




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

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

BASIC INFORMATION

Title and UNFCCC reference number of the programme of activities (PoA)	Paradigm Sub Saharan Africa Cook Stove Programme (PoA 9672)	
Version number(s) of the PoA-DD(s) to which this report applies	Version 10	
Version number of the verification and certification report	3	
Completion date of the verification and certification report	10/07/2018	
Monitoring period number and duration of this monitoring period	Monitoring Period: 2 Duration of the monitoring period: 01/01/2017 – 31/12/2017 (first and last days are included)	
Number and version number of the monitoring report to which this report applies	Monitoring Report Number: 1 Version Number of the Monitoring Report: 4	
Coordinating/managing entity (CME)	The Paradigm Project	
Host Parties	Host Parties of the PoA	Is this a host Party to a CPA covered in this report? (yes/no)
	Rwanda	No
	Ethiopia	Yes
Applied methodologies and standardized baselines	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 5.0)	
Mandatory sectoral scopes linked to the applied methodologies	Mandatory Sectoral Scope: 3	
Conditional sectoral scopes linked to the applied methodologies, if applicable	NA	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	29,001	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	5,829	

Name and UNFCCC reference number of the DOE	Carbon Check (India) Private Ltd. (E-0052)
Name, position and signature of the approver of the verification and certification report	Vikash Kumar Singh, Compliance Officer 

SECTION A. Executive summary

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Purpose, general description and location of the project activity:

The co-ordinating managing entity/project participant (The Paradigm Project) has commissioned the DOE, Carbon Check (India) Private Ltd. to perform an independent verification of the CDM Programme of Activity “Paradigm Sub Saharan Africa Cook Stove Programme” in Ethiopia and Rwanda (hereafter referred to as “Programme of Activity” or “PoA”) for the CPA(s) titled “Paradigm Cook Stove Programme: Ethiopia 01 (TPP-CPA-01-ETH)”. The only other included CPA in the PoA “Paradigm Cook Stove Programme: Rwanda 01 (TPP-CPA-01-RWN)” has not been reported in this monitoring report. The PoA involves dissemination of improved cooking stoves to household users in Ethiopia. The PoA saves greenhouse gas emissions by replacing baseline stoves with improved cookstoves. The aim of the PoA is to abate greenhouse gas (GHG) emissions and reduce non-renewable biomass consumption used for thermal energy needs by introducing improved, higher efficiency cook stoves to replace traditional inefficient and low efficiency cook stoves. The CPAs are designed to generate emission reductions by distribution of energy efficient or improved stoves for household cooking purposes in Ethiopia.

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

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

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

The objective of this verification was to verify and certify emission reductions reported for the Programme of activities “Paradigm Sub Saharan Africa Cook Stove Programme” in the host country “Ethiopia” for the period 01/01/2017 to 31/12/2017 (including both the days).

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

In particular, the monitoring plan, monitoring report and the project’s compliance with the relevant UNFCCC and host Party criteria are verified in order to confirm that the component project/s has/have been implemented in accordance with the previously registered/included component project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the registered/approved revised PoA-DD/CPA-DDs /B04/ and the approved monitoring methodology, AMS-II.G, version 05/B02/.

Scope of the verification:

The scope of the verification is:

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

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

Verification process:

The verification comprises a review of the monitoring report over the monitoring period from 01/01/2017 to 31/12/2017 and based on the registered/approved revised PoA-DD/CPA-DD /B04/ in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant/CME.

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

Conclusion:

The verification team assigned by the DOE concludes that the PoA-DD (Version 10, dated 27/10/2015), CPA-DD (CPA 1 - Version 8, 26/06/2013) /B04/ and the monitoring report (version 4.0, dated 09/07/2018) /2/, meets all the relevant requirements of the UNFCCC for CDM project activities/ programme of activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the VVS for the PoAs requirements version 01.0 /B01-1/.

The programme of activity was correctly implemented according to the selected monitoring methodology, monitoring plan and the registered/approved revised PoA-DD/B04/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the project activity has resulted in the 5,829 tCO₂e emission reductions during the second 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/document review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader/ Verifier / Technical Expert	IR	Dimri	Anubhav	CC IPL	X	X	X	X
2.	Local expert	EI	Abebaw	Samuel	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	Agarwalla	Sanjay Kumar	CC IPL
2.	Approver	IR	Singh	Vikash Kumar	CC IPL

SECTION C. Application of materiality in conducting the verification**C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	<i>Human Error: Recording and reporting of the information in the ER spreadsheet.</i>	<i>Medium</i>	<i>All the ER spreadsheet data of the stoves, including sales database, determination of parameter for efficiency testing including data calculation. This includes all the parameters to be monitored ex-post as per the PoA-DD/CPA-DDs/B04/.</i>	<i>The risk has been mitigated by the training of the personnel involved in the data capture, calculation and those involved in the WBT and by following the monitoring responsibilities. The training records have been checked by the verification team /8/ and the monitoring personnel were interviewed during the on-site visit.</i>
2.	<i>Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security</i>	<i>Medium</i>	<i>The data is recorded in the spreadsheets based on the raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and sales</i>	<i>The identified risk has been mitigated by managing access to the records. CME has trained staff responsible for distribution, data management and monitoring within the CPA/8/. It was confirmed through interviews that the raw data is collected by the</i>

			<i>database and Stove efficiency testing records.</i>	<i>monitoring personnel through an application and then transmitted and stored electronically.</i>
3.	<i>Accuracy of the measuring equipment</i>	<i>Medium</i>	<i>Check the calibration records for the measurement equipment.</i>	<i>The risk due to accuracy of the measuring equipment has been ensured by planning to check calibration certificates /6/ of the measuring equipment used for stove efficiency (water boiling tests) and other QA/QC procedures followed by the CME including the evaluations of the WBT reports by the Institute of Energy at the Mekelle University/10/.</i>

C.2. Consideration of materiality in conducting the verification

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The threshold of materiality was evaluated based on §13 of “Guideline: Application of materiality in verifications” Version 02.0 /B08/ and § 307 of CDM VVS for PoAs, version 01.0/B01-1/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 5% of 5,829 tCO₂e which is equal to 292 tCO₂e.

In planning the verification, verification team took cognizance of para 11 and 12 of the “Guideline: Application of materiality in verifications” Version 02.0 /B08/. A materiality threshold of 292 tCO₂e is determined in line with para 307 (d) of CDM VVS for PoAs, version 01.0.

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

1. Monitoring system including the data input procedure (including relevant personnel and applicable template forms used)
2. Sales/distribution agreements between the household and the CME (s) (origin of data)
3. Stove unique ID system
4. ER sheet (application of data)
5. Data flow
6. Data control procedures
7. Stove efficiency test (WBT) procedures and records

In conducting the verification, DOE took cognizance of para 13-17 of the “Guideline: Application of materiality in verifications” Version 02.0 /B08/ and based on the input of data from different sources checked through sampling of records during the on-site visit. Data flow was checked through comparison of data in the sales database/4/, Sample results and the ER sheet/4/. The training records/08/ of the personnel involved in conducting the stove efficiency testing, recording of data and calculation of the emission reductions data has been checked by the verification team. Monitoring personnel were involved and also by means of on-site visit interviews.

The risks identified were mitigated through cross check with all sets of documents. The verification team performed the following checks in order to mitigate the effects of the above-identified sources of error:

Mitigation of Human error risks: The verification team mitigated the risk by checking the training records /8/ of the personnel during the on-site visit. These records have been provided to the verification team by the CME. Further, data was crosschecked with the ER calculation spreadsheet /3/ and the raw data. The monitoring personnel were interviewed during the site visit on the procedure followed by them for the monitoring of the parameters.

Mitigation due to error in Information system: Verification team by conducting interviews with the personnel responsible for such activities mitigated the risk due to error in information system. It was confirmed through interviews that the data is collected by the field agents through a mobile based application. The data quality control is maintained by the monitoring personnel of the CME.

Accuracy of the measuring equipment: The risk due to inaccuracy in measurements is mitigated by reviewing calibration certificates/6/ of all the project equipment. The verification team has reviewed the dates of calibration and to check whether all equipment is being calibrated at regularly defined intervals. The calibration certificates for thermocouple and weight balance/6/ were assessed by the verification team and based on the manufacturer specification for the moisture meter/7-3/, it was determined that the instrument is self-calibrating and does not require calibration. The water boiling tests have been conducted by the trained, personnel as confirmed through the WBT training certificate/8/ for monitoring personnel. Furthermore, the WBT tests have been evaluated by the Institute of Energy, Mekelle university/10/.

CC IPL has conducted a review of the PoA-DD /B04/, the monitoring report /2/, emission reduction calculation spread sheets /4/ and the data provided and the assessment carried out above. CC IPL provides a reasonable level of assurance that the claimed emission reductions or removals are free from material errors, omissions or misstatements. A reasonable level of assurance is required on the emission reductions or removals prior to issuance of a verification opinion.

