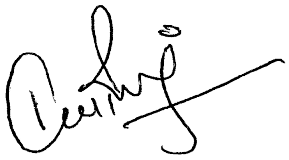
Verification and certification report form for CDM programme of activities

(version 02.0)

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

BASIC INFORMATION		
Title and UNFCCC reference number of the programme of activities (PoA)	African Improved Cooking Stoves Programme of Activities (5342)	
Version number(s) of the PoA-DD(s) to which this report applies	4.3	
Version number of the verification and certification report	2.1	
Completion date of the verification and certification report	26/10/2018	
Monitoring period number and duration of this morning period	Fifth Monitoring Period 25/10/2016 - 24/10/2017	
Number and version number of the monitoring report to which this report applies	Monitoring report number: 1.0 Monitoring report 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	No
	Nigeria	Yes
	Liberia	No
Applied methodologies and standardized baselines	AMS-II.G Ver 3.0: Energy efficiency measures in thermal applications of non-renewable biomass	
Mandatory sectoral scopes linked to the applied methodologies	Sectoral scope: 3: Energy demand	
Conditional sectoral scopes linked to the applied methodologies, if applicable	NA	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	88,318 tCO_2e	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	21,582 tCO_2e	

Name and UNFCCC reference number of the DOE	Earthood Services Private Limited
Name, position and signature of the approver of the verification and certification report	 Dr. Kaviraj Singh Managing Director

SECTION A. Executive summary

The registered PoA under verification involves distribution of improved cook stoves (ICS) in the regions of Ghana, Nigeria and Liberia. The ICS are biomass fuel based which replace the wood fuel/charcoal based traditional stoves. The ICS distributed under the programme are more efficient in transferring heat from the fuel to the pot when compared to the stoves typically being used in the baseline.

The ICS distribution is done by Envirofit International Ltd (Envirofit), which is the CME of the PoA as well as Distribution Organisation (DO) for implementation of the CPAs.

The areas (majorly rural and semi-urban) where the PoA implementation has taken place uses the inefficient traditional stoves (three-stone fire and equivalent). It has been replaced with the efficient improved cook stoves (ICS) which combust the fuel (wood or charcoal, wood fuel based traditional stoves being replaced by wood-fuel based ICS (M5000) and charcoal-fuel based traditional stoves being replaced by charcoal ICS (CH2300 and CH5300)) far more efficiently resulting in generation of much lesser GHG and particulate matter. Additionally, it enhances the flow of thermal energy to cooking pots reducing the fuel usage and thus reduces GHG emissions and improves livelihood prospects due to reduced expenses on fuel. These effects further results into improvised health of women and children in the household.

There are 6 CPAs viz., 5342-0001, 5342-0002, 5342-0003, 5342-0004, 5342-0005 and 5342-0006 included under the registered PoA. However, this request of issuance has been submitted only for two CPAs in Nigeria viz., 5342-0004 and 5342-0005. The current verification consists of two CPAs; 5342-0004 and 5342-0005 that are located in Nigeria.

Scope of verification:

The verification is an independent and objective review and 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/1/ & registered CPA-DDs/3,4/ viz., 5342-0004 and 5342-0005 in the monitoring period. The verification tests the data and assertions set out in the monitoring report based on the following:

(i) The approved methodology AMS II.G version 03 “Energy efficiency measures in thermal applications of non-renewable biomass”
(ii) The registered and/or revised PoA-DD & CPA-DD and monitoring plan
(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 1.0
(v) The CDM Project Standard (PS) for PoA version 1.0
(vi) Project Cycle Procedure (PCP) for PoA version 1.0
(vii) 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 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 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, as appropriate.

Verification Conclusion:

Based on the outcome of the verification process of the registered PoA "African Improved Cooking Stoves Programme of Activities" and its 02 CPAs (Batch 01 consisting of 5342-0004 and 5342-0005) for the monitoring period 25/10/2016 - 24/10/2017 (including both dates) ESPL confirms that the implementation of referenced registered PoA and CPAs is complying with applicable CDM rules and regulations as stated in the Monitoring Report (final) Version 3.0 dated 23/08/2018. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS II.G Version 03/7/ and the monitoring plan contained in the revised accepted PoA-DD/1/.

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" from its CPAs in Nigeria during the period 25/10/2016 - 24/10/2017 (including both dates) amount to 21,582 tCO_2e. 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.	Methodological Expert (AMS-II.G.)	IR	Mahala	Deepika	Central office	Y	Y	Y	Y
4.	Technical Expert (TA 3.1)	IR	Mahala	Deepika	Central office	Y	Y	Y	Y
5.	Trainee Verifier	IR	Guleria	Shifali	Central office	Y	N	N	Y
6.	Local Expert	ER	Eleri	Adeola Ijeoma	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	Garg	Shreya	Central Office
2.	TE to TR	IR	Garg	Shreya	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	Med	There may be lack of experience. The survey is conducted for representative samples of population, which may impact the population significantly.	Verification team randomly selected the samples from CME surveyed households. The recorded survey forms by CME were checked with DOE's field observations.
2.	Transfer of recorded data into ER spreadsheets	Med	The process is manual and therefore there is potential risk of errors / omissions/misstatements.	All recorded data (monitoring survey and thermal efficiency) were checked with ER sheet/11/ for consistency of information.
3.	Calculation Errors	Med	The process in manual and therefore there is potential risk of errors / omissions/misstatements.	All calculations/formulas were checked by verification team with respect to applicable requirements under various documents viz., methodology, registered PoA DD/1/, CPA DDs/3,4/ etc.

C.2. Consideration of materiality in conducting the verification

In accordance with CDM PoA VVS Version 1 para 307/13/ the prescribed thresholds for materiality for CDM PoAs is as under;

Emission Reductions (tCO2e)/year	500,000 or more	300,001 to 499,999	300,000 or less	Small Scale CDM PoAs	Micro Scale CDM PoAs
Materiality Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The applicable materiality threshold is 5% as all the CPAs being verified under PoA are comprised of only small-scale.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO2e) in this monitoring period	88,318 tCO_2e	21,582 tCO_2e*
Applicable Threshold (%) as per para 307(d) of CDM VVS Version 1 for PoAs	5%	5%

The verification team has identified the impact of errors observed and those have been corrected by CME during verification for all monitoring parameter at individual and aggregate level.

Monitored Parameter (Symbol / Description)/ formula	Reporting Frequency	Number of Discrete Data (Total) Data (%)	Sample selected for verification Data (%)	Type of error identified	Impact on ERs	
					ERs impacted (Sample)*	ERs impacted (Population based on extrapolation)
$\eta_{new,y}$ Efficiency of the system being deployed as part of the project	Annually	30 (100%)	30 (100%)	Errors raised and resolved in CAR 07	No impact as 100% data has been verified	No impact as 100% data has been verified

activity						
N_{all} Total number of stoves installed	Annually	8190 in database 135 surveyed samples (100%)	8190 (100% of database) 17 (12.59%)	No errors identified	No impact	No impact
SOF Stove Operation Fraction	Annually	135 (100%)	17 (12.59%)	No errors identified	No impact	No impact
$f_{old,}$ Fraction of end users that are still using baseline stoves	Annually	135 (100%)	17 (12.59%)	No errors identified	No impact	No impact
$\mu_{old,}$ The amount of woody biomass consumption that is consumed through the continued use of old stoves	Annually	135 (100%)	17 (12.59%)	No errors identified	No impact	No impact
$Stove_{year,}$ Calculated average stove operation years in the monitoring period	Annually	8190 (100%)	8190 (100%)	No errors identified	No impact	No impact

*The ERs mentioned in MR (public) were actually the ex-ante emission reduction, written erroneously in the place of emission reduction achieved. The ER sheet transparently presenting actual achieved ERs was checked and CL#01 was raised and resolved.
Errors identified were raised as CAR #07, in response to which revised calculation sheet was shared by PP. This has also changed the emission reductions.
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/13/. The applicable threshold for materiality in accordance with CDM PoA VVS Version 1 para 307(d)/13/ is 5%.
DOE assessment confirms that materiality of errors is within the threshold which implies that no material error is observed in the ER calculation.

SECTION D. Means of verification

D.1. Desk/document review

The desk review involves:

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;

- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;

The list of documents reviewed during the verification is provided under appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 23/07/2018 to 24/07/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Physical site visit: Households visited (implementation of PoA)	Lagos, Nigeria	23/07/2018 to 24/07/2018	Deepika Mahala
2.	Review of information flows for generating, aggregating and reporting the monitoring parameters	Lagos, Nigeria	23/07/2018 to 24/07/2018	Deepika Mahala
3.	Cross check between information provided in the monitoring report and data from other sources such as project database, sales receipts etc;	Lagos, Nigeria	23/07/2018 to 24/07/2018	Deepika Mahala
4.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the applicable requirements	Lagos, Nigeria	23/07/2018 to 24/07/2018	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	Lagos, Nigeria	23/07/2018 to 24/07/2018	Deepika Mahala

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**	**Team member**
	Last name	**First name**	**Affiliation**			
1.	Lohia	Rohit	Envirofit	20/07/2018, 03/08/2018 (via phone)	ER sheet calculation, Monitoring report	Deepika Mahala
2.	Olaore	Biodun	Envirofit Director	23/07/2018 to 24/07/2018	Implementation, ICS distribution, Sales Database, Monitoring survey, WBT, data review, Supervision	Deepika Mahala
3.	Boye	Adeife	Envirofit Business Development Associate	23/07/2018 to 24/07/2018	Sales Database & monitoring data recording	Deepika Mahala
4.	Djedo	Elizabeth	Envirofit Associate	23/07/2018 to 24/07/2018	Sales Database & monitoring data recording	Deepika Mahala
5.	Ube	Chibuzor	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
6.	Wilson	Mary	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
7.	Samuel	Oni Idowo	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
8.	Aderibigbe	Stephen	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
9.	Adisa	Olubunmi	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
10.	John	Nsikak	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala

11.	-	Ganiyu	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
12.	Friday	Christiana	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
13.	Juliana	Opeifa	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
14.	Benedicth	Ngah	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
15.	Mojisola	Kehinde	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
16.	Benedicta	Bassey	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
17.	Edah Sunday	Di	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
18.	Aho	Josephine	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
19.	-	Oyewole	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
20.	Alieze	Cecilia	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala
21.	Nwonu	Nwek	ICS User	23/07/2018 to 24/07/2018	DOE Survey	Deepika Mahala

D.4. Sampling approach

A single sampling plan in accordance with AMS-II.G. version 3.0 /07/ was carried out for the specific case CPAs covered in this monitoring period. The CME has applied Simple Random Sampling across the CPAs for different monitoring parameters as per validated PoA DD/01/ and CPA DDs/3,4/ and 95/10 confidence precision was applied by CME, which is appropriate given the length of monitoring period and sampling was done across the CPAs covered. The detailed sampling approach undertaken by CME is duly explained under Section E.3.4.3 of monitoring report.

