i) Reporting and closure of TR comments/findings (refer Section D.5 of this report) (CARs/CLs/FARs) and final approval for the decision made (refer Section G and H of this report).
- j) Issuance of final verification report to contracted CME (or authorized representatives) and submission of request for issuance to UNFCCC, as appropriate.

Verification Conclusion:

Based on the outcome of the verification process of the registered/revised accepted PoA “African Improved Cooking Stoves Programme of Activities” and its 3 CPAs (**5342-P1-0013-CP1**, **5342-P1-0014-CP1**, **5342-P1-0015-CP1**) for the monitoring period **25/10/2017 – 30/06/2019** (including both dates) we confirm that the implementation of referenced registered/revised accepted PoA and CPAs is complying with applicable CDM rules and regulations. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodologies AMS-II.G ver 3.0: Energy efficiency measures in thermal applications of non-renewable biomass and the monitoring plan contained in the registered PoA-DD.

Earthood Services Private Limited is able to certify that the emission reductions from the registered CDM PoA UN#5342 “African Improved Cooking Stoves Programme of Activities” in Ghana during the period **25/10/2017 – 30/06/2019** (including both days) amount to **2,855 tCO₂e**. Therefore, this is being submitted for request for issuance, as per UNFCCC procedures

SECTION B. Verification team, technical reviewer and approver
B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Mahala	Deepika	Central Office	Y	Y	Y	Y
2.	Verifier	IR	Mahala	Deepika	Central Office	Y	Y	Y	Y
3.	Technical Expert	IR	Mahala	Deepika	Central Office	Y	Y	Y	Y
4.	Methodology Expert	IR	Mahala	Deepika	Central Office	Y	Y	Y	Y
5.	Local Expert	IR	Wealth	Moses Dada	Central Office	Y	N	N	Y
6.	Trainee (Verifier)	IR	Vatsa	Vaishali	Central Office	Y	N	N	Y

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	Gupta	Anshika	Central Office
2.	TA to TR	IR	Gupta	Anshika	Central Office
3.	Approver	IR	Singh	Kaviraj	Central Office

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.	Observational error by monitoring survey staff of CME/CPA implementer while recording the responses of users in relation to survey parameters	High	3 CPAs are being verified for the first time and there may be lack of experience. The survey is conducted for representative samples of population, which may impact the population significantly. Surveyors may be unsupervised at the site.	Verification team randomly selected the samples from CME surveyed HHs. The recorded survey forms by CME were checked with DOE field observations. The verification team interviewed the monitoring staff and checked their training records.
2.	Calculation Errors	Med	The process is manual and therefore there is potential risk of errors / omissions/misstatements.	All calculations were checked by verification team with respect to applicable requirements under various documents viz., methodology, PoA DD/1/, CPA DDs/2,3,4/ etc.

C.2. Consideration of materiality in conducting the verification

In accordance with CDM VVS for PoAs, Version 02.0/9/ the prescribed thresholds for materiality for CDM PoAs are as under;

Type of PoA	PoAs comprising large-scale CPAs			PoAs comprising only small-scale CPAs	PoAs comprising only micro-scale CPAs
Emission Reductions (tCO ₂ e)/year	500,000 or more	300,001 to 499,999	300,000 or less		
Materiality Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The applicable materiality threshold is 5% as PoA comprises only small-scale CPAs.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO ₂ e) in this monitoring period	5,124	2,855*
Applicable Threshold (%) as per CDM VVS for PoAs Version 02.0	5.0%	5.0%

*The decrease in the ER's of the final monitoring report/13/ is due to typographical errors identified in the ER sheet which have been taken into account at the time of verification.

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total) Total (100%)	Sample selected for verification Sample (100%)	Type of error identified	Impact on ERs	
					ERs impacted (Sample)	ERs impacted (Population based on extrapolation)
CPA-5342-P1-0013-CP1, 5342-P1-0014-CP1, 5342-P1-0015-CP1						
For ICS:						
$\eta_{new,y}$	Annually	20	20(100% data was checked)	None	NA	NA

N_{all}	Annually	CPA-7:2,102 CPA-8:2,556 CPA-9:2,037 (6,695)	ICS database/5/ was checked for the information And 16 ICS were checked during the site visit/10/	None	NA	NA
SOF	Annually	120 (60 per sampling frame)	Usage and Monitoring survey/11/ results were checked and 16 ICS were checked on-site/10/	None	NA	NA
f_{old}	Annually	120 (60 per sampling frame)	Usage and Monitoring survey/11/ results were checked, and 16 ICS were checked on-site/10/	None	NA	NA
μ_{old}	Annually	120 (60 per sampling frame)	Usage and Monitoring survey/11/ results were checked, and 16 ICS were checked on-site/10/	None	NA	NA
Stove_{year}	Annually	CPA-7:2,102 CPA-8:2,556 CPA-9:2,037 (6,695)	ER calculation sheet/12/ was checked. (100% data checked)	None	NA	NA

Based on the above table it can be confirmed that the actual individual and aggregated material error is determined for the registered PoA as per CDM VVS for PoA/09/. The applicable threshold for materiality in accordance with CDM PoA VVS Version 2 para 308(d)/9/ is 5%.

SECTION D. Means of verification

D.1. Desk/document review

A desk review was conducted by the verification team that included:

- A review of data and information provided for its completeness.
- A review of registered monitoring plan, monitoring methodologies including applicable tools, standards and the applicable applied standardized baselines.

All the documents reviewed during the verification process are listed in the Appendix 3 of VCR.

D.2. On-site inspection

Duration of on-site inspection: 25/09/2019-27/09/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting	Ghana	25/09/2019	Deepika Mahala
2.	Review of information flows for generating, aggregating and reporting the monitoring parameters	Ghana	25/09/2019-26/09/2019	Deepika Mahala
3.	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	25/09/2019-26/09/2019	Deepika Mahala
4.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the applicable requirements	Ghana	25/09/2019-26/09/2019	Deepika Mahala
5.	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	25/09/2019-26/09/2019	Deepika Mahala
6.	Closing Meeting	Ghana	27/09/2019	Deepika Mahala

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Ozaore	Biodun	Envirofit (Director)	25/09/2019-27/09/2019	CPA Implementation	Deepika Mahala
2.	Amoako	Stephen	Envirofit (Ghana)	25/09/2019-27/09/2019	ER Calculation and Monitoring Report	Deepika Mahala
3.	Tay	Andrew	Envirofit (Ghana)	25/09/2019-27/09/2019	Monitoring Survey	Deepika Mahala
4.	Osacnyarko	Emmanuel	Envirofit (Ghana)	25/09/2019-27/09/2019	Monitoring Survey	Deepika Mahala
5.	Tiwaah	Abena	ICS User (Econofire)	25/09/2019	DOE Field Survey	Deepika Mahala
6.	Tutuwaa	Joyce	ICS User (Econofire)	25/09/2019	DOE Field Survey	Deepika Mahala
7.	Osei	Grace	ICS User (Econofire)	25/09/2019	DOE Field Survey	Deepika Mahala
8.	Badu	Ama	ICS User (Econofire)	25/09/2019	DOE Field Survey	Deepika Mahala
9.	Owusu	Diana	ICS User (Econofire)	26/09/2019	DOE Field Survey	Deepika Mahala
10.	Afram	Mercy	ICS User (Econofire)	26/09/2019	DOE Field Survey	Deepika Mahala
11.	Owusu	Kwame	ICS User (Econofire)	26/09/2019	DOE Field Survey	Deepika Mahala
12.	Abaza	Katiga	ICS User (Econofire)	27/09/2019	DOE Field Survey	Deepika Mahala
13.	Asamoah	Lydia	ICS User (Econochar)	25/09/2019	DOE Field Survey	Deepika Mahala
14.	Okoampa	Olivia	ICS User (Econochar)	25/09/2019	DOE Field Survey	Deepika Mahala
15.	Mahmoud	Mariam	ICS User (Econochar)	26/09/2019	DOE Field Survey	Deepika Mahala
16.	Danso	Theodora	ICS User (Econochar)	26/09/2019	DOE Field Survey	Deepika Mahala
17.	Asare	Florence	ICS User (Econochar)	26/09/2019	DOE Field Survey	Deepika Mahala

18.	Boateng	Solomon	ICS User (Econochar)	26/09/2019	DOE Field Survey	Deepika Mahala
19.	Ansah	Owusu	ICS User (Econochar)	27/09/2019	DOE Field Survey	Deepika Mahala
20.	Kwso-wuge	Wewora	ICS User (Econochar)	27/09/2019	DOE Field Survey	Deepika Mahala

D.4. Sampling approach

CME Sampling approach

For the purpose of sampling, CME has followed the CDM guidelines for Sampling and surveys for CDM project activities and programmes of activities version 4.0/14/ which is in-line with the PoA DD/1/. The CME has applied Simple Random Sampling at PoA level for different monitoring parameters as per validated PoA DD /1/and registered CPA DDs/2-4/. 95/10 confidence precision was applied by CME in the sampling which is appropriate as per the single sampling covering 3 CPAs. Thus, CPA-wide single sampling plan was used by the CME.

DOE Sampling Approach

In order to meet the requirements of paragraph 28 of Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 7/15/ the verification team applied acceptance sampling in the verification (in accordance with para 28). As per para 33 of the Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 7/15/.

