




Verification and certification report form for CDM programme of activities
(version 01.0)

Complete this form in accordance with the "Attachment. Instructions for filling out the verification and certification report form for CDM programme of activities" at the end of this form.

VERIFICATION AND CERTIFICATION REPORT

Title of the programme of activities (PoA)	Improved Cooking Stoves Programme of Activities in Africa	
UNFCCC reference number of the PoA	5341	
Version number(s) of the PoA-DD(s) applicable to this report	3.2	
Version number of the verification and certification report	04	
Completion date of the verification and certification report	09/07/2015	
Monitoring period number	First monitoring period	
Duration of this monitoring period	15/12/2012 — 31/12/2014 (first and last days are included).	
Number and version number of the monitoring report to which this report applies	3.0	
Coordinating/managing entity (CME)	Envirofit International Ltd.	
Host Party(ies)	Host Party(ies) of the PoA	Is this a host Party to a CPA covered in this report?(yes/no)
	Kenya	Yes
	South Africa	No
Sectoral scope(s)	3: Energy demand	
Selected methodology(ies)	AMS-II.G Version 03	
Selected standardized baseline(s)	--	
Total estimated GHG emission reductions or net GHG removals for this monitoring period in the included CPA(s) covered in this report	5341-0001 GHG emission reductions: 27,667 tCO ₂ e 5341-0002 GHG emission reductions: 40,212 tCO ₂ e 5341-0003 GHG emission reductions: 42,811 tCO ₂ e 5341-0004 GHG emission reductions: 32,538 tCO ₂ e	
Total certified GHG emission reductions or net GHG removals for this monitoring period for the included CPA(s) covered in this report	5341-0001 GHG emission reductions: 0 tCO ₂ e 5341-0002 GHG emission reductions: 32,272 tCO ₂ e 5341-0003 GHG emission reductions: 0 tCO ₂ e 5341-0004 GHG emission reductions: 0 tCO ₂ e	

Name of DOE	Carbon Check (India) Private Ltd.
Name, position and signature of the approver of the verification and certification report	Vikash Kumar Singh, Executive Director 

SECTION A. Executive summary

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Introduction:

The Co-ordinating Managing Entity/Project Participant has commissioned the DOE, Carbon Check (India) Private Ltd. to perform an independent verification of the CDM Programme of Activity "Improved Cooking Stoves Programme of Activities in Africa" in Kenya (hereafter referred to as "Programme of Activity or PoA") for the CPAs titled "Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya)"; Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00002 (Kenya)"; Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00003 (Kenya) and Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00004 (Kenya)". The PoA involves replacement of less efficient cooking stoves using woody biomass (wood-fuel and/or charcoal) with improved cooking stoves (ICS) which are more efficient. The ICS distributed under CPAs of the PoA are more efficient in transferring heat from the fuel to the pot when compared to the stoves typically used in baseline. By replacing inefficient stoves, the PoA will save on consumption of woody biomass (either wood or charcoal made of wood).

During the current monitoring period only 5341-0002 and 5341-0004 were implemented and the other two CPAs were not implemented. Out of the two implemented CPAs, in 5341-0004, only 1,195 stoves were distributed till the end of this monitoring period and PP has decided to claim emission reductions only for 5341-0002 in this monitoring period. The CPA 5341-0002 of the Programme of Activity is designed to generate emission reductions by distribution of the fuel-efficient charcoal based cook stoves in Kenya. The fuel-efficient cook stoves are replacing the baseline charcoal stoves in common use (baseline scenario). The CME and CPA implementer are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activity/ies.

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

Objective:

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

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

The objective of this verification was to verify and certify emission reductions reported for the "Improved Cooking Stoves Programme of Activities in Africa" in the host country "Kenya" for the period 15/12/2012 to 31/12/2014.

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

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

Scope:

The scope of the verification is:

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

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

The verification comprises a review of the monitoring report over the monitoring period from 15/12/2012 to 31/12/2014 and based on the registered/included CPA-DD in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant.

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

The verification team assigned by the DOE concludes that the PoA-DD (Version 3.2, dated 27/11/2012) /B04/, Component Project Activity 5341-0002 as described in the registered CPA-DD (Version 2.0, date 11/10/2013) /B04/ and monitoring report (version 3.0, dated 29/06/2015) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the VVS requirements version 09.0 /B01-1/.

The component project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the registered/included CPA DD/s. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site

visit the verification team confirms that the PoA has resulted in the 32,272 tCO₂e emission reductions during the first monitoring period.

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

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Agarwalla	Sanjay Kumar	CC IPL	X	X	X	X
2.	Verifier	IR	Agarwalla	Sanjay Kumar	CC IPL	X	X	X	X
3.	Technical Expert	IR	Agarwalla	Sanjay Kumar	CC IPL	X	X	X	X
4.	Local Expert	EI	Muriuki	Job N	CC IPL		X	X	

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

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

SECTION C. Means of verification

C.1. Desk review

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Documents reviewed or referenced during the verification are listed in Appendix 3 below.

C.2. On-site inspection

Duration of on-site inspection: 02/06/2015 to 04/06/2015				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PoA-DD, registered/included CPA-DD.	Kenya, visit to sample households	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Kenya, Envirofit office, Nairobi	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the CPA-DD	Kenya, Envirofit office, Nairobi	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	Kenya, Envirofit office, Nairobi	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the CPA-DD and the selected methodology and corresponding tool(s), where applicable	Kenya, Envirofit office, Nairobi	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Kenya, Envirofit office, Nairobi	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki
7.	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	Kenya, Envirofit office, Nairobi	02/06/2015 to 04/06/2015	Sanjay Kumar Agarwalla Job N Muriuki

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kigima	David	Envirofit	02/06/2015 to 04/06/2015	Project implementation and operation, monitoring procedure, data and information flow, Roles and responsibility, Quality Assurance – Management and operating system, Sales/Distribution records, Survey records, Qualification and Training	Sanjay Kumar Agarwalla, Job N Muriuki
2.	Perminus	Nyagena	Envirofit	02/06/2015 to 04/06/2015	Data and information flow, Data input device, Roles and responsibility, Project implementation and operation, monitoring procedure, Sales/Distribution records, Survey records, Qualification and Training	Sanjay Kumar Agarwalla, Job N Muriuki
3.	M	Phyllis	Envirofit	02/06/2015 to 04/06/2015	Monitoring procedure, Survey records, Data and information flow	Sanjay Kumar Agarwalla, Job N Muriuki
4.	W	Rebecca	Envirofit	02/06/2015 to 04/06/2015	Sales/Distribution records, Survey records, Qualification and Training	Sanjay Kumar Agarwalla, Job N Muriuki
5.	Nyakundi	Wycliffe	Envirofit	02/06/2015 to 04/06/2015	Sales/Distribution records, Qualification and Training	Sanjay Kumar Agarwalla, Job N Muriuki
6.	Lohia	Rohit	Envirofit	04/06/2015 and 15/06/2015 (through skype)	Project operation, CER calculation and completeness of monitoring report, Quality Assurance – Management and operating system, compliance of monitoring plan with monitoring methodology and registered CPA-DD.	Sanjay Kumar Agarwalla

C.4. Sampling approach

As assessed in above sections, out of the two implemented CPAs, emission reductions for only 5341-0002 are being claimed for this monitoring period. The total population of the stoves under this CPA are 24,790.

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

1. The thermal efficiency of the ICS distributed (%) (η_{new})
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})

Simple random sampling was applied by CME for selection of the monitoring samples with 95/10 confidence/precision for all the four parameters which is deemed acceptable as per the registered PoA DD /CPA DD. Please refer to the section I.4.3 of this report on detailed assessment on sampling plan opted by the CME.

