



**Monitoring 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.

MONITORING REPORT

Title of the PoA	Clean Cook Stoves in Sub-Saharan Africa by ClimateCare Limited	
UNFCCC reference number of the PoA	8438	
Version numbers of the PoA-DD applicable to this monitoring report	10	
Version number of this monitoring report	02	
Completion date of this monitoring report	23/02/2019	
Monitoring period number	4	
Duration of this monitoring period	01/07/2016-30/06/2018 (first and last days are included); 24 months	
Monitoring report number for this monitoring period	01	
Coordinating/managing entity	ClimateCare Limited	
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)
	Ghana	Yes
	Kenya	No
Sectoral scopes	3: Energy demand	
Applied methodologies and standardized baselines	AMS-II.G. ver. 04 - Energy efficiency measures in thermal applications of non-renewable biomass	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	CPA001 0 tCO ₂ e	266,433
	CPA002 0 tCO ₂ e	166,442
	Total 0 tCO₂e	432,875 tCO₂e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	594,344 tCO ₂ e	

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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The purpose of this SSC-PoA is to reduce the greenhouse gas emissions from cooking activity, by promoting the design or adoption of a design, manufacture, distribution and use of efficient charcoal cook stoves (ECSs) which provide the same service with significantly less fuel than traditional charcoal stoves in common use (see Section C for details of the technology applied). Through these measures over the next 28 years starting from 2012, the SSC-PoA will introduce wide-scale adoption of ECSs to kitchens in Ghana, and later, in Sub-Saharan Africa. This constitutes a market transformation, reducing global greenhouse gas emissions through reduced fuel consumption for an equivalent service, reducing pressure on forests and woody biomass resources.

Each CPA within the PoA develops or adopts cook stove designs, which use less fuel for the same cooking service and address product-specific factors such as safety, indoor smoke, usage, cost and stove price. These factors, together with public education are important in determining the uptake of ECSs at the household level. Raising awareness through information provided with products, as well as targeted media campaigns, will further promote the benefits of efficient charcoal stoves (ECS) in the targeted areas. The messaging is meant to promote behavioural change and encourage further energy savings while reducing deforestation and indoor air pollution.

The adoption and usage of the improved cook-stoves by Ghanaian, and later Sub-Saharan African, users therefore constitutes the project scenario. Initially, the PoA covered only Ghana but now includes Kenya (which is not included in this monitoring report).

The PoA is implemented and managed by the Coordinating/Managing Entity (CME), while each CPA is implemented by Programme Activity Implementers (PAIs) in consultation with the CME. Each PAI prepares and manages a single CDM programme activity (CPA) or group of CPAs. PAIs sell ECSs on a commercial basis through appropriate agents developed by the PAIs themselves. Each PAI is responsible for the manufacture, awareness creation, marketing and distribution of stoves for their respective CPAs. The PAIs are also responsible for collecting and storing sales data in the *Sales Database*, together with other monitored parameters, which they also maintain under the supervision of the CME, while providing the after-sales service to the users. Each PAI acts individually, running the project in accordance with the demands of the local market.

During the life of the PoA, the number of CPAs implemented will increase and will be monitored according to the monitoring plan. Different CPAs may be installed in the same areas, but can always be distinguished by a sales record keeping system (*Sales Database*) with a unique serial number for every ECS sold, which will ensure that each ECS can be traced to one specific CPA to avoid double counting.

The CME verifies the Sales Database and prepares monitoring reports. The CME also facilitates the verification processes while advising the PAI on the carbon asset development activities.

Accordingly, the PAIs will use the CER proceeds to reduce costs of ECSs to users, provide maintenance and to recoup associated costs for the dissemination of stoves, such as training of supply chain personnel, marketing activities and building new manufacturing units.

A.1.1. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
Title: Not available Reference Number: CPA0XX Reference: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/V7A06W39LCRF4X8P1BGIJDUEKTS5QH/view	10	3: Energy Demand	Methodology: AMS-II.G; Small-scale methodology; "Energy efficiency measures in thermal applications of non-renewable biomass" (version 04).

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Crediting period type and duration	Covered in this monitoring report? (yes/no)
CookClean Ghana Limited - CPA01 Ref: 8438-0001	Title: Not available Ref Number: CPA0XX	10	Type: Renewable Duration: 7 years (01/01/2013 – 31/12/2019)	Yes
CookClean Ghana Limited - CPA02 Ref: 8438-0002	Title: Not available Ref Number: CPA0XX	10	Type: Renewable Duration: 7 years (12/02/2016 – 11/02/2023)	Yes
Improved Jikos Project- CPA03 Ref: 8438-0003	Title: Not available Ref Number: CPA0XX	10	Type: Renewable Duration: 7 years (26/10/2016 – 25/10/2023)	No
Burn JikoKoa Project- CPA04, Ref: 8438-0004	Title: Not available Ref Number: CPA0XX	10	Type: Renewable Duration: 7 years (12/06/2018 – 11/06/2025)	No

A.2. Coordinating/managing entity

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ClimateCare Limited (ClimateCare) is the Coordinating/Managing Entity (CME) for the PoA. The CPAs are run by the Project Activity Implementers (PAIs) in coordination with the CME.

SECTION B. Implementation of PoA**B.1. Description of implemented PoA**

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The management system of the PoA is designed to ensure that real, measurable and long term GHG emission reductions for the project activity are monitored and reported. ClimateCare Limited is the Coordinating and Managing Entity (CME) for the PoA. The PoA is implemented through small scale CDM programme activities (CPAs) by Project Activity Implementers (PAIs), who are responsible for implementing the CPAs in accordance with agreement with, and as advised by, the CME. Through the technical review process of new CPAs, the CME has ensured that all CPAs included under the PoA meet the eligibility criteria outlined in Section K of the registered PoA-DD and that the records of the review process are maintained. The *PoA Joining Agreement* signed between ClimateCare Limited and each PAI for each CPA ensures that the PAI is aware and has agreed that their activity be subscribed to the PoA. The contract also ensures that the PAI is aware and agrees to abide by the *Inclusion Criteria* specified in Section K of the registered PoA-DD.