“A DOE may select a different sample size than the one indicated in paragraph 31 above, either by choosing a different value for the consumer risk and producer risk (e.g. 20 per cent for the consumer risk) when applying acceptance sampling or by using another approach, if any of the following conditions apply:

(a) The estimated volume of annual GHG emission reductions of the project activity or the PoA being verified is equal to or less than 100,000 t CO₂ eq.;

(b) The security conditions in the project region prevents inspection of many samples (e.g. conflict zones); or

(c) The project activity or the PoA is located in a least developed country or a host Party with 10 or fewer registered CDM project activities at the end of the monitoring period being verified.”

The current verification is for CPA 007(5342-P1-0013-CP1), CPA 008(5342-P1-0014-CP1) and CPA 009(5342-P1-0015-CP1).

Since, the the total ERs achieved and estimated for the CPAs under verification are less than 100,000t CO₂ eq, the verification team has applied para 33(a) of Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 7 and chosen 8 as sample size for each sampling frame(wood stove and charcoal stove-total 16stoves).

The verification team has selected the sample size as 8 HHs(from each sampling frame) for the purpose of physical on-site inspection / household visit to check the acceptability of CME's sampling results or otherwise.

DOE Sample Size:

CPA Ref No.	AQL	UQL	Producer Risk	Consumer Risk	Sample Size; Min	Acceptance No.
CPA 07-09	0.5%	20%	5%	20%	8	0

Considering the above input values, a sample size of 8 was required as per Table 1 in the referred Standard for the monitoring period. The team leader visited only 8 available samples for each of the ICS model (i.e.16 in total). The samples were chosen randomly (using website www.randomizer.org) out of total of 120 CME's monitored samples (as part of monitoring survey). All the households had same answer as reported in the monitoring survey sheet. thus, no discrepancy was observed. Accordingly, Acceptance number (c) thus determined for the sample size is 0 and a sample size of 8 (each stove type- wood and charcoal) meets the criteria in line with “Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 7,”.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
General	-	-	-
Compliance of the monitoring report with the monitoring report form	-	-	-
Remaining forward action requests from validation and/or previous verifications	-	-	FAR#01
CPAs considered for verification and covered in this report	-	-	-
Programme of activities	-	-	-
Compliance of the programme implementation with the registered PoA-DD	-	-	-
Implementation and operation of the management system	-	-	-
Post-registration changes	-	-	-
• Corrections	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents ¹	-	-	-
• Changes to the programme design	-	-	-
• Addition of CPA inclusion template	-	-	-
• Change of coordinating/managing entity	-	-	-
• Changes specific to afforestation and reforestation activities	-	-	-
Component project activities	-	-	-
Compliance of the CPA implementation with the included CPA design document	-	CAR#04, CAR#06	-
Post-registration changes	-	-	-
• Temporary deviations from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	-	-	-
• Corrections	-	-	-
• Changes to the start date-of the crediting period	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	-	-	-
• Changes to the project design	-	-	-
• Changes specific to afforestation and reforestation activities	-	-	-
Compliance of the registered monitoring plan with applied methodologies and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	CAR#04, CAR#05, CAR#06	FAR#01
• Data and parameters fixed ex ante or at renewal of crediting period	-	-	-
• Data and parameters monitored	-	-	-
• Implementation of sampling plan	-	CAR#06	-

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

Compliance with the calibration frequency requirements for measuring instruments	-	CAR#06	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	-	-	-
• Calculation of project GHG emissions or actual net GHG removals by sinks	-	-	-
• Calculation of leakage GHG emissions	-	-	-
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	CL#03	-	-
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	-	-	-
• Remarks on difference from estimated value in included CPA	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (evidences)	CL#02	-	-
Total	02	03	01

SECTION E. Verification findings

E.1. General

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

Means of verification	The monitoring report form used is CDM-PoA-MR-FORM version 03.0/17/ which is an appropriate form and the latest version available at the time of verification/submission for request for issuance. All the sections of the aforesaid form were duly filled as per the guidelines and provided all the relevant details.
Findings	None
Conclusion	The final monitoring report /13/ is found to be in-line with the latest CDM-PoA-MR-form/17/ available and the instructions therein.

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

There was one FAR (listed as FAR#01 under Appendix 4) raised at the time of previous verification/32/, related to the end user database for the whole population which is part of this verification, the end user database of whole population for the previous verification could not be confirmed at the time of previous verification by verifying DOE.

Therefore, the verification team raised this FAR#01. Based on the response submitted by CME and the ICS database/5/ shared by the CME, the whole population of the ICS end users included in the present verification was confirmed.

Please refer to Appendix #4 for more details.

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 00001 (Ghana) Version: 3.2	No	06/12/2012	Version 4.3 dated 07/06/2014	NA

Ref: 5342-P1-0001-CP1				
African Improved Cooking Stoves Programme of Activities CPA 00002 (Ghana) Version: 3.0 Ref: 5342-P1-0002-CP1	No	21/10/2013	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00003 (Ghana) Version: 2.0 Ref: 5342-P1-0003-CP1	No	08/11/2013	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00004 (Nigeria) Version: 6.1 Ref: 5342-P1-0004-CP1	No	23/09/2014	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00005 (Nigeria) Version: 6.1 Ref: 5342-P1-0005-CP1	No	23/09/2014	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00006 (Liberia) Version: 2.0 Ref: 5342-P1-0006-CP1	No	31/12/2014	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00010 (Nigeria) supported by Republic of Korea Version: 4.0 Ref: 5342-P1-0007-CP1	No	05/04/2019	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00011 (Nigeria) supported by Republic of Korea Version: 4.0 Ref: 5342-P1-0008-CP1	No	05/04/2019	Version 4.3 dated 07/06/2014	NA

African Improved Cooking Stoves Programme of Activities CPA 00012 (Nigeria) supported by Republic of Korea Version: 4.0 Ref: 5342-P1-0009-CP1	No	05/04/2019	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00013 (Liberia) supported by Republic of Korea Version: 4.0 Ref: 5342-P1-0010-CP1	No	05/04/2019	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00014 (Liberia) supported by Republic of Korea Version: 4.0 Ref: 5342-P1-0011-CP1	No	05/04/2019	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00015 (Liberia) supported by Republic of Korea Version: 4.0 Ref: 5342-P1-0012-CP1	No	05/04/2019	Version 4.3 dated 07/06/2014	NA
African Improved Cooking Stoves Programme of Activities CPA 00007 (Ghana) supported by Republic of Korea Version: 2.0 Ref: 5342-P1-0013-CP1	Yes	12/04/2019	Version 4.3 dated 07/06/2014	No(This is the first request for issuance for this CPA)
African Improved Cooking Stoves Programme of Activities CPA 00008 (Ghana) supported by Republic of Korea Version: 2.0 Ref: 5342-P1-0014-CP1	Yes	12/04/2019	Version 4.3 dated 07/06/2014	No (This is the first request for issuance for this CPA)
African Improved Cooking Stoves Programme of	Yes	12/04/2019	Version 4.3 dated 07/06/2014	No (This is the first request for issuance for this CPA)

Activities CPA 00009 (Ghana) supported by Republic of Korea Version: 2.0 Ref: 5342-P1- 0015-CP1				
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E.2. Programme of activities

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

Means of verification	<p>The PoA through the distribution of efficient improved cookstoves in Ghana aims at reducing GHG emissions by replacing less efficient non-renewable biomass based cookstove. This monitoring period includes the implementation and monitoring of 3 CPAs from 5342-P1-0013-CP1, 5342-P1-0014-CP1 & 5342-P1-0015-CP1 in Ghana. The coordinating and managing entity (CME) is Envirofit International Ltd. and CERPD Co., Ltd. is the CPA implementer/18/. CERPD has fully sponsored the ICS to beneficiary households in the CPAs, as well covered the cost of operation and management of the CPAs. Their roles and responsibilities are defined in the signed agreement.</p> <p>In the absence of the project activity, the ends users cooked on traditional three stone stove and used non-renewable biomass as fuel leading to release of high amount of GHG emissions in the baseline .</p> <p>CPAs of this PoA covered in the verification report involve dissemination of two models of ICS:</p> <ol style="list-style-type: none">1. Econofire /SmartSaver Wood (Wood Fuel)2. Econochar / SmartSaver Charcoal (Charcoal)² <p>Stove Specifications:/19/</p>															
	<table><tr><th>Parameter description</th><th>Econofire /SmartSaver Wood</th><th>Econochar /SmartSaver Charcoal</th></tr><tr><td>Thermal Efficiency</td><td>30.2 %</td><td>34.3 %</td></tr><tr><td>Unit Size</td><td>25.5 x 40 x 35.5 cm (height x width x depth)</td><td>28 x 37 x 42 cm (height x width x depth)</td></tr><tr><td>Unit Weight</td><td>2.7 kg</td><td>3.7 kg</td></tr><tr><td>CO emissions % improvement</td><td>77%</td><td>70%</td></tr></table>	Parameter description	Econofire /SmartSaver Wood	Econochar /SmartSaver Charcoal	Thermal Efficiency	30.2 %	34.3 %	Unit Size	25.5 x 40 x 35.5 cm (height x width x depth)	28 x 37 x 42 cm (height x width x depth)	Unit Weight	2.7 kg	3.7 kg	CO emissions % improvement	77%	70%
	Parameter description	Econofire /SmartSaver Wood	Econochar /SmartSaver Charcoal													
	Thermal Efficiency	30.2 %	34.3 %													
	Unit Size	25.5 x 40 x 35.5 cm (height x width x depth)	28 x 37 x 42 cm (height x width x depth)													
	Unit Weight	2.7 kg	3.7 kg													
	CO emissions % improvement	77%	70%													
	<p>The details of the ICS models installed were verified from the manufacturer's specification/19/ provided by the CME.</p> <p>During the on-site visit the installation of the ICS claimed by the CME were checked and found to be in-line with the technical description provided in the Monitoring report/13/.</p> <p>Also, the verification team checked the implementation status of the project activity and found it to be as defined in the registered PoA-DD/1/, and MR/13/.</p>															
	<p>Interview of the personnel involved in the QA/QC procedures revealed that the procedures mentioned in the PoA-DD/1/ were being followed and the training records/20/ regarding the trained personnel were checked.</p>															

² CH5200- Due to the small number of CH5200 stove units distributed in the current monitoring period, CH5200 is not included in monitoring and ER calculations for claiming ERs, conservatively.