DOE's sampling approach:

The onsite physical verification approach (number of households/ICS) of the verification team was prepared in accordance with para 33 (a) & 33 (b) of "Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 7/16/ considering the estimated annual ERs for the CPAs covered were less than 100,000 tCO_2e and security conditions (conflict situations) in Nigeria (which is the host Party for the CPAs being verified) prevents inspection of many samples.
The verification team determined the sample size for acceptance sampling by evaluating the following, using its own professional judgment and guidance in the Standard 'Sampling and surveys for CDM project activities and programme of activities' version 7:

- The proportion of discrepancies between the CME's data and verification team's (field or onsite inspection results) data that can be considered acceptable. This is referred to as the AQL (Acceptable Quality Level): 1% was considered in this verification.
- The proportion of discrepancies between the CME's data and verification team's (field or onsite inspection results) data that would be considered unacceptable. This is the UQL (Unacceptable Quality Level): 20% was considered in this verification.
- The producer risk of 10% and consumer risk of 20% were considered.

Apropos above, a sample size of 8 was required as per Table (page12) in the referred Standard/16/ for each sampling frame. Accordingly, Acceptance number (c) thus determined for the sample size is 0.

However, in order to account some potential non-responses due to non-availability of user household, logistic issues/constraints and prevailing security issues etc., a sample size of 9 was selected by the DoE meeting the required criteria.

The CPA being verified includes two types of ICS devices (wood (one model -M5000) and charcoal (two models CH2300 &CH5300)).Therefore selected required number (9 samples each for wood and charcoal category) were chosen randomly (using website www.randomizer.org) out of total of 135 CME's monitored samples (as part of monitoring survey). However, one non-availability (household owner was not present at home) was observed during the site visit.

The verification team verified total 17 samples of ICS (i.e., 9 for wood(M5000) & 8 for Charcoal (CH2300 and CH5300) Cookstoves) for the CPAs to verify the parameters SOF, (Stove Operation Fraction), f_{old} (The fraction of end users that are still using baseline (replaced) stoves), $\eta_{new,y}$ (Efficiency of the system being deployed as part of the project activity), N_{all} (Total number of stoves installed) & $Stove_{year}$ (Calculated average stove operation years in the monitoring period) and μ_{old} (The amount of woody biomass consumption that is consumed through the continued use of old stoves) during site visit(physically and via phone) and observed that the sampling survey results of the CME for all the ICSs checked were consistent with DOE's field survey results.

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	CL#02	-	-
Remaining forward action requests from validation and/or previous verification	-	-	-
CPA(s) 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	-	CAR#04	-
• Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
• Corrections	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
• Changes to the programme design or project design	-	-	-
• Change of coordinating/managing entity	-	-	-
• Changes specific to afforestation and reforestation activities	-	-	-
Component project activities	-	-	-
Compliance of the CPA implementation with the included CPA design document	-	-	-
Post-registration changes	-	-	-
• Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
• Corrections	-	-	-
• Changes to the start date of the crediting period of component project activities	-	-	-

• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
• Changes to the programme design of project design	-	-	-
• Changes specific to afforestation and reforestation component project activities	-	-	-
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	CAR#03, CAR#06	-
• Data and parameters fixed ex ante or at renewal of crediting period	-	CAR#11	-
• Data and parameters monitored	-	CAR#07, CAR#11	-
• Implementation of sampling plan	-	CAR#09	-
Compliance with the calibration frequency requirements for measuring instruments	-	CAR#05, CAR#10	-
Assessment of data and calculation of emission reductions or net removals	CL#01	CAR#08	-
• 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	-	-	-
• 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 (please specify)	-	-	-
Total	2	9	0

SECTION E. Verification findings

E.1. General

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

Means of verification	The verification team has compared the monitoring report/9/ with the applicable monitoring report form/20/ and found it to be fulfilling the guidelines of the FORM.
Findings	No findings.
Conclusion	Monitoring report is prepared using the correct template i.e. CDM-PoA-MR-FORM Version 02.0 /20/. The verification team confirms that the monitoring report has been appropriately prepared using the applicable monitoring report form, and that all sections are completed

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

There were no FARs during validation /2/ of PoA, inclusion /5,6/ of CPA or previous verification /21/ which needs to be closed during this monitoring period.

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) 5342-0001	No	06/12/2012	Version 4.3, Dated 07/06/2014	Y
African Improved Cooking Stoves Programme of Activities CPA 00002 (Ghana) 5342-0002	No	21/10/2013	Version 4.3, Dated 07/06/2014	Y
African Improved Cooking Stoves Programme of Activities CPA 00003 (Ghana) 5342-0003	No	08/11/2013	Version 4.3, Dated 07/06/2014	Y
African Improved Cooking Stoves Programme of Activities CPA 00004 (Nigeria) 5342-0004	Yes	23/09/2014	Version 4.3, Dated 07/06/2014	Y
African Improved Cooking Stoves Programme of Activities CPA 00005 (Nigeria) 5342-0005	Yes	23/09/2014	Version 4.3, Dated 07/06/2014	Y
African Improved Cooking Stoves Programme of Activities CPA 00006 (Liberia) 5342-0006	No	31/12/2014	Version 4.3, Dated 07/06/2014	N

E.2. Programme of activities

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

Means of verification	The registered PoA involves the promotion, distribution and sale of improved cook stoves (ICS) in regions of Ghana, Nigeria and Liberia/1/. The overall responsibility of implementation and operation is with the CME, which was also evident during the site visit. This was found to be consistent with PoA-DD/1/. There were a total 06 CPAs (5342-0001, 5342-0002, 5342-0003, 5342-0004, 5342-0005 & 5342-0006) found included at the end date of current monitoring period. However, this monitoring report includes the implementation and monitoring of two CPAs (5342-0004 & 5342-0005) located in Nigeria as part of registered PoA. The implementation of the CPA (included in this request), as referenced above, are

within the geographical boundary of the PoA DD/1/ and CPA DDs/3,4/ as both CPAs (5342-0004 & 5342-0005) are located in Nigeria.

The type of ICS distributed under the CPAs is of type M5000, CH2300 & CH5300 which is in line with the revised accepted PoA-DD/01/ and CPA-DDs/03,04/. The design efficiency of the ICSs are as follows, which have been verified from the technical specifications of the stoves/22/:

		Efficiency	Lifetime	Checked from
5342-0004	M5000	29.7%	5years	Technical specifications of the ICSs were verified through the details provided by supplier /22/
5342-0005	CH2300	39.4%	5years	Technical specifications of the ICSs were verified through the details provided by supplier /22/
5342-0005	CH 5300	35.7%	5years	Technical specifications of the ICSs were verified through the details provided by supplier /22/

The verification team has confirmed that the number of ICS deployed under the current CPAs is under the limit as set by the CME during the inclusion of each CPA and thus CPAs remain under the threshold of 180 GWh thermal energy savings/year. As checked from the sales database/23/, the total number of ICS deployed are 8,190 which is well within the maximum limit for the ICS distribution which is 27,926 as per the respective registered CPA DDs combined together.

CPA Ref. No.	ICS type	Quantity of ICS Sold / Disseminated during the current verification	Maximum Estimated Qty ICSs in CPA
5342-0004	M5000	993	13,658
5342-0005	CH2300 & CH5300*	7,197	14,268
Total		8,190	27,926

* CH5300 is a new model disseminated under CPA 05, which was found to meet the applicability criterion of applied methodology and the inclusion eligibility criteria as it has technical specifications/22/ similar to that of CH2300 and complies with requirements mentioned on page 5 of the 5342-0005 CPA DD/4/.

The verification team was able to confirm that the quantity, specification and target group of the ICS is consistent with the PoA DD /1/ and respective CPA DD/3,4/. Further, based on the review of ICS distribution database in ER sheet/11/, physical observations and interview conducted during the site visit, the verification team found that:

- The CPA is implemented within the boundary of the PoA as described in the PoA-DD/1/.
- The CME is same as that mentioned in the 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-DD/3,4/.
- All physical features of the CPA proposed in the included CPA-DD/3,4/ are

	in place • The project participants/CPA implementer has operated the CPA as per the included CPA-DD/3,4/. The verification team has visited the 17 households during site visit. It was observed that each ICS was assigned a unique identification number, which ensures that no double counting occurs. The unique identification number on sampled ICSs, personal information of ICS owners and commissioning date of ICS were cross checked during the physical on-site inspection, primary record of sales database and with the Sales database in ER sheet /11/. The operation of the ICS was confirmed through interviews of owners/representatives (of ICS) during the site visit. The emission reductions being claimed during this monitoring period are lesser than the estimated emission reductions in the included CPA-DDs/3,4/. The estimated CERs were 88,318 tCO2e whereas achieved ERs are 21,582 tCO2e for the current verification. The CPA wise estimated CERs & achieved ERs were; CPA Ref. No. | Estimated ERs (tCO2e) | Achieved ERs (tCO2e) 5342-0004 | 44,159 | 2,343 5342-0005 | 44,159 | 19,239 The verification team considers the project description of the project contained in the PoA-DD/1/ is complete and accurate. The PoA-DD/1/ complies with the relevant methodology, tools, forms and guidance at the time of PoA submission for registration. The monitoring report was compared and verified against the description provided in the PoA-DD/1/ and found to be correct.
Findings	CL#02 was raised and resolved.
Conclusion	a) The verification team confirms that the physical features (technology/type of ICS) of the implementation were in accordance with the PoA DD/01/. b) The actual operation is in line to respective CPA DDs/3,4/, which is further explained under Section E.3. of this report. c) The number of installations in the CPAs for the type of ICS were less than the maximum quantity estimated in the CPA-DD/3,4/. This is due to the reason that the ICSs are subject to the physical sale of stoves by retailers during the CPA lifetime which is based on the market demand for the product. The actual CERs for CPA were lower for comparable monitoring period. No information with regard to data and variables was identified that may surpass the estimated quantity of ERs in the CPA DD/3,4/.