SECTION D. Means of verification

D.1. Desk/document review

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

D.2. On-site inspection

Duration of on-site inspection: 05/06/2018 to 07/06/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PoA-DD/B04/, registered/included CPA-DDs/B04/.	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the CPA-DDs/B04/	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri
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	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the CPA-DDs/B04/ and the selected methodology and corresponding tool(s), where applicable	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri

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6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri
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	Ethiopia	05/06/2018 to 07/06/2018	Anubhav Dimri

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Spencer	Gregory	Paradigm	05/06/2018 to 07/06/2018	Project implementation and operation, monitoring procedure, data and information flow, Survey records, Sales/Distribution records	Anubhav Dimri
2.	Barber	David	Paradigm	06/06/2018	Project implementation and operation, Survey records	Anubhav Dimri
3.	Barber	Johanna	Evaluant	05/06/2018 to 06/06/2018	Sampling Plan, Survey records, Sales/Distribution records, CER waiver records and procedure, QA/QC Procedures, Quality Assurance – Management and operating system	Anubhav Dimri
4.	Tadelle	Amanual	Paradigm	05/06/2018 to 07/06/2018	CER calculation and completeness of monitoring report, Electronic Monitoring system, Sampling Plan, Survey records, Sales/Distribution records, CER waiver records and procedure, QA/QC Procedures, Quality Assurance – Management and operating system	Anubhav Dimri
5.	Anteneh	Eyob	Paradigm	07/06/2018	Project implementation and operation, Stove manufacturing process	Anubhav Dimri

D.4. Sampling approach

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The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the approved revised PoA-DD/CPA-DD /B04/. The CME/PP has appropriately performed Stratified Random Sampling in accordance with the applied methodology/B02/ and the monitoring plan provided in the PoA-DD/B04/ and the CPA-DD/B04/. Only

one stratum is applicable in the reported monitoring period as the reported period includes single country within one CPA and single technology (type of stove), thus only one strata is acceptable to the verification team.

The sampling survey has been carried out by the well-trained personnel of the CME, The Paradigm Project, WBT training certificate of the personnel has been provided to the verification team/8-1/. The personnel have also gone through enumerator training/8-2/ by the CME, the paradigm project. The training content/8-3/ has also been provided to the verification team. Monitoring parameters n_y and SM_y are monitored through monitoring surveys and an application was used on Android phone to record the responses. Monitoring parameter $\eta_{new,y}$ is monitored through conducting the water boiling tests to determine the efficiency of the installed stoves. Monitoring of the parameter ensures compliance to the para 23 (b) of the methodology AMS-II.G, version 05/B02/. Verification team has checked the water boiling test records/14/ to confirm the test results. The thermal energy generated by the project technology has also been determined in the section D.1 of the MR/02/ and the ER sheet/4/ in order to comply with the para 24 of the methodology/B02/. Parameter n_y monitors the total operating fraction of the stoves in the monitoring period. The monitoring of the parameter n_y ensures the compliance to the requirements to the para 22 of the monitoring methodology, AMS-II.G, version 05. Parameter SM_y monitors the fraction of project stove usage where baseline stoves continue to be used. The parameter records the value as the number of meals cooked on project stove divided by the total number of meals cooked in a week/4/. The monitoring of the parameter SM_y ensures the compliance to the requirements of the para 26(b) of the monitoring methodology, AMS-II.G, version 05/B02/.

CME has done a sampling for the PoA and the only CPA reported in the monitoring period, CPA 1 for the current monitoring period. The sample sizes have been calculated based on the variance and standard deviation values from the previous verification. This is acceptable to the verification team since the estimates are based on result of previous studies and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B08/. A sample size of 106 was determined for the parameter n_y based on the required confidence interval/precision level of 95/10, this sample size was increased to 223 in order to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined for the parameter SM_y based on the required confidence interval/precision level of 95/10 is 107. However, to account for the non-responses CME used a sample of 223 out of which 179 valid responses were obtained for the parameter n_y and 107 valid responses were obtained for the parameter SM_y . The valid responses received by the CME are more than the minimum required sample sizes and thus acceptable to the verification team. The precision achieved for the parameter n_y is 7.20% and thus within the limits of 10% required precision for the parameter. The precision achieved for the parameter SM_y is 2.85% and thus within the limits of 10% required precision for the parameter. A sample size of 11 was determined for the parameter $\eta_{new,y}$ based on the required confidence interval/precision level of 95/10. A sample of 27 was thus chosen to account for the non-responses and 17 valid responses (excluding non-responses and outliers) were obtained. The valid responses were more than the required minimum sample size of 11 and thus the sampling results are acceptable to the verification team. The precision achieved for the parameter $\eta_{new,y}$ is 1.77 % and thus within the limits of 10% required precision for the parameter.

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

Parameters	n_y	SM_y	$\eta_{new,y}$
Calculated Sample Size	107	106	11
Applied Sample Size (to account for non-responses and outliers)	223	223	27
Valid Responses	179	107	17
Precision achieved	7.20 %	2.85 %	1.77 %

DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves and to check if the WBT tests have been done in the

households and all the households confirmed that the WBT tests were conducted in their households. As per the sampling standard /B07/, DOE had identified 8 samples out of the PP's 107 samples for the parameter SM_y and 179 samples for the parameter n_y based on the AQL/UQL stated below. A sample of 8 is justified for the PoA since the PoA is located in a least developed country and meets the requirement of para 31 (c) of the Sampling Standard version 07/B07/. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 5 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. A sample size of 8 households was chosen with no non-responses observed. All the identified 8 samples had the same operational status as reported in the sampling frame of the PP/CME and hence no discrepancy was found (i.e. $c=0$). The number of meals cooked on the project stoves and on the baseline stoves was also interviewed and the results were consistent with the responses received during the monitoring and hence no discrepancy was found (i.e. $c=0$) with the MR /02/ and the ER sheet /04/. Thus, PP's set of records has been accepted in line with § 30 of the sampling standard, version 07B07/.

DOE checked the water boiling test report/10/ with records of all the sampled stoves for the verification of the stove efficiency of the project stoves.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
General			
Compliance of the monitoring report with the monitoring report form	00	00	00
Remaining forward action requests from validation and/or previous verification	00	00	00
CPA(s) considered for verification and covered in this report	00	00	00
Programme of activities			
Compliance of the programme implementation with the registered PoA-DD	00	00	00
Implementation and operation of the management system	00	00	00
Post-registration changes			
<ul style="list-style-type: none"> Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline 	00	00	00
<ul style="list-style-type: none"> Corrections 	00	00	00
<ul style="list-style-type: none"> Inclusion of a monitoring plan 	00	00	00
<ul style="list-style-type: none"> Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools 	00	00	00
<ul style="list-style-type: none"> Changes to the programme design or project design 	00	00	00
<ul style="list-style-type: none"> Change of coordinating/managing entity 	00	00	00
<ul style="list-style-type: none"> Changes specific to afforestation and reforestation activities 	00	00	00
Component project activities			
Compliance of the CPA implementation with the included CPA design document	00	00	00
Post-registration changes			
<ul style="list-style-type: none"> Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline 	00	00	00
<ul style="list-style-type: none"> Corrections 	00	00	00
<ul style="list-style-type: none"> Changes to the start date of the crediting period of component project activities 	00	00	00
<ul style="list-style-type: none"> Inclusion of a monitoring plan 	00	00	00

• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	00	00	00
• Changes to the programme design of project design	00	00	00
• Changes specific to afforestation and reforestation component project activities	00	00	00
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	00	00	00
Compliance of monitoring activities with the registered monitoring plan			
• Data and parameters fixed ex ante or at renewal of crediting period	00	00	00
• Data and parameters monitored	00	00	00
• Implementation of sampling plan	03	00	00
Compliance with the calibration frequency requirements for measuring instruments	00	01	00
Assessment of data and calculation of emission reductions or net removals			
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	00	01	00
• Calculation of project GHG emissions or actual net GHG removals by sinks	00	00	00
• Calculation of leakage GHG emissions	00	00	00
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	00	00	00
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	00	00	00
• Remarks on difference from estimated value in included CPA	00	00	00
Assessment of reported sustainable development co-benefits	00	00	00
Global stakeholder consultation	00	00	00
Others (please specify)	00	00	00
Total	03	02	00

SECTION E. Verification findings

E.1. General

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	The monitoring report provides all the information in accordance with the valid version of the CDM-PoA-MR-FORM (version 02)/B03/ and the instructions therein for filling the CDM-PoA-MR-FORM /B03/. The monitoring report has been prepared in accordance with the § 337 and § 338 of the VVS for the PoAs version 01.0 /B01-1/.

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

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This is the second periodic verification for the PoA. There are no forward action requests from validation and/or previous verification.