The CPAs included in the PoA are implemented in Ghana and Kenya. In Ghana, both CPA 8438-0001 and CP 8438-0002 are implemented by CookClean Ghana Limited as the PAI, while Burn Manufacturing implements Burn JikoKoa Project (CPA04) in Kenya. Besides being the CME, ClimateCare also acts as the PAI for Improved Jikos Project (CPA03) in Kenya. However, for the purpose of monitoring and issuance of CERs during this monitoring period, only one monitoring report has been prepared covering the two CPAs (CPA01 and CPA02). Separate monitoring reports will be prepared for the remaining CPAs.

All the stoves manufactured and sold under the PoA are individually identified by the unique stove serial number that is engraved on each stove at production. The unique serial number on each stove and the CPA *Sales Database* eliminates any risk of double-counting of ECSs between CPAs and within a CPA.

During the monitoring period, ClimateCare Limited, as as the Co-ordinating/Managing Entity (CME) of the PoA, provided oversight of the record-keeping, monitoring, verifying the *Sales Database* of the individual CPAs and preparing the *Monitoring Report*. The *Sales Database* and the stored parameters were reviewed by the CME who also calculated the emission reductions based on the monitored data and prepared the *Mornitoring Report*. The CME also facilitated the verification processes while advising the PAI on the carbon asset development activities and supporting training and capacity development of CPA personnel while providing guidance on record keeping and quality control.

The operationalisation of the management system in the case of the two CPAs (CPA 8438-0001 and CP 8438-0002) covered in this monitoring period is described below:

- a) ClimateCare provided instructions to CookClean to collect the end user information at the time of sale through *Warranty Cards*. CookClean Ghana Limited staff were then trained by Climatecare on the required end user data to be collected and recorded in the *Sales Database* and guidance was provided by ClimateCare to them on the standard procedures to be followed in collecting and maintaining the information.

During a sale, the user is informed that CDM finance is being used to fund the ECSs, and the user agrees to transfer the rights to the emission reductions to the PAI, and to cooperate with the PAI and the CME for monitoring purposes as per the *Warranty Card*, which also captures the relevant user and stove details for traceability and unique identification. The user in turn enjoys a subsidised ECS price. The PAIs collect and maintain the *Warranty Cards* as part of the monitoring records. The information collected by the PAIs through the *Warranty Cards* is transferred to the *Sales Database* which is updated regularly and shared with the CME electronically. The *Sales Database* carries all the required sales information on all ECS sold, including their serial numbers, user details and sale date. Together with associated records, the *Sales Database* for each CPA is checked by the CME in oder to confirm that it is authentic and that no double-counting, of either CPAs or ECSs has occurred.

- b) In consultation with CookClean, ClimateCare, as the CME, coordinated all ex-post monitoring activities in the PoA. These included the following:
 - i. Implementation of the monitoring plan as per the registered PoA-DD
 - ii. Determination of the sample sizes for the different strata of stoves as per the PoA sampling plan
 - iii. Carried out quality control and assurance on the monitored data from field
- c) A single cross-CPA sampling approach covering both CPAs (CPA01 and CPA02) included in this monitoring report was applied for the determination of the monitored parameter values. While CookClean Ghana Limited and ClimateCare Limited jointly identified the samples to be monitored (surveyed or tested), the following key parameters were captured

and checked by the CME following surveys and/or testing, and before using them to calculate the emissions reduction realised by the CPAs:

- i. Efficiency of project stoves (η_{new})
 - ii. The Drop-off Rate (DO_y) to check if project stoves are operational and in use and to determine N_y
 - iii. Fraction of end users that continue to use the baseline stoves (where the base line stove continues to be used, the associated project stoves are discounted for emissions reduction calculation.
- d) Using the monitored data collected, ClimateCare calculated the emission reductions and prepared this monitoring report.

Thus, through the management system explained above, ClimateCare Limited and the CookClean Ghana Limited ensured that the PoA Management System, as given in section B of the registered PoA-DD, was duly implemented for the concerned CPAs (CPA01 and CPA02).

The PoA has been in operation since November 2012 and it has had three successful issuances of a total of 293,510 CERs since then. But there has been no events that have had an impact on the applicability of the applied methodology.

This monitoring report is being submitted to cover two CPAs (CPA01 and CPA02) with a total stove sales count of 75,286. However, out this total, stoves that are more than 4 years have been excluded from the estimated emission reductions for the monitoring period. In addition, a discount has been applied to allow for the Drop-off (DO_y) as explained in Section E.3 of this report.

B.2. Post-registration changes to PoA

B.2.1. Corrections

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The following corrections, which were approved by the EB after registration in the first PRC (PRC-8438-001) on 20th December 2016, were made prior to this monitoring period:

- a) The source of $B_{old,appliance,survey}$ was changed to include both survey methods and use of historical data, in line with paragraph 7 (a) of the methodology.
- b) The parameter, $B_{old,appliance,survey}$, was moved from section I.7.1 to section I.6.2.

The applicable PoA-DD is Version 06 (completion date: 07/09/2016).

The following corrections, which were approved by the EB after registration in the second PRC (PRC-8438-002) on 30 May 2018, were made prior to this monitoring period:

- a) The following parameters were corrected as follows:
 - i. $B_{y,saving}$ changed to $B_{y,savings}$ in line with the methodology
 - ii. η_{oew} corrected to η_{new}
 - iii. $N_{y,non-adjustedpliance}$ corrected to $N_{y,non-adjusted}$
- b) Furthermore, editorial changes concerning referencing sections due to adoption of latest PoA-DD template were effected.

The applicable PoA-DD is Version 07 (completion date: 23/03/2018).

The following corrections, which were approved by the EB after registration in the third PRC (PRC-8438-003) on 06 December 2018, were made prior to this monitoring period:

- a) Editorial corrections/revisions in various sections of the PoA-DD.

- b) Deletion in section I.2 of the PoA-DD, 'Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass ($f_{NRB,y}$), if not fixed at inclusion'.

The applicable PoA-DD is Version 10 (completion date: 01/11/2018).

There are no corrections being submitted with this monitoring report as part of the request for issuance (post-registration change-issuance track).