E.2.2. Implementation and operation of the management system

Means of verification	Based on the interview of CME representatives and monitoring team during the site visit, it is confirmed that the CME has organized an appropriate management and operational system for monitoring and reporting. Envirofit International Ltd. is CME for the PoA and responsible for inclusion of CPAs in the PoA. CME records the unique identification number, location, and installation date of each ICS in each CPA, helps to identify, locate and verify any or all of the ICS installations in particular CPA. The verification team has checked the cookstove sales database/23/ in the CME's system during the site visit to ascertain the record keeping system of the CME. CME is responsible for QA/QC of the data, analysis and reporting into the monitoring report. For survey data, monitoring team consist of the team member from CME which is consisting of trained monitoring staff, who conducted the surveys and WBTs. The monitoring manager at the CME is responsible for QA/QC of the data, analysis and reporting into the monitoring report /9/. The trainings are imparted to the monitoring & survey team by the CME's trained person, and the CME has provided the PPT "Monitoring Survey Training Presentation"/24/ to the

	verification team. The verification team has checked the PPT for the training and also interviewed few of the trained monitoring staff/field officers during the site visit and found that they (monitoring & survey team) are well trained to carry out the task. Regular trainings are provided to the field team as a part of continuous improvement procedures.
Findings	No findings
Conclusion	The verification team 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. The roles and responsibilities data collection transfer and aggregation procedures, data storage and archiving for the monitoring system have been provided in the MR /9/. 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. Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline

Not applicable

E.2.3.2. Corrections

Not applicable

E.2.3.3. Inclusion of a monitoring plan

Not applicable

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

Not applicable

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

A previously approved PRC to expand the PoA boundary to include Liberia exists at:
https://cdm.unfccc.int/PRCContainer/DB/prcp237694862/view
Ref. No. PRC-5342-001 approval date 16/06/2014

E.2.3.6. Change of coordination/managing entity

Not applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

Not applicable

E.3. Component project activities

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

Means of verification	CPA 5342-0004 & CPA 5342-0005 described in this section targets the promotion, distribution and sale of ICS/Improved Cook Stoves of model M5000, CH5300 & CH2300 respectively, of ICS implemented in this CPA till date. Envirofit International Ltd. is the CPA implementer for the implementation of CPA.

CPA Ref. #	***5342-0004***	***5342-0005***	***Means of***

				verification
	Inclusion date of CPAs	23/09/2014	23/09/2014	UNFCCC webpage for PoA 5342/25/.
	Location	Nigeria	Nigeria	Checked from CPA DDs/3,4/ and site visit to the project location.
	Product Type	ICS	ICS	Checked from CPA DDs/3,4/ and site visit to the project location.
	ICS Model	M5000	CH2300, CH5300	CPA DDs/3,4/ and sales database/23/. CH5300 is a new model disseminated under CPA 05, which was found to meet the applicability criterion of applied methodology as it has technical specifications/22/ similar to CH2300 and complies with requirements mentioned on page 5 of the 5342-0005 CPA DD/4/ as well as the eligibility criteria mentioned in the CPA DD/4/.
	Quantity Sold / Disseminated	993	7,197	Sales database/23/
	Maximum Estimated ICSs in CPA	13,658	14,268	CPA DDs/3,4/
	ICS sales start date	06/02/2013	09/01/2013	CPA DDs/3,4/
	Estimated CERs (comparable period)	44,159	44,159	CPA DDs/3,4/
	Actual CERs from the ICS Type	2,343 tCO2e	19,239 tCO2e	ER calculation sheet/11/
	Thermal savings achieved	8.58 GWh_{th}	70.42 GWh_{th}	ER calculation sheet/11/
	ICS were distributed in Nigeria, which is consistent with the description given in the included CPA-DDs/3,4/. By the end of current monitoring period the total number of cook stoves disseminated under the two CPAs, were within estimated quantity of ICSs as per CPA DDs/3,4/. It has been confirmed by the transparent calculation presented in the ER sheet/11/ that the CPA is below the threshold of 180 GWh/year (thermal).			
Findings	CL#02 was raised and resolved.			
Conclusion	a) The verification team is of the opinion that physical features of the CPAs have been implemented in accordance with the CPA-DD/3,4/. b) No specific monitoring equipment had to be installed according to the monitoring plan/1,3,4/. c) It is also confirmed, through the physical site visit and review of the supporting documentation that physical features of the component CPAs have been implemented in accordance with the CPA-DD/3,4/. d) The CPAs were also found to be completely operational in line with the CPA-DD/3,4/. e) The information provided in the relevant sections of the monitoring report are appropriately describe the implementation and operational status of the PoA/1/.			

E.3.2. Post-registration changes

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

Not applicable

E.3.2.2. Corrections

Not applicable

E.3.2.3. Changes to the start date of the crediting period of component project activities

Not applicable

E.3.2.4. Inclusion of a monitoring plan

Not applicable

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

Not applicable

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

Not applicable

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

Not applicable

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

Means of verification	The monitoring plan as contained in respective CPA-DD/03,04/ was reviewed against the monitoring requirements of the applied methodology AMS-II.G. version3.0/7/ 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-DD/3,4/ 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 03/7/.
Findings	No finding was raised.
Conclusion	The monitoring plan is in accordance with the approved methodology, AMS-II.G. version 3.0/07/ as included in the respective CPA-DDs /3,4/.

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

E.3.4.1.1. Annual average biomass consumption per appliance, $Q_{biomass}$, Tonnes/year

Means of verification	The value of the parameter was determined from literature review using sources and conservative assumptions indicated in Appendix 4 of CPA DDs/3,4/. The values considered for this monitoring period are:		
	CPA UN Ref. No.	Value applied	Checked from

	5342-0004	4.94 Tonnes/year	CPA-DD /3/ page 24
	5342-0005	4.5 Tonnes/year	CPA-DD /4/ page 25
Findings	CAR#11 was raised and resolved.		
Conclusion	The values in the Monitoring Report /9/ and corresponding Emission Reduction Spreadsheet /11/ are consistent with the CPA-DDs /3,4/. The values applied for ER calculations sheet /11/ for the relevant CPAs are correct and justified.		

E.3.4.1.2. Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass, fNRB,y , Fraction

Means of verification	The value of the parameter was determined from Value derived from the Annex 14 Paragraph 4 of the 37 meeting of the SSC WG report./18/ The values considered for this monitoring period are:		
	CPA UN Ref. No.	Value applied	Checked from
	5342-0004	0.93	CPA-DD /3/ page 24
	5342-0005	0.93	CPA-DD /4/ page 25
Findings	No finding was raised.		
Conclusion	The values in the monitoring Report /9/ and corresponding Emission Reduction Spreadsheet /11/ are consistent with the CPA-DDs /3,4/. The values applied for ER calculations sheet /11/ for the relevant CPAs are correct and justified.		

E.3.4.1.3. Net calorific value of the non-renewable biomass that is substituted, $NCV_{biomass}$, TJ/tonne

Means of verification	The parameter value is sourced from 2006 IPCC guidelines for National Greenhouse Gas Inventories/12/. The values considered for this monitoring period are:		
	CPA UN Ref. No.	Value applied	Checked from
	5342-0004	0.015 TJ/tonne	CPA-DD /3/ page 25
	5342-0005	0.015 TJ/tonne	CPA-DD /4/ page 26
Findings	No finding was raised.		
Conclusion	The values in the Monitoring Report /9/ and corresponding Emission Reduction Spreadsheet /11/ are consistent with the PoA-DD/1/, applied methodology/7/ and CPA-DDs /03, 04/. The values applied for ER calculations sheet /11/ for the relevant CPAs are correct and justified.		

E.3.4.1.4. Emission factor for the substitution of non-renewable biomass by similar consumers, $EF_{projected\_fossilfuel}$, tCO_2/TJ

Means of verification	The parameter value is sourced from 2006 IPCC guidelines for National Greenhouse Gas Inventories/12/. The values considered for this monitoring period are:		
	CPA UN Ref. No.	Value applied	Checked from
	5342-0004	81.6 tCO2/TJ	CPA-DD /3/ page 25
	5342-0005	81.6 tCO2/TJ	CPA-DD /4/ page 26
Findings	No finding was raised.		
Conclusion	The values in the Monitoring Report /9/ and corresponding Emission Reduction Spreadsheet /11/ are consistent with the PoA-DD, applied methodology /7/ and CPA-DDs /3,4/. The values applied for ER calculations sheet /11/ for the relevant CPAs are correct and justified.		

E.3.4.1.5. Efficiency of the system being replaced, η_{old}, Efficiency

Means of verification	The value of the parameter was determined as a weighted average of default values given in the methodology/7/ for traditional and improved stove in baseline scenario. Country profile provided by Global Alliance for Clean Cookstoves was reviewed to source the percentage of the penetration of traditional / open fired cookstoves in Nigeria/19/. The value considered for this monitoring period is		
	CPA UN Ref. No.	Value applied	Checked from
	5342-0004	0.106	CPA-DD /3/ page 25
	5342-0005	0.106	CPA-DD /4/ page 26
Findings	No finding was raised.		
Conclusion	The values in the Monitoring Report/9/ and corresponding Emission Reduction Spreadsheet/11/ are consistent with the PoA-DD/1/ and CPA-DDs /3,4/ are in		

	accordance with applied methodology/7/. The values applied for ER calculations sheet/11/ for the relevant CPAs are correct and justified.

E.3.4.1.6. Net to gross adjustment factor to account for leakages, LAF, Fraction

Means of verification	The value, which is a default sourced from the applied methodology/7/ was considered for both the CPAs covered in this report. The values are as following:

CPA UN Ref. No.	Value applied	Checked from
5342-0004	0.95	CPA-DD /3/ page 26
5342-0005	0.95	CPA-DD /4/ page 26

Findings	No finding was raised.
Conclusion	The values in the Monitoring Report /9/ and corresponding Emission Reduction Spreadsheet /11/ are consistent with the PoA-DD/1/, applied methodology/07/ and CPA-DDs/03,04/. The values applied for ER calculations sheet/11/ for the relevant CPAs are correct and justified.