E.1.3. CPAs considered for verification and covered in this report

Title and UNFCCC reference number of the CPA included in the PoA as of the end of this monitoring period	Is the CPA considered for this verification? (yes/no)	The date when the CPA was included	Version of the PoA-DD	Confirmation that a request for issuance including the CPA has been published for the previous monitoring period (Y/N)
Paradigm Cook Stove Programme: Ethiopia 01 (TPP-CPA-01-ETH); UNFCCC reference number: 9672-0001	Yes	01/07/2013	Version 10	Y
Paradigm Cook Stove Programme: Rwanda 01 (TPP-CPA-01-RWN); UNFCCC reference number: 9672-0002	No	01/07/2013	Version 10	N

E.2. Programme of activities**E.2.1. Compliance of the programme implementation with the registered programme design document**

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	As part of the site visit, the verification team was able to confirm that the implementation of Programme of Activity (PoA) and the Component Project Activity (CPA) is in accordance with the project description contained in the registered/revised approved PoA-DD of 27/10/2015/B04/. The verification took cognizance of § 260 and 261 of the CDM Project Standard for the programme of activities and § 339 and § 340 of the VVS for the PoAs/B01/.

E.2.2. Implementation and operation of the management system

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	The management system for the PoA including the record-keeping system has been explained in section C of the registered PoA DD /B04/. During the course of verification, verification team based on review of provided documents and OSV interview/observation has assessed this management system. This included the organisational chart, roles and responsibilities, data collection, transfer and aggregation procedures, training and capacity development for personnel /08/, Procedures for technical review of inclusion of CPAs, procedure to avoid double counting, Records and documentation control process and Measures for continuous improvements of the PoA management system. The PoA monitoring manual/05/ was reviewed and it was found that the monitoring has been done in accordance with the manual/05/. On the basis of onsite interview with the personnel of the CME involved in the project monitoring and data collection, inspection of monitoring database & equipment used and document review verification team can confirm that the responsibilities and authorities for monitoring and reporting are appropriate and effective for the project type and hence in accordance with the monitoring plan of the registered PoA-DD/B04/ and the applied monitoring methodology/B02/.

Recipient household of ICS have ceded the rights of all entitlement of CERs to the managing entity of the PoA, this has been cross-verified from the signed sales agreements /13-1//12-1/ with the end users and signed agreements with the suppliers/13-2//12-2/. Sample sales agreements were also checked during the onsite visit /13/. Annual quality review/15/ was conducted by the CME of the sales and distribution records to determine the data is being managed in accordance with the monitoring plan. Operation of the ICSs in the CPA 1 was confirmed during the site visit by the verification team. CPA 2 has not been implemented yet and has not been reported in the monitoring report/02/. Following was confirmed during the site visit:

1. Stoves numbering system
2. Electronic monitoring system including input procedure (through Android phone based ODK)
3. Actual implementation of the stoves
4. Household-representatives were interviewed regarding the usage of stove and the sampling for the monitoring parameters n_y , SM_y and $\eta_{new,y}$
5. Whether or not baseline technology was still in use
6. Process of data collection during installation of stove
7. Sales Agreements between households and CPA implementer

Carbon Check's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the approved revised PoA-DD /B04/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PoA-DD /B04/ and registered/included CPA-DDs /B04/.

In accordance with § 385 c) of VVS for Programme of Activities, version 01B01-1/, information (data and variables) provided in the monitoring report that are different from that stated in the registered CPA-DDs /B04/ were assessed. The assessment is summarized below:

Parameter	Ex-ante value in the CPA-DD	Actual operation for the reported monitoring period	Assessment by the verification team
Number of distributed ICS in year y (S_y)	19,804	9,312	The number of distributed ICS in the CPA are lower than the ex-ante estimation due to the delays in early work and slower sales than estimated in the host country Ethiopia. The actual sales records/04/ have been checked by the verification team and the values reported are correct.
Fraction of distributed ICS operational in year y (n_y)	100% in year 1 and 90% for the remainder of the crediting period.	0.5978	The fraction of distributed ICS operational in the CPA is lower than the estimated ex-ante value in the CPA-DDs/B04/. Based on the interview with the CME it was observed that some of the non-operational stoves were due to the stoves not having been used at all and such households were trained during the monitoring and thus started using stoves. However, during the monitoring period such stoves that

				were not being used at the time of monitoring have been not taken as operational stoves and thus higher dropout rate. This is deemed acceptable as it does not lead to increase of emission reductions and is appropriate at the time of monitoring.
	Cumulative number of days which ICSs have been operational in year y (D_y)	365 days	2,630,672 days	The cumulative number of days which ICSs have been operational has been calculated by the number of days in total for each stove distributed in the CPA. The value of 365 was assumed for each stove at the time of registration, however as the stoves were distributed on different dates, the cumulative takes into account only the number of days after the distribution of the stove. This is deemed acceptable as it does not lead to increase of emission reductions.
	Fraction of meals in a week cooked on the project stove in year y (SM_y)	1	0.6877	Fraction of meals in a week cooked on the project stove monitored ex-post for the current monitoring period is lower than the estimated ex-ante value in the CPA-DDs/B04/. CME has confirmed during the OSV that it is due to the technology being new to the households and that households are slowly changing from the baseline stoves to the project stoves. The value of the parameter has increased from the previous verification however still less than the ex-ante values. This is deemed acceptable as it does not lead to increase of emission reductions.
	Efficiency of the device being deployed as part of the project activity in year y ($\eta_{new,y}$)	0.28	0.222	The average efficiency of the device being deployed ($\eta_{new,y}$) monitored ex-post for the current monitoring period is lower than the estimated ex-ante value in the CPA-DDs. CAR 01 was raised in this regard and has been resolved.

				<p>The value of the efficiency has decreased from the previous verification and the ex-ante values and CME has clarified that the value has decreased as a result of degradation in efficiency of the cookstove/16/ over time.</p>
	<p>The verification team confirms that the monitoring management system of the CDM PoA is in place; with the responsibilities properly identified and in place. This confirms the compliance of § 339 (a), § 346 (b) (iv) and § 346 of CDM VVS PoAs version 01.0 /B01-1/.</p>			

E.2.3. Post-registration changes

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

>>

There are no temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

E.2.3.2. Corrections

>>

Post Registration Change to the PoA was approved on April 11, 2016 under reference number PRC-9672-002. The post registration change is prior to the submission of issuance request for the PoA.

E.2.3.3. Inclusion of a monitoring plan

>>

There are no inclusions of a monitoring plan in a registered PoA-DD applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

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

>>

Post Registration Change to the PoA was approved on April 11, 2016 under reference number PRC-9672-002. The post registration change is prior to the submission of issuance request for the PoA.

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

>>

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

E.2.3.6. Change of coordination/managing entity

>>

There are no changes to the coordinating/managing entity.

E.2.3.7. Changes specific to afforestation and reforestation activities

>>

Not applicable to the type of programme of activities.

E.3. Component project activities

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

Means of verification	Document Review, Interview																												
Findings	There are no findings on this section of the VR.																												
Conclusion	<p>The implementation status of the PoA and the component project activities is:</p> <table border="1"> <tr> <td>Co-ordinating and Managing entity/Project Participants:</td><td>The Paradigm Project</td></tr> <tr> <td>Title of the PoA:</td><td>Paradigm Sub Saharan Africa Cook Stove Programme</td></tr> <tr> <td>UNFCCC registration No:</td><td>9672</td></tr> <tr> <td>Applied Baseline and monitoring methodology:</td><td>AMS-II.G version 5/B02/</td></tr> </table> <table border="1"> <tr> <td>Title of the CPA:</td><td>Paradigm Cook Stove Programme: Ethiopia 01 (TPP-CPA-01-ETH)</td></tr> <tr> <td>CPA reference number:</td><td>9672-0001</td></tr> <tr> <td>Date of inclusion:</td><td>01/07/2013</td></tr> <tr> <td>CPA start date:</td><td>01/02/2013</td></tr> <tr> <td>CPA start of operation:</td><td>25/03/2015</td></tr> <tr> <td>CPA implementer</td><td>The Paradigm Project</td></tr> <tr> <td>Project Scale:</td><td>Small scale</td></tr> <tr> <td>Location of the CPAs:</td><td><i>Ethiopia</i></td></tr> <tr> <td>CPA crediting period:</td><td>01/09/ 2013 – 31/08/2020</td></tr> <tr> <td>Reported monitoring Period verified in this verification:</td><td>01/01/2017 to 31/12/2017 (Second monitoring period)</td></tr> </table> <p>There is only one CPA under Verification. The CPA involves the distribution of improved cooking stoves in the host country Ethiopia. The coordinating/managing entity for the PoA is The Paradigm Project. The ICS deployed under CPA 1 is EzyStove /7/. CPA 2 (9672-0002) has not been reported in the monitoring report. This is in accordance with the para 330 (a) of the VVS for the PoAs, version 01.0/B01-1/ and the CPA is not reported in this batch in the monitoring report. The numbers of stoves deployed under each CPA has been confirmed through the review of the sales database /4/. The verified /04/ total number of stoves deployed (implemented) under the CPA/PoA are 9,312. The stoves are being manufactured by the Paradigm Project Ethiopia and a manufacturing license is available with the manufacturing and assembling facility in accordance with the host country regulations/18/.</p> <p>As per the registered CPA-DDs /B04/, the maximum number of ICS to be deployed per year to ensure the CPA remains under the threshold of 60 GWh (corresponding to 180 GWh thermal energy savings). The total energy savings in the CPA during the monitoring period totalling 55.53 GWh_{th} and 0.0077 GWh_{th} per device. Thus the total energy savings from the CPA is less than the small scale threshold in the CPA-DD/B04/ and the methodology AMS-II.G, version 05/B02/.</p> <p>The value of the ERs per unit of stove is 0.809 tCO₂e/year/4/. The value of the ERs per unit of stove calculated ex-ante is 2.232 tCO₂e/year/B04/. Since the values of the ERs per unit of stove is less than the value determined ex-ante, it is due to the lower value of the efficiency of the stoves, drop out of stoves and the lesser number of meals cooked on the project stove as estimated ex-ante/02/ /B04/.</p> <p>The component project activity was implemented and equipment installed as described in the registered/included CPA DD/B04/.</p> <p>It was confirmed during the OSV that The Paradigm Project is the Coordinating/ Managing Entity for the PoA and the CPA implementer for CPA 1 (9672-0001). The</p>	Co-ordinating and Managing entity/Project Participants:	The Paradigm Project	Title of the PoA:	Paradigm Sub Saharan Africa Cook Stove Programme	UNFCCC registration No:	9672	Applied Baseline and monitoring methodology:	AMS-II.G version 5/B02/	Title of the CPA:	Paradigm Cook Stove Programme: Ethiopia 01 (TPP-CPA-01-ETH)	CPA reference number:	9672-0001	Date of inclusion:	01/07/2013	CPA start date:	01/02/2013	CPA start of operation:	25/03/2015	CPA implementer	The Paradigm Project	Project Scale:	Small scale	Location of the CPAs:	<i>Ethiopia</i>	CPA crediting period:	01/09/ 2013 – 31/08/2020	Reported monitoring Period verified in this verification:	01/01/2017 to 31/12/2017 (Second monitoring period)
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actual project activity is in line with the registered/ included CPA-DDs /B04/.