B.2.2. Inclusion of monitoring plan

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Not applicable

B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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The following permanent changes from Monitoring Plan, which were approved by the EB after registration in the second PRC (PRC-8438-002) on 30 May 2018, were made prior to this monitoring period:

- a) Monitoring frequency for the following parameters have been changed from 'Once, at the time of inclusion of a CPA into the PoA' to 'Annual' to reflect programme circumstances and actual requirements of the applied methodology:
 - i. Annual energy saving per appliance
 - ii. Annual number of appliances to reach small scale threshold
- b) Monitoring frequency of the monitored parameter B_{old} was changed from "calculation of the baseline emission reductions" to "Annual".
- c) The monitoring frequency for parameter DO_y has been changed from 'biennially' to 'annual' to improve accuracy of the result.

The applicable PoA-DD is Version 07 (completion date: 23/03/2018).

The following permanent changes from Monitoring Plan, which were approved by the EB after registration in the third PRC (PRC-8438-003) on 06 December 2018, were made prior to this monitoring period:

- a) Monitoring frequency of the parameters " B_{old} ", " DO_y " and " η_{new} " have been changed to "at least biennially".
- b) 90/10 when annual monitoring is applied for each CPA separately and 95/10 when biennial or cross CPA sampling is applied.
- c) Possibility of cross-CPA sampling stated consistently in the PoA-DD.

The applicable PoA-DD is Version 10 (completion date: 01/11/2018).

B.2.4. Changes to programme design

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The following changes to programme design, which were approved by the EB after registration in the first PRC (PRC-8438-001) on 20th December 2016, were made prior to this monitoring period:

- a) Change of PoA boundary to include Kenya
- b) Use of positive list of technology and project activity types that are defined as automatically additional (deemed additionality) were added as an option for additionality in the CPA inclusion criteria.

- c) The CPA inclusion criterion on specifications of technology/measure and performance level has been edited to allow manufacturer's specifications on efficiency based on water boiling tests (WBT) to be used to determine stove efficiency.
- d) The requirement for a GS passport was removed from the eligibility criteria of the PoA-DD because, in response to market requirements, the PoA is no longer going to register under the Gold Standard.

The applicable PoA-DD is Version 06 (completion date: 07/09/2016).

PART II Monitoring of CPAs

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CPA01 and CPA02 have been grouped together for cross-CPA sampling because both CPAs manufacture and sell the CookMate stoves, which are manufactured to the same specifications in the same CookClean factory in Accra and are distributed in the same country, Ghana.

SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

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This monitoring report covers component project activities (CPAs) CookClean Ghana Limited– CPA01 and CPA02 which are components of the Programme of Activities (PoA); “Clean Cook Stoves in Sub-Saharan Africa by ClimateCare Limited”. The purpose of these CPAs is to promote the use of efficient charcoal stoves (ECSs) which provide the same service with significantly less fuel use than the charcoal stoves in common use (Baseline stoves) in the specified areas of operation. The two CPAs aim to establish regular use of efficient charcoal stoves (ECSs) by distributing ECSs in the designated geographical areas. The adoption and usage of the efficient cook-stoves therefore constitutes the project scenario.

During this monitoring period, the four CPAs (CPA01, CPA02, CPA03 and CPA04) were in operation as components of the Programme of Activities entitled, “Clean Cook Stoves in Sub-Saharan Africa by ClimateCare Limited”. However, for the purposes of monitoring and issuance of GHG emission reductions under this monitoring period, this single monitoring report has been prepared to cover only CPA01 and CPA02. Separate monitoring reports will be prepared for CPA03 and CPA04.

Under this PoA, CookClean Ghana Limited, acting as the Programme Activity Implementer (PAI) for CPA01 and CPA02, has adapted an appropriate ECS design, the CookMate, which it manufactures, markets, distributes and sells on a commercial basis through appropriate agents developed by the company in Ghana. CookClean Ghana Limited has set up and applies procedures, appropriate records and documentation control process to assert legal rights of the carbon credits generated and to avoid double counting. Through a *Warranty Card* system, CookClean Ghana Limited transfers the information of each ECS sold to the Sales Database, and this ensures that no ECS is counted more than once under the CPA as per the registered PoA-DD. The *Sales Database* also serves as the basis for the calculation of CERs. Accordingly, the PAI will use the CER proceeds to reduce costs of ECS to users, provide maintenance and recoup associated costs for the dissemination of the stoves, such as the development of the supply chain personnel and systems, marketing activities and building new manufacturing units.

Since registration of the PoA on 30/11/2012, CPA01 has been in operation, manufacturing and selling ECSs (CookMate brand and design) in Ghana. It has up-scaled the manufacture of ECSs, expanding and recruiting retailers in several parts of Ghana. After CPA01 reached the small scale threshold in 2016, CPA02 started operations on 12/2/2016 and is yet to reach the small scale threshold.

Under the two CPAs, CookClean Ghana Limited (PAI) has manufactured and sold 75,286 ECSs in three stove sizes (small, medium and large) as described below. The ECSs are manufactured in the Cookstove Ghana factory in Accra under the brand name 'CookMate'. Some of the ECSs sold have passed the 4-year stove life and stopped claiming emissions. The number of ECSs manufactured and sold to date by each of the two CPAs are show in the table below:

CPA	Type/Size of Stove	Total Number of ECSs Sold To date
8438-0001	Charcoal (Small, large and medium)	47,244
8438-0002	Charcoal (Small, large and medium)	28,042
Total		75,286

(a) Description of the installed technology

The ECSs which are distributed by the two CPAs included in this monitoring report are manufactured as per the design registered in the CPA-DDs and the manufacturing is done in the factory which was established by the PAI. The factory manufactures only the CookMate stove and this is done under very stringent quality control conditions and specifications. The material used are of a specified standard, design measurements and the production process is well controlled. As a result, no significant variation is expected in the product quality, including in the efficiency of the ECSs. The CookMate stove is sold under the two CPAs (CPA01 and CPA02) in Ghana.