E.3.4.2. Data and parameters monitored

E.3.4.2.1. Efficiency of the system being deployed as part of the project activity, η_{new}, Efficiency

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The surveys and WBTs were conducted in March-May 2018. Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/, CPA DDs/3,4/ and applied methodology/7/.
	Monitoring equipment	The Water Boiling Tests (WBTs)/26,27/ were conducted by trained CME personal and undertaken according to applied methodology/7/ supported by PCIA/28/. The PoA DD/1/ or CPA DDs/3,4/ do not prescribe any specific monitoring equipment but weighing scale, moisture meter and thermometer were required and used to conduct WBT. The details of the equipment used for WBT are mentioned below -

Equipment
Thermometer: Brand: Omega Model: Omegaette HH308 Type K Accuracy: +/- 0.3% reading +1^{0}C Number of units: 3 S/N: 130803109, 141203661 and 141203662
Mass balance Brand: KERN Model: EMS 12K0.1 Accuracy: +/- 0.3gm Number of units: 1 S/N: WD140099205
Moisture Meter Brand: TROTEC Model: T500 Accuracy: +/- 1% Number of units: 1

		S/N: 3510207500 The calibration requirements were found acceptable as checked from the calibration certificates and manufacturer's specification/32,33,34/. These are described under Section E.3.4.4 of this report.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	There is no accuracy class defined in the registered PoA DD/1/ or CPA DDs/3,4/ so it was checked and found acceptable as per manufacturer's specification/32,33,34/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	The reported accuracy class was found applicable to the entire monitoring range.
	Calibration frequency /interval:	Calibration frequency is not defined in the CPA DDs/3,4/ or applied methodology/7/, however, the CME has calibrated the equipment used according to the manufacturer's specification/34,35,36/. Please refer to section E.3.4.4. of this report for detailed assessment.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Calibration frequency is not defined in the CPA DDs/3,4/ or applied methodology/7/, however, the CME has calibrated the equipment used according to the manufacturer's specification/34,35,36/. Please refer to section E.3.4.4. of this report for detailed assessment.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Please refer to section E.3.4.4. of this report for detailed assessment.
	Is(are) calibration(s) valid for the whole reporting period?	No delay in calibration was observed. Calibration frequency is not defined in the CPA DDs/3,4/ or applied methodology/7/, however, the CME has calibrated the equipment used according to the manufacturer's specification/34,35,36/. Please refer to section E.3.4.4. of this report for detailed assessment.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes, the calibration has been carried out for a range comparable with the range for which measurements have been carried out
	How were the values in the monitoring report verified?	The WBT calculation Sheets/29,26,27/ provided by PP were checked.

		The value of the parameter is mentioned below as per type/ model of ICS <table><tr><th>Stove model</th><th>CPA Ref. No.</th><th>Monitored Efficiency</th></tr><tr><td>M5000</td><td>5342-0004</td><td>28.27%</td></tr><tr><td>CH2300</td><td>5342-0005</td><td>31.01%</td></tr><tr><td>CH5300</td><td>5342-0005</td><td>32.59%</td></tr></table> The results are based on representative sampling as prescribed in the registered monitoring plan. There were 10 random samples selected for each model (M5000, CH2300 and CH5300) of ICS as against the required number 7 for each. The verification team checked the primary record/26,27/ and WBT calculation sheet/29/ for each of them and found the results as included in the ER calculation sheets/11/ to be correct.
	If applicable, has the reported data been cross-checked with other available data?	The verification team has checked all the stove efficiency test (WBT) results/26,27/ and found out the efficiency of the ICS to be consistent. The monitored efficiencies of the ICSs were within the designed efficiencies as given in the CPA DDs/03,04/ and comparable with the previous monitoring period/21/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	QA/QC procedures were found to be appropriate and reliable. The WBTs were conducted in line with the guidance provided by the CME and according to a methodology supported by PCIA. The said documentation has been checked from PCIA website http://www.pciaonline.org/testing /28/. The WBT Sheets/26,27/ provided by PP have been checked and found to be satisfactory.
	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?	Not applicable
Findings	CAR#03 and CAR#07 were raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/3,4/ (as per measurement methods and procedures to be applied) and applied methodology/7/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/3,4/.	

E.3.4.2.2. Total number of stoves installed, N_{all}, Number

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The recording of the sales was done in a regular basis during the crediting period and the monitoring is done annually.

	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/, CPA DDs /3,4/ and applied methodology/7/.
	Monitoring equipment/Source	CPA Distribution Records and logbooks (Sales database/23/)
	Calibration frequency /interval:	Not applicable
	How were the values in the monitoring report verified?	The values in the MR were verified from the Sales database/23/ during the on-site inspection. These are also included in the ER sheet/11/.
	If applicable, has the reported data been cross-checked with other available data?	The values were checked from the sales database/23/. Records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/11/ of final Monitoring Report/09/. The value of N_{all} applied for ER calculations is lower than the actual number of distributed ICS, due to discounting of stove population by proportion households reporting more than one EF stoves during the monitoring surveys. The discount factor applied has been calculated as Total number of stoves distributed multiplied by number of samples who reported using another biomass ICS to total number of samples surveyed. The procedure of discounting is as per registered monitoring plan/3,4/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	QA/QC procedures were found to be appropriate and reliable. The sales database was regularly checked by the Director in order to ascertain that there were no errors while recording the ICS information in the sales database w.r.t the cook stove serial numbers, name of the owner, location etc. This has been verified during the site visit by the verification team by interviewing the Director & the person responsible for the data recording.
	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?	Not applicable

CPA Ref. No.	Stove model	As per database	Discounted Number
5342-0004	M5000	993	961
5342-0005	CH2300 and CH5300	7,197	6,901

Findings	CAR#11 was raised and resolved.
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/3,4/ (as per measurement methods and procedures to be applied) and applied methodology/7/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/3,4/.

E.3.4.2.3. Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through sampling, SOF, **Fraction**

<table>
<tr><td rowspan="9">Means of verification</td><td>Criteria/Requirements</td><td>Assessment/Observation</td></tr>
<tr><td>Measuring /Reading /Recording frequency</td><td>Measured Annually</td></tr>
<tr><td>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</td><td>Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/, CPA DDs/3,4/ and applied methodology/7/.</td></tr>
<tr><td>Monitoring equipment</td><td>Survey questionnaires/30,31/</td></tr>
<tr><td>Calibration frequency /interval:</td><td>Not applicable</td></tr>
<tr><td>How were the values in the monitoring report verified?</td><td>The values in the MR have been verified from the Monitoring Survey results/30,31/.

<table><tr><th>CPA Ref.</th><th>Model</th><th>Value</th></tr><tr><td>5342-0004</td><td>M5000</td><td>0.903</td></tr><tr><td>5342-0005</td><td>CH2300 & CH5300</td><td>0.945</td></tr></table></td></tr>
<tr><td>If applicable, has the reported data been cross-checked with other available data?</td><td>The survey results, assumptions and sales records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/11/ of final Monitoring Report/9/.

The verification team randomly selected 17 samples (9 samples for M5000 & 8 samples for CH2300 and CH5300) for DOE’s field survey and via interview found out that all the ICS which are picked up for sampling are installed at the households and were in working condition, which was consistent with the CME’s sample survey result.</td></tr>
<tr><td>Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</td><td>QA/QC procedures were found to be appropriate and reliable. The person responsible for the monitoring & survey are well trained which is evident from the site visit interview. The verification team has also checked the monitoring survey results /30,31/ vis-à-vis the DOE site visit samples and found that the results are comparable.</td></tr>
<tr><td>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?</td><td>Not applicable</td></tr>
<tr><td>Findings</td><td colspan="2">No findings.</td></tr>
<tr><td>Conclusion</td><td colspan="2">The parameter has been monitored appropriately, in accordance with the registered monitoring plan/3,4/ (as per measurement methods and procedures to be applied) and applied methodology/7/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/3,4/.</td></tr>
</table>

E.3.4.2.4. The fraction of end users that are still using baseline (replaced) stoves, f_{old}, Fraction

<table>
<tr><td rowspan="8">Means of verification</td><td>Criteria/Requirements</td><td>Assessment/Observation</td></tr>
<tr><td>Measuring /Reading /Recording frequency</td><td>Annually</td></tr>
<tr><td>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</td><td>Yes, the measuring and reporting frequency are in line to registered CDM PoA DD/1/, CPA DDs/3,4/ and applied methodology/7/.</td></tr>
<tr><td>Monitoring equipment</td><td>Survey questionnaire/30,31/</td></tr>
<tr><td>Calibration frequency /interval:</td><td>Not applicable</td></tr>
<tr><td>How were the values in the monitoring report verified?</td><td>The values in the MR/9/ were calculated using the values obtained from the monitoring survey, which were verified from filled survey forms/31/ and monitoring survey records/30/.

The survey questionnaire was used as the tool to conduct interviews of selected sample households in which the ICS are implemented and functioning. The verified values are as given below:

<table>
<tr><th>Stove model</th><th>Value</th><th>CPA Ref. No.</th></tr>
<tr><td>M5000</td><td>0.498</td><td>5342-0004</td></tr>
<tr><td>CH2300, CH5300</td><td>0.101</td><td>5342-0005</td></tr>
</table>

The parameter $\mathbf{f_{old}}$ was measured ex-post by estimation of a representative sample of end users using the deployed ICS, as conducted in line with the PoA Sampling Plan.

Sampling estimated the value of this parameter through monitoring the fraction of end users not using baseline stoves ($f_{non\text{-}old}$),

Based on the registered CPA-DDs/3,4/, the fraction of users not using the baseline stoves ($f_{non,old}$) has been monitored. Then fold has been calculated as $1 - f_{non\text{-}old}$.</td></tr>
<tr><td>If applicable, has the reported data been cross-checked with other available data?</td><td>The survey results, assumptions and sales records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/11/ of final Monitoring Report/9/.

The verification team randomly selected 17 samples (9 samples for M5000 & 8 samples for CH2300 and CH5300) for DOE's field survey and via interview found out the fraction of end users that are still using baseline (replaced) stoves, $\mathbf{f_{old}}$, which was consistent with the CME's sample survey result.</td></tr>
<tr><td>Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</td><td>QA/QC procedures were found to be appropriate and reliable. The person responsible for the monitoring & survey are well trained which is evident from the site visit interview. The verification team has also checked the monitoring survey results /30,31/ vis-à-vis the DOE site visit samples and found that the results are comparable.</td></tr>
</table>

		AS checked from the ER sheet/11/, the required precision is met for charcoal stoves but not for wood stoves. Therefore, for wood stoves upper bound value (lower bound for $f_{non\ old}$) and for charcoal stoves direct value of the survey results/30/ have been used for ER calculation.
	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?	Not applicable
Findings	CAR#06 was raised and resolved.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/3,4/ (as per measurement methods and procedures to be applied) and applied methodology/7/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/3,4/.	

E.3.4.2.5. The amount of woody biomass consumption that is consumed through the continued use of old stoves, μ_{old}, kg/year

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line to registered CDM PoA DD/1/, CPA DDs/3,4/ and applied methodology/7/.
	Monitoring equipment	Survey questionnaire
	Calibration frequency /interval:	Not applicable
	How were the values in the monitoring report verified?	The values in the MR/9/ were calculated using the values obtained from the monitoring survey, which were verified from filled survey forms/31/ and monitoring survey records/30/.

The survey questionnaire was used as the tool to conduct interviews of selected sample households in which the ICS are implemented and functioning. The verified values are as given below:**Stove model**	**Value (kg/year)**	**CPA Ref. No.**
M5000	1,762	5342-0004
CH2300, CH5300	1,904	5342-0005

The parameter **μ_{old},** was calculated by multiplying the Total Annual Fuel Consumption, $Q_{biomass}$, by the ratio of meals cooked by the traditional stove in operation before and after purchasing the Envirofit Stove.