	<p>During the site visit the project location and coordinates were verified using the “Go geo-coordinates app” and found to be in-line with the registered PoA-DD/1/ and MR/13/.</p> <p>Further, based on the review of ICS end user database (presented in ER sheet)/5/, physical observations and interview conducted during the site visit, the verification team found that:</p> <ul style="list-style-type: none"> • The CPA(s) were implemented within the boundary of the PoA as described in the revised accepted PoA-DD/1/. • The CME is same as that mentioned in the revised accepted PoA-DD/1/ • The implementation and operation of the project activity has been conducted in accordance with the description contained in the PoA-DD/1/ and included CPA-DDs/2-4/. • All physical features of the CPA proposed in the included CPA-DDs/2-4/ were in place • The project participants/CPA implementer has operated the CPAs as per the included CPA DDs/2-4/. <p>An onsite verification was conducted by the verification team; 8 HHs with Econofire (wood stove) and 8 HHs with Econochar (charcoal stove) were visited. The uniqueness of the system was identified from UID written on the units on the cookstove itself/10/. Along with the unique ID the following details are also noted in the database:</p> <ul style="list-style-type: none"> • Name of customer • Address / location of the customer • Stove unique serial ID number • Stove Model • Stove distribution date • Type of old / baseline stove replaced by ICS, i.e. the fuel type used in the old / baseline stove <p>The information of the installed cookstoves was also verified from the CME ICS database/5/ which was cross checked for 16 samples (8 samples for each sampling frame) with the warranty cards and other on-site documents/10/.</p> <p>The emission reductions being claimed during this monitoring period are lesser than the estimated emission reductions in the CPA-DDs/2-4/, as given in the table under section E.3.6.5. for comparable estimated ERs in the CPA DDs/2-4/ for the corresponding period.</p> <p>The CPAs are within the threshold limits of the applied methodology/6/.</p> <p>The monitoring report was compared and verified against the description provided in the registered PoA-DD/1/ and found to be correct.</p>
Findings	CL#02 was raised and resolved.
Conclusion	<p>The verification team confirms that the physical features (technology/type of ICS) of the implementation were in accordance with the registered PoA-DD/01/.</p> <ul style="list-style-type: none"> • The distribution of ICS is below the estimated quantity given in the respective CPA-DDs/2-4/. • The actual operation is in line to the respective CPA-DD, which is further explained under Section E.3 of this report. 5342-P1-0013-CP1, 5342-P1-0014-CP1, 5342-P1-0015-CP1 are less than the estimated ERs for the same period. The reason for decrease is limited distribution of ICS as compared to the estimated quantity of ICS distribution. The total actual CERs for CPAs (combined) were less for comparable monitoring period. Apart from this, no information about data and variables was identified that may surpass the estimated quantity of ERs in the respective CPA DDs/2-4/.

	<ul style="list-style-type: none"> The difference in emission reductions achieved by each specific case CPA DD in comparison to that estimated quantity in the corresponding CPA DDs/2-4/ are appropriately justified.
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E.2.2. Implementation and operation of the management system

Means of verification	<p>The verification team during the site visit assessed the management systems in place to implement the monitoring of the PoA. This included the roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system through physical inspection. The roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system have been provided in the MR /13/ and were verified through interviews with the local staff.</p> <p>CPA implementers maintain the CPA distribution records /23/ at the time of distribution to note the details of the end user, ICS model, the serial number of the ICS installed and the kind of stove replaced. All the information is transferred to ICS distribution database/5/ by the CME which was checked during the site visit to confirm that the management system is in place. The ICS database was crosschecked against sample CPA distribution records/23/, delivery note to confirm that information for any system installed (unique ID) is consistent between the records. The unique IDs of the ICS were checked for all the sampled systems seen during site visit to ensure that no number is repeating in the database and the same system is not credited in any other CPA either, thus avoiding the double counting.</p> <p>For data survey, a monitoring team has been organized by the CME consisting of trained monitoring staff, who conducted the WBT test /35/ and Usage surveys/24/. The monitoring manager of CME is responsible for QA/QC of the data, analysis and reporting in the monitoring report. QA/QC procedures were found being followed during the site visit. Completed monitoring survey forms with test results/24/ and end user agreement /23/were made available to the verification team for assessment of the information of HHs and survey and test results, in the sales data and monitoring data mentioned in ER calculator /12/. Monitoring team staff were interviewed by the verification team regarding the monitoring procedures, using the water boiling test and filling the monitoring questionnaires. The verification team also checked training records of the monitoring & data recording personnel/20/.</p> <p>Thus, it can be confirmed that the Implementation and operation of the management system has been done in line with the registered PoA DD/1/ and CPA DDs/2-4/.</p>
Findings	No Findings were raised
Conclusion	The verification team confirms that the monitoring management system of the PoA is in place with the responsibilities properly identified and established.

E.2.3. Post-registration changes

E.2.3.1. Corrections

No correction observed

E.2.3.2. Inclusion of a monitoring plan

N/A

E.2.3.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

N/A

E.2.3.4. Changes to the programme design

Changes in the programme design were included through PRC-5342-001, which made to expand the project boundary to include Liberia under the PoA. The PRC was approved on 16/07/2014. For more detail, refer the following link:

<https://cdm.unfccc.int/PRCContainer/DB/prcp237694862/view>

E.2.3.5. Addition of CPA inclusion template

N/A

E.2.3.6. Change of coordination/managing entity

N/A

E.2.3.7. Changes specific to afforestation and reforestation activities

N/A

E.3. Component project activities**E.3.1. Compliance of the CPA implementation with the included CPA design document**

Means of verification

The registered PoA aims at disseminating improved cookstoves in Ghana, Liberia and Nigeria. The PoA is primarily designed to replace the existing traditional three stone cookstove by installing Improved cookstoves instead to provide easy access to clean and affordable energy. CERPD is the implementer of the CPAs and has fully implemented the CPAs with the help of Sales and Distribution Partner (SDP). The same has been verified from the agreement between the CME and CPAI/18/. The monitoring report under verification includes the implementation and monitoring of 3 CPAs- CPA 5342-P1-0013-CP1 to CPA 5342-P1-0015-CP1 in Ghana.

CPA no.	First ICS Installation date	Inclusion date	Crediting period start date	No. of units		Estimated ERs	ERs achieved
				Econofir e	Econoch ar		
5342-P1-0013-CP1	18/12/2018	12/04/2019	12/04/2019	446	1656	10,212	959
5342-P1-0014-CP1	18/12/2018	12/04/2019	12/04/2019	693	1863	10,212	1,132
5342-P1-0015-CP1	18/12/2018	12/04/2019	12/04/2019	941	1096	10,212	764
MOV	AS checked from the ICS database/5/	Checked from the UN website /25/	Checked from the UN website /25/	Checked from ICS data base/5/	Checked from sales data base/5/	CPA DDs/2-4/	Checked from the ER sheet/12/

The verification team confirms that:

- Each of the independent subsystems/measures included in the CPA of a PoA is no larger than 1% of the small-scale thresholds(180 GWh or 1.8 GWhth/year) defined by the applied methodology criteria stated in the CPA DD/2-4/ and PoA DD/1/ as verified through the ER sheet/12/.

