

 <b>Monitoring report form for CDM programme of activities</b> <b>(Version 02.0)</b>								
Complete this form in accordance with the instructions attached at the end of this form.								
<b>MONITORING REPORT</b>								
<b>Title of the PoA</b>	Improved Cooking Stoves Programme of Activities in Africa							
<b>UNFCCC reference number of the PoA</b>	5341							
<b>Version numbers of the PoA-DD applicable to this monitoring report</b>	Version 3.2 dated 27/11/2012							
<b>Version number of this monitoring report</b>	4.0							
<b>Completion date of this monitoring report</b>	02/02/2019							
<b>Monitoring period number</b>	Fourth monitoring period							
<b>Duration of this monitoring period</b>	01/01/2017 - 31/12/2017 both days inclusive							
<b>Monitoring report number for this monitoring period</b>	1.0							
<b>Coordinating/managing entity</b>	Envirofit International Ltd.							
<b>Host Parties</b>	<table border="1"> <thead> <tr> <th>Host Party of the PoA</th> <th>Is this the host Party of a CPA covered in this monitoring report? (yes/no)</th> </tr> </thead> <tbody> <tr> <td>Kenya</td> <td>Yes</td> </tr> <tr> <td>South Africa</td> <td>No</td> </tr> </tbody> </table>	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)	Kenya	Yes	South Africa	No	
Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)							
Kenya	Yes							
South Africa	No							
<b>Sectoral scopes</b>	Sectoral scope: 3: Energy demand							
<b>Applied methodologies and standardized baselines</b>	AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass, version 03.0							
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period</b>	<table border="1"> <thead> <tr> <th>Amount achieved before 1 January 2013</th> <th>Amount achieved from 1 January 2013</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>99,963 tCO<sub>2</sub>e</td> </tr> </tbody> </table>	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	0	99,963 tCO <sub>2</sub> e			
Amount achieved before 1 January 2013	Amount achieved from 1 January 2013							
0	99,963 tCO <sub>2</sub> e							
<b>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</b>	163,532 tCO <sub>2</sub> e							

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## PART I Monitoring of programme of activities (PoA)

### SECTION A. Description of PoA

#### A.1. General description of PoA

>>

The purpose of the Programme of Activities (PoA) is dissemination of high efficiency improved cook stoves (ICS) in Kenya and South Africa. The PoA promotes improved cookstove (ICS) technologies that replace existing, less efficient cooking stoves using woody-biomass (charcoal or wood-fuel).

The ICS distributed under the PoA are portable and use charcoal or woodfuel as fuel. These ICSs are more efficient in transferring heat from the fuel to the pot, thus saving charcoal/woodfuel compared to the traditional charcoal/woodfuel stoves currently used by the project households. Furthermore, these ICSs have been designed not only to increase heat transfer, but also to match traditional utensils and cooking habits of project households.

In accordance with version 3.0 of the small-scale CDM methodology AMS-II.G, in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. Therefore, by reducing the amount of fuel required for cooking and thus the use of non-renewable woody biomass, the replacement of less efficient stoves with more efficient ICS reduces the amount of greenhouse gases (GHG) emitted into the atmosphere.

Envirofit International Ltd (Envirofit) is the coordinating/managing entity (CME) for this PoA and coordinates the efforts of different Distribution Organizations (DOs) who are involved in distribution of ICS within the boundary of the PoA and comply with the requirements of this PoA. Each DO sells ICSs either directly or through retailers, entrepreneurs or other agents sub-contracted by the DO. The CME provides training and guidance on the correct distribution and monitoring procedures to each DO. Each DO acts individually, implementing the CPA(s) in accordance with local circumstances and the requirements prescribed by CME.