The principal design of the ECSs (CookMate stoves) features a pot-skirt and a conical grate feature that improves charcoal stoves' efficiency and reduces charcoal demand. The main stove design is an adaptation of the Pulamusa stove developed by ProBEC in Zambia after extensive research into the manufacturing of energy efficient stoves and other thermal technologies. For durability (up to 4 years average lifetime), the stoves are made of Galvanised/Mild Steel Plate and are produced in three sizes as shown in Figure 1 below. The materials used are of a specified standard for all stoves produced in the factory. As a result, no significant variation is expected in the product quality and performance of the CookMate stoves, which are more efficient than traditional (baseline) charcoal stoves¹ as they reduce the heat loss, and hence charcoal consumption.

During the life of the project, research and development work may result in more efficient ECS designs, subject to the appropriate tests proving real and measurable quantity of charcoal saved.

Figure 1: The CookMate Design

				
	Size	Diameter (cm)	Circumference (cm)	Height (cm)
	1	24	74	28
	2	27	80	28
	3	30	92	28

¹ The baseline stove is the traditional coal pot, used in most urban areas of Ghana.

(b) Relevant dates for the project activity

The following are the key relevant milestones of the project activity:

- a) Programme of activity (PoA), including CPA01, registration: 30/11/2012
- b) Installation of stove manufacturing equipment: October 2012
- c) Stove production start: November 2012
- d) Factory relocation and equipment upgrade: December 2013
- e) Cutting and punching machine breakdown: January 2014
- f) First Monitoring period: 01/01/2013 to 31/03/2014
- g) Second Monitoring period: 01/04/2014 to 31/07/2015
- h) Third Monitoring period: 01/08/2015 to 30/06/2016
- i) Second CPA02 inclusion into the PoA: 12/02/2016

C.2. Location of CPAs

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- a) Host Party(ies): Ghana
- b) Region/ State/ Province: Geographical boundary of the country of Ghana
- c) City/ Town/ Community: Geographical boundary of the country of Ghana
- d) Physical/ Geographical location: 8° 00' N, 2° 00' W for Ghana

C.3. Post-registration changes to CPAs**C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies or standardized baselines**

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None

C.3.2. Corrections

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The following corrections, which were approved by the EB after registration in the fourth PRC (PRC-8438-004) on 18th February 2019, were made to prior to this monitoring period on CPA01 and CPA02, which are the two CPAs considered in this Monitoring Report:

- a) Changes in the CPA-DDs due to change in version of the CDM-CPADD template (i.e. adopting the latest format of the CDM-PoA-DDFORM, Version 08.1)
- b) Deletion in section B.1 of the CPA-DDs, "Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass ($f_{NRB,y}$)"

All the above corrections have been notified to the secretariat as applicable from this monitoring period.

Notification date of the PRC: 28/12/2018.

Reference number of the PRC: PRC-8438-004.

C.3.3. Changes to the start date of the crediting period

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None

C.3.4. Inclusion of monitoring plan

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None

C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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The following permanent changes, which were approved by the EB after registration in the fourth PRC (PRC-8438-004) on 18th February 2019, were made to prior to this monitoring period on CPA01 and CPA02, which are the two CPAs considered in this Monitoring Report:

- a) The monitoring parameter, Quantity of charcoal used in the absence of the project activity per appliance ($B_{old,appliance,survey}$) has been moved from being a monitored parameter (section B.5.1) to parameter fixed ex-ante (section B.4.2).
- b) Monitoring frequency of the parameters “Annual energy saving per appliance”, “Annual number of appliances to reach small scale threshold” have been corrected to “annual”.
- c) Monitoring frequency of the parameters “ B_{old} ”, “ DO_y ” and “ η_{new} ” have been changed to “at least biennially”.
- d) 90/10 when annual monitoring is applied for each CPA separately and 95/10 when biennial or cross CPA sampling is applied

All the above changes have been notified to the secretariat as applicable from this monitoring period.

C.3.6. Changes to project design

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None

SECTION D. Description of monitoring system of CPAs

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The monitoring system in place established by the project follows the monitoring plan in the registered PoA-DD and CPA-DD.

At the CPA level, ClimateCare Limited provided guidance to CookClean Ghana Limited to collect the end user information, at the time of sale, via the *Warranty Card*. ClimateCare Limited made CookClean Ghana Limited staff aware of requirements and procedures for end user data collection.

To avoid double counting and enable tracking of the ECS for ex-post monitoring purposes, the necessary data was correctly obtained from the customers at the time of sale and recorded in the *Warranty Card*. The data collected included the following:

- a) Sale date of the stove
- b) Name of user
- c) Contact details of the user
- d) Serial number of the stove
- e) Stove size
- f) CPA number
- g) Agent/retailer name and location

The data collected is entered into the *Sales Database*. The number of stoves manufactured and sold are monitored through the *Sales Database* and the production records. The database is maintained electronically (Excel file) by CookClean Ghana Limited and is shared with the CME.

The CME checks the information in the *Sales Database* and verifies the reported sales with the number of stoves produced by the manufacturer. With the unique code (serial number) inscribed on each cook stove, it is possible to trace the stove from the users back to the production process and this assures against the occurrence of double counting.

On an annual basis, the number of stoves required to reach the small scale threshold of 180 GWh_{th} has been calculated and checked to verify that the small-scale threshold limit is not exceeded and the de-bundling requirements are met. The calculation used the latest available stove efficiency values that are monitored biennially.

All other monitoring parameters have been determined via cross-CPA single sampling as detailed in sections E below.

The collected data was analysed and used to prepare this biennial monitoring report for the two CPAs. The results of all monitoring was entered into both the individual CPA's and the CME's database.

Where a users has multiple number of stoves, those stoves have been excluded from the emission reduction calculations.

(a) Quality assurance/Quality control

In order to minimise errors, all personnel conducting field measurements, both for the collection of baseline data and annual monitoring of CPAs on behalf of the programme, are trained on the procedures to be used for data collection, including the formats in which data should be collected, basic functioning of the efficient stoves, any other relevant project background information and the management system put in place as part of the overall PoA..