	<p>2. The target population is households and communities/SMEs only as verified through site visit.</p> <p>The implementation of the CPA as mentioned above is within the geographical boundary of PoA-DD/1/, which constitutes the physical boundary as well. Envirofit International Ltd. is the CME of the CPA and CEPRD Co.,Ltd. is the CPAI/18/.</p> <p>The reference number and the inclusion date of CPAs have been checked and verified from the UN website/25/ and the details are found correct and consistent. The start date of CPAs was confirmed from the evidence provided /21/. The ICS are installed across Ghana</p> <p>The verification team also confirmed following:</p> <ol style="list-style-type: none"> 1. Presence of CME logo on distributed units and record through onsite observation. 2. Unique stove ID punched on each stove onsite observation. 3. Carbon right transfer through end user agreement/23/. 4. The installations of CH5200 type is very small in number. So, the CME has chosen not to monitor or claim for it under current verification. The extra cost involved in monitoring extra samples for such a small number of distributions was the reason behind not doing it. The reason and approach were found to be reasonable.
Findings	CAR#04, FAR#01 and CAR#05, CAR#06 were raised and resolved.
Conclusion	<ol style="list-style-type: none"> a) The verification team is of the opinion that physical features of the CPA have been implemented in accordance with the registered CPA-DDs/2-4/. b) No specific monitoring equipment had to be installed according to the monitoring plan. c) It is also confirmed, through the physical site visit and review of the supporting documentation that physical features of the component CPA have been implemented in accordance with the CPA-DDs/2-4/. d) The CPAs were also found to be completely operational in line with the CPA-DDs/2-4/. e) The information provided in the relevant sections of the monitoring report are appropriately describe the implementation and operational status of the PoA

E.3.2. Post-registration changes

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

No deviations identified in the current verification and there exist no previously approved deviations for the CPAs under verification.

E.3.2.2. Corrections

NA

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

No changes to the start date of crediting period

E.3.2.4. Inclusion of a monitoring plan

N/A

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

N/A

E.3.2.6. Changes to the project design

N/A

E.3.2.7. Changes specific to afforestation and reforestation activities

N/A

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

Means of verification	The monitoring plan as contained in CPA-DDs/2-4/ were reviewed against the monitoring requirements of the applied methodology AMS-II. G version 03 /6/ as well as PoA-DD/1/ with reference to the technology involved. Based on this review, it was found that the monitoring plan contained in the CPA DDs/2/ includes all the required parameters to be monitored in the context of the CPA design and description and allows proper determination of emission reductions in accordance with PoA DD/1/ and applied methodology AMS-II.G version 03/6/.
Findings	None.
Conclusion	The monitoring plan is in line with the approved methodology AMS II.G Ver.3/6/, that is included in the CPA-DDs/2-4/.

E.3.4. Compliance of monitoring activities with the registered monitoring plan**E.3.4.1. Data and parameters fixed ex ante or at renewal of crediting period****Annual average biomass consumption per appliance, Tonnes/year, Q_{biomass}**

Means of verification	The value of the parameter is fixed at the time of first CPA and has been calculated as per the applied methodology/6/. The value for firewood stoves and charcoal stoves is 1.90 and 4.10 respectively. It was checked from the CPA-DDs/2-4/.
Findings	No Findings were raised
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet/12/ are consistent with the CPA DDs/2-4/. The applied value is correct and justified.

Fraction of biomass saved by the project activity in year y that can be established as non-renewable biomass, Fraction, $f_{\text{NRB},y}$

Means of verification	The value of the parameter is fixed at the time of first CPA and has been calculated as per the data extracted from FAO and IPCC. The value of the parameter applied in the ER sheet is 0.99 which is consistent with the CPA-DDs/2-4/.
Findings	No Findings were raised
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet/12/ are consistent with the CPA-DDs/2-4/. The applied value is correct and justified.

Net calorific value of the non-renewable biomass that is substituted, TJ/tonne, NCV_{biomass}

Means of verification	The value of the parameter is 0.015 which is a default value stated by the applied methodology/6/ and was checked from the CPA-DDs/2-4/.
Findings	No Findings were raised
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet/12/ are consistent with the CPA-DDs/2-4/. The applied value is correct and justified.

Emission factor for the substitution of non-renewable woody biomass by similar consumers, $t\text{CO}_2/\text{TJ}$, $EF_{\text{projected_fossilfuel}}$

Means of verification	The value of the parameter is 81.6 which is a default value stated by the applied methodology/6/.and was checked from the CPA-DDs/2-4/.
Findings	No Findings were raised
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet/12/ are consistent with the CPA-DDs/2-4/. The applied value is correct and justified.

Efficiency of the system being replaced, Fraction, η_{old}

Means of verification	The value of the parameter is 0.101 which was determined at the time of first CPA inclusion through the default values stated by the applied methodology/6/ for
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	replacing traditional and improved stove by multiplying it with their respective penetration rates. The value found to be consistent between CPA-DDs/2-4/, MR/13/ and ER calculation sheet/12/.
Findings	No Findings were raised
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet/12/ are consistent with the CPA-DDs/2-4/. The applied value is correct and justified.

Net to gross adjustment factor to account for leakages, Fraction,LAF

Means of verification	The value of the parameter is 0.95 which is a default value sourced from the applied methodology/6/. The value was found to be consistent between the CPA-DDs/2-4/ and ER sheet/12/.
Findings	No Findings were raised
Conclusion	The value in the monitoring report and corresponding emission reduction calculations spreadsheet/12/ are consistent with the CPA-DDs/2-4/. The applied value is correct and justified.

E.3.4.2. Data and parameters monitored

Efficiency of the device being deployed as part of the project activity in year y, %, $\eta_{new,y}$

Means of verification	Criteria/Requirements	Assessment/Observations
	Measuring /Reading /Recording frequency	Annually.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Monitoring equipment	Yes. Moisture meter, Digital Thermometer and Weighing Scale. See section E.3.5. for the detailed assessment of calibration of monitoring equipment.
	How were the values in the monitoring report verified?	<p>The efficiency of the stoves deployed were as follows:</p> <p>i) Econofire- 29.34%</p> <p>ii) Econochar-33.65%</p> <p>The efficiency has been calculated through the WBT test performed for sampled number of stoves. The sample size was determined following PoA sampling plan/1/. The WBT tests were performed for 20 stoves in all (10 stoves per ICS model) as checked from the WBT sheet calculation sheet presented in the ER calculation sheet/12/.</p> <p>During the site visit, the verification team visited 16 HHs, out of which 10 were the houses where WBT was conducted. The end users surveyed confirmed that their stove was picked up for WBT and another stove was given to them. The team was able to confirm the UIDs of both old and new stoves through observation of the stove and the end user agreement/23/.</p> <p>The values given in the ER sheet/12/ were checked with WBT sheets/35/ and</p>

		found to be correct. The test has met the required confidence and precision. The team confirms that the applied value is correct and justified.
	If applicable, has the reported data been cross-checked with other available data?	Yes. The efficiency values were cross-checked as stated in the ER calculation sheet with the WBT forms/35/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The CME has provided the training evidences/36/ and list of persons involved/29/ in conducting the WBT to confirm that QA/QC procedure are followed in line with the registered monitoring plan.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	NA
Findings	CAR#05 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/6/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

Total number of stoves installed, Number, Nall

Means of verification	Criteria/Requirements	Assessment/Observations															
	Measuring /Reading /Recording frequency	Annually.															
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.															
	Monitoring equipment	NA															
	How were the values in the monitoring report verified?	<p>The values stated in the MR are as following:</p> <table><tr><td>Parameter</td><td>5342-P1-0013-CP1</td><td>5342-P1-0014-CP1</td><td>5342-P1-0015-CP1</td></tr><tr><td>N_{wood}</td><td>446</td><td>693</td><td>941</td></tr><tr><td>N_{Charcoal}</td><td>1,656</td><td>1,863</td><td>1,096</td></tr><tr><td>Nall</td><td>2,102</td><td>2,556</td><td>2,037</td></tr></table> <p>The parameter is recorded for each sale in the ICS database/5/.</p> <p>The CME also keeps end user agreement as installation evidence/23/.</p> <p>Each stove has Unique ID, which is mentioned in the ICS database and claims for ERs.</p> <p>The entries in database were checked to confirm the total number presented in the MR/13/. 8 samples (for each sampling frame-total 16) were visited physically also, to confirm that the</p>	Parameter	5342-P1-0013-CP1	5342-P1-0014-CP1	5342-P1-0015-CP1	N _{wood}	446	693	941	N _{Charcoal}	1,656	1,863	1,096	Nall	2,102	2,556
Parameter	5342-P1-0013-CP1	5342-P1-0014-CP1	5342-P1-0015-CP1														
N _{wood}	446	693	941														
N _{Charcoal}	1,656	1,863	1,096														
Nall	2,102	2,556	2,037														

		details of the entries in the database/5/ are correct.
	If applicable, has the reported data been cross-checked with other available data?	Yes. Sampled number of entries (16) were checked with the installation invoices/26/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Representatives of the CME working the host country were interviewed to understand and confirm that the database management is done in line with the registered monitoring plan.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	NA
Findings	CAR#05 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/6/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through sampling, Fraction, SOF

Means of verification	Criteria/Requirements	Assessment/Observations
	Measuring /Reading /Recording frequency	Annually.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	<p>The values stated in the MR are as following:</p> <p>SOF_{charcoal}: 1.000</p> <p>SOF_{wood}: 0.950</p> <p>This parameter is monitored ex-post through sampling. 60 Samples each stove type (total 120) were monitored by the CME.</p> <p>Based on the end user survey the parameter was calculated and the values applied can be verified from the monitoring survey sheet/12/</p> <p>16 samples (8 of each stove type) were visited by the verification team during the site visit to confirm the result presented in the survey sheet/11,12/.</p> <p>No discrepancies were found during the site visit.</p> <p>Thus, it can be confirmed that the applied value has been correctly determined and applied.</p>

	If applicable, has the reported data been cross-checked with other available data?	Yes. The results presented in the ER sheet/12/ were checked with monitoring survey forms/24/ and found to be have same information.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	NA
Findings	CAR#05 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/6/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