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

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

Subject	Webhosted Monitoring Report (MR) /1-1/	Verified Monitoring Report /2/
Changes		
CER calculations (amount of emission reduction)	6,540	5,829 The total emission reductions have reduced due to the removal of outliers and has changed due to reduction in the value of the monitoring parameter SM_y as during sampling by the CME, for households that report using the improved stove as their primary stove and a secondary stove, the meals cooked on the secondary stove are removed from the calculation of parameter SM_y .

Carbon Check's verification team considers the project description of the project contained in the approved revised PoA-DD /B04/ and CPA-DD /B04/ to be complete and accurate. The CPA-DD complies with the relevant methodology/B02/, tools, forms and guidance at the time of CPA-DD submission for registration/inclusion.

Carbon Check's verification team considers the CPA description of the project contained in the registered CPA-DDs/4/ to be complete and accurate. The CPA-DDs complies with the relevant methodology, tools, forms and guidance at the time of CPA-DDs' submission for registration/inclusion. The CPA has been implemented in accordance with the registered CPA-DDs/04/.

In summary, the monitoring period is reasonable and the operation of the CPAs is in accordance with the registered CPA-DDs. The verification team took cognizance of § 339, 340 and 341 of the CDM VVS for PoA, version 01 /B01-1/ to conduct the verification and conducted a site visit in accordance with the § 320 and 321 of the CDM VVS for PoA, version 01 /B01-1/.

E.3.2. Post-registration changes

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

>>

There are no temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

E.3.2.2. Corrections

>>

Post Registration Change to the PoA was approved on April 11, 2016 under reference number PRC-9672-002. The post registration change is prior to the submission of issuance request for the PoA and CPA.

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

>>

There are no changes to the start date of the crediting period applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

E.3.2.4. Inclusion of a monitoring plan

>>

There are no inclusions of a monitoring plan to an included CPA-DD applicable to the monitoring period that have been approved by the Board during this monitoring period or to be submitted with the request for issuance.

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

>>

Post Registration Change to the PoA was approved on April 11, 2016 under reference number PRC-9672-002. The post registration change is prior to the submission of issuance request for the PoA.

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

>>

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

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

>>

Not applicable to the type of component project activities.

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the registered CPA-DD/B04/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-II.G (version 05) /B02/.</p> <p>The monitoring plan is in accordance with the approved methodology, AMS-II.G version 05 /B02/, applied by the component project activity and as provided in the CPA-DD /B04/.</p> <p>The verification took cognizance of § 342 to § 344 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

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

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	Verification team confirms that the Data and parameters fixed ex ante are in compliance with the registered CPA-DDs/B04/ and the monitoring plan. Please refer Appendix 5 for detailed analysis of the ex-ante parameters.

	The verification took cognizance of § 345 of CDM VVS for PoAs, Version 01.0 /B01-1/.
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E.3.4.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	<p>The verification team has assessed the data and parameters monitored during the monitoring period in accordance with the monitoring plan proposed in the registered/revised PoA-DD and the CPA-DD/B04/. A complete assessment of each of the monitored parameters has been provided in Appendix 6 of the verification report. A complete assessment of the sampling approach has also been provided in section E.3.4.3 of the verification report.</p> <p>In summary, the verification team confirms that all the ex-ante and ex-post parameters are monitored in accordance with the approved monitoring plan and applied methodology. The verification took cognizance of § 345, 346 (c), 357 and 358 of CDM VVS for PoAs, Version 01.0 /B01-1/.</p>

E.3.4.3. Implementation of sampling plan

Means of verification	Document Review, Interview
Findings	CL 01, CL 02 and CL 03 had been raised in this regard and have been resolved.
Conclusion	<p>As mentioned in the above sections, CPA 9672-0001 has been implemented for which emission reductions are being claimed for this monitoring period. The total population of the stoves under CPA 01 is 9,312 stoves the total number of stoves in the PoA is 9,312. The monitoring parameters required to be monitored through the sampling plan are:</p> <ol style="list-style-type: none"> 1. Fraction of distributed ICS operational in year y (n_y) 2. Fraction of meals in a week cooked on the project stove in year y (SM_y) 3. Efficiency of the device being deployed as part of the project activity in year y ($\eta_{new,y}$) <p>The sampling plan implemented by the CME is in accordance with the applied approved monitoring methodology /B02/ and the approved revised PoA-DD/CPA-DD /B04/. The PP has appropriately performed Stratified Random Sampling in accordance with the applied methodology/B02/ and the monitoring plan provided in the PoA-DD/B04/ and the CPA-DD/B04/. Only one stratum is applicable in the reported monitoring period as the reported period includes single country within one CPA and single technology (type of stove), thus only one strata is acceptable to the verification team.</p> <p>The sampling survey has been carried out by the well-trained personnel of the CME, The Paradigm Project, WBT training certificate of the personnel has been provided to the verification team/8-1/. The personnel have also gone through enumerator training/8-2/ by the CME, the paradigm project. The training content/8-3/ has also been provided to the verification team.</p> <p>Monitoring parameters n_y and SM_y are monitored through monitoring surveys and an application was used on Android phone to record the responses. Monitoring parameter $\eta_{new,y}$ is monitored through conducting the water boiling tests to determine the efficiency of the installed stoves. Monitoring of the parameter ensures compliance to the para 23 (b) of the methodology AMS-II.G, version 05/B02/. Verification team has checked the water boiling test records/14/ to confirm the test results. The thermal energy generated by the project technology has also been determined in the section D.1 of the MR/2/ and the ER sheet/4/ in order to comply with the para 24 of the methodology/B02/. Parameter n_y monitors the total operating fraction of the stoves in the monitoring period. The monitoring of the parameter n_y ensures the compliance to the requirements to the para 22 of the monitoring methodology, AMS-II.G, version 05. Parameter SM_y monitors the fraction of project stove usage where baseline stoves continue to be used. The parameter records the value as the number of meals cooked on project stove divided by the total number of meals cooked in a week/04/. The monitoring of the parameter SM_y ensures the compliance to the requirements of the para 26(b) of the monitoring methodology, AMS-II.G, version 05/B02/.</p>

CME has done a sampling for the PoA and the only CPA reported in the monitoring period, CPA 1 for the current monitoring period. The sample sizes have been calculated based on the variance and standard deviation values from the previous verification. This is acceptable to the verification team since the estimates are based on result of previous studies and based on the researcher's own experiences. This is in accordance with the para 5 (a) and (c) of the Appendix 1 of the Sampling Guidelines version 4.0 (EB 86 Annex 4)/B08/. A sample size of 106 was determined for the parameter n_y based on the required confidence interval/precision level of 95/10, this sample size was increased to 223 in order to meet the lower responses in accordance with the requirements of the sampling standard/B07/. The sample size determined for the parameter SM_y based on the required confidence interval/precision level of 95/10 is 107. However, to account for the non-responses CME used a sample of 223 out of which 179 valid responses were obtained for the parameter n_y and 107 valid responses were obtained for the parameter SM_y . The valid responses received by the CME are more than the minimum required sample sizes and thus acceptable to the verification team. The precision achieved for the parameter n_y is 7.20% and thus within the limits of 10% required precision for the parameter. The precision achieved for the parameter SM_y is 2.85% and thus within the limits of 10% required precision for the parameter. A sample size of 11 was determined for the parameter $\eta_{new,y}$ based on the required confidence interval/precision level of 95/10. A sample of 27 was thus chosen to account for the non-responses and 17 valid responses (excluding non-responses and outliers) were obtained. The valid responses were more than the required minimum sample size of 11 and thus the sampling results are acceptable to the verification team. The precision achieved for the parameter $\eta_{new,y}$ is 1.77 % and thus within the limits of 10% required precision for the parameter.