DOE used sampling during verification for checking the stoves. A sample size of 18 households was chosen (no non-responses). A sample size of 18 was required, based on an AQL of 1 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 10 %. Acceptance number (c) thus determined for the sample is 1. It was observed that all the stoves were in working condition and thus $c=0$, i.e. no discrepant records were observed with the published MR /1/ and ER sheet /3/. Thus PP's set of records has been accepted in line with § 28 of the sampling standard, version 04.1 /B07/.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
General	--	--	--
Compliance of the monitoring report with the monitoring report form	--	01	--
Remaining forward action requests from validation and/or previous verification	--	--	--
Specific-case 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			
1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline	--	--	--
2. Corrections	--	--	--
3. Inclusion of a monitoring plan in a registered PoA-DD (including its generic CPA-DD(s))	--	--	--
4. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline	--	--	--
5. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA	--	--	--
6. Types of changes specific to afforestation and reforestation activities	--	--	--
Component project activity(ies)			
Compliance of the CPA implementation with the included CPA design document	02	--	--
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	--	--	--
• Inclusion of a monitoring plan to an included CPA-DD	--	--	--
• Permanent changes to the monitoring plan as described in the included CPA-DD, applied methodology, or applied standardized baseline	--	--	--
• Changes to the programme design of the included CPA-DD	--	--	--
• Types of changes specific to afforestation and reforestation component project activities	--	--	--
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	--	--	--
Compliance of monitoring activities with the registered monitoring plan			
• Data and parameters fixed ex ante or at renewal of crediting period	--	--	--
• Data and parameters monitored	03	--	--
• Implementation of sampling plan	--	--	--
Compliance with the calibration frequency requirements for measuring instruments	--	--	--
Assessment of data and calculation of emission reductions or net removals	--	--	--
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	--	01	--
• Calculation of project GHG emissions or actual net GHG removals by sinks	--	--	--
• Calculation of leakage GHG emissions	--	--	--
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	--	--	--
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included specific-case CPA	01	--	--
• Remarks on difference from estimated value in registered PDD	--	--	--
Others (please specify)			
Total	06	02	

SECTION D. Internal quality control

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

SECTION E. Verification opinion

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Carbon Check (India) Private Ltd. (CC IPL) has performed the first periodic verification of the registered CDM Programme of Activities "Improved Cooking Stoves Programme of Activities in Africa" having UNFCCC reference number as 5341 for the CPAs titled "Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya)"; "Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00002 (Kenya)"; "Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00003 (Kenya)" and "Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00004 (Kenya)" with UNFCCC reference numbers 5341-0001, 5341-0002, 5341-0003 and 5341-0004 respectively for the four CPAs. The CPAs covered for this verification are the ones which have crediting period falling within this monitoring period. During the current monitoring period only 5341-0002 and 5341-0004 were implemented

and the other two CPAs were not implemented. Out of the two implemented CPAs, in 5341-0004, only 1,195 stoves were distributed till the end of this monitoring period and PP has decided to claim emission reductions only for 5341-0002 in this monitoring period.

The verification team assigned by the DOE concludes that the PoA-DD (Version 3.2, dated 27/11/2012), Component Project Activity 0002 as described in the registered CPA-DD (Version 2.0, date 11/10/2013) /B04/ and monitoring report (version 3.0, dated 29/06/2015) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the VVS requirements version 09.0 /B01-1/.

Verification methodology and process

The Verification team confirms the contractual relationship signed on 24/02/2015 between the DOE, Carbon Check (India) Private Ltd. and the Co-ordinating Managing Entity/ Project Participant, (Envirofit International Ltd.). The team assigned to the verification meets the CCIPL's internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and Carbon Check procedures and requirements.

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

- Reviewing the registered PoA-DD (version 3.2, date 27/11/2012), the registered CPA DD for 5341-0002 (Version 2.0, date 11/10/2013), including the monitoring plan and the corresponding validation report/s /B04/;
- Publication of the MR (version 1, 08/05/2015) /1/ on the UNFCCC website on 08/05/2015
- Desk review of the validation report, MR and other relevant documents including documents related to the projects activities in emission reductions
- Review of the applied monitoring methodology (AMS-II.G version 03) /B02/;
- Review of any CMP and EB decisions, clarifications and guidance /B05/;
- On-site assessment (02/06/2015 – 04/06/2015)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The component project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the registered/included CPA DD/s. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the PoA has resulted in the 32,272 tCO₂e emission reductions during the first monitoring period.

During the reported monitoring period only 5341-0002 and 5341-0004 were implemented and the other two CPAs (5341-0001 and 5341-0003) were not implemented (i.e. no stoves were sold under these two CPAs). Further in 5341-0004 only 1,195 stoves were distributed and emission reductions for only 5341-0002 were monitored and claimed for this monitoring period by the CME. Emission reductions have been claimed by CME only for 5341-0002 (UNFCCC reference number 5341-0002) and no emission reductions are being claimed for 5341-0001, 5341-0003 and 5341-0004:

Verified emission reductions for the PoA: 32,272 tCO₂e.

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

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO₂e)	0	32,272

Break up of emission reductions CPA wise:

5341-0001; 0 tCO₂e

5341-0002: 32,272 tCO₂e

5341-0003: 0 tCO₂e

5341-0004: 0 tCO₂e

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

SECTION F. Certification statement

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Carbon Check (India) Private Ltd., the DOE, has performed the verification of the registered Programme of Activities, UNFCCC Registration Number 5341, "Improved Cooking Stoves Programme of Activities in Africa" in Kenya. The PoA involves replacement of less efficient cooking stoves using woody biomass (wood-fuel and/or charcoal) with ICS which are more efficient. The ICS distributed under CPAs of the PoA are more efficient in transferring heat from the fuel to the pot when compared to the stoves typically used in baseline. By replacing inefficient stoves, the PoA will save on consumption of woody biomass (either wood or charcoal made of wood).

The component project activity (5341-0002) of the Programme of Activity is designed to generate emission reductions by distribution of the fuel-efficient charcoal based cook stoves in Kenya. The fuel-efficient cook stoves are replacing the baseline charcoal stoves in common use (baseline scenario). The CME and CPA implementer are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activity/ies. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the component project/s. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PoA-DD/CPA-DD. The verification is carried out in-line with the VVS requirements.

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

The verification is based on:

- PoA-DD version 3.2 dated 27/11/2012;
- CPA-DD/s included in the registered PoA and its monitoring plan for the monitoring period 15/12/2012 to 31/12/2014.
- Approved monitoring methodology AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass", version 03;
- Validation report /B04/ for the PoA and CPA/s;

— Monitoring report(s) version(s) 1, 2.0 and 3.0 dated 04/05/2015, 12/06/2015 and 29/06/2015 respectively).

This statement covers verification period from 15/12/2012 and 31/12/2014.

The DOE has raised 06 clarification and 02 corrective action requests, all of which have been successfully resolved by PP(s).

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

The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 32,272 tCO₂ equivalent and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO ₂ e)	0	32,272

SECTION G. Verification findings - General

G.1. Compliance of the monitoring report with the monitoring report form

The MR form uses the latest applicable version of the Monitoring report form for CDM programme of activities (version 01.0).

Means of verification	DR
Findings	CAR 01 was raised as the names of the host countries as stated in the published MR do not match with the registered PoA DD
Conclusion	The CAR was closed after CME submitted revised MR stating the host countries as per the registered PoA DD. Verification Team confirms that the latest available version of monitoring report /2/ has been used by the CME and the MR /2/ is in compliance of the monitoring report with the relevant form and instructions therein. This confirms the compliance of § 381 and 382 of VVS version 09.0.

G.2. Remaining forward action requests from validation and/or previous verification

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This is the 1st periodic verification of the PoA. There are not any forward action requests from validation of the PoA and CPA.

G.3. Specific-case CPA(s) considered for verification and covered in this report

Reference number of the specific-case CPA included in the PoA as of the end of this monitoring period	Is the specific-case CPA considered for this verification? (yes/no)	Version number of the registered PoA-DD to which the specific-case CPA complies with	Confirmation that a request for issuance including the specific-case CPA has been published for the previous monitoring period (Y/N)
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Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya)	Yes	3.2	N
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00002 (Kenya)	Yes	3.2	N
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00003 (Kenya)	Yes	3.2	N
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00004 (Kenya)	Yes	3.2	N

SECTION H. Verification findings – Programme of activities

H.1. Compliance of the programme implementation with the registered programme design document

Means of verification	DR, I
Findings	CL 01 was raised for clarification on implementation status of 5341-0001, 5341-0003 and 5341-0004. CL 02 was raised for clarification on implementation of only 4 models of ICS vis a vis 5 models stated in the 5341-0002.
Conclusion	CC IPL by means of an on-site inspection and document review, assessed that all physical features (technology, project equipment, and monitoring and metering equipment) of the included CDM CPA in the registered PDD or CPA-DD are in place and that the project participants or the coordinating/managing entity have operated the PoA and CPA as per the registered PoA-DD and CPA-DD. Verification team confirms that the programme has been implemented as per the registered PoA DD. This confirms the compliance of § 383 and § 384 of VVS version 09.0.