Fraction of end users that are still using baseline stoves, Fraction, f_{old}

Means of verification	Criteria/Requirements	Assessment/Observations
	Measuring /Reading /Recording frequency	Annually.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	<p>The parameter is determined through survey and applying a simple formula to survey result:</p> $f_{old} = 1 \text{ (people not using old stove/total envirofit stove users)}$ <p>The values obtained in the ER sheet/11,12/ and the MR/13/ are as following:</p> $f_{old_charcoal}: 0.133$ $f_{old_wood}: 0.123$ <p>For survey 60 samples each stove type (total 120) were monitored by the CME.</p> <p>Thus, parameter is calculated through monitoring of users not using baseline stoves (f_{nonold}) as stated in the CPA-DD/2-4/.</p> <p>Based on the end user survey the parameter was calculated and the values applied can be verified from the monitoring survey summary presented in the ER sheet/11,12/</p> <p>16 samples (8 of each stove type) were visited by the verification team during the site visit to confirm the result presented in the survey sheet/12/.</p>

		No discrepancies were found during the site visit. Thus, it can be confirmed that the applied value has been correctly determined and applied.
	If applicable, has the reported data been cross-checked with other available data?	Yes. The results presented in the ER sheet/12/ were checked with monitoring survey forms/24/ and found to be have same information.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	NA
Findings	CAR#05 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/6/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

The amount of woody biomass consumption that is consumed through the continued use of old stoves, kg/year, μ old

Means of verification	Criteria/Requirements	Assessment/Observations
	Measuring /Reading /Recording frequency	Annually.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	<p>The parameter is determined through survey and applying following formula to survey result:</p> $U_{old} = (MPM_{after\ ICS} / MPM_{before\ ICS} * \text{Total annual fuel consumption(kg)})$ <p>During the survey, the end users are asked for the number of meals they prepare on old stove and on new stove to calculate the value of MPM before and after ICS use.</p> <p>The values obtained in the ER sheet/11,12/ and the MR/13/ are as following:</p> <p>$\mu_{old_charcoal}$: 1,324</p> <p>μ_{old_wood}: 905</p> <p>Out of 120 end users surveyed only 15 reported still using the old stoves: 8 Samples for Econochar stove and 7 Samples for Econofire stove. Thus, the</p>

		<p>final value is average of these 15 responses.</p> <p>Based on the end user survey the parameter was calculated and the values applied can be verified from the monitoring survey summary presented in the ER sheet/11,12/</p> <p>16 samples (8 of each stove type) were visited by the verification team during the site visit to confirm the result presented in the survey sheet/11,12/.</p> <p>No discrepancies were found during the site visit.</p> <p>Thus, it can be confirmed that the applied value has been correctly determined and applied.</p>
	If applicable, has the reported data been cross-checked with other available data?	Yes. The results presented in the ER sheet/12/ were checked with monitoring survey forms/24/ and found to be have same information.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	NA
Findings	CAR#05 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/6/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

Calculated average stove operation years in the monitoring period. If stoves have been operating for 365 days, then $\text{Stove}_{\text{year}} = 1.0$. If less than 365 days, then $\text{Stove}_{\text{year}}$ is represented as a fraction of 365 (eg. 180 days= 0.5), Year, $\text{Stove}_{\text{year}}$

Means of verification	Criteria/Requirements	Assessment/Observations
	Measuring /Reading /Recording frequency	Annually.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	<p>The parameter is calculated for all the stoves disseminated under the CPAs by considering their date of installation and estimating the total number of days for which they operated in the current monitoring period.</p> <p>The values obtained in the ER sheet/11,12/ and the MR/13/ are as following:</p>

		<table><tr><td>Parameter</td><td>5342-P1-0013-CP1</td><td>5342-P1-0014-CP1</td><td>5342-P1-0015-CP1</td></tr><tr><td>STOVE_{yearwood}</td><td>0.19</td><td>0.19</td><td>0.17</td></tr><tr><td>STOVE_{yearcharcoal}</td><td>0.16</td><td>0.16</td><td>0.16</td></tr></table>	Parameter	5342-P1-0013-CP1	5342-P1-0014-CP1	5342-P1-0015-CP1	STOVE _{yearwood}	0.19	0.19	0.17	STOVE _{yearcharcoal}	0.16	0.16	0.16	<p>The above values were checked in the ER sheet/12/ for the calculation and found to be correct.</p> <p>The total stoves considered for calculating average values of stove year in the ER sheet/12/ are same as the number of stoves listed in the ICS database/5/.</p>
		Parameter	5342-P1-0013-CP1	5342-P1-0014-CP1	5342-P1-0015-CP1										
		STOVE _{yearwood}	0.19	0.19	0.17										
		STOVE _{yearcharcoal}	0.16	0.16	0.16										
		If applicable, has the reported data been cross-checked with other available data?	Yes. The entries in the ICS database/5/ were checked with end user agreement/23/ and DOE physical site visit.												
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes														
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	NA														
Findings	CAR#05 was raised and resolved														
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology/6/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.														

E.3.4.3. Implementation of sampling plan

Means of verification	<p>The monitoring has been carried out in accordance with the monitoring plan contained in the revised approved PoA DD/1/ and CPA DDs/2-4/.</p> <p>Sampling Design/Target Population/Sampling Frame/Reliability:</p> <p>The CME has applied single sampling plan for all of the 3 CPAs. According to the 'Sampling and Survey standards,' version 7.0/15/, the sampling plan applied by the CME for the following CPAs are found to be appropriate. As per the sampling plan stated in the PoA DD/1/, a minimum 95% confidence interval and a 10% margin of error requirement is achieved for the sampled parameters whenever cross-sampling takes place. The CME has followed a frequency of annual monitoring. Since the sampling has been done across the CPAs, the CME has taken 95/10 as the confidence precision levels which is found to be in line with the registered monitoring plan/1,2-4/.</p> <p>The target population for the parameters stated above are ICS installed and recorded in the project ICS database/5/.</p> <p>Sampling Frame:</p> <p>All the stoves are homogeneous for their location, target population and stove type. However, there are two different type of ICS used by the end users under the CPAs: Wood based ICS (Econofire stoves) and charcoal based ICS (Econochar stoves).</p>
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	<p>Therefore, wood stoves-Econofire and charcoal stove-Econochar have been considered in different sampling frames.</p> <p>Sampling Method and selection:</p> <p>The samples have been chosen randomly from both the frames as checked from screenshots of random generator/37/.</p> <p>Sample Size for Parameter of Interest:</p> <p>The sampling is applied to the following monitoring parameters:</p> <ul style="list-style-type: none"> • The thermal efficiency of the ICS distributed (%), $\eta_{new,y}$ • The Stove Operating Fraction, i.e. the fraction of users using the ICS, SOF • The fraction of stove users still using baseline (replaced) stoves, f_{old} • The amount of woody biomass that continues to be used in the replaced stoves (kg), μ_{old} <p>The sample size is chosen using the equation inline to CDM guidelines for Sampling and surveys for CDM project activities and programmes of activities version 4.0/14/.</p> <p>In this regard, sample size calculation spreadsheet /12/ was checked and found correct as per registered monitoring plan. The complete details are given in section E.3 of Monitoring Report/13/.</p> <p>Implementation of Sampling Survey and Field Test Records:</p> <p>Based on interviews with the CME, HHs and surveyors during the site visit, in addition to simply asking this question to the end users, the verification team also checked the training documents of the personnel handling monitoring and tests/36/. Therefore, the implementation of surveys and tests was considered reliable.</p> <p>Monitoring survey (by CME) duration:</p> <p>The monitoring surveys were conducted from 11 July, 2019 to 23 July, 2019 and WBT tests were conducted from 03 August, 2019 to 15 August, 2019.</p> <p>Reliability and precision calculation:</p> <p>The verification team has verified the ER calculation spreadsheets /12/ with the monitored data, where the actual achieved precision is calculated against the Guidelines outlined under “Standard for sampling and surveys for CDM project activities and Programme of Activities” v7.0 /15/ and confirms that the calculation of achieved reliability was done correctly.</p> <p>All parameters of interest are included in the ER spreadsheet for the CPAs. These were checked for the input values as well as formula applied and were found consistent. The reliability (demonstration of precision achieved after the survey results) is depicted in the ER calculation sheets /12/ corresponding to final Monitoring Report /13/, which were also found correct.</p> <p>Thus, the verification team confirms that required precision has been met and the results are reliable.</p>
Findings	CAR#06 was raised and resolved.
Conclusion	The verification team has found out that the sampling plan applied is found to be in-line with the monitoring plan mentioned in the registered PoA-DD/1/ and CPA-DDs/2-4/ and Sampling and survey standards, ver.7/15/

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

Means of verification	The monitoring plan (included in CPA DDs/2-4/ and registered PoA DD/01/) does not state the calibration requirements for any of the parameter. However, the verification team has checked if the monitoring equipment used during WBT test (mass balance, moisture meter and thermometer) were duly calibrated. As a result, following information was verified from the purchase invoice/30/ of the equipment used for thermal efficiency test;
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Equipment	Sr. No.	Name of Manufacturer	Name of Model	Measuring range -	Measurement Accuracy
Thermometer	1861053	Proster	Digital Dual Channel Thermometer	-200 °C to 1767 °C (R-N-S type)	+/- 1.5%
Mass Balance	20190102318	WKA	WKA ZD30	(20g - 30 kg)	accurate to 1 g
Moisture Meter	RZ MT-10	Proster	PST049	0 % - 99.9%	0.5 %
<p>The date of purchase of monitoring equipment used for WBTs is 01/08/2019 as checked from the purchase invoice in-order/30/ to ensure that the tests have been conducted with newly purchased and calibrated instrument. The WBTs were done during the month of 3rd August 2019 to 15th August 2019.</p> <p>In absence of manufacturer mentioned any specific validity of the calibration, the "General Guidelines to SSC CDM methodologies" is applied. As per the guidelines as per "General Guidelines to SSC CDM methodologies" EB 61, Annex 21/31/, para 17 (c): "Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years". Hence, the instrument can be considered calibrated till three years from the date of purchase.</p>					
Findings	CAR#06 was raised and resolved.				
Conclusion	The verification team confirm that CME applied good practices (as per manufacturer recommendation) while using the monitoring equipment and these were under the state of calibration. There is no specific requirement prescribed in this regard in the registered monitoring plan/01/ and in monitoring methodology/6/. Therefore, the approach presented by PP was accepted.				