This strategy for quality assurance and control includes a planning phase in which a clear definition of the target population, the issues and variables to be investigated, the sampling frames and sample sizes are determined, a distribution and random sample selection in the different strata of the population is defined, and the design of a questionnaire that reflects the objectives of the survey and facilitates field operations and information processing is prepared.

Response rates are maximised by contacting all randomly-selected stove users beforehand to arrange practical site visit dates. In case of any non-responses or non-availabilities during the pre-contacting, additional random sampling is conducted to achieve the required number of respondents. Through this process the required sample sizes have been realised. In cases where participants declined to participate in the monitoring survey, the reason is documented by the PAI.

All monitored data have been entered in appropriate records which are maintained by the CPAs and the CME. In case an error is made in data entry, original copies of all monitoring documents are kept and filed appropriately by each CPA for possible reference.

Reliability checks were carried out on the collected data in order to demonstrate that the required confidence/precision of 95/10 was met as summarised in the results tables in Section E.3.

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

Data / Parameter	η_{old}
Unit	Fraction
Description	Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of system is being replaced
Source of data	Default value in AMS-II.G, vers 04.0
Value(s) applied	10%

Choice of data or measurement methods and procedures	<p>According to the methodology, 0.10 default value may be optionally used if the replaced system is the three stone fire or a conventional system lacking improved combustion air supply mechanism and flue gas ventilation system i.e. without a grate and without a chimney.</p> <p>The replaced systems in the project area will be conventional system lacking improved combustion air supply mechanism and flue gas ventilation system.</p>
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	<p>According to the methodology, 0.10 default value may be optionally used if the replaced system is the three stone fire or a conventional system lacking improved combustion air supply mechanism and flue gas ventilation system i.e. without a grate and without a chimney.</p> <p>The replaced systems in the project area are conventional system lacking improved combustion air supply mechanism and flue gas ventilation system.</p>

Data / Parameter	L_{POA}
Unit	-
Description	Net-to-gross adjustment factor for PoA Leakage
Source of data	AMS-II.G; Version 04.0
Value(s) applied	0.95
Choice of data or measurement methods and procedures	As per the methodology AMS II.G, vers. 04.0, a default value as provided under par. 22 can be optionally used to account for PoA leakage, in which case estimates of the leakage are not required.
Purpose of data/parameter	Calculation of leakage emissions
Additional comment	The 0.95 PoA leakage factor will be applied to all CPAs

Data / Parameter	L_{NRB}
Data unit	-
Description	Net-to-gross adjustment factor for NRB Leakage (fixed parametric value of 0.95)
Source of data	AMS-II.G; Version 04.0
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	As per the methodology AMS II.G, vers. 04.0, a default value as provided under par. 13 can be optionally used to account for NRB leakage, in which case surveys are not required. See Part II, Section I.6.3 of PoA-DD for details.
Purpose of data/parameter	Calculation of leakage
Additional comment	The 0.95 PoA leakage factor will be applied to all CPAs

Data / Parameter	$EF_{projected_fossilfuel}$
Unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data	AMS-II.G; vers. 04.0
Value(s) applied	81.6
Choice of data or measurement methods and procedures	This is the IPCC default value as provided by AMS II.G (vers. 04.0), paragraph 5
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	This is the IPCC default value specified in AMS II.G (vers. 04.0), paragraph 5

Data / Parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	AMS-II.G; vers. 04.0
Value(s) applied	0.015
Choice of data or measurement methods and procedures	This is the IPCC default value as provided by AMS II.G (vers. 04.0), paragraph 5
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	This is the IPCC default value for non-renewable woody biomass that is substituted as specified in AMS II.G (vers. 04.0), paragraph 5.

Data / Parameter	$B_{old, appliance, survey}$
Unit	Tonnes per stove/year
Description	The average quantity of charcoal used in the absence of the project activity per appliance(stove)
Source of data	A survey of local baseline stove usage
Value(s) of monitored parameter	0.72
Choice of data or measurement methods and procedures	Determined once for each region as stated in the additional comment of registered CPA-DD. $B_{old, appliance, survey}$ is determined at 90/10 precision through appropriate sampling methods for the Kitchen Performance Test (KPT) protocol. B_{old} is calculated from $B_{old, appliance, survey}$ The KPT is carried out in accordance with national standards (if available) or international standards or guidelines e.g. the KPT procedures specified by the Partnership for Clean Indoor Air (PCIA); http://www.pciaonline.org/node/1049 .
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	This parameter is determined once for each region where the stoves are to be sold as per the registered CPA-DD. According to the registered CPA-DD, the parameter $B_{old, appliance, survey}$ is determined once and not monitored on a continuous basis, but stays constant throughout the crediting period. The determination of the parameter was done through a KPT during validation and covered the geographic region of Ghana, where the CPA is being implemented.

E.2. Data and parameters monitored

Data / Parameter	Annual energy saving per appliance
Unit	GWh
Description	Annual energy saving per appliance
Measured/calculated / default	Calculated
Source of data	Calculated from average charcoal saving per stove ($B_{y, saving, appliance}$) and $NCV_{charcoal}$
Value(s) of monitored parameter	0.0036
Monitoring equipment	-
Measuring/reading/ recording frequency	Annual

Calculation method (if applicable)	Calculated as product of $B_{y,saving, appliance}$, and $NCV_{charcoal}$ (taken as 0.0295 TJ/t) divided by the conversion factor (TJ/GWh taken as 3.6 from IPCC 2006 Tables)
QA/QC procedures	Use of nationally approved source of data
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	Used to verify that the de-bundling requirements are met. This is a calculated parameter (calculated using the values of fuel saved per appliance per year and the NCV of the fuel using the following steps; $B_{old, appliance} * (1 - (\eta_{old}/\eta_{new})) * N_y * NCV_{charcoal} * 3.6$ i.e. the fuel saved per appliance in tonnes/year is multiplied by NCV of charcoal in TJ/tonne and conversion factor to GWh. In the above calculation step, the monitored parameter is the efficiency of the stoves, while the rest of the parameters are fixed) which results to annual energy saving only. The calculation using values monitored annually or biennially will result to annual value only