H.2. Implementation and operation of the management system

Means of verification	DR, I
Findings	-
Conclusion	The PoA management system including the record-keeping system has been explained in the registered PoA DD /B04/. During the course of verification, verification team based on review of provided documents and OSV interview/observation has assessed this management system. Verification team evaluated the management systems in place to implement the monitoring of the project activity. This included the roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system. As outlined in section D.7.2 of CPA-DD /B02/ and section G of MR, monitoring shall be done by the CPA implementer, Envirofit Kenya Limited (DO) by means of sales database. The data is further periodically checked by the CME to ensure there is no double counting. The records of sales database /6/ has been verified during the course of verification.

	<p>In order to ensure completeness and accuracy of monitoring information, electronic database(s) is operated and maintained by the DO. This information is further maintained by the CME who verifies the reported sales with the number of stoves produced by the manufacturer. Since the unique code inscribed on the cook stoves will correspond to its CPA, the occurrence of double counting is avoided. This provision for the avoidance of double counting as outlined in the PoA management system has been verified by means of review records of sales database /6/ and OSV interview/observation during the course of verification. This unique serial numbering system and the data from manufacturer were further cross-checked (on a sampling basis) during the site visit physical inspection.</p> <p>It was confirmed during the OSV and by checking the monitoring system that all the roles and responsibilities related to monitoring are fulfilled by representatives of CME and the CPA implementer.</p> <p>The responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan /B04/.</p> <p>The details about monitoring system have been provided in Section G of the monitoring report /2/. The data flow and management and reporting structure was also checked during the site visit.</p> <p>Diagrams of the roles and responsibilities data collection transfer and aggregation procedures, data storage and archiving for the monitoring system have been provided in section G of the MR /2/.</p> <p>The verification team confirms that the monitoring management system of the CDM PoA is in place; with the responsibilities properly identified and in place. This confirms the compliance of § 83 (a), § 390 (b) (iv) and § 390 (e) of VVS version 09.0.</p>
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H.3. Post-registration changes

H.3.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

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"N/A"

H.3.2. Corrections

>>
"N/A"

H.3.3. Inclusion of a monitoring plan in a registered PoA-DD (including its generic CPA-DD(s))

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"N/A"

H.3.4. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline

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"N/A"

H.3.5. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA

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“N/A”

H.3.6. Types of changes specific to afforestation and reforestation activities

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“N/A”

SECTION I. Verification findings – Component project activity(ies)

I.1. Compliance of the CPA implementation with the included CPA design document

The implementation status of the component project activity

Co-ordinating and Managing entity/Project Participants:	Envirofit International Ltd.
Title of the PoA:	Improved Cooking Stoves Programme of Activities in Africa
UNFCCC registration No:	5341
Applied Baseline and monitoring methodology:	AMS-II.G (version 03)

Title of the CPA:	Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya)
CPA reference number:	5341-0001
Date of inclusion:	06/12/2012
CPA start date:	01/01/2012
CPA start of operation:	Not implemented during the reported monitoring period
CPA implementer	East Africa Energy Limited
Project Scale:	Small scale
Location of the CPA:	Kenya
CPA crediting period:	15/12/2012 to 14/12/2022
Reported monitoring Period verified in this verification:	15/12/2012 to 31/12/2014

Title of the CPA:	Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00002 (Kenya)
CPA reference number:	5341-0002
Date of inclusion:	29/10/2013
CPA start date:	16/03/2012
CPA start of operation:	Sale/Distribution of stoves – 16/03/2012 /6/
CPA implementer	Envirofit Kenya Limited
Project Scale:	Small scale
Location of the CPA:	Kenya
CPA crediting period:	01/01/2014 to 31/12/2023
Reported monitoring Period verified in this verification:	01/01/2014 to 31/12/2014

Title of the CPA:	Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00003 (Kenya)
CPA reference number:	5341-0003
Date of inclusion:	06/11/2013
CPA start date:	06/09/2013
CPA start of operation:	Not implemented during the reported monitoring period.
CPA implementer	Envirofit Kenya Limited
Project Scale:	Small scale
Location of the CPA:	Kenya
CPA crediting period:	01/01/2014 to 31/12/2023
Reported monitoring Period verified in this verification:	01/01/2014 to 31/12/2014

Title of the CPA:	Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00004 (Kenya)
CPA reference number:	5341-0004
Date of inclusion:	24/03/2014
CPA start date:	16/03/2012
CPA start of operation:	Sale/Distribution of stoves – 10/01/2013
CPA implementer	Envirofit Kenya Limited
Project Scale:	Small scale
Location of the CPA:	Kenya
CPA crediting period:	01/04/2014 to 31/03/2024
Reported monitoring Period verified in this verification:	01/04/2014 to 31/12/2014

During the reported monitoring period, only 5341-0002 and 5341-0004 were implemented and only 5341-0002 was monitored as there were no stoves distributed in 5341-0001 and 5341-0003 and in 5341-0004 only 1,195 stoves were distributed. No emission reductions are being claimed by the CME for 5341-0001, 5341-0003 and 5341-0004. As part of the site visit, the verification team was able to confirm that the Programme of activities and the component project implementation is in accordance with the project description contained in the included CPA-DD for 5341-0002 /B04/. The verification team took cognizance of § 239 to § 242 of CDM Project Standard, version 09.0 and § 373 b (i), § 383, § 384 and § 385 of VVS version 09.0.

Project physical features (technology, project equipment, monitoring and metering equipment)	<p>Out of two implemented CPAs, since only 5341-0002 is being claimed for the reported monitoring period by the CME, the assessment below is for 5341-0002.</p> <p>The 5341-0002 includes distribution of energy efficient improved cooking stoves. The CPA implementer is Envirofit Kenya Limited. The portable improved cook stoves (ICS) under the 5341-0002 use charcoal /7/ as fuel. These ICSs are efficient in transferring heat from the fuel to the pot, thus saving charcoal compared to the traditional charcoal stoves used by the Kenyan households.</p> <p>There are four models /4/, /6/ of stoves being used in the 5341-0002 under the monitoring period:</p> <ol style="list-style-type: none"> 1. CH2200 2. CH4400 3. CH5200 4. CH6600 <p>The average stove efficiencies /4/, /11/ determined for each of the</p>
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	stove models, through sampling is: 1. CH2200 – 34.17 % 2. CH4400 – 28.86 % 3. CH5200 – 33.43 % 4. CH6600 – 28.37 % The stove efficiency has been determined through water boiling tests /11/. There were no changes observed during OSV from the technology stated during the validation.	
Any Project Design Change been sought and approved by EB for the CPA? <small>(compliance of § 330 (f) of VVS)</small>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	No project design change has been sought from EB for the CPA.

The implemented CPA involves distribution and sales of fuel-efficient charcoal stoves by Envirofit Kenya Limited in individual households of Kenya with the help of dealers with whom it has made contractual agreements /14/. It was confirmed through the monitoring database /5/ that the CPA involves distribution and installation of 24,790 stoves till the end of the monitoring period. During the reported monitoring period survey, it was found that out of the total samples of hundred households, four households were using more than one Envirofit ICS. Hence in accordance with the CPA DD, CME has discounted the proportionate number of ICS from the total distributed ICS and considered only 23,798 cook stoves (after discounting) for emission reduction calculation, the approach is deemed appropriate and hence acceptable to the verification team.

The annual energy savings was found to be 119,414 MWh /4/ for the CPA which is less than 180,000 MWh_{th} and thus the CPA remains under the small scale limit /B02/.

The stoves in the CPA have been distributed across different locations in Kenya. As confirmed through the monitoring database provided in the ER spread sheet, first stove for the CPA was distributed on 16/03/2012 /6/ and last stove on 23/12/2014 /4/. All the stoves that were checked during verification site visit were found to be working and with the serial number marked on the stoves.

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

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

Based on above assessment, verification team confirms that the component project activity was implemented and equipment installed as described in the included CPA DD.