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

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

Means of verification	<p>The following equations were used to determine the baseline emissions as provided in the monitoring report /13/ and applied in the corresponding ER calculations sheet /12/. The expressions used were found consistent with the PoA DD /1/, CPA DDs /2-4/ and the applied methodology AMSII.G, version 03 /6/:</p> $ER_y = B_{y,savings} \cdot f_{NRB} \cdot NCV_{biomass} \cdot EF_{projected\ fossil\ fuel}$ <p>Where:</p> <p>ER_y : Emission reductions during the year y in tCO₂e.</p> <p>$B_{y,savings}$: Quantity of woody biomass that is saved in tonnes.</p> <p>f_{nrB} : Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass.</p> <p>$NCV_{biomass}$: Net calorific value of the non-renewable woody 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 woody biomass by similar consumers. Use a 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 woody biomass used in the absence of the project activity in tonnes.</p>
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	<p>η_{old} : Efficiency of system being replaced η_{new} : Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Use weighted average values if more than one type of system is being introduced by the project activity.</p> $B_{old} = LAF \cdot N_{all} \cdot SOF \cdot (Q_{biomass} - \left(\frac{\mu_{old}}{1000} \cdot f_{old}\right)) \cdot Stove_{year}$ <p>Where, B_{old} : Quantity of woody biomass used in the absence of the project activity in tonnes. LAF : Net leakage adjustment factor</p> <p>The effective duration of monitoring period is from 12/04/2019 to 30/06/2019 as the crediting period start date of the CPAs covered is 12/04/2019 and thus the CME has claimed the ERs only from the start date of the crediting period.</p> <p>The verification team has checked that the calculation for the 3 CPAs (CPA 007(5342-P1-0013-CP1), CPA 008(5342-P1-0014-CP1) and CPA 009(5342-P1-0015-CP1)) have been done in the worksheet 'ERs Summary' /12/ correctly.</p> <p>The calculations for all the CPAs were checked in the ER sheet/12/ and it was found that calculations have been done inline to the PoA DD/01/ and in accordance to the applied methodology/6/. The ex-ante values applied were also found to be consistent with the PoA and the CPA DDs/1-4/</p> <p>All the parameters are assessed in detail under section E.3.4. of this report.</p>
Findings	No findings were raised
Conclusion	<p>The verification team confirms that</p> <ol style="list-style-type: none"> The complete data was available and is duly reported; As indicated above, the description with regard to cross-check of reported data is included under respective parameter above; Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed; Appropriate emission factors, IPCC default factors and other reference values were correctly applied. There is no pro-rata approach applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.

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

Means of verification	As per applied methodology/6/, single equation is provided for the emission reduction calculation without any separate calculations for baseline emissions, project emissions or leakages related to the project. Hence, PE is not applicable in this case.
Findings	No findings were raised
Conclusion	The Project emission is not applicable, and the approach is in-line with the applied methodology.

E.3.6.3. Calculation of leakage GHG emissions

Means of verification	As per applied methodology/6/, single equation is provided for the emission reduction calculation without any separate calculations for baseline emissions, project emissions or leakages related to the project. 0.95 is applied as gross to net leakage adjustment factor to the ER calculation as per methodology.
Findings	No findings were raised
Conclusion	The leakages could not be calculated, and the approach is in-line with the applied methodology.

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

Means of verification	<p>As elaborated above, the entire emission reductions from the PoA were based on the baseline emissions. The calculations presented in this regard in the monitoring report /13/ and the corresponding ER sheet /12/ were found appropriate and complying with provisions prescribed in the registered monitoring plan/1/ of the respective CPA-DDs/2-4/, PoA-DD/1/ and applied methodology/6/</p> <p>The verification team affirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found legitimate.</p>
Findings	CL#03 was raised and resolved
Conclusion	<p>The verification team confirms that:</p> <p>a) The complete data was available and is duly reported;</p> <p>b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.3.4.2 of this report);</p> <p>c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed;</p> <p>d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied.</p> <p>e) There is no pro-rate approach was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.</p> <p>The total number of ERs achieved during the current monitoring period is 2,855 tCO₂e.</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
African Improved Cooking Stoves Programme of Activities CPA 00007 (Ghana) supported by Republic of Korea Version: 2.0 Ref: 5342-P1-0013-CP1	959	0	0	0	959	959
African Improved Cooking Stoves Programme of Activities CPA 00008 (Ghana) supported by Republic of Korea Version: 2.0 Ref: 5342-P1-0014-CP1	1,132	0	0	0	1,132	1,132
African Improved Cooking Stoves Programme of Activities CPA 00009 (Ghana) supported by Republic of Korea Version: 2.0	764	0	0	0	764	764

Ref: 5342-P1-0015-CP1						
Total	2,855	0	0	0	2,855	2,855

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

Means of verification	<p>Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 5342 "African Improved Cooking Stoves Programme of Activities" in Ghana for the monitoring period 25/10/2017-30/06/2019 (including both days) amount to 2,855tCO₂. The achieved and estimated ERs are presented in the next table. The achieved ERs are lower as compared to the estimated ERs due to lesser number of installations done under each CPA. Since, the achieved ERs are lower than the estimated, no further justification was sought.</p> <p>Verified and certified emission reductions as per commitment period:</p> <table> <tr> <td>Commitment period</td><td>Amount</td></tr> <tr> <td>Upto 31/12/2012 (1st commitment period)</td><td>0 tCO₂e</td></tr> <tr> <td>From 01/01/2013</td><td>2,855 tCO₂</td></tr> </table>	Commitment period	Amount	Upto 31/12/2012 (1 st commitment period)	0 tCO ₂ e	From 01/01/2013	2,855 tCO ₂
Commitment period	Amount						
Upto 31/12/2012 (1 st commitment period)	0 tCO ₂ e						
From 01/01/2013	2,855 tCO ₂						
Findings	None.						
Conclusion	The actual ERs achieved in included CPAs are not higher than the estimated quantity of ERs in the CPA-DDs/2-4/. Accordingly, it was accepted by verification team.						

Title and UNFCCC reference number of the CPA	Actual values achieved by the CPAs during this monitoring period	Value estimated in ex ante calculation in the included CPA-DD(s)
5342-P1-0013-CP1	959	10,212
5342-P1-0014-CP1	1,132	10,212
5342-P1-0015-CP1	764	10,212
Total	2,855	30,636

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

Means of verification	<p>As verified and evident from the Monitoring Report /13/ and corresponding ER calculations sheet /12/, the actual emission reductions achieved for Improved Cookstoves for the CPAs under this verification in the current monitoring period were found less than the estimated quantity in the CPA-DDs/2-4/ for the comparable period.</p> <p>The lower number of ERs are due to a smaller number of installations done under the CPAs as compared to estimated distribution number. Considering, there is no increase in ERs no further verification effort was put in. The details of actual values of achieved ERs for the CPA and value estimated in the CPA- DDs/2-4/ is presented in the table above.</p>
Findings	None.
Conclusion	The actual emission reductions achieved in any of specific CPAs are not higher than the estimated quantity of ERs in the CPA-DDs/2-4/. Accordingly, it was accepted by the verification team.

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

Means of verification	The coordinating/managing entity did not identify and establish the monitoring of the sustainable development benefits of the registered CDM PoA/1/ and no such document was developed and published on the UNFCCC CDM website/25/. Therefore, no assessment is required.
Findings	None.
Conclusion	The CME is not required to monitor the sustainable development benefits of the registered CDM PoA.

E.3.8. Global stakeholder consultation

Means of verification	The global stakeholder consultation was not found applicable because period under verification is sixth monitoring period.
Findings	None.
Conclusion	The requirement is applicable for situations when global stakeholder consultation was carried out after the publication of first monitoring report. Therefore, this was not found applicable.

SECTION F. Internal quality control

The draft verification report that is prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process additional findings may be identified or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the Technical Reviewer is final and is authorized on behalf of Earthood Services Private Limited.