Data / Parameter	Annual number of appliances to reach small scale threshold
Unit	Number
Description	Annual number of appliances to reach small scale threshold
Measured/calculated / default	Calculated
Source of data	Calculated from the annual energy saving per appliance
Value(s) of monitored parameter	50,312
Monitoring equipment	-
Measuring/reading/ recording frequency	Annual
Calculation method (if applicable)	Calculated as 180 divided by annual energy saving per appliance
QA/QC procedures	Use of nationally approved source of data
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	<p>This is a calculated parameter (calculated as 180 GWh_{th} divided by annual energy savings per year per appliance using the following steps: Annual small-scale energy saving threshold 180 (GWh) * 3.6 Conversion factor (TJ/GWh) = 648 Annual small-scale energy saving threshold (TJ). To get the number of stoves, you divide 648/Annual energy saving per stove (TJ/stove) to end up with total number of stove units which reach the limit). The above calculation gives the total number of units required to reach the small-scale limit. The calculation using values monitored annually or biennially will result to annual value only.</p> <p>Used to verify that the small-scale threshold limit is not exceeded and the de-bundling requirements are met.</p>

Data / Parameter	B_{old}				
Unit	Tonnes				
Description	Quantity of woody biomass used in the absence of the project activity				
Measured/calculated / default	Calculated				
Source of data	Calculated from $B_{old, appliance, survey}$ and N_y				
Value(s) of monitored parameter	<table border="1"> <tr> <td>CPA001</td> <td>326,215</td> </tr> <tr> <td>CPA002</td> <td>207,143</td> </tr> </table>	CPA001	326,215	CPA002	207,143
CPA001	326,215				
CPA002	207,143				
Monitoring equipment	-				
Measuring/reading/ recording frequency	At least biennial				

Calculation method (if applicable)	B_{old} is Calculated as the summation of the product of the average daily consumption of woody biomass per baseline stove ($B_{old, appliance}$) and the number of days the stove has been in use (Ref Excel sheet calculations)
QA/QC procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$f_{NRB,y}$
Unit	%.
Description	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass
Measured/calculated / default	Calculated
Source of data	FAO (2011): Global Forest Resource Assessment 2011, Country Reports (for the PoA participating Sub-Saharan Country); http://www.fao.org/forestry/country/en/
Value(s) of monitored parameter	99%
Monitoring equipment	N/A
Measuring/reading/ recording frequency	Once, at the time of inclusion of a CPA into the PoA.
Calculation method (if applicable)	Calculated as provided for in AMS-II.G, version 04.0
QA/QC procedures	Use of nationally approved source of data
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	Details on how $f_{NRB,y}$ is determined are provided in file " <i>Determination of NRB_Ghana</i> "

Data / Parameter	N_y				
Unit	-				
Description	Adjusted total number of stoves deployed until period y				
Measured/calculated / default	Calculated				
Source of data	Sales Database				
Value(s) of monitored parameter	<table border="1"> <tr> <td>CPA-001</td> <td>42,398</td> </tr> <tr> <td>CPA-002</td> <td>25,165</td> </tr> </table> <p>Refer spreadsheet for details</p>	CPA-001	42,398	CPA-002	25,165
CPA-001	42,398				
CPA-002	25,165				
Monitoring equipment	Sales records				
Measuring/reading/ recording frequency	Continuous				
Calculation method (if applicable)	The total number of stoves in use during the monitoring period multiplied by the correction factor for non-usage of stoves (Ref Excel sheet calculations).				
QA/QC procedures	Data is collected using the standard procedures and kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.				
Purpose of data/parameter	Calculation of baseline emissions				
Additional comment					

Data / Parameter	DO_y
Unit	%
Description	Statistically adjusted drop off rate from total population of appliances in period y
Measured/calculated / default	Calculated
Source of data	Sample survey of local project stove usage
Value(s) of monitored parameter	10.26
Monitoring equipment	Sampling
Measuring/reading/ recording frequency	At least biennially
Calculation method (if applicable)	<p>Monitoring of the statistically adjusted drop-off involves two steps:</p> <p>Step 1: Sample survey amongst stoves of the same type deployed under CPAs of the PoA as specified in section E.3 below.</p> <p>Step 2: Calculation of the adjusted drop-off rate at confidence level and precision as required by the methodology (AMS II.G. ver. 04.0) for the inspection frequency chosen, following the statistical standard approach for a homograde test of independent units that have a standard normal distribution.</p> <p>The Drop offs will be determined through interviews where it will be checked if the appliances are still operational during the biennial surveys, performed according to the sampling procedure described in section E.3.</p> <p>Interviews will be reported in a questionnaire.</p> <p>Checks are conducted until the required precision for this parameter is achieved. All questionnaires and information gathered during the sampling by the survey team are handed over to the coordinating managing entity that maintains an electronic database</p>
QA/QC procedures	<p>All formulas applied to determine the statistical precision are standard. According to AMS II.G (version 04.0), paragraph 21.</p> <p>Data was collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.</p>
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	The result of the DOy survey met the 95/10 confidence and precision level.

Data / Parameter	η_{new}						
Unit	%						
Description	Efficiency of the project stoves deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.						
Measured/calculated / default	Measured and calculated						
Source of data	Water Boiling Tests (WBTs)						
Value(s) of monitored parameter	<table border="1"> <tr> <td>Small</td> <td>41.63</td> </tr> <tr> <td>Medium</td> <td>40.51</td> </tr> <tr> <td>Large</td> <td>38.40</td> </tr> </table>	Small	41.63	Medium	40.51	Large	38.40
Small	41.63						
Medium	40.51						
Large	38.40						
Monitoring equipment	Laboratory Testing						

Measuring/reading/recording frequency	At least biennially, as per of AMS II.G version 04.0
Calculation method (if applicable)	The GACC Water Boiling Test (WBT) protocol (Version 4.2.3) was applied for this monitoring period. Since three different stoves of four different ages were distributed, for each size the average value was applied.
QA/QC procedures	Sampling and survey was carried out at 95% confidence interval and a 10% margin of error. In this case results show that 95/10 precision was achieved.
Purpose of data/parameter	Calculation of baseline emissions
Additional comment	The result of the WBT met the 95/10 confidence and precision level.