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

Subject	Webhosted Monitoring Report (MR) /1/	Verified Monitoring Report /2/
Changes		
Emission reductions	31,784 tCO _{2e}	32,272 tCO _{2e} (please refer to CAR 02 and its closure for further details)

The actual operation of the CDM project activity

The starting date of the CPA is 16/03/2012 as per the CPA-DD /B04/ and the first distribution of stoves took place on 16/03/2012 /6/. A total of 24,790 stoves were distributed in the CPA during the monitoring period /6/. As stated above, during the current monitoring period survey it was found that out of the total samples of hundred households, four households were using more than one Envirofit ICS. Hence in accordance with the CPA DD, CME has correctly discounted the proportionate number of ICS from the total distributed ICS and considered only 23,798 cook stoves (after discounting) for emission reduction calculation. The CME / DO has got the recipient households consent for carbon rights for CME during the distribution of the ICS and also there is a contractual agreement in between the CME and the DO for the exclusive rights of the CERs for CME /8/. Operation of the devices is confirmed during the site visit by the verification team. Followings were verified at the project site:

1. Stoves numbering system
2. Electronic monitoring system including input procedure
3. Actual distribution / implementation of the stoves
4. Household-representatives were interviewed regarding the usage of stove
5. Whether or not baseline technology was still in use
6. Process of data collection during installation of stove
7. Agreements between households and the CPA implementer

In accordance with § 385 (c) of VVS, version 09, information (data and variables) provided in the monitoring report that are different from that stated in the registered CPA-DD /B04/, have been assessed. The assessment is summarized below:

Parameter	Ex-ante value in the CPA-DD	Actual operation for the reported monitoring period	Assessment by the verification team
Number of cook-stoves (N_{all})	18,500	23,798	<p>Verification team noted that the actual number of cook-stoves distributed under the CPA is higher than the number indicated in the registered CPA DD /B04/. This difference is acceptable based on the following:</p> <ul style="list-style-type: none"> ➤ CPA-DD does not restricts the number of cook stoves to 18,500 which is just an indicative value (as explained below) ➤ The project energy saving is still less than 180 GWh_{th}/year. ➤ The emission reductions from the project during the reported monitoring period are less than that estimated in the registered CPA DD for the same period. <p>Verification team further noted that the cook-stove numbers as indicated in the registered CPA DD is not a fixed number (thus this cannot be categorized under a design change) and this assessment has been based on review of following paragraphs of CPA DD:</p> <p><i>“The CPA will have a maximum energy saving of less than or equal to 180 GWh_{th}/year thus staying within the small-scale threshold. Based on the estimated energy savings, it is envisaged that about 18,500 stoves will be distributed under the CPA”</i></p>

			<p>(Refer Section A.3, of the registered CPA-DD, version 2.0 dated 11/10/2013) /B04/.</p> <p>The number of cook-stoves stated in the CPA-DD is only an indicative number based on the small scale annual energy saving threshold of 180GWh_{th}/year. The 23,798 stoves implemented in the CPA results in 119.414 GWh_{th}/year of energy saving. The verification team noted that with the increase in number of stoves, the CPA still remains under the limit of small scale and hence this is not deemed as any design change.</p> <p>Verification team during course of verification noted that the average energy savings per stove during the monitoring period depends not just on the thermal efficiency of the stoves (η_{new}), but also on the other monitored parameters, including:</p> <ul style="list-style-type: none"> • “Stove Operation Fraction” (SOF); • “the amount of woody biomass consumption that is consumed through the continued use of old stoves” (μ_{old}); • “the fraction of end users that are still using baseline (replaced) stoves” (f_{old}); and, • “Calculated average stove operation years in the monitoring period” (Stove_{year}). <p>The ex-post monitored values for these parameters were also found to be different from the ex-ante estimates provided in the registered CPA-DD. For instance, SOF was found to be 84 % instead of the 95% anticipated in the CPA-DD. This is approximately 11.5 % lower than initially assessed in the CPA-DD. Stove year was also estimated in the CPA-DD to be 1.00 while the monitored valued is 0.88. The Stove year is lower due to the progressive distribution of cook-stoves over the monitoring period. When considering the differences of the aforesaid five parameter values together, (and not just the thermal efficiency), the average energy savings per stove is approximately 52.2 % of what was initially estimated in the CPA-DD (refer CPA-DD section A.12) substantiating the increase in number of cook-stoves distributed under the CPA.</p>
Efficiency of the ICS (η_{new})	36.5%	30.78%	<p>The weighted average efficiency of the cook-stoves (η_{new}) monitored ex-post for the current monitoring period is less than the estimated ex-ante value in the CPA-DD. Verification team based on its sectoral expertise confirms that decrease in efficiency in actual project condition is a realistic condition and thus this issue does</p>

			not require further assessment, as it does not lead to increase in emission reductions.
Stove Operation Fraction (SOF)	0.95	0.84	Since, the monitored ex-post value of SOF for the current monitoring period is less than the estimated ex-ante value in the CPA-DD, this is acceptable to the verification team, as it does not lead to increase of emission reductions. This is deemed acceptable.
The amount of woody biomass consumption that is consumed through the continued use of old stoves (μ_{old})	177.9 kg/year	1889.91 kg/year	Since, the amount of woody biomass consumption that is consumed through the continued use of old stoves monitored ex-post for the current monitoring period is higher than the estimated ex-ante value in the CPA-DD, this is acceptable to the verification team as it does not lead to increase of emission reductions. This is deemed acceptable.
The fraction of end users that are still using baseline (replaced) stoves (f_{old})	0.1	0.3290	Since, the fraction of end users that are still using baseline (replaced) stoves monitored ex-post for the current monitoring period is higher than the estimated ex-ante value in the CPA-DD, this is acceptable to the verification team as it does not lead to increase of emission reductions. This is deemed acceptable.
Calculated average stove operation years in the monitoring period ($Stove_{year}$)	1	0.88	$Stove_{year}$ monitored ex-post for the current monitoring period is lower than the estimated ex-ante value in the CPA-DD. This is deemed acceptable as it does not lead to increase of emission reductions.

Verification team has assessed the project in order to check any proposed or actual changes to the project design in accordance with § 317 of VVS version 09.0. In the opinion of Carbon Check, there is no change to the project design. Carbon Check's verification team confirms that the CPA is implemented within the boundary of the PoA as described in the registered PoA-DD and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PoA-DD and registered/included CPA-DD.

The monitoring report has been submitted for monitoring period 1 (from 15/12/2012 to 31/12/2014).

Means of verification	DR, I
Findings	CL 01 was raised for clarification on implementation status of 5341-0001, 5341-0003 and 5341-0004. CL 02 was raised for clarification on implementation of only 4 models of ICS vis a vis 5 models stated in the 5341-0002.
Conclusion	Carbon Check's verification team considers the CPA description of the project contained in the registered CPA-DD to be complete and accurate. The CPA-DD complies with the relevant methodology, tools, forms and guidance at the time of CPA-DD submission for registration/inclusion. In summary, the monitoring period is reasonable and the operation of the CPA is in

	accordance with the registered CPA DD. The verification team took cognizance of § 239 to § 242 of CDM Project Standard and § 373 b (i), § 383, § 384 and § 385 of VVS version 09.
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I.2. Post-registration changes**I.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

“N/A”

I.2.2. Corrections

“N/A”

I.2.3. Changes to the start date of the crediting period

“N/A”

I.2.4. Inclusion of a monitoring plan to an included CPA-DD

“N/A”

I.2.5. Permanent changes to the monitoring plan as described in the included CPA-DD, applied methodology, or applied standardized baseline

“N/A”

I.2.6. Changes to the programme design of the included CPA-DD

“N/A”

I.2.7. Types of changes specific to afforestation and reforestation component project activities

“N/A”

I.3. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	DR
Findings	-
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the registered CPA-DD is in accordance with the approved methodology applied by the project activity, i.e. AMS-II.G (version 03) /B02/.</p> <p>The monitoring plan is in accordance with the approved methodology, AMS-II.G version 03 /B02/, applied by the component project activity and as provided in the CPA-DD /B04/.</p> <p>The verification took cognizance of § 386 to § 388 of VVS version 09 /B01/.</p>

I.4. Compliance of monitoring activities with the registered monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the registered CPA-DD. This conclusion has been made based on assessment below in section I.4.1, I.4.2 and I.4.3 below.