SECTION G. Verification opinion

Earthood Services Private Limited (ESPL), contracted by Envirofit (the CME for the PoA), has performed the sixth independent verification of the emission reductions for the registered CDM PoA 5342 "African Improved Cooking Stoves Programme of Activities" for the sixth monitoring period 25/10/2017-30/06/2019 (both days included) as reported in the Monitoring Report (final) Version 3.0 dated 05/11/2019. The CME is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

This verification report is for the PoA-5342 which was included at the UNFCCC webpage at the end of the current monitoring period.

ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. This verification report has been prepared using the latest available template specified by UNFCCC and complies with the instructions to follow of CDM VVS-PoA Version 02.

The verification activities were conducted in accordance with ESPL's CDM Quality Manual System as per the steps indicated under Section A of this report. The verification process has resulted in conclusion that the included CPAs confirm to the revised accepted PoA-DD as well as comply with applicable CDM rules and regulations and in accordance with applied monitoring methodologies, AMS II.G (Version 03).

As a result, it is confirmed that the emission reductions from the CDM PoA 5342 "African Improved Cooking Stoves Programme of Activities" are correctly reported in the Monitoring Report Version 3 dated 05/11/2019 and corresponding ER sheets for the monitoring period 25/10/2017-30/06/2019 (including both days) amount as 2,855 tCO₂e. Therefore, this will be submitted as part of request for issuance as per CDM PCP Version 02.

SECTION H. Certification statement

Earthood Services Private Limited (ESPL), contracted by Envirofit (the CME for the PoA), has performed the sixth independent verification of the emission reductions for the registered CDM PoA 5342 "African Improved Cooking Stoves Programme of Activities" in Ghana for the monitoring period 25/10/2017-30/06/2019 (both days included) as reported in the Monitoring Report (final) Version 3.0 dated 05/11/2019.

The verification is based on the registered PoA-DD, CPA--DDs and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board.

The management of the Envirofit International Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report Version 3.0 dated 05/11/2019. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the Bureau of Energy Efficiency. The development and maintenance

of records and reporting procedures are in accordance with the Monitoring Report Version 3.0 dated 05/11/2019.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the monitoring period 25/10/2017-30/06/2019 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 3.0 dated 05/11/2019 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, ESPL planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

ESPL confirms the following;

Monitoring period: From 25/10/2017 up to 30/06/2019 (including both dates)

Verified and certified emission in the above monitoring period:

	Amount	Unit
Certified emission reductions (CERs)	2,855	tCO ₂ e

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Level
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
CER	Certified Emission Reduction
CL	Clarification Request
CME	Coordinating or Managing Entity
CPA	Component Project Activity
CP	Crediting period
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	Executive Board
ESPL	Earthhood Services Private Limited
FAR	Forward action request
GHG	Green House Gases
GS	Gold standard
ICS	Improve Cook Stoves
IPCC	Intergovernmental Panel on Climate change
POA	Programme Of Activity
PO	Partner Organization
PSU	Primary Sampling Unit.
TA	Technical Area
TR	Technical Reviewer
VVS	Validation and Verification Standard
UNFCCC	United Nation Framework convention on Climate change
WBT	Water Boiling Test

Appendix 2. Competence of team members and technical reviewers

Competence Statement	
Name	Deepika Mahala
Country	India
Education	M. Sc. (Environmental Management), GGSIP University B.Sc. Hons. (Chemistry), Sri Venkateshwar College, DU
Experience	3 Years +
Field	Climate Change
Approved Roles	
Team Leader	YES
Validator	YES
Verifier	YES
Methodology Expert	ACM0002, AMS.I.D., AMS.I.A, AMS.III.AV, AMS.II.G
Local expert	YES (India)
Financial Expert	NO

Technical Reviewer	YES		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Shreya Garg	Date	14/09/2018
Approved by	Anshika Gupta	Date	14/09/2018

Competence Statement			
Name	Anshika Gupta		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	4 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.A., AMS-II.G., ACM0002, AMS-III.A.V.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	Yes (TA 1.2, TA 3.1)		
Reviewed by	Shreya Garg	Date	12/03/2019
Approved by	Kaviraj Singh	Date	12/03/2019

Competence Statement			
Name	Vaishali Vatsa		
Education	M.Sc. (Environmental Studies and Resource Management), TERI University		
Experience	4 months		
Field	Climate Change		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	Validator/ Verifier		
Reviewed by	Shreya Garg	Date	28/06/2019
Approved by	Anshika Gupta	Date	28/06/2019

Competence Statement	
Name	Moses Dada Wealth
Country	Ghana

Education	Advanced Diploma (Chemical Engineering)		
Experience	7 years +		
Field	Water Treatment, Oil Storage and Transporting		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (Ghana)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	NO		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Kumar Gautam	Date	01/03/2018

Appendix 3. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
1	Envirofit International Ltd	Registered PoA-DD Revised accepted PoA DD	Version 3.2, dated 27/11/2012 Version 4.3 Dated:07/06/2014	Others
2	Envirofit International Ltd	Registered CPA-DD-007 (5342-P1-0013-CP1)	Version 2.0 Dated:15/03/2019	Others
3	Envirofit International Ltd	Registered CPA-DD-008 (5342-P1-0014-CP1)	Version 2.0 Dated:15/03/2019	Others
4	Envirofit International Ltd	Registered CPA-DD-009 (5342-P1-0015-CP1)	Version 2.0 Dated:15/03/2019	Others
5	Envirofit International Ltd	ICS Database	-	CME
6	UNFCCC	AMS-II.G	Version 3.0	Others
7	UNFCCC	Project Standard for PoA	Version 2.0	Others
8	UNFCCC	Project Cycle Procedure for PoA	Version 2.0	Others
9	UNFCCC	Validation and Verification Standard for PoA	Version 2.0	Others
10	ESPL	On-site assessment files (survey sheets)	25/09/2019	Others
11	Envirofit International Ltd	Usage and Monitoring survey (presented in the ER sheet)	22/10/2019	CME
12	Envirofit International Ltd	ER calculation sheet	22/10/2019	CME
13	Envirofit International Ltd	Monitoring Report (final)	Version 3.0 Dated:05/11/2019	CME
14	UNFCCC	Guidelines for Sampling and Surveys for CDM project activities and Programme of activities	version 4.0	Others
15	UNFCCC	Standards for Sampling and Surveys for CDM project activities and programme of activities	Version 7.0	Others
16	Carbon Check	PoA PRC Validation opinion	Version 2.0 Dated 28/02/2014	Others
17	UNFCCC	CDM Monitoring Form for PoA (CDM-PoA-MR-FORM)	Version 3.0	Others

CDM-PoA-VCR-FORM

18	Envirofit International Ltd	CME and CPA implementer agreement	1/11/2018	CME
19	Envirofit International Ltd	Stove specification	-	CME
20	Envirofit International Ltd	Training records for monitoring	-	CME
21	Envirofit International Ltd	CPA start date evidence -date of first shipment of ICS	17/12/2018	CME
22	Germanischer Lloyd Certification GmbH	PoA Validation report	Version 11, Dated 15/12/2012	Others
23	Envirofit International Limited	End User Agreement	Various	CME
24	Envirofit International Limited	Monitoring Survey forms	2019	CME
25	UNFCCC	PoA Link: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/4R62VM8H3CFJDZTAXYQEL7I19NBPWO/viewCPAs	-	Others
26	Envirofit International Limited	Installation Invoices	Various	CME
27	TUV NORD CET GmbH	Inclusion report for CPA 007(5342-P1-0013-CP1), CPA 008(5342-P1-0014-CP1) and CPA 009(5342-P1-0015-CP1)	Version 1.0 08/04/2019	Others
28	GACC	EPTP Protocol-GACC	-	CME
29	Envirofit	List of persons involved in WBT	-	CME
30	TheDukes Engineering	Monitoring Equipment Purchase Invoice	01/08/2019	CME
31	UNFCCC	General Guidelines to SSC CDM methodologies EB 61, annex 21	-	Others
32	Carbon Check India private limited	Verification report for MP5	Version 4.0, Dated 23/01/2019	Others
33	Envirofit International Ltd	Stove test pictures	-	CME
34	Envirofit International Ltd	Equipment pictures	-	CME
35	Envirofit International Ltd	WBT Forms	3/8/2019 to 15/8/2019	CME
36	Envirofit International Ltd	WBT training certificates	-	CME
37	Envirofit International Ltd	Screenshot of random number generated for monitoring	-	CME

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

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

FAR ID	01	Section no.	E.3.1	Date : 22/10/2019
Description of FAR				
As per the FAR raised during the previous verification CME is requested to provide the end user database for the whole population.				
Project participant response				Date : 22/10/2019
The end user database for the ICS population covered under the CPAs being monitored is being submitted.				
Documentation provided by project participant				
PoA 5342 MP#6 Ghana v2.0 22102019 ICS database				
DOE assessment				Date: 25/10/2019
PP has provided the end user database for the ICS population covered under the CPAs being monitored (Closed)				