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

Parameters	n_y	SM_y	$\eta_{new,y}$
Calculated Sample	107	106	11
Applied Sample Size (to account for non-responses and outliers)	223	223	27
Valid Responses	179	107	17
Precision achieved	7.20 %	2.85 %	1.77 %

DOE used sampling during verification for checking the operational status and the proportion of meals cooked on the project cookstoves and to check if the WBT tests have been done in the households and all the households confirmed that the WBT tests were conducted in their households. As per the sampling standard /B07/, DOE had identified 8 samples out of the PP's 107 samples for the parameter SM_y and 179 samples for the parameter n_y based on the AQL/UQL stated below. A sample of 8 is justified for the PoA since the PoA is located in a least developed country and meets the requirement of para 31 (c) of the Sampling Standard version 07/B07/. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 5 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. A sample size of 8 households was chosen with no non-responses observed. All the identified 8 samples had the same operational status as reported in the sampling frame of the PP/CME and hence no discrepancy was found (i.e. $c=0$). The number of meals cooked on the project stoves and on the baseline stoves was also interviewed and the results were consistent with the responses received during the monitoring and hence no discrepancy was found (i.e. $c=0$) with the MR /02/ and the ER sheet /04/. Thus, PP's set of records has been accepted in line with § 30 of the sampling standard, version 07 /B07/.

DOE checked the water boiling test report /10/ with records of all the sampled stoves for the verification of the stove efficiency of the project stoves.

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

Means of verification	Document Review, Interview
Findings	CAR 02 had been raised in this regard and has been resolved.
Conclusion	<p>Stove sales database/4/ has been used to record the stoves details by the CME. The stove efficiency needs to be checked by the use of measuring equipment used. The stove efficiency testing has been done by WBTs conducted in line with the guidance provided by the CME in the PoA-DD/CPA-DD /B04/. The monitoring equipment used for conducting the stove efficiencies by WBTs are digital thermometer, moisture meter and digital balance. The monitoring equipment digital balance/6-2/ and digital thermometer/6-1/ were calibrated prior to the start of the water boiling tests as checked through the review of the calibration certificates. The monitoring equipment has been calibrated by the National Metrology Institute of Ethiopia, the laboratory is accredited by the German Accreditation Body, DAKKS (https://www.dakks.de/en/startseite). The calibration certificate of the equipment confirm that they are calibrated/6/. Based on the manufacturer specification for the moisture meter, Extech MO210 moisture meter/7-3/, it is determined that the meter is self-calibrating and does not require calibration. The appropriate QA/QC procedures have been followed for the monitoring parameters. The WBTs were conducted by personnel trained in conducting WBTs/8/ from the (Alternative energy technology development and promotion directorate) ministry of water, irrigation and electricity, Ethiopia. The ministry has provided the WBT test training according to the WBT protocol and the host party systems. WBT tests have been further evaluated by the Institute of Energy, Mekelle University/10/ and thus accepted by the verification team.</p> <p>The verification took cognizance of section 10.2.6 of CDM VVS for PoAs, version 01 /B01-1/.</p>

E.3.5. Assessment of data and calculation of emission reductions or net removals**E.3.5.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks**

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	<p>The equations for baseline emissions, as provided in the monitoring report /02/ and confirmed with the registered CPA-DD /B04/ and the methodology AMS-II.G, version 05 /B02/, are:</p> $ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \times N_{y,i}$ <p>Where:</p> <p>ER_y Emission reductions during the year y in tCO₂e</p> <p>B_{y,savings} Quantity of woody biomass that is saved in tonnes</p> <p>f_{NRB,y} Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass</p> <p>NCV_{biomass} Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)</p> <p>EF_{projected_fossilfuel} Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO₂/TJ</p> <p>N_{y,i} Number of project devices of type i operating in year y,</p> <p>The project uses Option 2 Equation 3 of the baseline and monitoring methodology AMS-II.G to calculate the parameter B_{y,savings} as shown below:</p> $B_{y,savings} = B_{old} \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$ <p>Where:</p>

	B_{old}	Quantity of woody biomass used in the absence of the project activity in tonnes
	η_{old}	A weighted average 0.1032 has been used as a weighted average of the traditional three stone fires and the improved cook stoves in Ethiopia. .
	η_{new}	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Use weighted average values if more than one type of system is being introduced by the project activity.
	The verification took cognizance of § 357 of CDM VVS for PoAs, version 01.0 /B01-1/.	

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and the CPA-DD /B04/.

E.3.5.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	<p>Net-to-gross adjustment factors to account for leakage (NTG) (fixed default values of 0.95 as per AMS II.G. ver.5) /B02/ was applied to the project activity to calculate Emission Reductions of this Monitoring Period.</p> <p>Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from registered CPA-DDs/B04/.</p>

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

Means of verification	Document Review, Interview
Findings	There are no findings on this section of the VR.
Conclusion	<p>Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from registered CPA-DD. The total number of ERs achieved during the monitoring period is 5,829 tCO₂e.</p> <p>In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD/B04/ for the current monitoring period. The verification took cognizance of § 357 of CDM VVS PoAs, version 01 /B01-1/.</p>

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
9672-0001	5,829	0	0	0	5,829	5,829
Total	5,829	0	0	0	5,829	5,829

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

Means of verification	Document Review
Findings	There are no findings on this section of the VR.
Conclusion	<p>The actual GHG emission reductions are less than the estimates in the included specific-case CPA/B04/. CME has stated that this is due to the slower sales than anticipated. In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered (included) CPA-DD/B04/ for the current monitoring period.</p> <p>The verification team took cognizance of § 357 of CDM VVS for PoAs, version 01 /B01-1/.</p>

Title and UNFCCC reference number of the CPA	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the CPAs during this monitoring period
9672-0001	29,001	5,829
Total	29,001	5,829

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

Means of verification	Document Review
Findings	There are no findings on this section of the VR.
Conclusion	<p>Verification team confirms that actual emission reduction is lower than the estimate of the registered (included)/approved CPA-DD/B04/ for the current monitoring period. The total ERs for the monitoring period are 5,829 tCO₂e and the ex-ante ERs for the monitoring period were 29,001 tCO₂e (based on the fifth year of the crediting period). The total ERs for the monitoring period is less than the estimated ex-ante. The total ERs for the previous monitoring period (MP 1 – 01/09/2013 to 31/12/2016) is 2,512 tCO₂e. The total ERs have increased during the monitoring period due to the increase in the number of stoves distributed. The difference of other monitoring parameters has been assessed in the section E.2.2 of this report. The value of the ERs per unit of stove is 0.809 tCO₂e/year/4/. The value of the ERs per unit of stove calculated ex-ante is 2.232 tCO₂e/year/B04/. The per unit ERs for the monitoring period is less than the estimated value ex-ante. The value of the ERs per unit of stove is 0.981 tCO₂e/year for the first monitoring period. The actual sales for the first monitoring period had started only from January 2015 and thus very few stoves distributed in the first two years of operation. The emission reductions have been claimed only from 01/01/2016. The value of ERs per unit stove has decreased from the previous monitoring period due to the reduction in the value of the efficiency of the stoves (from 30.79 % to 22.2%). The complete assessment of the change in the monitoring parameters is provided in the section E.2.2 of this report.</p> <p>The verification took cognizance of § 272 and 273 of the CDM Project Standard for the PoAs version 01/B01-2/ and § 341 of the VVS for the PoAs version 01/B01-1/.</p>

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

Means of verification	Document Review
Findings	There are no findings on this section of the VR.
Conclusion	<p>Not applicable (as there are no sustainable development co-benefits required as per the registered CDM PoA-DD).</p> <p>The verification took cognizance of § 360 of CDM VVS PoAs, version 01 /B01-1/.</p>

E.3.7. Global stakeholder consultation

Means of verification	Document Review
Findings	There are no findings on this section of the VR.
Conclusion	<p>Not applicable (this is not first Monitoring report)</p> <p>The verification took cognizance of § 369 of CDM VVS PoAs, version 01 /B01-1/.</p>

SECTION F. Internal quality control

>>

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

SECTION G. Verification opinion

>>

Carbon Check (India) Private Ltd. has performed the second periodic verification of the registered CDM Programme of Activities "Paradigm Sub Saharan Africa Cook Stove Programme" and UNFCCC reference number 9672 for the CPA titled "Paradigm Cook Stove Programme: Ethiopia 01 (TPP-CPA-01-ETH)" and UNFCCC ref numbers 9672-0001 and "Paradigm Cook Stove Programme: Rwanda 01 (TPP-CPA-01-RWN)" with 9672-0002 has not been reported in the monitoring report. The verification team assigned by the DOE concludes that the Component Project Activity/ies as described in the registered/included CPA-DD (CPA 1 - Version 8, 26/06/2013) and monitoring report (version 04, dated 09/07/2018)/02/, meets all the 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 for the PoAs version 01.0 /B01-1/.