I.4.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	DR
Findings	-
Conclusion	Verification team confirms that the Data and parameters fixed ex ante are in compliance with the registered CPA DD and monitoring plan. Please refer to the

	<p>Annex 1 for assessment of each parameter.</p> <p>The verification took cognizance of § 389 of VVS version 09 /B01/.</p>
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I.4.2. Data and parameters monitored

Means of verification	DR, I
Findings	<p>CL 04 was raised for clarification on the chosen sampling plan (Option A or Option B) for the monitoring parameter "μ_{old}" as stated in section D.7.2 of the CPA DD.</p> <p>CL 05 was raised for clarification on the methodology used for WBTs.</p> <p>CL 06 was raised for clarification on monitoring equipment used WBT.</p>
Conclusion	<p>Verification team confirms that the Data and parameters monitored are in compliance with the registered CPA DD and monitoring plan. Please refer to the Annex 2 for assessment of each parameter.</p> <p>The verification took cognizance of § 389 and § 401 of VVS version 09 /B01/.</p>

I.4.3. Implementation of sampling plan

As mentioned in the above sections, only 5341-0002 was implemented for which emission reductions are being claimed for this monitoring period. The total population of the stoves under this CPA are 24,790. The four monitoring parameters required to be monitored through the sampling plan are:

1. The thermal efficiency of the ICS distributed (%) (η_{new})
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})

Simple random sampling was applied for selection of the monitoring samples with 95/10 confidence/precision for all the four parameters which is deemed acceptable as per the registered PoA DD /CPA DD.

Single sampling frame was applied for the three monitoring parameters, "SOF", " f_{old} " and " μ_{old} " as because all the models of stoves distributed under the 5341-0002 are similar (charcoal stoves) and were distributed to homogenous end users that are domestic households.

For the thermal efficiency of the stoves (η_{new}), four sampling frames (one for each of the four stove model type distributed during the monitoring period for the 5341-0002) were chosen.

The number of samples for each of the parameters covered during the monitoring activity is as given below:

Parameter	Sample Size (n) required	Samples covered during monitoring
SOF	68	100
$f_{non\ old}$	68	84
μ_{old}	18	20
η_{new} (CH2200)	7	7
η_{new} (CH4400)	7	11
η_{new} (CH5200)	7	7
η_{new} (CH6600)	7	7

For the monitoring parameters SOF, f_{old} and μ_{old} data were collected following a specially designed survey form. For thermal efficiency of the stoves WBTs were conducted. In order to achieve the 95/10 reliability level, few additional stoves were sampled to cover for non responses, if any.

It was found that except for “ f_{old} ” and “ μ_{old} ”, the 95/10 confidence/precision was met and for these two parameters lower and higher bound values were applied in a conservative manner which is deemed acceptable. Section I.4.2 above may be referred for more details.

Further the verification team used sampling during verification for checking the stoves. A sample size of 18 households was chosen (no non-responses). A sample size of 18 was required, based on an AQL of 1 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 10 %. Acceptance number (c) thus determined for the sample is 1. It was observed that all the stoves were in working condition and thus $c=0$, i.e. no discrepant records were observed with the published MR /1/ and ER sheet /3/. Thus PP's set of records has been accepted in line with paragraph 28 of the sampling standard, version 04.1 /B07/.

Means of verification	DR, I
Findings	-
Conclusion	Verification team confirms that the sampling approach applied by the CME is in accordance with the registered PoA DD and the CPA DD /B04/ including the Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/ and Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 04.1 /B07/.

I.5. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	DR, I
Findings	-
Conclusion	Only 5341-0002 was operational and reported during the monitoring period. Sales database has been used to record the stoves details by the CPA implementer and the CME through a survey of the installed stoves based on sampling basis. The stove efficiency also needs to be checked. The stove efficiency testing has been done by WBTs conducted in line with the guidance provided by the CME in the CPA DD /B04/ /17/. The monitoring equipments used for conducting the stove efficiencies by WBTs are thermometer and weighing machines. Both of these equipments were newly bought by the CME and hence deemed duly calibrated /13/. The appropriate QA/QC procedures have been followed for the monitoring parameters. The verification took cognizance of § 389 and § 394 of VVS version 09 /B01/.

I.6. Assessment of data and calculation of emission reductions or net removals

In line with the requirement of § 401 of VVS, version 09.0 verification team has reviewed the Monitoring report and ER spread sheet to check the arithmetic calculation of the emission reductions. The equation used for the calculation is compared with those provided in the registered CPA-DD /B04/ and the methodology AMS-II.G, version 03 /B02/ and found to be in correct. Verification team further noted that for the monitoring parameters “ μ_{old} ” and “ f_{old} ”, the desired precision of 10% was not met and hence correction have been applied for these parameters in a conservative manner as per the revised approved PoA-DD /B04/. The verification took cognizance of § 389 and § 401 of VVS version 09 /B01/.

I.6.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	DR, I
Findings	CAR 02 was raised for the following identified issues: 1. Correctness of computation of the parameter N_{all} . 2. In the survey records, two stoves which were non operational are stated to be operational in the ER sheet 3. Usage of three baseline stoves do not match in between the reported values in the ER spread sheet and the survey records 4. Efficiency values as obtained from the WBTs do not match in between the reported values and the supporting document
Conclusion	The equations for baseline emissions, as provided in the monitoring report /1/ and confirmed with the registered CPA-DD /B04/ and the methodology AMS-II.G, version 03 /B02/, are:

$$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where:

ER_y = Emission reductions during the year y in tCO₂e

$B_{y,savings}$ = Quantity of biomass that is saved in tonnes

$f_{NRB,y}$ = Fraction of biomass saved by the project activity in year y that can be established as non-renewable biomass using survey results, national or local statistics or other sources of information (fixed ex ante as 92%)

$NCV_{biomass}$ = Net calorific value of the non-renewable biomass that is substituted

(IPCC default for wood fuel, 0.015 TJ/tonne)

$EF_{projected_fossilfuel}$ = Emission factor for the substitution of non-renewable biomass by similar consumer (Default value of 81.6 tCO₂/TJ).

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

B_{old} = Quantity of biomass used in the absence of the project activity in tonnes/year

η_{old} = Efficiency of the system being replaced (fixed 12.9% ex ante)

η_{new} = Efficiency of the system being deployed as part of the project activity (30.78% monitored ex post during the monitoring period)

$$B_{old} = LAF \cdot N_{all} \cdot SOF \cdot \left(Q_{biomass} - \left(\frac{\mu_{old}}{1000} \cdot f_{old}\right)\right) \cdot Stove_{year}$$

LAF = Net to gross Adjustment factor (0.95) applied in accordance with paragraph 13 and 23 of AMS-II.G v. 03

N_{all} = Total number of stoves installed (23,798 monitored ex post during the monitoring period)

SOF = Stove Operation Fraction - % of stoves operating or replaced by equivalent in-service appliance (84.0% monitored ex post during the monitoring period)

$Q_{biomass}$ = Average annual biomass consumption per appliance (3.56 tonnes / year fixed ex -ante).

μ_{old} = Average amount of woody biomass consumption that is consumed through the continued use of old stoves (1,889.91 kg/year monitored ex post)

f_{old} = Fraction of end users that are still using their replaced stoves during the monitoring period (32.90% monitored ex post during the monitoring period)

$Stove_{year}$ = Calculated average stove operation years in the monitoring period (0.88 monitored ex post for the monitoring period)

From the above equation and the parameter values, B_{old} is calculated as 49,335 tonnes

Hence $B_{y,savings}$ = 28,659 tonnes

ER_y = 32,272 tCO₂e

The verification took cognizance of § 389 and § 401 of VVS version 09 /B01/.

I.6.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	DR, I
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Findings	-
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and the CPA-DD /B04/.

I.6.3. Calculation of leakage GHG emissions

Means of verification	DR, I
Findings	-
Conclusion	A default (0.95) Net to gross adjustment factor to account for leakages (LAF) has been considered by the project and thus it is in line with the requirement of monitoring methodology /B02/ and the CPA-DD /B04/. The verification took cognizance of § 389 of VVS version 09 /B01/.

I.6.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Means of verification	DR
Findings	-
Conclusion	Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from registered CPA-DD. The total number of CERs achieved during the monitoring period is 32,272 tCO ₂ e. In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD for the current monitoring period. The verification took cognizance of § 401 of VVS version 09 /B01/.

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e)		
				Results achieved in the period up to 31 December 2012	Results achieved in the period from 1 January 2013 onwards	Results achieved in the entire monitoring period
5341-0001	0	-	-	0	0	0
5341-0002	32,272	-	-	0	32,272	32,272
5341-0003	0	-	-	0	0	0
5341-0004	0	-	-	0	0	0
Total	32,272	-	-	0	32,272	32,272

I.6.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included specific-case CPA

Means of verification	DR
Findings	CL 03 was raised for clarification on ex ante estimation of emission reductions for 5341-0001
Conclusion	Comparison of the actual GHG emission reductions with the estimates in the included specific CPAs is given in the below table. Verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD for the current monitoring period. The verification team took cognizance of § 401 of VVS version 09 /B01/.