#### 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
<b>Title:</b> Improved Cooking Stoves Programme of Activities in Africa – CPA No. ##### <b>Identification:</b> Generic CPA-DD <b>Reference:</b> <a href="https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/T0ZKV3S1F2JH8RL75D9GQ6AMO4XNIC/view">https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/T0ZKV3S1F2JH8RL75D9GQ6AMO4XNIC/view</a> <b>Version:</b> 1.0	Version 3.2 dated 27/11/2012	Sectoral Scope 3: Energy Demand	AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass, version 03.0

#### 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)
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya) 5341-0001	<b>Title:</b> Improved Cooking Stoves Programme of Activities in Africa – CPA No. ##### <b>Identification:</b> Generic CPA-DD	Version 3.2 dated 27/11/2012	15/12/2012 – 14/12/2022	Yes
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00002 (Kenya) 5341-0002			01/01/2014 – 31/12/2023	Yes

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Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00003 (Kenya) 5341-0003	<b>Reference:</b> <a href="https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/T0ZKV3S1F2JH8RL75D9GQ6AM04XNIC/view">https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/T0ZKV3S1F2JH8RL75D9GQ6AM04XNIC/view</a> <b>Version:</b> 1.0		01/01/2014 – 31/12/2023	Yes
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00004 (Kenya) 5341-0004			01/04/2014 – 31/03/2024	Yes
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00005 (Kenya) 5341-0005			06/11/2017 – 05/11/2027	Yes
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00006 (Kenya) 5341-0006			06/11/2017 – 05/11/2027	Yes
Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00007 (Kenya) 5341-0007			06/11/2017 – 05/11/2027	Yes

## A.2. Coordinating/managing entity

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Envirofit International Limited is the CME for the PoA. The responsible person for completing the CDM-PoA-MR-Form are as follows:

Rohit Lohia  
Carbon Projects Development Manager  
Envirofit International  
[rohit.lohia@envirofit.org](mailto:rohit.lohia@envirofit.org)

## SECTION B. Implementation of PoA

### B.1. Description of implemented PoA

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Envirofit International Limited is the Coordinating and Managing Entity (CME) for the PoA. The Distributing Organization(DO) for the CPAs included in the PoA are as follows:

CPA	Name of DO	Status of CPA Implementation <sup>1</sup>
5341-0001	East Africa Energy (EAE)	Not implemented
5341-0002	Envirofit Kenya	Implemented
5341-0003	Envirofit Kenya	Implemented
5341-0004	Envirofit Kenya	Implemented
5341-0005	Envirofit Kenya	Not implemented
5341-0006	Envirofit Kenya	Not implemented
5341-0007	Envirofit Kenya	Not implemented

Envirofit Kenya Ltd. is the DO for the CPAs that have been implemented under the PoA so far and has subcontracted retailers/entrepreneurs (referred as dealers) for dissemination of project stoves. The implemented CPAs (5341-0002, 5341-0003 and 5341-0004) follow the same management system as follows:

<sup>1</sup> The CPAs that have not been implemented have not been monitored. Thus, zero CERs have been claimed for these CPAs (5341-0001, 5341-0005, 5341-0006 and 5341-0007) for this monitoring period.

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1. Envirofit provided instructions to various dealers to collect the end user information at the time of sales to make the stove eligible under the PoA. Envirofit made them aware of requirements of end user data collection. Guidance was provided to them on the correct procedures to be followed during distribution.
2. Envirofit maintains a PoA Distribution and Monitoring database. This database is a compilation of CPA distribution records. The database includes CPA wise list of stoves sales, based on following information, received from various dealers, collected at the time of sale, in CPA distribution record form:
  - a. Name of customer
  - b. Address / location of the customer
  - c. Stove unique serial ID number
  - d. Stove Model
  - e. Stove distribution date
  - f. Type of old stove replaced by ICS i.e. the fuel type used in the baseline – wood or charcoal.
3. Envirofit performed cross-checks on the ICS sales information received from the dealers via CPA distribution records. The CME's logo is clearly displayed on the CPA Distribution Record, with a copy retained by Envirofit. A unique stove id is punched on each stove and the same serial ID is mentioned on the CPA distribution record. Therefore, it is possible to identify each stove in the PoA with its unique serial ID number. The unique serial number linked to each stove and its association with a unique CPA bearing a CPA ID number eliminates any risk of double-counting of ICSs between CPAs.
4. Envirofit obtained the customer's approval during distribution to exclusively assign carbon rights to the CME as per the disclaimer specified on stove boxes / CPA distribution records.
5. Envirofit coordinated all ex-post monitoring activities in the PoA. In addition the Envirofit;
  - a. Implemented the monitoring plan,
  - b. Determined the sample size as per sampling plan and identified the samples to be monitored (the sampling plan has been applied across group of CPAs as detailed in section E.3 below)
  - c. Ensured the quality of monitoring data obtained through QA/QC
  - d. Used this data for emissions reduction calculations.
6. Envirofit checked and recorded the following key parameters in a CPA Monitoring Record. Key monitored parameters were:
  - a. Efficiency of project stoves ( $\eta_{new}$ )
  - b. Check if project stoves are operational and in use (SOF)
  - c. Check fraction of end users continuing to use baseline stoves ( $f_{old}$ )
  - d. If baseline stoves are being used, the consumption accounted for by the old stoves ( $\mu_{old}$ )
7. Calculated of emission reductions based on monitoring data collected and preparation of monitoring report.