Verification methodology and process

The Verification team confirms the contractual relationship signed on 16/04/2018 between the DOE, Carbon Check (India) Private Ltd. and the Co-ordinating Managing Entity/ Project Participant, (The Paradigm Project). The team assigned to the verification meets the Carbon Check (India) Private Ltd.'s internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per the UNFCCC and Carbon Check procedures and requirements.

The verification has been performed as per the requirements described in the VVS for the PoAs version 01.0 and constitutes the review and completion of the following steps:

- Reviewing the registered PoA-DD (Version 10, 27/10/2015), registered/included CPA DDs (CPA 1 - Version 8, 26/06/2013), including the monitoring plan and the corresponding validation report/s;
- Previous verification and certification reports and the monitoring reports for Monitoring Period 1/B09/;
- Publication of the MR on the UNFCCC website (version 01, 09/05/2018) (submitted to UNFCCC for publication on 16/05/2018)
- Desk review of the validation report, MR and other relevant documents including documents related to the projects activities in emission reductions
- Review of the applied monitoring methodology (AMS-II.G, version 05);
- Review of any CMP and EB decisions, clarifications and guidance;
- On-site assessment (05/06/2018 – 07/06/2018)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

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

visit the verification team confirms that the PoA has resulted in the 5,829 tCO₂e emission reductions during the second monitoring period.

During the reported monitoring period two CPAs were registered and the only one eligible to claim emission reductions. The emission reductions have been reported for 1 out of 2 CPAs in the monitoring report. The emission reductions have been claimed only for CPA 1 (UN reference number: 9672-0001):

Verified emission reductions (CPA 1): 5,829 tCO₂e

The break-up of emission reduction from 01/01/2017 to 31/12/2017 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	5,829

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

SECTION H. Certification statement

>>

Carbon Check (India) Private Ltd, the DOE, has performed the verification of the registered Programme of Activities “UNFCCC Registration Number 9672”, “Paradigm Sub Saharan Africa Cook Stove Programme” in Ethiopia and Rwanda. The aim of the PoA is to abate greenhouse gas (GHG) emissions and reduce non-renewable biomass consumption used for thermal energy needs by introducing improved, higher efficiency cook stoves to replace traditional inefficient and low efficiency cook stoves. The component project activities of the Programme of Activity are designed to generate emission reductions by distribution of the fuel-efficient cook stoves in Ethiopia and Rwanda. The included CPA in the PoA from Rwanda “Paradigm Cook Stove Programme: Rwanda 01 (TPP-CPA-01-RWN)” has not been reported in this monitoring report. Only CPA titled “Paradigm Cook Stove Programme: Ethiopia 01 (TPP-CPA-01-ETH)” from Ethiopia has been reported in this monitoring report. The fuel-efficient cook stoves are replacing the baseline biomass-based stoves in common use (baseline scenario).

The CME and the 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 projects. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PoA-DD/CPA-DD. The verification is carried out in-line with the VVS requirements.

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

The verification is based on:

- PoA-DD version 10 dated 27/10/2015, revised approved/ registered with the CDM Executive Board;
- CPA DD/s included in the registered PoA and its monitoring plan.
- Previous verification and certification reports and the monitoring reports for Monitoring Period 1/B09/;

- Approved monitoring methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass”, version 05;
- Validation report /B04/ for the PoA and CPA/s;
- Monitoring report(s) version(s) 1, 2, 3 and 4 (dated 09/05/2018, 17/06/2018, 25/06/2018 and 09/07/2018 respectively).

This statement covers verification period of 365 days between 01/01/2017 and 31/12/2017.

The DOE had raised 03 clarification and 02 corrective action requests, all of which have been successfully resolved by PP(s). No Forward action request had been raised during the previous verification.

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.

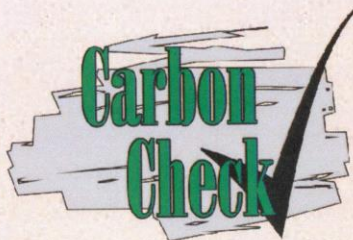
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 5,829 tCO₂e and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction from 01/01/2017 to 31/12/2017 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	5,829

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 ₂ e	Carbon Dioxide Equivalent
DR	Document review
DOE	Designated Operational Entities
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
FA	Final Approval
FAR	Forward Action Request
FVR	Final verification Report
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
I	Interview
IPCC	Intergovernmental Panel on Climate Change
IR	Internal resource
MWh	Mega Watt Hour
MR	Monitoring Report
PoA	Programme of Activities
PoA-DD	Programme of Activities Design Document
PP	Project Participant
OSV	On Site Visit
QC/QA	Quality control /Quality assurance
RMP	Revised Monitoring Plan
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Limit
VR	Verificaton Report
VVS	Validation and Verification Standard
WBT	Water boiling test

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Anubhav Dimri

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

For following functions:

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

In the following Technical Areas:

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

Mr. Vikash Kumar Singh
Compliance Officer

Date of Approval
24/12/2017

Mr. Amit Anand
CEO

Valid Till
23/12/2018

Revision History of the Document

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

¹India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED

Registered in India: U74930DL2012PTC232495

Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005

Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301

Tel: +91 120 4373114 | URL: www.carboncheck.co.in

e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Sanjay Agarwalla

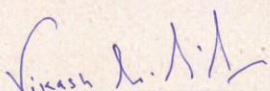
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

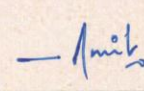
For following functions:

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

In the following Technical Areas:

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


Mr. Vikash Kumar Singh
Compliance Officer


Mr. Amit Anand
CEO

Date of Approval
24/12/2017

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¹India

CARBON CHECK (INDIA) PRIVATE LIMITED

Registered in India: U74930DL2012PTC232495

Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005

Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301

Tel: +91 120 4373114 | URL: www.carboncheck.co.in

e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	The Paradigm Project	1. Webhosted Monitoring report 2. Monitoring Report 3. Monitoring Report	Version 1, dated 09/05/2018 Version 2, dated 17/06/2018 Version 3, dated 25/06/2018	CME
2	The Paradigm Project	Final Monitoring report	Version 4, dated 09/07/2018	CME
3	The Paradigm Project	1. Emission reduction calculation spread sheets corresponding to /1.1/ 2. Emission reduction calculation spread sheets corresponding to /1.2/ 3. Emission reduction calculation spread sheets corresponding to /1.3/	- - -	CME
4	The Paradigm Project	Emission reduction calculation spread sheets, corresponding to /02/	-	CME
5	The Paradigm Project	PoA Monitoring Manual	-	CME
6	National Metrology Institute of Ethiopia	Calibration Certificates: 1. Digital Thermometer 4. Digital Balance 3. Moisture meter	(TH-02) PTH-1788 dated 16/04/2018 OBL-3149 dated 19/04/2018 Not applicable	CME
7	The Paradigm Project	Manufacturer Specifications for: 1. Digital Thermometer specifications (amazon.com) 2. Digital balance specifications 3. Moisture meter specifications	GoerTek Digital Thermometer AWS SR Series User Manual Extech MO210 User Manual and Data sheet	CME
8	Ministry of Water, Irrigation & Electricity, Ethiopia	1. WBT Training Certificate (from Ministry of Water, Irrigation and Electricity) for the monitoring manager Mr Amanual Tadelles, Mr Yergalem Gezehagn 2. Enumerator Training Certificate (The Paradigm Project) for the monitoring manager Mr Amanual Tadelles, Mr Yergalem Gezehagn	Dated 21-23/03/2018 Dated 28/01/2018	CME CME
9	The Paradigm Project	Sampling Calculator	-	CME
10	Mekelle University	1. Evaluation of Improved Cook Stoves (Water Boiling Test Certification from Mekelle University) 2. Memorandum of Understanding between Paradigm Project and Mekelle University for certification of WBT results	May 2018	CME
11	The Paradigm Project	Quality control check records for parameter SM _y (QA/QC Log) Includes Records of follow up calls with end users of the ICS for customer service	-	CME
12	The Paradigm Project	Templates for: 1. Credit Sales Agreement 2. Supply Agreement	-	CME