Specific-case CPA reference number	Value estimated in ex ante calculation in the included specific-case CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
5341-0001	27,677	0
5341-0002	40,212	32,272
5341-0003	42,811	0
5341-0004	32,538	0
Total	129,117	32,272


I.6.6. Remarks on difference from estimated value in registered PDD

Means of verification	DR
Findings	-
Conclusion	Verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD for the current monitoring period.

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Limit
BAU	Business As Usual
CA	Corrective Action / Clarification Action
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CER	Certified Emission Reduction
CL	Clarification Request
CME	Co-ordinating and Managing entity
CPA	Component Project Activity
CPA-DD	Component Project Activity Design Document
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DR	Document review
DOE	Designated Operational Entities
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
FA	Final Approval
FAR	Forward Action Request
FVR	Final verification Report
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
I	Interview
IPCC	Intergovernmental Panel on ClimateChange
IR	Internal resource
MWh	Mega Watt Hour
PoA	ProgrammeofActivities
PoA-DD	Programme of Activities Design Document
PP	Project Participant
OSV	On Site Visit
QC/QA	Qualitycontrol/Qualityassurance
RMP	Revised Monitoring Plan
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Limit
VVS	Validation and Verification Standard
WBT	Water boiling test

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Sanjay Agarwalla

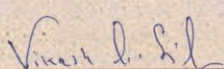
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

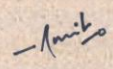
Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Assessor ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:


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



Mr. Vikash Kumar Singh
Director



Mr. Amit Anand
Director



Date of Approval
26/12/2014

Valid Till
25/12/2015

Revision History of the Document

26/12/2014	Initial Adoption
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¹India

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
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Carbon Check (India) Private Ltd.

Vikash Kumar Singh

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

For following functions:

Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Assessor ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

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

Mr. Anubhav Dimri
Director

Mr. AmitAnand
Director



Date of Approval
26/12/2014

Valid Till
25/12/2015

Revision History of the Document

26/12/2014

Initial Adoption

¹India, South Africa

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Envirofit	1. Webhosted Monitoring report	Version 1, dated 04/05/2015	CME
		2. Monitoring report during findings resolution	Version 2.0, dated 12/06/2015	
2	Envirofit	Final Monitoring report	Version 3.0, dated 29/06/2015	CME
3	Envirofit	1. Emission reduction calculation spread sheet corresponding to /1-1/	Version 1, dated 04/05/2015	CME
		2. Emission reduction calculation spread sheet corresponding to /1-2/	Version 2.0, dated 12/06/2015	
4	Envirofit	Emission reduction calculation spread sheet, corresponding to /2/	Version 3.0, dated 29/06/2015	CME
5	Envirofit	CPA Monitoring Survey Records	-	CME
6	Envirofit	CPA distribution records including evidence for the dates of distribution and first shipment of cook stoves under 5341-0002 on 16/03/2012	-	CME
7	Envirofit	Stove specifications for CH2200, CH4400, CH5200 and CH6600 models used under the 5341-0002	-	CME
8	Envirofit	Proof of Carbon Credits waiver by End user	-	CME
9	Envirofit	Sample stoves sales receipt	-	CME
10	Envirofit	Training records	-	CME
11	Envirofit	Water boiling test records	-	CME
12	Envirofit	Sample agreement copies in between the distributors and the end users	-	CME
13	Envirofit	Manuals for the thermometer and weighing machine used for monitoring of the stove efficiency	-	CME
14	Envirofit	Contractual agreement in between the CME and the DO as per the eligibility criteria number 13 in section A.4.2.2 of the PoA DD	-	CME
15	Envirofit	List of all the dealers for 5341-0002	-	CME
16	Envirofit	Evidence for random number generator for sampling	-	CME
17	Envirofit	WBT conducting methodology for the cook stoves	-	CME
18	Envirofit	Sample warranty cards	-	CME
19	Envirofit	Evidence for display of programme logo on the stoves	-	CME

CDM-PoA-VCR-FORM

/B01/	UNFCCC	1. Validation and Verification Standard version 09.0 2. Project Standard version 09.0 3. Project Cycle Procedure version 09.0	http://cdm.unfccc.int/	Others
/B02/	UNFCCC	Applied baseline and monitoring methodology, AMS-II.G, version 03	http://cdm.unfccc.int/	Others
/B03/	UNFCCC	Instructions for filling out the monitoring report form for CDM programme of activities version 01.0	http://cdm.unfccc.int/	Others
/B04/	UNFCCC	Registered PoA-DD (version 3.2 dated 27/11/2012), (CPA-DD for 5341-0002: version 2.0 dated 11/10/2013) and corresponding validation report.	http://cdm.unfccc.int/	Others
/B05/	Web sites	Websites: http://cdm.unfccc.int/ http://www.ipcc-nggip.iges.or.jp/ http://www.pciaonline.org/testing	--	Others
/B06/	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0	http://cdm.unfccc.int/	Others
/B07/	UNFCCC	Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 04.1	http://cdm.unfccc.int/	Others

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

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

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

Table 2. CL from this verification

CL ID	CL 01	Section no.	H.1, I.1	Date: 12/06/2015
Description of CL				
As per the CPA DDs for 5341-0001, 5341-0003 and 5341-0004, the first date delivery / shipment of the cook stoves were 01/01/2012, 16/03/2012 and 06/09/2013 respectively. PP needs to provide reason / clarification for non implementation of the 5341-0001, 5341-0003 and 5341-0004.				
Also as stated in the MR, version 1,195 cook stoves were distributed for 5341-0004 till the end of this monitoring period. PP needs to clarify the reason for not claiming any emission reductions for this CPA for the monitoring period.				
CME response				Date: 15/06/2015
Please note that only 5341-0001 and 5341-0003 have not been implemented. Sales have been made in 5341-0002 and 5341-0004.				
The volume of sales depends upon a lot of external factors like size of market, competitive alternative products in market, awareness amongst users, affordability of ICS models, last mile reach to end users etc which are not under complete control of DO/CME.				
The date of delivery / shipment refers to the date of shipping the bulk order to DO from Envirofit China warehouse. However the on-field implementation of the CPA starts once the stoves are sold to the end users.				
5341-0001's DO, East Africa Energy (EAE), could not capture the market as initially envisaged. Shortly after the start of the CPA (01/01/2012) EAE went into financial troubles and was subsequently liquidated. Hence no stoves could be distributed in 5341-0001 with EAE as CPA implementer.				
Thereafter, Envirofit decided to implement the CPAs itself as DO and implemented 5341-0002 as its first CPA followed by 5341-0003 and 5341-0004.				
5341-0003 is the first woodfuel stove CPA in the PoA. Envirofit tried selling woodfuel stoves in Kenya but could not find much success and therefore 5341-0003 could not be implemented. Envirofit could successfully sell woodfuel stoves much later (CPA00004) after targeting the fuelwood market in Kenya.				
In 5341-0004 although 1195 woodfuel stoves have been implemented, the PP decided to not claim any emission reductions for 5341-0004 due to a cost/benefit analysis of the efforts required to conduct sampling based field monitoring for these stoves vs. the credits that would be generated out them.				
Documentation provided by the CME				
Monitoring report /2/				
DOE assessment				Date: 16/06/2015
The explanation provided by PP for the reason of non implementation of 5341-0001 and 5341-0003 and also for not monitoring of the 5341-0004 for the current monitoring period is found to be convincing. Hence the CL is closed.				

CL ID	CL 02	Section no.	H.1, I.1	Date: 12/06/2015
Description of CL				
As per the CPA DD, there are five stove models to be distributed under 5341-0002. But only 4 models are distributed during the monitoring period. PP needs to clarify.				
CME response				Date: 15/06/2015

The CPA-DD lists various models as those envisaged for distribution under the CPA ex-post. It is impossible to predict which models will be the most attractive in the market and therefore those that will achieve the greatest sales figures. There is no compulsion to distribute all the models as listed in CPA-DD and CME/DO must react to market conditions which determine the models that will achieve the greatest uptake in the market and therefore those included in a CPA. The stove models which constitute a CPA are dependent upon the market situation, feedback received from the users/ potential users and Envirofit's business targets/strategy.	
Documentation provided by the CME	
CPA distribution records /6/	
DOE assessment	Date: 16/06/2015
Out of the 5 stove models stated in the CPA DD, the model CH2300 was not sold due to market demand conditions. This is acceptable. The CL is closed.	