	If applicable, has the reported data been cross-checked with other available data?	The survey results, assumptions and sales records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/11/ of final Monitoring Report/9/. The verification team randomly selected 17 samples (9 samples for M5000 & 8 samples for CH2300 and CH5300) for DOE's field survey and via interview found out the Quantity of woody biomass that is still consumed by the customers using their baseline cook stoves, which was consistent with the CME's sample survey result.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	QA/QC procedures were found to be appropriate and reliable. The person responsible for the monitoring & survey are well trained which is evident from the site visit interview. The verification team has also checked the monitoring survey results /30,31/ vis-à-vis the DOE site visit samples and found that the results are comparable. As checked from the ER sheet /11/, the required precision is not met for all the stove types(wood/charcoal). Thus upper bound values of the survey results/30/ have been used in the calculation of ERs.
	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?	Not applicable
Findings	No findings.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/03,04/ (as per measurement methods and procedures to be applied) and applied methodology/07/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/3,4/.	

E.3.4.2.6. Calculated average stove operation years in the monitoring period, $Stove_{year}$, Year

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annual
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency are in line with the registered CDM PoA DD/1/, CPA DDs/3,4/ and applied methodology/7/.
	Monitoring equipment	PoA Distribution and Monitoring Database (sales database)/23/.
	Calibration frequency /interval:	Not applicable
	How were the values in the monitoring report verified?	The values in the MR have been verified from PoA Distribution and Monitoring Database included in the ER sheet/11/. Each ICS entered into the PoA Distribution and Monitoring Database was linked to a distribution

		date (recorded during distribution). Thus, for any monitoring period it is possible to calculate the period of time for which a stove operational period overlaps with the monitoring period. It is described as calculated average stove operation years in the monitoring period. If stoves have been operating for 365 days then $Stove_{year}$ = 1.0. If less than 365 days, then $Stove_{year}$ is represented as a fraction of 365 (e.g., 180 days= 0.5). **Stove model** | **Value** | **CPA** M5000 | 0.98 | 5342-0004 CH2300, CH5300 | 0.94 | 5342-0005
	If applicable, has the reported data been cross-checked with other available data?	The sales records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet/11/ of final Monitoring Report/9/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	QA/QC procedures were found to be appropriate and reliable. No error was identified by verification team pertaining to the sample selected for visit.
	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?	Not applicable
Findings	No findings.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/03,04/ (as per measurement methods and procedures to be applied) and applied methodology/07/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/03,04/.	

E.3.4.3. Implementation of sampling plan

Means of verification	The monitoring has been carried out in accordance with the monitoring plan contained in the revised approved PoA DD/1/ and CPA DDs/3,4/. The monitoring period covered the period between and including 25/10/2016 – 24/10/2017. A single sampling plan was carried out across all specific-case CPAs covered in this monitoring period. 02 CPAs viz., 5342-0004 and 5342-0005 were covered in the single sampling plan. **Sampling Design/Target Population/Sampling Frame/Reliability:** A simple random sampling method was used by PP, which is in line with the monitoring plan of the PoA DD/1/ (Section B.7.2) and the respective CPA-DDs/3,4/. In a single sampling design both the CPAs were included together under the current monitoring period. The sampling approach considered confidence level and precision as 95/10 in line with the requirement of Standard for "Sampling and Surveys for CDM Project Activities and Programme of Activities" version 7/16/. As per page 53 of the PoA-DD/1/, for the parameter η_{new}, the population of each stove model shall be deemed homogeneous across CPAs as the stoves have been designed to meet stringent efficiency specifications and are manufactured in factories to specification. The PP therefore has calculated sample size for η_{new}

considering each stove model type as separate population. As per page 53 and page 57 of the PoA-DD/1/, for other parameters (SOF, f_{old}, μ_{old}), the homogeneity of the population was demonstrated in compliance with the following conditions;

Homogeneity condition	Characteristic of Population	Status of population	Verification team conclusion
Country	all units have been distributed in the same geographical area, i.e. Nigeria as confirmed during the DOE site visit.	Homogeneous	Ok, based on assessment of stove sales database/23/ for CPA 5342-0004 and 5342-0005, all stove units have been distributed within Nigeria.
Fuel Type – charcoal / wood fuel	There are two fuel type in the population: Charcoal and woodfuel as confirmed during the DOE site visit.	Charcoal stoves have been considered as one sampling frame and wood fuel stove have been considered as other sampling frame.	Ok, considering charcoal stove and woodfuel stoves in separate sampling frames is in line with registered sampling plan/3,4/ and is deemed appropriate by the verification team.
End user – domestic / small-medium enterprises / community	all units are for domestic (household) usage as per their design as confirmed during the DOE site visit.	Homogeneous within each sampling frame	Ok, the stoves models are small portable stoves suited for domestic usage only by virtue of their design. During the verification site visit the assessment further confirmed that the usage of the stoves was for domestic purposes through interviews of sampled households.
Stove Type – efficiencies are in a similar range defined as being within +/-10% of each other and they have other common design features	There are following models under each sampling frame: 1. for charcoal – it is CH2300 and CH5300 2. for woodfuel – it is M5000 as confirmed during the DoE site visit.	Homogeneous in wood fuel sample frame and Heterogeneous in charcoal sample frame	CH2300 and CH5300 are being within +/-10% of each other and they have other common design features as checked from the manufacturer's specification of the ICS/22/.

Sampling Method:
Simple Random Sampling approach was used and samples were randomly selected from the designated sampling frames which included all ICS disseminated up to the end of the monitoring period. To ensure a random selection of ICS, random number generators was applied. Each ICS in the target sampling frame is uniquely identifiable by its unique ID number. Each ICS was allocated a Sample Selection Number, starting at 1 and increasing up to the total number of ICS in the pre-defined sampling frame. Applying the random number generators, the ICS were randomly chosen from the defined sampling frame up to the required sample size as calculated by the CME.

Sample Size (Required and Actual) for Parameter of Interest:
The sampling is applied to the following monitoring parameters:
1. The thermal efficiency of the ICS distributed (%): $\eta_{new,y}$
2. The Stove Operating Fraction, i.e. the fraction of users using the ICS: SOF
3. The fraction of stove users still using baseline (replaced) stoves: f_{old}
4. The amount of woody biomass that continues to be used in the replaced stoves (kg): μ_{old}

In order to calculate the sample size estimates, the expected parameter values (mean, standard deviation and proportion) were determined based on project developer's knowledge and experience as per para 12(b) and 12(c) of the "Standard: Sampling and surveys for CDM project activities and programmes of activities", Version 7/16/.

The required sample sizes were correctly derived using equation (1) on page 68 and equation (4) on page 70 of the Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0/17/.

Also, the use of t-distribution formula in line with paragraph 13 of the Standard: Sampling and surveys for CDM project activities and programmes of activities, version 7/16/ was correctly applied in case the sample size for mean parameter was found as less than 30. The parameters used to determine the t-constant are confidence level and degrees of freedom. The confidence level has been taken as 95%. The degrees of freedom is equal to (n-1) where n is the sample size arrived at using equation in MR/09/ (less than 30). The sample size is iterated unless the sample size value becomes stable and equal to that arrived in preceding iterations.

Based on the assumptions following calculation were done as included under ER sheet (worksheet "Sample size calculations")/11/ with reliability as 95/10 for each of the parameter.

Data collection
Data was collected for SOF, f_{old} and μ_{old} following a specially design survey form. As for the thermal efficiency of the stoves, WBTs were conducted using WBT protocol as given by PCIA/28/. Refer ER calculator worksheet/11/ "Monitoring Survey summary", "WBT Summary" and "WBT calculator"/29/ for details on data collected during monitoring. In this regard, worksheet "sample size calculations" /11/ was checked and found to be correct as per registered monitoring plan/3,4/.

All parameters of interest included in the Sample Size Calculator spread sheet/11/ 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 sheet /11/ corresponding to final Monitoring Report /9/, which were also found correct.

Based on the verified results the verification team found the following result:
1) η_{new} - required precision is met for all the stove models (CH2300, CH5300 and M5000). Therefore, the WBT results/29/ were directly used in the calculation of ERs.
2) SOF - required precision is met for all the stove types(wood/charcoal). Therefore, the survey results /30/ for this parameter were directly used in the calculation of ERs.

	3) f_{old} – required precision is met for charcoal stoves but not for wood stoves. Therefore, for wood stoves upper bound value (lower bound for $f_{non\ old}$) and for charcoal stoves direct value of the survey results/30/ have been used for ER calculation. 4) μ_{old-} required precision is not met for all the stove types(wood/charcoal). Thus upper bound values of the survey results/30/ have been used in the calculation of ERs.
Findings	CAR#09 was raised and resolved.
Conclusion	The verification team confirmed that the sampling plan and the parameter values are in accordance with the monitoring plan provided in PoA DD /1/.

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

Means of verification	Details of the equipment used for WBT are as provided below: **Equipment** / **Calibration Details** **Mini-thermometer:** Brand: Omega; Model: Omegaette HH308 Type K; Accuracy: +/- 0.3% reading +1^{0}C; Number of units: 03; S/N: 130803109, 141203661, 141203662 — Calibration conducted on 08/05/2018 by third party SELFA Nigeria Ltd/32/. The validity of calibration is 1 year. The devices were duly calibrated prior to the water boiling test survey reported in the survey forms/26,27/. **Mass balance** Brand: KERN; Model: EMS 12K0.1; Accuracy: +/- 0.3 gm; Number of units: 01; S/N: WD140099205 — Calibration conducted on 08/05/2018 by third party SELFA Nigeria Ltd/33/. The validity of calibration is 1 year. The device was duly calibrated prior to the water boiling test survey reported in the survey forms/26,27/. **Moisture Meter** Brand: TROTEC; Model: T500; Accuracy: +/- 1%; Number of units: 1; S/N: 3510207500 — The moisture meter (TROTEC T500) has an auto-calibration feature built in it, as per the technical specifications of the instrument/34/, as verified by the verification team. The verification team has checked the user manual/34,35,36/ of the respective monitoring equipment and found calibration requirement met. The date of first WBT was confirmed from the WBT records for CPA#4 and CPA#5 as 18/05/2018 which clearly after the date of calibration of the instruments. Therefore, the verification team confirms that the measurements were done with calibrated devices.
Findings	CAR#10 and CAR#05 were raised and resolved.
Conclusion	The verification team confirm that CME applied good practice by for data collection & sampling survey and the equipment's used for sample surveyed are duly calibrated.