13	The Paradigm Project	Records for: 1. End User Agreements 2. Supplier Agreements	-	CME
14	The Paradigm Project	WBT Records: 1. Raw Data Sheets 2. WBT Calculations	-	CME
15	The Paradigm Project	Annual review of data collection and data entry to identify systematic errors and general points of weakness in the data management.	MP1: Jan 1, 2017 – Dec 31, 2017	CME
16	Aprovecho Research Center	Stove Manufacturer Specifications and the WBT test	October 2012	CME
17	The Paradigm Project	Enumerator Training Guide	-	CME
18	The Paradigm Project	Business License and Registration Documents	No. 096689 0046793984	CME
B01	UNFCCC	1. Validation and Verification Standard for PoAs, version 01.0 2. Project Standard for PoAs, version 01.0 3. Project Cycle Procedure for PoAs, version 01.0	http://cdm.unfccc.int/	Others
B02	UNFCCC	Applied baseline and monitoring methodology, AMS-II.G, version 05.0	http://cdm.unfccc.int/	Others
B03	UNFCCC	Instructions for filling out the monitoring report form for CDM programme of activities, version 02.0	http://cdm.unfccc.int/	Others
B04	UNFCCC	Registered/ Revised approved PoA-DD (version 10 dated 27/10/2015); CPA-DD for 9672-0001: (version 8 dated 26/06/2013); and corresponding validation reports.	http://cdm.unfccc.int/	Others
B05	Web sites	Websites: http://cdm.unfccc.int/	--	Others
B06	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0	http://cdm.unfccc.int/	Others
B07	UNFCCC	Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities, version 07.0	http://cdm.unfccc.int/	Others
B08	UNFCCC	Guideline: Application of materiality in verifications" Version 02.0	http://cdm.unfccc.int/	Others
B09	UNFCCC	Monitoring Reports and Verification Reports of the previous monitoring periods: 1. MR version 05 dated 08/05/2017 and corresponding VR for MP1	http://cdm.unfccc.int/	Others
B10	UNFCCC	Fraction of non-renewable value for Ethiopia http://cdm.unfccc.int/DNA/fNRB/index.html	--	Others

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

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

FAR ID	xx	Section no.	Date: DD/MM/YYYY
Description of FAR			
CME response			Date: DD/MM/YYYY

Documentation provided by the CME	
DOE assessment	Date: DD/MM/YYYY

Table 2. CLs from this verification

CL ID	01	Section no.	E.3.4.3	Date: 11/06/2018
Description of CL				
It has been observed in the ER sheet that for some households that were surveyed during the sample survey by the CME, the stove number has been stated as not-readable. It is not clear how the stove was uniquely identified in that case.				
CME response				Date: 17/06/2018
<i>In identifying a household selected for monitoring, several identifiers are used in addition to the serial number: name of the household, location and partner through which the household purchased the stove. To locate each household in the sampling frame, enumerators used contact information provided for the household to directly contact the household or, where no phone number was available, enumerators worked with the person who sold the cookstove to locate the household. Where the stove serial number was not readable, the household confirmed their name, location and purchase details to verify that they are the household sampled for monitoring. Each household monitored was cross checked against the sample set and either marked as having been monitored or the reason for non-response was noted.</i>				
Documentation provided by the CME				
CL01_ISS2 Sampling Frame				
DOE assessment				Date: 21/06/2018
It has been clarified by the CME that all the stoves were marked with unique serial numbers however due to the normal degradation during the course of usage the serial number was not completely readable at the time of survey for some of the stoves. This is in compliance with the eligibility criterion (b) of the section B.2 of the PoA-DD. During the monitoring survey, in such cases in addition to the unique serial number, a household has been identified based on the name of the household, location and partner through which the household purchased the stove. To correctly identify the stove, the details were confirmed through the contact number and where no phone number was available, enumerators worked with the person who sold the cookstove to locate the household correctly. To address the double counting, it needs to be clarified if more than one stove has been distributed to the same household. The method of identifying the outliers from the sample also needs to be provided. What was the basis on which the outliers were identified.				
CME response				Date: 21/06/2018
Only one stove is sold to each household. When checking for duplicate records as part of ongoing quality assurance measures, the CME checks for duplications of both serial numbers and household details. Each record in the household database used for monitoring sampling has been confirmed as a unique record. Outliers have been identified based on commercial cooking practices and through standard meals using the Median Absolute Deviation (MAD) methodology. Any households identified as outliers are removed from the sampling frame and data set used to calculate parameters Ny and SMy. Three monitored households were identified and removed as outliers. One household reported using the ICS in her coffee house (for commercial cooking) as well as for personal use and was thus removed from the data set as an outlier and no credits are claimed for his household during the monitoring period. This household was permanently removed from the customer database. The MAD analysis uses the complete set of data to identify upper and lower limits of acceptable data. Two households were removed based on overall meals falling below the MAD calculated threshold of 16 meals per week. One household was cooking only breakfast and another was using the improved stove for boiling milk for her farm workers. Both households were removed from the sample frame and data set. The household using the stove for boiling milk was permanently removed from the customer database while the household with low meal usage was retained in the customer database since meal usage may increase over time. No credits were claimed for either household during the monitoring period. Though all three households reported using the stove on a regular basis, they were excluded from the data set used to analyze dropout rates and usage frequency.				
Documentation provided by the CME				
N/A				
DOE assessment				Date: 25/06/2018

CME has clarified that only one stove is sold/distributed to once household and thus the issue of double counting of stoves is handled.

Furthermore, CME has clarified that the outliers have been identified based on Median Absolute Deviation for the parameter SMY. Three households were removed as outliers and as explained by the CME, two out of the 3 households have been removed from the sales/distribution database as one of those stoves was being used for commercial application and the second was removed as it was being used only for boiling milk and thus very low usage. These stoves were permanently removed from the database. For the third stove, as the usage was low, zero emission reductions are being claimed from that stove conservatively. This is acceptable to the verification team.

CL is closed.

CL ID	02	Section no.	E.3.4.3	Date: 11/06/2018
Description of CL				
<p>The value of the parameter $\eta_{new,y}$ has decreased from the previous verification and the registered CPA-DD. The reason for such a change needs to be provided by the PP in accordance with the para 272 of the PS for the PoAs, version 01.</p> <p>It has been observed in the efficiency tests conducted for the monitoring parameter $\eta_{new,y}$ that a value of less than 20% is obtained for some of the stoves. It needs to be clarified how the CPA meets the requirements of footnote 2 of the methodology, AMS-II.G, version 05.</p>				
CME response				Date: 17/06/2017
<p><i>The value of parameter $N_{new,y}$ has decreased as a result of degradation in efficiency of the cookstove over time. The value for $N_{new,y}$ used in the ex-ante calculations and reflected in the previous verification is consistent with the efficiency of new stoves. Because stoves included in the project are now 3 years old, those that have been in use over time have seen degradation in efficiency. No stove tested had been in use for less than 6 months and, while the testing results show a trend of decreasing efficiency for each year of use, there is variation of results among each year tested, likely due to differences in usage and care of the stove in each individual household.</i></p> <p><i>Average results for each year of testing remain above 20%, even though some stoves show efficiency of less than 20%. This average result is consistent with the requirements presented in footnote 2 of the AMS.II.G, version 05 methodology.</i></p>				
Documentation provided by the CME				
N/A				
DOE assessment				Date: DD/MM/YYYY
<p>CME has clarified that the value of the parameter $\eta_{new,y}$ has decreased as a result of degradation in efficiency of the cookstove over time. As some of the stoves that were sampled during the sampling were 3 years old, the degradation is high in such stoves. CME has also clarified that since the total average efficiency remain above 20%, the compliance to footnote 2 of the AMS.II.G, version 05 methodology is met. Since, the footnote 2 of the methodology AMS-II.G, version 05 states that "Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%." The specified efficiency of the stoves at the time of validation is 28 % based on the lab test report/16/ from Approvecho Research Center Laboratory in Oregon, USA. Thus, the specified efficiency is more than the required 20%. CME has taken the actual monitored efficiency during the monitoring period for the calculation of emission reductions which is deemed acceptable.</p> <p>Efficiency result of a stove has been taken as an outlier, it needs to be clarified how the outliers were identified.</p>				
CME response				Date: 21/06/2018
<p>The outlier removed from efficiency testing results was identified based on a Median Absolute Deviation analysis of boiling temperature. The local boiling point is 91.8 degrees and the boiling point recorded was 80.9 for cold start and 83.8 for hot start. Both results were below the MAD threshold and the test was thus removed as an outlier. Because the test did not reach a full boil, the test was deemed to be incomplete and was thus removed from the overall data set. The stove used for this test was severely damaged and thus did not boil water during the test. During monitoring, this stove was replaced with a new stove under the EzyLife warranty and the replacement stove details have been recorded in the customer database. No credits were claimed for this household during the monitoring period.</p>				
Documentation provided by the CME				
N/A				
DOE assessment				Date: 25/06/2018

CME has clarified that the outlier was removed from the efficiency testing results as the boiling point of 91.8 degree Celsius was not possible with the stove. The stove was damaged and it was replaced by a new stove under the EzyLife warranty by the CME. As the stove was damaged, no credits are being claimed for the stove during the monitoring period. This is acceptable to the verification team. CL is closed.

CL ID	03	Section no.	E.3.4.3	Date: 11/06/2018
Description of CL				
In section E.3 of the MR, for the calculation of the sample size for the monitoring parameters n_y , SM_y and $\eta_{new,y}$, the rationale for the response rate, precision, mean and standard deviation used has not been provided.				
CME response				Date: 17/06/2018
<i>The CME has updated the MR to include information on standard deviation, variance and response rates from the prior monitoring period, which were used to calculate sample sizes for this monitoring period.</i>				
Documentation provided by the CME				
01_MR ParadigmEthiopiaPoA 9672 17June2018				
DOE assessment				Date: 21/06/2018
CME has clarified that for the calculation of the sample size response rate, precision, mean and standard deviation have been used from the previous verification (MP1). This is deemed to be appropriate in case of the project and thus accepted by the verification team. CL is closed.				