CL ID	CL 03	Section no.	I.6.5	Date: 12/06/2015
Description of CL				
PP needs to justify values of the ex-ante estimated emission reductions for 5341-0001 for the monitoring period (considering that for 5341-0001 the MP is from 15/12/2012 to 31/12/2014) as stated in section H.5 of the published MR, version 1.				
CME response				Date: 15/06/2015
Section H.5 of the MR has been revised to include the ex-ante estimate for 5341-0001 corresponding to the monitoring period. Please refer revised MR.				
Documentation provided by the CME				
Monitoring report /2/				
DOE assessment				Date: 16/06/2015
The ex-ante estimated emission reductions for 5341-0001 for the monitoring period has been appropriately revised in the MR. CL is closed.				

CL ID	CL 04	Section no.	I.4.2	Date: 12/06/2015
Description of CL				
For the monitoring parameter " μ_{old} ", PP needs to clarify in the MR, the chosen sampling plan (Option A or Option B) as stated in section D.7.2 of the CPA DD.				
CME response				Date: 15/06/2015
Option A as stated in CPA-DD has been used for determination of μ_{old}				
Documentation provided by the CME				
Monitoring report /2/				
DOE assessment				Date: 16/06/2015
Out of the two possible options as per the CPA DD, PP has used option A sampling plan. This has been stated in the revised MR. CL is closed.				

CL ID	CL 05	Section no.	I.4.2	Date: 12/06/2015
Description of CL				
In section H.1 of the published MR, for the monitoring parameter " η_{new} ", sources has been stated as "ex-ante estimation". PP needs to clarify. Also for this parameter, in the CPA DD it is stated "...to conduct WBTs in line with the guidance provided by the CME and according to a methodology supported by PCIA ". But in the MR it is stated EPTP protocol. PP needs to clarify the actual methodology followed.				
CME response				Date: 15/06/2015

<p>This is a typographical error (“ex-ante estimation”) in the Monitoring report. The same has been corrected in the revised monitoring report version 2.0 dated 12 June 2015</p> <p>The monitoring report has been revised to mention the correct Protocol used for WBT. Please refer revised MR.</p> <p>Please note that Partnership for clean indoor air (PCIA) has been integrated into Global Alliance on Clean Cookstoves (GACC). As per PCIA website, “As part of PCIA’s integration with the Global Alliance for Clean Cookstoves, the PCIA website has transitioned to a legacy website. The resources that were produced over the past 10 years of the Partnership are still accessible on this website. However, the content will no longer be updated as of June 1, 2012.” http://www.pciaonline.org/node/2</p> <p>The protocol used for monitoring efficiency is WBT protocol version 4.2.3 available at GACC (refer website - http://cleancookstoves.org/technology-and-fuels/testing/protocols.html).</p>	
Documentation provided by the CME	
Monitoring report /2/; WBT conducting methodology /17/	
DOE assessment	Date: 16/06/2015
<p>The typographical error in section H.1 of the MR has been corrected.</p> <p>Efficiency of the stoves has been carried out as per the GACC protocol and it is acceptable.</p> <p>CL is closed.</p>	

CL ID	CL06	Section no.	I.4.2	Date: 12/06/2015
Description of CL				
For the monitoring parameter “ η_{new} ”, in section G.2 of the published MR, PP needs to clarify how this parameter was monitored without using any monitoring equipment.				
CME response				Date: 15/06/2015
The parameter “ η_{new} ” has been monitored using MCT 33Plus weighing scale and omegaette HH308 type K thermometer. Please refer revised MR where the equipment used for WBT has been listed with specifications.				
Documentation provided by the CME				
Monitoring equipment details /13/				
DOE assessment				Date: 16/06/2015
The monitoring equipment (weighing scale and thermometer) have been stated in the revised MR. CL is closed.				

Table 3. CAR from this verification

CAR ID	CAR 01	Section no.	G.1	Date: 12/06/2015
Description of CAR				
As per the PoA DD and project page information available on UNFCCC web site, the programme involves two host countries: Kenya and South Africa. But on the cover page of the published MR, only Kenya has been stated.				
CME response				Date: 15/06/2015
The MR cover page has been revised to include South Africa as a host country to the PoA. It has also been mentioned that South Africa is not a host party to any of the CPAs covered under this monitoring period. Please refer revised MR.				
Documentation provided by the CME				
Monitoring report /2/				
DOE assessment				Date: 16/06/2015
In the revised MR, South Africa has been included. The CAR is closed.				
CAR ID	CAR 02	Section no.	I.6.1	Date: 12/06/2015
Description of CAR				

1. PP needs to clarify the correctness of the statement in section G.2 of the MR for the monitoring parameter "N_{all}": *"The reported value of parameter has been used to adjust N_{all} by discounting the total installations by the % of samples found using more than one stove. $23765 = 24790 * (1 - 4/100)$ as four samples reported having more than 1 Envirofit Stove (one additional stove in each of the four households)"*.
 2. From the survey sheets of the 100 samples it is found that 2 stoves are stated to be operational in the ER spread sheet whereas actually they are non operational as stated in the survey sheets.
 3. For 3 stoves, the usage of old stoves, do not match with that stated in the survey sheets.
 4. The efficiency values obtained after the WBTs for the ICSs as stated in the ER spread sheet do not match with the provided supporting document.
- CME is requested to correct the identified errors and also again cross check all the data for any further errors.

CME response	Date: 15/06/2015
<ol style="list-style-type: none"> 1. The statement in the MR has been revised to avoid any confusion. Further, it has been noted that the adjustment applied to N_{all} was not correct and excel function 'Floor' was used instead of 'round down'. Hence, the calculation of N_{all} has been corrected in revised ER Workbook and MR. The revised adjusted N_{all} is 23,798. 2. The ER calculator has been revised in accordance with survey sheet for these two samples (#20 and #29). 3. The ER calculator has been revised in accordance with survey sheets for these three samples (#9, #15 and #27). 4. The WBT values in the ER calculator have been revised to be consistent with the WBT calculation sheet and hardcopy WBT observation records. <p>Please refer revised MR and revised ER calculator.</p>	

Documentation provided by the CME
Monitoring report /2/; Emission reduction spread sheet /4/; CPA monitoring survey records /5/; WBT records /11/

DOE assessment	Date: 16/06/2015
<ol style="list-style-type: none"> 1. ER spread sheet and MR has been revised by PP appropriately. Due to this correction, N_{all} value has increased from 23,765 to 23,798. 2. The identified error can be classified as an error due to information flow from one document (original survey records) to other (ER spread sheet). For the stated two samples out of 100, it was mistakenly stated to be operational instead of non-operational. This was checked from the survey sheet. ER spread sheet has been corrected. This has resulted in reduction of SOF value from 0.86 to 0.84. This has also resulted in reduction of f_{old} value from 0.3348 to 0.3290. 3. In the survey sheet, the usage of baseline stove was stated per week for these three samples whereas in the ER spread sheet version 01 it was stated as daily. This has been now corrected. This has resulted in reduction of μ_{old} value from 2153.76 kg/year to 1889.91 kg/year. 4. The efficiencies of all the stoves have been corrected as per the records in the WBT records done during the survey. This has resulted in the increase of η_{new} value from 30.65% to 30.78%. <p>In response to the CAR, CME not only corrected the identified errors (due information flow), but also once again checked for all the survey samples and WBTs records for any further errors in transposing the date to the ER spread sheet and found no errors. Verification team also checked all the sample records and found no errors.</p> <p>The closure of this CAR has resulted in increase of emission reductions from 31,784 tCO₂e, as reported in the published MR to 32,272 tCO₂e in the final MR.</p> <p>The CAR is closed.</p>	

Table 4. FAR from this verification

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

Annex 1: Assessment of data and parameters fixed ex-ante at the time of validation

Parameter	Annual average biomass consumption per appliance (Q_{biomass})
Data unit:	tonnes/year
Default values used:	3.56
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

Parameter	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass. ($f_{\text{NRB},y}$)
Data unit:	Fraction
Default values used:	0.92
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

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

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

Parameter	Efficiency of the system being replaced (fraction) (η_{old})
Data unit:	Fraction
Default values used:	0.129
Purpose of data	Baseline emissions calculation
Source and Verification of the source	The value of this parameter is fixed ex-ante /B04/.