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

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

Means of verification	The verification team verified that a) A complete set of data for the monitoring period was available for the monitoring period and the verification of each monitoring parameter is elaborated under Section E.3.4.2. of this report. The complete monitoring data is also presented in the corresponding ER calculations sheet/11/ of final Monitoring Report/9/. b) The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.3.4.2. of this report. c) The calculations of baseline emissions as presented in the corresponding ER calculations sheet /11/ of final Monitoring Report /9/ were checked and found to be consistent with the formulae and methods described in the registered

	monitoring plan of each relevant CPA-DD/3,4/, PoA-DD/1/ and the applied methodology/7/. d) All assumptions used in the emission calculations were found appropriate and therefore justified e) Appropriate emission factors, IPCC default factors and other reference values have been correctly applied. This has also been elaborated under Section E.3.4.1 of this report. f) No standardized baseline was prescribed in the PoA DD/1/ and therefore it has not been applied. g) 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. The following equations were used to determine the baseline emissions as provided in the monitoring report /9/ and applied in the corresponding ER calculations sheets /11/. The expressions used were found consistent with the revised PoA-DD/1/, CPA-DDs/3,4/ and the applied methodology AMS-II.G., version 03/7/: Total ER reductions achieved for any CPA is calculated using the following expressions: $ER_y = B_{y,savings} \cdot f_{NRB} \cdot NCV_{biomass} \cdot EF_{projected\ fossil_{fuel}}$ $B_{y,savings} = B_{old} \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$ $B_{old} = LAF \cdot N_{all} \cdot SOF \cdot (Q_{biomass} - \left(\frac{\mu_{old}}{1000} \cdot f_{old}\right)) \cdot Stove_{year}$ It has been verified that the corresponding ER calculations sheet /11/ to the final Monitoring Report /9/ has considered the number of stoves as per the vintage and accordingly the efficiency of such stoves in the ER calculation for relevant CPA.
Findings	CL#01 and CAR#08 raised and resolved
Conclusion	The verification team confirms that a) The complete data was available and is duly reported; 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); c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed; d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied. 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.

E.3.5.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	The PoA DD/01/, CPA DD/03,04/ and applied monitoring methodology/07/ does not prescribe any project emissions to be considered. The onsite visit and project design also did not reveal any potential source to be considered in this regard.
Findings	No finding was raised.
Conclusion	No project emissions were required to be calculated.

E.3.5.3. Calculation of leakage GHG emissions

Means of verification	The PoA DD/1/, CPA DD/3,4/ and applied monitoring methodology/07/ do not prescribe any leakage emissions to be considered. The onsite visit and project design also did not reveal any potential source to be considered in this regard. However, the leakage adjustment factor that is required to adjust the baseline emissions has been duly accounted in baseline calculations.
Findings	No finding was raised.

Conclusion	No additional leakage emissions (other than what is already considered in baseline calculations) were required in accordance with the methodology AMS-II.G., version 03 /7/.

E.3.5.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	As discussed in the above sections, the entire emission reductions from the PoA were based on baseline emissions. The calculations presented in this regard in the final monitoring report /9/ and corresponding ER calculations sheet /11/ were found appropriate and complying with the provisions prescribed in the registered monitoring plan of respective CPA-DD/3,4/, PoA-DD/1/ and applied methodology/7/. The verification team confirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found acceptable.
Findings	No finding was raised.
Conclusion	The verification team confirms that a) The complete data was available and is duly reported; 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); c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed; d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied. e) There is no pro-rata approach that 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. The total number of ERs achieved during the current monitoring period (for ICS only) is 21,582 tCO_2e.

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_2e)	Leakage (tCO_2e)	GHG emission reductions or net GHG removals by sinks (tCO_2e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
African Improved Cooking Stoves Programme of Activities CPA 00004 (Nigeria) 5342-0004	2,343	0	0	0	2,343	2,343
African Improved Cooking Stoves Programme of Activities CPA 00005 (Nigeria) 5342-0005	19,239	0	0	0	19,239	19,239
Total	**21,582**	**0**	**0**	**0**	**21,582**	**21,582**

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

Means of verification	As verified from the final Monitoring Report/9/ and corresponding ER calculations

	sheet /11/, the actual emission reductions achieved by each CPA that is included in the current monitoring period were found to be less than the estimated quantity in the respective CPA-DD/03,04/ for the comparable period.
Findings	No findings.
Conclusion	The actual emission reductions achieved in specific CPA were not higher than the estimated quantity of ERs in the respective CPA-DD/3,4/. Therefore, it was accepted by the verification team.

Title and UNFCCC reference number of the CPA	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPAs during this monitoring period
African Improved Cooking Stoves Programme of Activities CPA 00004 (Nigeria) 5342-0004	44,159	2,343
African Improved Cooking Stoves Programme of Activities CPA 00005 (Nigeria) 5342-0005	44,159	19,239
Total	**88,318**	**21,582**

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

Means of verification	The achieved emission reductions were less than the estimated ERs in the CPA DD/3,4/. Thus, no further explanation was sought by verification team.
Findings	No finding was raised.
Conclusion	The achieved ERs were less than the estimated amount for the comparable period.

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

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

E.3.7. Global stakeholder consultation

Means of verification	Not applicable as this is not the first monitoring period.
Findings	Not applicable
Conclusion	Not Applicable

SECTION F. Internal quality control

A draft verification report prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm whether all the internal procedures established and implemented by ESPL were duly complied with and such opinion/conclusion were 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 by the Managing Director on behalf of Earthood Services Private Limited

SECTION G. Verification opinion

Earthood Services Private Limited (ESPL), contracted by Envirofit International Ltd. (the CME for the PoA), has performed an independent verification of the emission reductions for the registered CDM PoA 5342 “African Improved Cooking Stoves Programme of Activities” for its two CPAs in Nigeria under the PoA’s fifth monitoring period 25/10/2016 - 24/10/2017 (both dates included) as reported in the Monitoring Report (public) Version 1 dated 11/06/2018. 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 CPAs (5342-0004 and 5342-0005), which were included under the PoA as per the UNFCCC webpage at the end of the current monitoring period. A single monitoring report has been prepared by the CME for the same in which implementation of all referred CPAs along with monitoring results is included.

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.

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 methodology, AMS II.G Version 03. There was no FAR raised during validation of PoA / CPA inclusion, which required further attention from the verification team.

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 (final) Version 3.0 dated 23/08/2018 and corresponding ER sheets for the monitoring period 25/10/2016 - 24/10/2017 (including both days) amount as 21,582 tCO2e. Therefore, this will be submitted as part of request for issuance as per CDM PCP Version 1.0.

SECTION H. Certification statement

The verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion, the GHG emissions reductions reported for the PoA for the monitoring period 25/10/2016 - 24/10/2017 are fairly stated in the Monitoring Report (final) Version 3.0 dated 23/08/2018.

ESPL, based on outcome of verification activities, certify in writing that, during the monitoring period 25/10/2016 - 24/10/2017 (including both days), the registered CDM PoA "African Improved Cooking Stoves Programme of Activities" and all of the included CDM CPAs (5342-0004 and 5342-0005) in the registered CDM PoA achieved the verified amount of 21,582 tCO_2e reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CPAs.

The verified amount of emission reductions is stated below as per each CPAs and as per commitment period;

	Emission Reductions (Amount) in this monitoring period (in tCO_2e)	
CPAs (included in this request)	**Up to 31/12/2012 (1st commitment period)**	**01/01/2013 onwards**
5342-0004	0	2,343
5342-0005	0	19,239
Total	**0**	**21,582**

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Level
CAR	Corrective Action Request
CDM	Clean Development Mechanism17,
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
CEP	Clean Energy Product
CER	Certified Emission Reduction
CL	Clarification Request
CME	Coordinating or Managing Entity
CP	Crediting period
CPA	Component Project Activity
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIL	Envirofit International Ltd
EF	Envirofit
EPTP	Stove Manufacturers Emissions and Performance Test Protocol
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GACC	Global Alliance for Clean Cookstoves
GHG	Greenhouse Gas(es)
ICS	Improved Cook Stove
IPCC	Intergovernmental Panel on Climate Change
PoA-DD	Programme of activities Design Document
PPT	PowerPoint Presentation
RMP	Registered monitoring plan
SQIL	Sonic Quality Inspectors Limited
TA	Technical Area (with in Sectoral Scope)
TR	Technical Reviewer
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Level
VVS	Validation and Verification Standard
WBTs	Water Boiling Tests

Appendix 2. Competence of team members and technical reviewers

Competence Statement	
Name	Deepika Mahala
Country	India
Education	M. Sc. (Environmental Mgmt), GGSIP University B.Sc. Honour (Chemistry), Sri Venkateshwar College, DU
Experience	2 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	NO		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Kumar Gautam	**Date**	01/03/2018

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	6 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Gautam	**Date**	01/03/2018

Competence Statement			
Name	Shifali Guleria		
Education	M.Sc. (Environmental Studies and Resource Management), TERI University		
Experience	Few 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 (Quality Manager)	**Date**	01/07/2018
Approved by	Anshika Gupta (Technical Manager)	**Date**	01/07/2018

Competence Statement			
Name	Ms. Adeola Ijeoma Eleri		
Country	Nigeria		
Education	Certificate in Energy and Sustainable Development (IIIEE, Sweden) M.Sc. (Environmental Biology) B.Sc. (Microbiology)		
Experience	8 Years		
Field	Climate Change, Energy & Environment		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (Nigeria)		
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	EIL EIL	Registered PoA-DD Revised accepted PoA-DD	V 3.2 dated 27/11/2012 V 4.3, dated 07/06/2014	Other
2	GL CarbonCheck	Validation Report (registered PoA-DD) Revised Validation Report PRC	V11, dated 05/12/2012 V 3, dated 11.06/2014	Other
3	EIL	5342-0004 CPA DD	V 6.1, dated 11/09/2014	Other
4	EIL	5342-0005 CPA DD	V 6.1, dated 11/09/2014	Other
5	CarbonCheck	5342-0004 validation report	V04, dated 23/09/2014	Other
6	CarbonCheck	5342-0005 validation report	V04, dated 23/09/2014	Other
7	UNFCCC	Methodology AMS II G	Version 3	Other
8	EIL	Monitoring report (Publication)	V1, dated 12/05/2017	CME
9	EIL	Monitoring report (Final version)	Version 3.0 dated 23/08/2018	CME
10	EIL	ER calculation sheet (Initial)	Pertaining to initial MR	CME
11	EIL	ER calculation sheet (Final)	Pertaining to final MR	CME
12	IPCC	IPCC Defaults	2006	Other
13	UNFCCC	CDM VVS for PoA	version 1.0	Other
14	UNFCCC	CDM PS for PoA	version 1.0	Others
15	UNFCCC	CDM PCP for PoA	version 1.0	Others
16	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities	7	Others
17	UNFCCC	Guideline: Sampling and surveys for CDM project activities and programme of activities	4.0	Others
18	UNFCCC	Data available here :	-	