Table 2. CLs from this verification

Table 21: CLS from this verification

CL ID	02	Section no.	E.2.1	Date : 22/10/2019
Description of CL				
PP is requested to provide the following supportive evidence:				
<ol style="list-style-type: none">1. Stove specification2. Calibration details of the monitoring equipment along with the calibration certificates3. Agreement between CME and CPAI4. CPA Start date evidence for all the three CPAs included in the current monitoring period.				
Project participant response				Date : 22/10/2019
Refer the following wrt the supportive documents requested:				
<ol style="list-style-type: none">1. Stove Specification: The specification of the stoves distributed in the CPAs are given in the Product Catalogue. Refer Envirofit product catalogue being submitted.2. Calibration details of the monitoring equipment along with the calibration certificates: The equipment used for WBTs were newly purchased at the time of monitoring, to ensure that the measurements were done with necessary guarantees. The purchase invoice of monitoring equipment is being submitted to substantiate the same.3. Agreement between CME and CPAI: An agreement between CME (Envirofit International Inc) and CPA Implementer (CERPD Co., Ltd.) is being submitted.4. CPA Start date evidence for all the three CPAs included in the current monitoring period: The start date of all the three CPA included in the current monitoring period is 17/12/2018, which is the date of invoice of first ICS shipment for these CPAs. The same is being submitted.				
Documentation provided by project participant				
<ol style="list-style-type: none">1. Envirofit Product Catalogue2. Monitoring equipment's purchase invoice3. Agreement between CME and CPAI4. ICS shipment invoice				
DOE assessment				Date: 25/10/2019
All the evidences provided by the PP was appropriate and found to be acceptable. (Closed)				

CL ID	03	Section no.	E.3.6.4	Date	: 22/10/2019
Description of CL					
<ol style="list-style-type: none"> 1. As per the MR the start date of the monitoring period is 25/10/2017. However, the ER sheet mentions start date of the MP as 12/04/2019. 2. The Total ERs in the MR sent for publication (5,124 tCO₂e) is inconsistent with the ER sheet (2,880 tCO₂e). Please clarify. 					
Project participant response				Date : 22/10/2019	

<ol style="list-style-type: none"> 1. The end date of PoA MP5 was 24/10/2017. Thus, the start date of PoA MP6 is 25/10/2017. However, the concerned monitoring report covers three CPAs (5342-P1-0013-CP1, 5342-P1-0014-CP1 and 5342-P1-0015-CP1) whose crediting period start date is 12/04/2019. Therefore, the effective monitoring period start date is deemed 12/04/2019 for ER calculations. This has now been clarified in the revised MR and ER calculator. 2. The inconsistency in the MR is on account of typographical error. The MR has been accordingly corrected. 	
Documentation provided by project participant	
<ol style="list-style-type: none"> 1. PoA 5342 MP#6 Ghana ER Sheet v2.0 22102019 2. PoA 5342 MP#6 Ghana MR v2.0 22102019 	
DOE assessment	Date: 25/10/2019
<ol style="list-style-type: none"> 1. PPs explanation for the start date of the monitoring period for the considered CPAs was found to be acceptable as the start date of crediting period of the CPAs considered is from 12/04/2019. Thus the effective MP is to be from 12/04/2019. Hence, the finding is closed. 	

Table 3. CARs from this verification

CAR ID	04	Section no.	E.3.1	Date : 22/10/2019
Description of CAR				
<ol style="list-style-type: none"> 1. As per section C.1 of the MR (page 7) 'single ICS is given to a household, no household in the CPA database owns more than one ICS unit'. PP is requested to clarify the procedure used to ensure that all the distributions are made in-line to aforesaid statement. 2. Footnote 1 states "Due to the small number of CH5200 stove units distributed in the current monitoring period, CH5200 is not included in monitoring and ER calculations". PP shall clarify if Econochar /SmartSaver Charcoal and CH5200 are different models or same. If same, then is footnote 1 applicable? 3. Section A.1.2 of the MR on page 3 mentions incorrect CPA-DD version for CPA 00010-CPA 00012 of Nigeria (Reference no. 5342-P1-0007-CP1, 5342-P1-0008-CP1, 5342-P1-0009-CP1). 				
Project participant response				Date : 22/10/2019
<ol style="list-style-type: none"> 1. For each stove distributed, the CME collects information from the ICS beneficiary on presence of any existing Envirofit stove via the "Stove user agreement". Any user reporting use of existing Envirofit ICS is not included in the PoA / CPA database. Thus, CME ensures that only a single ICS is credited in a given household. The stove user agreement is being submitted for reference. 2. CH5200 is different from Econochar / SuperSaver Charcoal. 3. CPA-DD version of CPA 00010, CPA 00011, CPA 00012 of Nigeria (UNFCCC Reference no. 5342-P1-0007-CP1, 5342-P1-0008-CP1, 5342-P1-0009-CP1) have been corrected in the revised MR. The revised MR is being submitted. 				
Documentation provided by project participant				
<ol style="list-style-type: none"> 1. Stove User Agreement 2. PoA 5342 MP#6 Ghana MR v2.0 22102019 				
DOE assessment				Date: 25/10/2019
<ol style="list-style-type: none"> 1. PP has provided the stove user agreement which records the information regarding the presence of any existing Envirofit stove. Also, the Monitoring forms provided by the PP was checked and it was confirmed from both the evidence that one user owns one ICS unit only. (Closed) 2. CH5200 is different model from the Econochar and Econofire and the same was verified from the Monitoring forms which has a section of model of stove present with the user which enlists both CH5200 and Econo char separately. Hence, the finding is closed. 3. The CPA-DD version for CPA 00010, CPA 00011, CPA 00012 was found to be correct in the revised MR. (Closed) 				

CAR ID	05	Section no.	E.3.4.2	Date : 22/10/2019
Description of CAR				
<ol style="list-style-type: none"> 1. The monitoring survey sheet in the ER calculator sheet does not indicate the date of the monitoring survey. PP is requested to include the date of survey in the monitoring survey sheet. 2. Adama Zakari owning Econochar has a different stove serial number code than all other entries for Econochar (EL1T0XXXXX instead of EA1H0XXXXX). CME shall clarify. 				
Project participant response				Date : 22/10/2019

<ol style="list-style-type: none"> 1. The date of monitoring survey is given in section E.3 of the MR and is consistent with the date of survey recorded in the survey forms already submitted. 2. The ICS serial number is a 10-digit alpha-numeric code. The EL1T0XXXXX belongs to the CH5200 family of ICS and EA1H0XXXXX belongs to Econochar family of ICS. Thus, the ICS with Adama Zakari has now been removed from database for the concerned monitoring period and is not included for ER calculations. The MR and ER have been revised accordingly.
Documentation provided by project participant
PoA 5342 MP#6 Ghana ER Sheet v2.0 22102019 PoA 5342 MP#6 Ghana MR v2.0 22102019
DOE assessment
<ol style="list-style-type: none"> 1. PP has included the date of monitoring survey in section E.3 of MR which was found to be consistent with the survey forms. (Closed) 2. Adama Zakari has been removed from the updated ICS database and the ERs have been accordingly revised in the MR and ER sheet. (Closed)

CAR ID	06	Section no.	E.3.1., E.3.5., E.3.4.3.	Date : 04/11/2019
Description of CAR				
<ol style="list-style-type: none"> 1. For CH5200, it is not clear if there is low distribution or no distribution. What is the number of distribution if it is low? What is the reason of selectively not monitoring the low population of CH5200? 2. PP is requested to add the calibration details for the monitoring equipment used for WBT under section E.2 of MR. 3. Please provide evidence for expected values assumed for sample size calculation in the ER sheet. 				
Project participant response				Date : 05/11/2019
<ol style="list-style-type: none"> 1. The number of CH5200 units distributed till the end of monitoring period under the concerned CPAs is 77 units only. The PP has chosen to not monitor, and more importantly, not claim any emission reductions for CH5200 units as a conservative measure. The costs involved in monitoring CH5200 outweighed the CERs generated by merely 77 units over an 80-day monitoring period. Hence PP decided not to include them in the monitoring population / ER calculations for the concerned monitoring period. Please note that no selective monitoring is deemed involved as CH5200 is not part of monitoring population/sampling frame. 2. The MR has been revised to include the detail of monitoring equipment. 3. All parameter expected values are based on the project developer's experience and knowledge in line with para 12(b) and 12(c) of sampling standard. 				
Documentation provided by project participant				
DOE assessment				
<ol style="list-style-type: none"> 1. The installations of CH5200 type is very small in number. So, the CME has chosen not to monitor or claim for it under current verification. The extra cost involved in monitoring extra samples for such a small number of distributions was the reason behind not doing it. The reason and approach were found to be reasonable. 2. The detail of the monitoring equipment has been added under the required section, which has also been checked with the purchase order. All information is correct and consistent. 3. The values have been determined on CME's experience. The applied standard for sampling version 7.0 allows to apply the experience based expected values in sample size calculation as per its paragraph 12(b) and 12(c). Thus, the values were accepted by the team. <p>Thus, the CAR stands closed.</p>				

Table 4. FARs from this verification

FAR ID	xx	Section No.		Date: DD/MM/YYYY
Description of FAR				
There is no FAR from this verification.				
CME response				Date: DD/MM/YYYY
NA				
Documentation provided by the CME				
NA				

DOE assessment	Date: DD/MM/YYYY
NA	

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Document information

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

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1.0	04/05/2018	Guidelines updated	Shreya Garg	04/05/2018	Anshika Gupta	04/05/2018
*This table is for ESPL internal document control purpose only						