E.3. Implementation of sampling plan

>>

Due to the large number of ECSs sold under the CPAs, it was not economically feasible to monitor each individual ECS unit distributed. Therefore, a representative single cross-CPA sampling approach was applied as part of a PoA-wide Sampling Plan. This sampling approach was applicable because the two CPAs are homogenous (same design, manufactured in the same factory by CookClean, sold and used in Ghana). The sampling plan consisted of monitoring the following parameters mentioned in section E.2 above:

- Efficiency of the project stoves (η_{new})
- Statistically adjusted drop off rate from total population of appliances in period y (DO_y)
- The continued use of the baseline stoves

Based on the registered CPA-DDs, 95/10 confidence/precision level was applied for cross-CPA biennial sampling for the parameters mentioned above as per the registered PoA-DD.

Target Population

The target population for the application of the monitoring procedure were the users of the 75,826 CookMate stoves distributed and recorded under CPA01 and CPA02 in the *Sales Database* maintained by the PAI and CME. The stoves in the *Sales Database* are in three sizes (small, medium and large) with varying ages from 1 to 4 years.

Sampling Method

Stratified random sampling was applied since there are three sizes of stoves of four different ages. The total population of ECSs was stratified by size and age for the determination of η_{new} . For the determination of DO_y and the assessment of the continued use of the ECSs, the stoves were stratified by size only. The stratifications are as shown in the tables below. The details of the stratification are provided in the Excel Spreadsheet file *Stratified Samples_Surveys & WBT*.

Combined CPA01 and CPA02 Stoves Stratified by Age and Size for WBT

Age of Stove	Size of Stoves	Numbers of Stoves Sold	%
Year 1	Small	504	1%
	Medium	8,362	11%
	Large	1,577	2%
Year 2	Small	2,267	3%
	Medium	21,452	28%
	Large	3,684	5%
Year 3	Small	2,252	3%
	Medium	17,928	24%

	Large	2,698	4%
Year 4	Small	1,196	2%
	Medium	12,124	16%
	Large	1,242	2%
	Totals Sales	75,286	100%

Combined CPA01 and CPA02 Stoves Stratified by Size for DO_y Survey

Size	Number of Stoves	Proportion
Small	6,219	8%
Medium	59,866	80%
Large	9,201	12%
Totals Sales	75,286	100%

On each of the strata, simple random sampling was applied to select the stoves for the WBT and the survey to determine DO_y and to assess the continued use of the ECSs.

Sample Size

The minimum sample sizes for the determination of the monitored parameters were determined as per 'The Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities', Version 02.0 (EB 69, Annex 5) and the registered PoA-DD. The minimum sample sizes required for the determination of the different types of parameters (proportion and mean) were determined using different methods as described below.

a) Drop-off (DO_y) survey sample size calculation (proportion parameter)

For cross-CPA sampling, and the required applicable confidence level of 95/10, the following formula for stratified random sampling (As provided in the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities', Version 02.0; EB 69, Annex 5) was used to determine the sample size for the determination of the parameter 'Drop-off' (DO_y); a proportion parameter. (For details, please see the Excel Spreadsheet; file 'Stove Sales Record Data ER', tab 'Sample Size Drop off'):

$$n \geq t^2 \cdot N \cdot (SD^2/p^2) / (((N-1) \cdot 0.1^2) + (t^2 \cdot (SD^2/p^2)))$$

Where;

<i>n</i>	63	Minimum size of the sample
<i>N</i>	75,286	Size of the population
<i>t</i>	1.96	Confidence interval (taken as 1.96 for 95% confidence intervals)
<i>p</i>	0.86	Population proportion, set at 0.86 (the proportion of stoves still in use after 3 years assuming an annual drop off rate of 5%)
<i>l</i>	0.1	Represents the 10% relative precision
<i>SD</i> ²	0.12	Overall variance

The overall variance was calculated as follows:

$$SD^2 = \frac{(g_a \times p_a(1 - p_a)) + (g_b \times p_b(1 - p_b)) + (g_c \times p_c(1 - p_c)) + \dots + (g_k \times p_k(1 - p_k))}{N} \quad (44)$$

Applying the above approach, the minimum sample size was determined as 63 which was adjusted by 20% oversampling to 78 (with rounding off) to provide for eventualities as recommended in the *Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities*, version 03.0, paragraph 12, footnote 10. The table below is a summary of the sample size calculation for the determination of *DO_y* and continued use of the baseline stove.

Estimated Sample Sizes for Different Strata for *DO_y* Determination

Strata	Stove Numbers (g_a)	Propotional Sample Allocation	Oversample by 20%
Small	6,219	5	7
Medium	59,866	50	61
Large	9,201	8	10
Total Samples	75,286	63	78

For each strata, the number of samples was allocated, out of the total samples, in proportion to the strata population within the total stove population as shown in the table above.

b) Stove Efficiency (η_{new}) testing sample size calculation (mean parameter)

For the determination of the parameter ‘Stove Efficiency’ (η_{new}), which is a mean parameter, at 95/10 confidence level, stratified random sampling was used.

Following the guidance of paragraph 12 of *Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities*, version 03.0. and the ‘*Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities*’ (version 02.0), the minimum sample size was estimated as 4, having applied the following equation as provided in the *Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities*, Version 02.0 (EB 69, Annex 5). (See Excel Spread Sheet file ‘Stove Sales Record Data ER_Version 01’, tab ‘Sample Size WBT’):

$$n \geq \frac{1.96^2 NV}{(N-1) \times 0.1^2 + 1.96^2 V} \tag{43}$$

Where;

<i>n</i>	4	Minimum size of the sample
<i>N</i>	75,286	Size of the population
<i>t</i>	1.96	Confidence interval (taken as 1.96 for 95% confidence intervals)
$V=(SD/Mean)^2$	0.01	Overall variance divided by the mean squared

Since this value was less than 30 and in accordance with the the *Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities*, Version 02.0 (EB 69, Annex 5), a student t-distribution test was then carried out to adjust the 4 samples, bringing the total calculated sample size to 7 samples (See ER spreadsheet for details). Since each age of the stoves was to be tested, the 7 samples were distributed among the 12 age sets and a total number of stoves required came to 15 when rounding up to nearest whole number as shown in the table below (For details, please refer ER spreadsheet and Stratified Samples_Survey & WBT spreadsheet).