Table 3. CARs from this verification

CAR ID	01	Section no.	E.3.4.4	Date: 11/06/2018
Description of CAR				
The calibration records for the moisture meter used during the WBT has not been provided to the verification team.				
CME response				Date: 17/06/2018
<i>The moisture meter is self-calibrating and thus does not require calibration from an external body. Prior to WBT testing, the moisture meter was calibrated and confirmed in accordance with the instructions in the owner's manual and was confirmed to be in working order.</i>				
Documentation provided by the CME				
CAR01_Exttech Pocket Size Moisture Detector User Manual				
DOE assessment				Date: 21/06/2018
CME has clarified that the moisture meter is self-calibrating and thus does not require calibration. The user manual for the meter is provided as an evidence. CAR is closed.				

CAR ID	02	Section no.	E.3.5.1	Date: 11/06/2018
Description of CAR				
The project emissions are greater than the baseline emissions in the section F.4 of the MR. The values also do not match with the calculations made in the ER sheet. In section F.2 of the MR, it is stated that project emissions are not applicable. However, the value has been provided and a 0 value is reported for baseline emissions.				
CME response				Date: 18/06/2018
<i>The CME has updated section F.4 of the MR to reflect that baseline emissions are calculated in the project and no project emissions are reported for the period. This is consistent with the AMS.II.G methodology, which does not require the calculation of project emissions separately from baseline emissions</i>				
Documentation provided by the CME				
01_MR ParadigmEthiopiaPoA 9672 17June2018				
DOE assessment				Date: 21/06/2018
CME has updated the section F.4 of the MR and clarified that the baseline and project emissions were inadvertently listed in the wrong columns. The values have been corrected and are consistent with the AMS-II.G methodology and other sections of the MR and ER sheet. The value of the emission reductions has changed as during sampling by the CME, for households that report using the improved stove as their primary stove and a secondary stove, the meals cooked on the secondary stove are removed from the calculation of parameter SM_y . CAR is closed.				

Table 4. FARs from this verification

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

Appendix 5. Data and parameters fixed ex ante

Data/Parameter	η_{old} Efficiency of the system being replaced
Default values used:	0.1032
Purpose of data	Baseline emission calculation
Source and Verification of the source	The value has been determined ex-ante based on the baseline survey conducted. The value has been compared with the registered CPA-DD/B04/ and found correct by the verification team.

Data/Parameter	NTG Net to gross adjustment factor of to account for leakage
Default values used:	0.95
Purpose of data	Baseline emission calculation
Source and Verification of the source	Default value as per the methodology AMS II.G (Ver. 5)/B02/. The value has been compared with the registered CPA-DD/B04/ and found correct by the verification team.

Data/Parameter	f_{NRB} Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Default values used:	0.88
Purpose of data	Baseline emission calculation
Source and Verification of the source	Default values from the CDM SSC_WG Information note on default f_{NRB} /B08/ calculated using the methodology prescribed in the baseline and methodology AMS-II.G version 05/B02/. The value has been compared with the registered CPA-DD/B04/ and found correct by the verification team.

Data/Parameter	NCV_{biomass} Net calorific value of the non-renewable woody biomass that is substituted
Default values used:	0.015 TJ/tonne
Purpose of data	Baseline emission calculation
Source and Verification of the source	IPCC default value as per the methodology AMS II.G (Ver. 5)/B02/. The value has been compared with the registered CPA-DD/B04/ and found correct by the verification team.

Data/Parameter	EF_{projected_fossilfuel} Emission factor for the substitution of non-renewable biomass by similar consumers
Default values used:	81.6 tCO ₂ /TJ
Purpose of data	Baseline emission calculation
Source and Verification of the source	Default value as per the methodology AMS II.G (Ver. 5)/B02/. The value has been compared with the registered CPA-DD/B04/ and found correct by the verification team.

Data/Parameter	B_{old} Quantity of woody biomass used in the absence of the project activity in tonnes per device per year
Default values used:	3.4545
Purpose of data	Baseline emission calculation
Source and Verification of the source	The value has been determined based on the baseline survey in accordance with the methodology AMS-II.G version 05/B02/.

In summary, the verification team confirms that all the ex-ante and ex-post parameters are monitored in accordance with the approved monitoring plan and applied methodology. The verification took cognizance of § 358 of the VVS for the PoAs, version 01/B01/.

Appendix 6. Data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	S_y Number of distributed ICS in year y
Measuring frequency/Time Interval:	Continuously
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine the parameter number of distributed ICS in year y.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not Applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes, reported data in MR/02/ has been compared with ER sheet/04/ and the sales database/04/.
How were the values in the monitoring report verified?	The values in the monitoring report/02/ were compared against the values in ER sheet/04/ and the sales database/04/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	n_y Fraction of distributed ICS operational in year y
Measuring frequency/Time Interval:	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment is used. Source of data is from sales records database.

Is accuracy of the monitoring equipment as stated in the PDD? If the PDD 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 PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA
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 value of parameter has been crosschecked with the monitoring database/4/, ER sheet/4/ and sample sales agreements/13/ and the hard copy records were also checked during the OSV. The reported values for the sampled households have been checked from the questionnaire answers as provided in the ER sheet/4/ and the sampling calculator/9/.
How were the values in the monitoring report verified?	The reported data has been cross-checked against the questionnaire answers as provided in the ER sheet/4/ and compared with the MR/2/. The data was then verified against the sample households checked during the site visit.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC process 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. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	D_y Cumulative number of days which ICSs have been operational in year y
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment is used.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	NA
Calibration frequency /interval:	NA

Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA
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/2/ has been compared with ER sheet/04/ and the sales database/4/.
How were the values in the monitoring report verified?	The values in the monitoring report/2/ were compared against the values in ER sheet/4/ and the sales database/4/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	SM_y Fraction of meals in a week cooked on the project stove in year y
Measuring frequency/Time Interval:	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	NA
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD 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 PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	NA
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 value of parameter has been crosschecked with the monitoring database/4/, ER sheet/4/ and sample sales

	agreements/13/ and the hard copy records were also checked during the OSV. The reported values for the sampled households have been checked from the questionnaire answers as provided in the ER sheet/4/ and the sampling calculator/9/.
How were the values in the monitoring report verified?	The reported data has been cross-checked against the questionnaire answers as provided in the ER sheet/4/ and compared with the MR/2/.
	The data was then verified against the sample households checked during the site visit.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC process 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. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	$\eta_{new,y}$ Efficiency of the device being deployed as part of the project activity in year y
Measuring frequency/Time Interval:	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	GoerTek Digital Thermometer /7/ AWS SR Series Digital Balance /7/ Extech MO210 Moisture Meter /7/
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	No accuracy of equipment is not stated in the CPA-DDs.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	The equipment used has been calibrated prior to the use during monitoring: The calibration of the digital thermometer has been done on 16/04/2018, for digital balance on 19/04/2018 by the national metrology institute, ministry of science and technology, Ethiopia/06-1,2/. Further, the manufacturer specification of the moisture meter Extech MO210 confirms that it is self-calibrated and just requires pressing of a button prior to use for calibration/7/. Verification team thus confirms that the equipment is calibrated prior to use.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration interval has not been provided in the CPA-DD. However, since the equipment is calibrated prior to use the selected frequency represent good monitoring practise.
Company performing the calibration (internal or external calibration):	External. National metrology institute, ministry of science and technology, The Federal Democratic Republic of Ethiopia/6/. The monitoring equipment has been calibrated by the National Metrology Institute of Ethiopia, the laboratory is

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	accredited by the German Accreditation Body, DAkkS (https://www.dakks.de/en/startseite).
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes, the calibration confirmed proper functioning of the monitoring equipment.
Is (are) calibration(s) valid for the whole reporting period?	Yes, the calibration is valid for the whole reporting period.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been crosschecked with the raw data sheets for the WBTs and calculation sheets/14/, ER sheet/4/ and the hard copy records were also checked during the OSV. The reported values for the sampled households have been checked from the ER sheet/4/ and the sampling calculator/9/.
How were the values in the monitoring report verified?	The reported data has been cross-checked against the raw data sheets for the WBTs and calculation sheets/14/ and compared with the ER sheet/4/ and the MR/2/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC process are in place.</p> <p>The appropriate QA/QC procedures have been followed for the monitoring parameters. The WBTs were conducted by personnel trained in conducting WBTs/8/ from the (Alternative energy technology development and promotion directorate) ministry of water, irrigation and electricity, Ethiopia. The ministry has provided The WBT test training according to the WBT protocol and the host party systems. WBT tests have been further evaluated by the Institute of Energy, Mekelle University/10/ and thus accepted by the verification team.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA. Full data is available for the monitoring period.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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