		http://cdm.unfccc.int/Panels/ssc_wg/meetings/037/ssc_37_an14.pdf		
19	Global Alliance of Clean Stoves	country profile provided by Global Alliance for Clean Cookstove (http://www.cleancookstoves.org/countries/africa/nigeria.html)	-	
20	UNFCCC	CDM-PoA-MR-FORM	Version 2.0	Others
21	ESPL	Verification report for MP4	Version 1.0 dated 19/07/2017	Others
22	Envirofit	Manufacturer's specification- M5000, CH2300, CH5300	-	CME
23	Envirofit	ICS sales database for CPA #4 and CPA#5	-	CME
24	Envirofit	Monitoring Survey Training Presentation	-	CME
25	UNFCCC	UNFCCC webpage for PoA 5342 http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/4R62VM8H3CFJDZTAXYQEL7I19NBPWO/view	-	Others
26	Envirofit	WBT records for CPA #4	-	CME
27	Envirofit	WBT records for CPA #5	-	CME
28	PCIA	PCIA website http://www.pciaonline.org/testing	-	Others
29	Envirofit	WBT excel sheet	-	CME
30	Envirofit	Monitoring survey excel sheets	-	CME
31	Envirofit	Filled monitoring survey forms	-	CME
32	SELFA	Calibration certificate for thermometers and weighing balance	Dated 08/05/2018	CME
33	SELFA	Calibration certificate for weighing balance	Dated 08/05/2018	CME
34	TROTEC	Manufacturer's specification of moisture meter	-	CME
35	Omega	Manufacturer's specification of thermometer	-	Other
36	KERN	Manufacturer's specification of weighing balance	-	Other

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

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

FAR ID	NA	**Section No.**		**Date :**DD/MM/YYYY
Description of FAR				
There is no finding from validation /5,6/ or previous verification report/21/.				
Project participant response				**Date :**DD/MM/YYYY
-				
Documentation provided by project participant				
-				
DOE assessment				**Date:** DD/MM/YYYY
-				

Table 2. CL from this verification

CL ID	01	**Section no.**	E.3.5.1	**Date :**03/08/2018
Description of CL				
Achieved Emission reduction in the ER submitted to the DoE is 21,595 tCO2, which is significantly lower than the achieved emission reduction written in the published MR (88,318). PP shall explain the reason for the difference.				
Project participant response				**Date :**16/08/2018
The values published in MR were ex-ante values, specified as a matter of oversight. The MR has been revised to mention the ex-post actual achieved ER volumes i.e. 21,582 tCO_2e				

Documentation provided by project participant	
CDM PoA 5342 MP#5 Nigeria MR version 2.0 19072018 CDM PoA 5342 MP#5 Nigeria ER calculator version 2 19072018	
DOE assessment	**Date:** 20/08/2018
Since the value of achieved emission reductions in the published MR is the same as ex-ante estimated value of CERs, the explanation given by the PP was found to be satisfactory. Therefore, the CL stands closed.	

CL ID	02	**Section no.**	E.3.1 and E.2.1	**Date :**03/08/2018
Description of CL				
PP shall add technical description of the stoves under section C.1 and provide evidence for the same.				
Project participant response				**Date :** 16/08/2018
The MR has been revised to add the requested information. The stove specifications are being submitted.				
Documentation provided by project participant				
CDM PoA 5342 MP#5 Nigeria MR version 2.0 19072018 Stove Specification Sheets - CH2300, CH5300, M5000				
DOE assessment				**Date:** 20/08/2018
Latest version of MR submitted by the PP includes technical specifications of stoves and corresponding evidence has been provided as requested. Therefore, the CL stands closed.				

Table 3. CAR from this verification

CAR ID	03	**Section no.**	E.3.4.2.1	**Date : 03/08/2018**
Description of CAR				
Site visit observation: 1. For household names Mrs Ganiyu, old unique ID. EC1H094274 and new stove with unique ID EC1H094336 and Mrs. Oyewole, old unique ID EC1H093746 and new stove (EC1H058443) the owner was found to have a replaced stove. However, no such information was found in survey forms or CPA distribution database.				
Project participant response				**Date :** 16/08/2018
Mrs. Ganiyu stove was picked for WBT hence a new stove unit (against picking their stove unit for WBT) was provided to her for cooking. For Mrs. Oyewole, at the time of survey the stove handles were found damaged which made shifting stove from one point to another very difficult. Hence the user was also provided with a new stove. The record of all original stoves picked up for testing (WBTs) or otherwise, and the serial number of replacement stoves provided to the corresponding users is being submitted.				
Documentation provided by project participant				
List of stove units picked Vs new units distributed while monitoring				
DOE assessment				**Date:** 20/08/2018
The list submitted by the PP confirms that stoves of the beneficiary in question were replaced. Justification given by the PP is found to be satisfactory. Therefore, the CAR stands closed.				

CAR ID	04	**Section no.**	E.2.3.5.	**Date :**03/08/2018
Description of CAR				
As per para 261 of PS for PoA version 1.0, the coordinating/managing entity shall indicate whether there are any temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines, or corrections or permanent changes to the PoA or to the included CPAs hereinafter referred to as post-registration changes). For post-registration changes that have been approved by the Board, the coordinating/managing entity shall indicate the dates of approval. It was checked from the CDM website that the PoA has undergone a post registration change. http://cdm.unfccc.int/PRCContainer/DB/prcp237694862/view However, no information about the PRC has been mentioned in the MR.				
Project participant response				**Date :** 16/08/2018
The MR has been revised to mention information about approved PRC				

Documentation provided by project participant	
CDM PoA 5342 MP#5 Nigeria MR version 2.0 19072018	
DOE assessment	**Date:** 20/08/2018
Information about approved PRC has been added to MR version 2.0. Therefore, the CAR stands closed.	

CAR ID	05	**Section no.**	E.3.4.4	**Date :**03/08/2018
Description of CAR				
As per para 264, PS for PoA, describe the equipment used to monitor each parameter, including details on accuracy class, and calibration information (frequency, date of calibration and validity), if applicable as per the registered monitoring plan; PP shall mention the information related of the calibration of all the equipment used for monitoring.				
Project participant response				**Date :** 16/08/2018
The information relating to the equipment used for monitoring has been added to the MR. The information related to their calibration status is being submitted.				
Documentation provided by project participant				
Monitoring equipment specifications Calibration documents / invoice for monitoring equipment				
DOE assessment				**Date:** 20/08/2018
The information regarding the equipment used for monitoring was found in the latest version of MR submitted by the PP and corresponding evidences about calibration were also submitted as requested. Therefore, the CAR stands closed.				

CAR ID	06	**Section no.**	E.3.4.2	**Date :**03/08/2018
Description of CAR				
Monitoring report: 1. There are several inconsistencies between the ER sheet and the MR. Please refer to the commented MR. 2. Page 12 of the MR mentions, “The parameter value for Charcoal is deemed as zero as during monitoring, none of the charcoal stove sampled user were found using baseline stoves i.e.$f_{old\ Charcoal}$ = 0”. This statement was found to be incorrect with respect to the monitored data.				
Project participant response				**Date :** 16/08/2018
1. The inconsistencies between the ER sheet and MR sheet have been rectified. 2. This cited text was left over from last year’s monitoring report. The MR has been revised to remove the same.				
Documentation provided by project participant				
CDM PoA 5342 MP#5 Nigeria MR version 2.0 19072018				
DOE assessment				**Date:** 20/08/2018
1. All inconsistencies between ER sheet and MR were found to be appropriately addressed and the hence, the finding is closed. 2. The revision made in MR was found to be appropriate and satisfactory. Closed. Therefore, the CAR stands closed.				

CAR ID	07	**Section no.**	E.3.4.2	**Date :**03/08/2018
Description of CAR				
WBT calculation sheet: 1. Several values in the WBT summary sheet are inconsistent with the WBT forms submitted to the DoE. For eg. Cell G6, K11, K17, U6.etc. please refer the commented WBT summary sheet. 2. In Cell D71, unique ID mentioned in inconsistent with the monitoring survey form. 3. Source of the values in column O and column AF could not be traced.				
Project participant response				**Date :** 16/08/2018
1. The WBT calculator has been made consistent with the values in the WBT forms. 2. The unique ID of the stove has been corrected as per that of the WBT form 3. Column O and AF are average values of moisture content based on values specified in column AQ:BH				

Documentation provided by project participant	
CDM PoA 5342 MP#5 Nigeria ER calculator version 2 19072018 CDM PoA 5342 MP#5 Nigeria WBT version 2.0 16082018	
DOE assessment	**Date:** 20/08/2018
All discrepancies in the WBT calculator were accurately made consistent with WBT forms. The calculation of moisture content was also made clear and traceable. Therefore, the CAR stands closed.	

CAR ID	08	**Section no.**	E.3.5.1	**Date :**03/08/2018
Description of CAR				
ER sheet: 1. In the sheet titled “Monitoring Survey Summary”, cell W120, the date of discontinuation has not been mentioned. 2. Sheet titled “Sample size calculations”, Cell B12, the sampling frames mentioned, do not include stove model CH5300. 3. entries in Sheet titled “Monitoring survey Summary”, cell AF18 are AI 115 are inconsistent with the monitoring survey forms. 4. Sheet titled “Monitoring survey Summary”, Cell AA60, have unique ID inconsistent with the CPA database. 5. Unique ID mentioned in Sheet titled “Monitoring survey Summary”, Cell AA65, could not be found in the CPA distribution database. 6. PP shall add the calculation of ex-ante emission reduction in the ER sheet.				
Project participant response				**Date :** 16/08/2018
ER sheet: 1. The date of discontinuation of stoves for users that have stopped using ICS has been removed from the ER sheet as this is a non-activity parameter. Moreover, any sampled user reporting not using the stove, has been considered as not operational for the entire monitoring period and SoF has been calculated accordingly. 2. Sheet titled “Sample size calculations”, Cell B12, has been revised to mention all the three sampling frames. 3. Entries in Sheet titled “Monitoring survey Summary”, have been made consistent with the monitoring survey forms. 4. The unique ID in “Monitoring survey Summary”, cell AA60 has been made consistent with CPA-database 5. As a conservative approach, if a household is found using more than 1 EF stove, the same is considered for discounting the total population (N_{all}), irrespective of the presence of the subsequent stove in the database. 6. The calculation of ex-ante emission reduction in the ER calculator				
Documentation provided by project participant				
CDM PoA 5342 MP#5 Nigeria ER calculator version 2 19072018				
DOE assessment				**Date:** 20/08/2018
1. Since the stoves which have been reported to be discontinued are considered non-operational for the entire monitoring period and not included in the calculations, the date of discontinuation can be considered a non-activity parameter, thus justifying the removal of this parameter from the ER sheet. Therefore, the explanation was found satisfactory and the finding is closed. 2. The revision has accurately been made and model CH5300 has been added to the sampling frame in the latest version of ER sheet. Hence, closed. 3. Entries were found to be made consistent in the latest version of ER sheet and hence, the finding is closed. 4. The inconsistency has been addressed and found appropriate. Therefore, the finding is closed 5. The explanation given by the PP was found to be appropriate. The finding is closed. 6. The calculation of ex-ante emission reduction were found to be added in the latest version of ER sheet by the PP. Therefore, the CAR stands closed.				