Sample Identification and Conducting the Survey and WBT

a) Drop-off (DO_y) and continued use of baseline stove survey

The total stove population of 75,286 was stratified by size (small, medium and large) and the required sample size was allocated in proportion to the strata population. Using the random function in Microsoft Excel, the required number of samples (7 small, 61 medium and 10 large), making the 78 stoves, were randomly sampled from each strata and their details extracted from the *Sales Database*. The respective users were then contacted by phone and their availability for the survey visit confirmed. There were 8 users who were reachable but not available for home visits while 1 user could not be reached. A second round of random sampling was therefore conducted on the strata, as required, to replace the 8 who were not available for visits. Again, out of the 8 sampled, 1 user could not be reached. The 2 users who could not be reached were counted as part of the survey but as drop-offs. The remaining 76 samples were visited for the survey. The following was applied

The survey was conducted by trained CookClean staff and a questionnaire was administered. All the data collectors spoke the local language which enabled full understanding of any responses given by users, and any questions arising. Excluding the 2 non-reachable samples which were counted as drop-offs, a total of 76 samples were visited and surveyed.

The following criteria was applied to analyse the survey results and to determine the drop offs (DO_y):

- i. Where a sampled user cannot be reached, the user is counted in the survey as a drop-off.
- ii. Those cases where the baseline stove was found to be still in use along the project stove were treated as drop-offs.
- iii. Those cases where the user had multiple project stoves but one stove was a large stove used for commercial purposes, both stoves were counted as in use. This is because in the baseline, such users would still use two stoves (1 for domestic and the other for commercial/restaurant application. This is considered conservative since even though the baseline stove emissions for the large stove are higher for commercial/restaurant application than for the medium stoves used for domestic application, the emission calculations applied the baseline emissions for the medium stove to large stoves also.
- iv. Where a user is found to have more than one small and or large stove during a survey, only one stove will be counted as in use for the determination of the drop-off. The other stoves will be considered as drop-offs.

The data collected was entered and analysed in an Excel Spreadsheet. The survey resulted in a DO_y value of 10.26% which was applied for both CPA01 and PA02 stove population adjustment (See ER spreadsheet and Stratified Samples_Survey & WBT spreadsheet for details).

In addition, for further conservativeness, all multiple stove users were not included in the emission reduction calculations.

b) Stove Efficiency (η_{new}) and WBT

The *Sales Database* was stratified by size and age of stove. For each stratum, the required number of samples was generated using the random function in Microsoft Excel. In total, 15 stoves were sampled for WBT (See ER Spreadsheet and Stratified Samples_Survey & WBT spreadsheet). Because one of the stove owners was not ready to give the stove for testing, a replacement stove was randomly sampled.

The 15 samples were sent to the Council for Scientific and Industrial Research-Institute for Industrial Research (CSIR-IIR) who carried out the WBTs in accordance with the GACC Water Boiling Test (WBT) protocol (Version 4.2.3) (Refer ER spreadsheet and Stratified Samples_Survey & WBT spreadsheet for details).

The stove efficiencies were determined as 41.63% for small stoves, 40.51% for medium stoves and 38.40% for large stoves.

Analysis of the Data

Analysss of the reliability of the results show that the 95/10 confidence and error level was met by both the DO_y survey and the WBT results.

For detailed calculations, reference is made to the ER spreadsheet.

SECTION F. Calculation of emission reductions or net anthropogenic removals

F.1. Calculation of baseline emissions or baseline net removals

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As per the methodology AMS-II.G (version 04.0), it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs and that there are no project emissions.

Therefore, the emission reductions realised by the two CPAs covered by this monitoring report were calculated based on the formula below as per the registered PoA-DD:

$$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \times N_{y,i} \quad \text{Equation (1)}$$

Where:

Parameter	Small	Medium	Large	Value	Sources
ER_y	3.21	3.18	3.12	t CO ₂ e/yr	Calculated
$B_{y,savings}$	2.65	2.62	2.58	tonnes per device/yr	Calculated
$f_{NRB,y}$	0.99	0.99	0.99	fraction	Default country specific value for Ghana
$NCV_{biomass}$	0.015	0.015	0.015	TJ/tonne	IPCC default for wood fuel
$EF_{projected_fossilfuel}$	81.6	81.6	81.6	CO ₂ /TJ	IPCC default value
$N_{y,i}$	See excel for details	See excel for details	See excel for details		Sales records and monitored stoves in operating

Detailed calculation step are found in the Excel Spreadsheet file 'Stove Sales Record data ER'.

F.2. Calculation of project emissions or actual net removals

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From the methodology applied (AMS-II.G; Version 04.0), project emissions or net GHG removals by sinks are taken as 0 t CO₂e.

F.3. Calculation of leakage emissions

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Under the PoA, the two potential sources of leakage have been provided for by applying the default net to gross adjustment factor of 0.95 to account for leakages, in accordance with AMS II.G./Version 04.

F.4. Calculation of emission reductions or net anthropogenic removals

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
CPA: 8438-0001	266,433	0.0	0.0	0.0	266,433	266,433
CPA: 8438-0002	166,442	0.0	0.00	0.0	166,442	166,442
Total	432,875	0.0	0.0	0.0	432,875	432,875

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DDs

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante (t CO ₂ e)
CPA: 8438-0001	266,433	303,442
CPA: 8438-0002	166,442	290,902
Total	432,875	594,344

F.6. Remarks on increase in achieved emission reductions

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The actual GHG emission reductions achieved by the two CPAs covered by this report are less than the amount based on the ex ante estimation in the included CPA-DD.

Document information

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02.0	7 June 2017	Revision to: <ol style="list-style-type: none">1. Ensure consistency with version 01.0 of the “CDM project standard for programmes of activities (CDM-EB93-A07-STAN);2. Make editorial improvements.
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