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

Annex 2: Assessment of data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE												
Data / Parameter: (as in monitoring plan of CPA-DD):	Efficiency of the system being deployed as part of the project activity (η_{new})												
Measuring frequency/Time Interval:	Annual												
Reporting frequency:	Annual												
Reported value:	<table> <tr> <th>Stove model</th><th>%</th></tr> <tr> <td>CH2200</td><td>34.17%</td></tr> <tr> <td>CH4400</td><td>28.86%</td></tr> <tr> <td>CH5200</td><td>33.43%</td></tr> <tr> <td>CH6600</td><td>28.37%</td></tr> <tr> <td>Weighted Average</td><td>30.78%</td></tr> </table>	Stove model	%	CH2200	34.17%	CH4400	28.86%	CH5200	33.43%	CH6600	28.37%	Weighted Average	30.78%
Stove model	%												
CH2200	34.17%												
CH4400	28.86%												
CH5200	33.43%												
CH6600	28.37%												
Weighted Average	30.78%												
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes												
Details of monitoring equipment:	Sampling of the households												
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	CPA DD does not specify the accuracy of the monitoring equipment (thermometer, and mass balance). Verification team confirms that the accuracy of the monitoring equipment as stated in the MR represent good monitoring practice based on sectoral expertise.												
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA												
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	<p>NA. The stove efficiency testing has been done by WBTs conducted in line with the guidance provided by the CME in the CPA DD /B04/ /17/. The monitoring equipments used for conducting the stove efficiencies by WBTs are thermometer and weighing machines. Both of these equipments were newly bought by the CME and hence deemed duly calibrated /13/.</p> <p>QA/QC procedures stated in MR comply with CPA-DD.</p>												
Company performing the calibration(internal or external calibration):	NA												
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA												
Is (are) calibration(s) valid for the whole reporting period?	NA												
If applicable, has the reported data been cross-checked with other available data?	The data has been cross-checked with the WBT test documents /11/.												
How were the values in the monitoring report verified?	NA												
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.</p> <p>For this monitoring period of the PoA, the confidence/precision applicable is 95/10.</p> <p>Standard error of mean is calculated by using the formulae $\sqrt{(1-f)*s^2/n}$;</p> <p>where, f = sampling fraction</p>												

	<p>s = standard deviation n = sample size</p> <p>This is deemed correct in line with paragraph 11, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>Precision reliability is calculated using the formulae $z * \text{standard error of mean} / \text{mean}$</p> <p>This is deemed correct in line with paragraph 16 and 17, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/</p> <p>The precision achieved is calculated to be as follows: CH2200 – 6.79% CH4400 – 6.13% CH5200 – 5.93% CH6600 – 5.69% This is below the required precision of 10% in all the cases and hence deemed acceptable.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Total number of stoves installed (N_{all})
Measuring frequency/Time Interval:	Continuous
Reporting frequency:	Yearly
Reported value:	23,798
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Sales database
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	An electronic sales database has been maintained for the project activity.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been	Yes, the value of parameter has been cross-checked

cross-checked with other available data?	with the monitoring database and sample households and the hard copy records were also checked during the OSV.
How were the values in the monitoring report verified?	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through sampling (SOF)
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	0.840
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from the monitoring survey of samples
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with monitoring survey report and the ER sheet
How were the values in the monitoring report verified?	The values in the monitoring report were compared against the values in ER sheet
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. For this monitoring period of the PoA, the confidence/precision applicable is 95/10.

	<p>Standard error of proportion is calculated by using the formulae $\sqrt{(1-f) \cdot pq/n}$;</p> <p>where, f = sampling fraction p = sample proportion q=1-p n = sample size</p> <p>This is deemed correct in line with para 31, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>The Relative precision has been calculated using the formulae $z \cdot \text{standard error of proportion}$ /fraction of operational stoves.</p> <p>This is deemed correct in line with paragraph 38 and 39, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>The precision achieved by the sample is calculated to be 8.54 %, which is less than the required precision of 10% and hence deemed acceptable.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	The amount of woody biomass consumption that is consumed through the continued use of old stoves (μ_{old})
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	1889.91 kg/year
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from monitoring survey of samples
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA

Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR has been compared with monitoring survey records and the ER sheet
How were the values in the monitoring report verified?	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.</p> <p>For the parameter, the amount of woody biomass that continues to be used in the replaced stoves (μ_{old}), data could only be collected out of those sampled users that are still using the baseline cookstoves. During the monitoring activity, 20 stove users were sampled using baseline stoves along with project stoves.</p> <p>The mean value of μ_{old} thus obtained was 1.53 tonne/year.</p> <p>Now for this monitoring period of the PoA, the confidence/precision applicable is 95/10.</p> <p>Standard error of mean is calculated by using the formulae $\sqrt{(1-f)*s^2/n}$;</p> <p>where, f = sampling fraction s = standard deviation n = sample size</p> <p>This is deemed correct in line with paragraph 11, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>Precision reliability is calculated using the formulae $z * \text{standard error of mean} / \text{mean}$</p> <p>This is deemed correct in line with paragraph 16 and 17, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>The precision achieved by the sample has been calculated as 23.84% and thus the desired 10% precision is not met.</p> <p>Based on paragraph 16 of "Standard for Sampling and surveys for CDM project activities and programme of activities" version 04.1 /B07/, the precision has not been met and option (b), has been applied,</p> <p>As per paragraph 16 (c) of the above Standard /B07/, paragraph 16 (b) is only eligible for application to the survey undertaken during the first two years of the crediting period of the project activity or CPAs which is satisfied for this PoA monitoring period.</p> <p>Accordingly PP has applied the option as per paragraph 16 (b), (i), (a) and taken the higher bound value which is conservative.</p>

	The higher bound value is calculated by using the formulae = mean + (Standard error or mean * z value) = 1889.91 kg/year or 1.88991 tonne/year which is conservative and hence deemed acceptable as per paragraph 84, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	The fraction of end users that are still using baseline (replaced) stoves (f_{old})
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	32.90%
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from monitoring survey of samples
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with monitoring survey report and the ER sheet
How were the values in the monitoring report verified?	NA
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.</p> <p>84 of the 100 surveys where Envirofit stoves were still in operation provided valid results on the use of baseline stoves along with the Envirofit stoves. Of the 84 samples, 64 of them were not using the baseline stoves, i.e. 76.19% of the total.</p> <p>Now for this monitoring period of the PoA, the</p>

	<p>confidence/precision applicable is 95/10.</p> <p>Standard error of proportion is calculated by using the formulae $\sqrt{(1-f)*pq/n}$;</p> <p>where, f = sampling fraction p = sample proportion q=1-p n = sample size</p> <p>This is deemed correct in line with para 31, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>The Relative precision has been calculated using the formulae $z * \text{standard error of proportion} / \text{fraction of operational stoves}$.</p> <p>This is deemed correct in line with paragraph 38 and 39, Appendix 4 of Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 03.0 /B06/.</p> <p>The precision achieved by the sample is calculated to be 11.93 %, which exceeds the required precision of 10%.</p> <p>Based on paragraph 16 of "Standard for Sampling and surveys for CDM project activities and programme of activities" version 04.1 /B07/, the precision has not been met and option (b), has been applied,</p> <p>As per paragraph 16 (c) of the above Standard /B07/, paragraph 16 (b) is only eligible for application to the survey undertaken during the first two years of the crediting period of the project activity or CPAs which is satisfied for this PoA verification.</p> <p>Accordingly PP has applied the option as per paragraph 16 (b), (i), (a) and taken the lower bound value for the households not using the baseline stoves.</p> <p>Hence PP has correctly calculated this values as $\{76.19\% - (z * \text{standard error of proportion})\} = 76.19\% - (1.96*4.64\%) = 67.1\%$.</p> <p>Accordingly the fraction of users still using the baseline stoves has been calculated using the formula $f_{old} = 1 - f_{non,old}$, = 32.9% and this is conservative and hence deemed acceptable by the verification team.</p>
<p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>	<p>NA</p>

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of CPA-DD):	Calculated average stove operation years in the monitoring period (Stove_{year})
Measuring frequency/Time Interval:	Annual
Reporting frequency:	Annual
Reported value:	0.88
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Value obtained from monitoring survey of samples
Is accuracy of the monitoring equipment as stated in the CPA-DD? If the CPA-DD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	NA.
Is the calibration interval in line with the monitoring plan of the CPA-DD? If the CPA-DD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA. QA/QC procedures stated in MR comply with CPA-DD.
Company performing the calibration(internal or external calibration):	NA
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	NA
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR has been compared with monitoring survey report and the ER sheet
How were the values in the monitoring report verified?	Yes, reported data in MR has been compared with monitoring survey report and the ER sheet
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA.

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