CAR ID	09	**Section no.**	E.3.4.3.	**Date :10/10/2018**
Description of CAR				

The PoA-DD establishes that the sampling plan shall have sampling frames taking into account country, fuel type, user and stove type. Three sampling frames were established to determine parameter 'Efficiency of the system being deployed as part of the project activity'. However, for the other parameters (Stove operation factor; Fraction of end users that are still using baseline stoves; and the amount of woody biomass consumption that is consumed through the continued use of old stoves), there were only two sampling frames, one for charcoal and one for woodfuel. It has not been demonstrated that:

i. The efficiency of the two types of charcoal stoves are within +/-10%. As per the specification, efficiency of stove CH5300 is 35.7%. The +/-10% range of this efficiency would be 32.13% - 39.27%, whereas the efficiency of stove CH2300 is 39.4%;
ii. The two types of charcoal stove have the same feature. The PoA-DD has provided an example of two types of stove having the same efficiencies, but they are considered different due to the suitability of different shape of pot's bottom. Furthermore, it is observed from the figures in page 6 of the monitoring report that CH5300 stove has air grill whereas CH2300 stove does not. Please refer to paragraph 345 of VVS-PoA (version 01.0).

Project participant response	**Date :** 26/10/2018

The PoA-DD on page 57 states the following:

> *Stove types can be treated as sufficiently homogenous (referred to below as "similar") provided that their efficiencies are in a similar range defined as being within +/-10% of each other and they have other common design features. This means differentiating between fixed vs portable stoves, stoves with a capacity designed for households vs institutional users, and potentially other design features that could impact on end user preferences.*

The charcoal stoves that have been monitored under the MP#3 are CH5300 (distributed during 2016 - 2017) and CH2300 (distributed during 2013 - 2017). Thus, it not appropriate to consider their design rated efficiency (as specified on page 6 of MR) for the purpose of determining sampling frames. Instead, the PP, in line with the para 12(b) and 12(c) of the "Standard: Sampling and surveys for CDM project activities and programmes of activities", Version 07.0, determined the expected thermal efficiency values (mean, standard deviation) based on its knowledge and experience given ICS were distributed over a longer time frame and will not be performing at the design / rated efficiency levels.

The PP therefore considered the expected efficiency of CH2300 as 31% and that of CH5300 as 32% (lower than the rated efficiency). These values are within the +/-10% range, for them to be considered under one sampling frame for other monitoring parameters. The appropriateness of the assumptions is further substantiated by the monitoring results which yield a thermal efficiency value of 31.01% for CH2300 and 32.59% for CH5300, which are well within the +/-10% range of each other.

Also, in terms of design features these ICS are not deemed to differ as they both correspond to portable stove type with capacity designed for domestic usage. The air ring provided in case of CH2300 only provides for a stable base to keep the pot as well as allows the flames and gases to move up by creating a natural draught. In CH5300 the same provision has been made via the top cast iron plate with 3 inner pot rests at an angle of 120 degrees with each other (refer image on page 6 of MR) for smaller pots and 6 outer pot rests at an angle of 60 degrees with each other for larger pots. The other visible difference is that CH2300 has a bottom ash collection area which can be emptied after the cooking event whereas CH53300 has an ash tray which can be emptied by pulling it out. Also, the combustion chamber technology in these stoves are identical Again this does not change any end user preferences which are primarily, based on fuel type (charcoal vs woodfuel), stove type (fixed vs portable) and service level type (domestic vs institutional).

It should be noted that the physical appearance of stove models does not impact their homogeneity, as this is proved by the type (charcoal/fuelwood, fixed/portable) and level of service (domestic / institutional) provided. Thus, by virtue of their design these charcoal stove models are considered homogenous and not impacting any end user preferences and hence have been clubbed into one sampling frame in line with PoA-DD.

Documentation provided by project participant

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DOE assessment	**Date:** 26/10/2018

i. The CME has considered expected efficiency of CH2300 as 31% and that of CH5300 as 32% (lower than the rated efficiency) based on para 12 of the Standard: Sampling and surveys for CDM project activities and programmes of activities for sample size calculations. The monitoring results also yielded very similar values (thermal efficiency value of 31.01% for CH2300 and 32.59% for CH5300) compared to that initially expected for sample size calculations. The monitoring results also show that thermal efficiency values for these stoves are within +/-10% of each other. Thus, it complies PoA DD requirement and considering these two types of stoves in one frame was deemed to be correct

ii. The air ring in the model CH2300 only provides stability and does not impact efficiency or any other design feature. Both the stoves are portable, designed for household users, and have similar designs, thus, it complies PoA DD requirement. Therefore, considering these two types of stoves in one frame was deemed to be correct.

Thus, the CAR stands closed.

CAR ID	10	**Section no.**	E.3.4.4.	**Date : 10/10/2018**
Description of CAR				
As per the MR, the surveys and WBTs were conducted during March - May 2018. The PP needs to clarify how it concluded that the devices were duly calibrated prior to the water boiling test survey reported in the survey forms, as the mini-thermometer and mass balance were calibration on 08/05/2018.				
Project participant response				**Date :** 26/10/2018
The surveys were conducted in March – April 2018 and subsequently the WBTs were conducted in May 2018. The first WBT was conducted on 18 May 2018 which is after the date of calibration of the mini thermometer and mass balance				
Documentation provided by project participant				
-				
DOE assessment				**Date:** 26/10/2018
The date of first WBT was confirmed from the WBT records for CPA#4 and CPA#5. The date of first WBT is 18/05/2018 which is clearly after the date of calibration of the instruments used. Thus, it can be confirmed that the WBTs have been conducted with calibrated instruments. Thus, the CAR stands closed.				

CAR ID	11	**Section no.**	E.3.4.2.2. and E.3.4.1.1.	**Date : 10/10/2018**
Description of CAR				
Some households are observed having more-than-one stoves as per the 'CPA Distribution Data'. For example, the same households (referring to the same CUSTOMER NAME, same CUSTOMER ADDRESS, same CITY OR VILLAGE, same TELEPHONE NUMBER) are observed to have 5 stoves, 8 stoves, 18 stoves, or even 41 stoves (i.e. MRS O.K ROTIMI). The parameter ex-ante parameter $Q_{biomass}$ (Annual average biomass consumption per appliance, i.e. 4.94 and 4.50 Tonne/year/stove for CPA4 and CPA5 respectively) was determined based on biomass consumption at household level. For example, in CPA4, the value 4.94 was calculated from average fuelwood consumption per capita of 0.99 tonne/y, multiplied by average size household in Nigeria of 5 persons/household. The resulting unit of this calculation would be 'tonne/y/household'. However, unit of this parameter the CPA-DDs is 'tonne/y/stove', which implies that there will be one stove per household. Given the fact above, the PP shall provide information on how it has verified the appropriateness of applying the values 4.94 and 4.50 Tonne/year/stove for CPA4 and CPA5 respectively in determining the emission reductions. Please refer to paragraph 358(d) of VVS-PoA (version 01.0).				
Project participant response				**Date :** 26/10/2018

More than one ICS on a single user name need not necessarily indicate them being in the same household, despite having the same user name, address and contact detail. It is a feature of last-mile distribution programmes in frontier markets that retailers of cookstoves must respond the nature of demand – that is, would a retailer refuse a sale of 40 cookstoves to the representative of a group of buyers because that representative cannot provide personal data of each of the end users? The answer is of course no, but this does not mean that the cookstoves are not valid for crediting under the CPA, because:

a. Often, people buy additional ICS units to give it to their immediate relatives as gift, resulting in more than one ICS on a given name.
b. Groups of end-users buy together via a single representative, for additional discounts (bulk order discounts), at the point of retail and hence multiple stoves might be listed on a single given name in the database despite being distributed to different households in the neighbourhood.
c. In case of donor / sponsored programs, the ICS are disseminated to different users but are owned by the donor / sponsor hence bear a common name in the database.
d. In case of rented living / slum developments, the ICS might be bought by landlords for a number of their quarters each of which will have one stove. Hence the stove ownership lies with the landlord, but the usage is in different households. In such cases, the database may list the ICS with the landlord as the owner of the ICS.
e. In some cases, the end user may not wish to share their private details and hence instead share the detail of the local representative like village head or the retailer from whom they have purchased the stove.

In all the above cases, although the actual end user is not listed in the database, it is possible to track them uniquely via the ICS serial number and contacting the buyer / owner.

There are also checks on this in the monitoring plan. Page 47 of the PoA-DD, under the monitoring parameter table for N_{all} refers to discounting additional stoves found in a sampled household, at the time of monitoring, from the population. At the time of monitoring, the PP checks if there are multiple ICS in use in each sampled household and the presence of any additional stove is recorded. The percentage of users found having more than one ICS in the household is used to discount such multi-use scenarios from the total stove population, ensuring that only ICS per household is credited.

Please refer the ER Calculator, tab “Monitoring Survey Summary”. In columns R:V, presence of more than one ICS in the sampled household is being monitored and if applicable, the same is being used to discount the total number of ICS (N_{all}) in the tab “ER Calculations”, cell B29 and C29 for CPA04 and CPA05 respectively. Thus, the total population has been discounted by the % of sampled household reporting using more than 1 ICS, to ensure that only 1 stove is credited per households as a conservative measure.

Documentation provided by project participant

DOE assessment	**Date:** 26/10/2018

The above listed reasons for observing more than one stove installed under one end users were found to be relatable to actual scenario on field and acceptable. Additionally, the PP has adjusted the final value of N_{all} for proportion of monitored samples which were found to have more than one stove. The approach was found to be in line with the registered monitoring plan (PoA DD, page 47)

Thus, the CAR stands closed.

Table 4. FAR from this verification

FAR ID	NA	**Section No.**		**Date :**DD/MM/YYYY
Description of FAR				
There is no FAR raised from this verification.				
Project participant response				**Date :**DD/MM/YYYY
-				
Documentation provided by project participant				
-				
DOE assessment				**Date:** DD/MM/YYYY
-				

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Document information

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01.0	5 June 2015	Initial publication.

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Version	Date of issue	Nature of Revision	Prepared by		Reviewed by	
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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*						