Thus, by carrying out the aforesaid, Envirofit ensured that the PoA Operational and Management plan as given in section A.4.4.1 of registered PoA-DD is duly implemented for concerned CPAs.

#### B.2. Post-registration changes to PoA

##### B.2.1. Corrections

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NA

**B.2.2. Inclusion of monitoring plan**

>>  
NA

**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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NA

**B.2.4. Changes to programme design**

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NA

**PART II Monitoring of CPAs**

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This Monitoring Report covers three CPAs included in the concerned monitoring period. These CPAs have the same project boundary and follow a common generic CPA as identified in section A.1.1, Part I of this monitoring report. The following sections therefore represent all these three CPAs.

**SECTION C. Implementation of CPAs****C.1. Description of implemented CPAs**

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**(a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks;**

The purpose of the CDM Programme Activities (CPAs) is dissemination of improved cooking stoves (ICS) in the Republic of Kenya. The CPAs replace cooking stoves using charcoal / woodfuel with more efficient stoves using charcoal / woodfuel.

The project ICS are more efficient in transferring heat from the fuel to the pot, thus saving fuel compared to the baseline stoves which would have been used in the absence of the project activity. Furthermore, the ICSs applied in these CPAs have been designed not only to increase heat transfer, but also to match traditional utensils and cooking habits of people in Kenya.

**(b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria;**

The Envirofit stoves have been designed with the specific intention of maximizing thermal efficiency while simultaneously minimizing the production of toxic emissions. While many interrelated factors need to be considered in order to achieve these goals, primary aspects of stove performance were explored during the development of the stoves: 1) fuel and air mixing 2) heat transfer to the pot. In order to maximize temperature, the combustion chamber shape, fuel amount, and air flow through the stove all need to be considered and correctly coordinated. In order to use the available thermal energy in the most efficient manner possible, specific stove geometry and configuration choices were made; including reducing stove thermal mass and minimizing heat flux through the sides and bottom of the stove. In order to minimize emissions, the combustion chamber shape, fuel amount, and air flow rate through the stove all need to be considered and correctly coordinated in order to maintain a proper air to fuel mixture.

The following table details the implementation status of the CPAs along with technology involved:

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CPA	Type of Project stoves eligible	Stove models included <sup>2</sup>	Total number of stoves
5341-0001	Charcoal	--	0
5341-0002	Charcoal	CH2200, CH4400, CH5200, CH5300	23,965 <sup>3,4</sup>
5341-0003	Woodfuel	M5000	17,754
5341-0004	Charcoal and Woodfuel	CH2200, CH4400, CH5200, CH5300, ECCL, M5000	24,727
5341-0005	Charcoal and Woodfuel	--	0
5341-0006	Charcoal and Woodfuel	--	0
5341-0007	Charcoal and Woodfuel	--	0

The stove models referred above are shown below:

Woodfuel stoves



M5000

Charcoal Stoves



CH5200



CH2200



CH4400



CH5300



ECCL

Information required by Eligibility criteria

<sup>2</sup> At the end of monitoring period

<sup>3</sup> Section A.2, page 2 of the registered CPA-DD for CPA 5341-0002, clearly mentions, "CPA will have a maximum energy saving of less than or equal to 60/180 GWh<sub>th</sub>/year, thus staying within the micro/small-scale threshold. Based on the **estimated** energy savings, it is envisaged that 18,500 number of stoves will be distributed under the CPA." It must be noted that the CPA-DD does not restrict or set a limit on the number of stoves that may be implemented under the CPA and the number of stoves mentioned in respective CPA-DD is only an indicative number. As long as the micro/small-scale threshold is respected, the number of cookstoves under the CPA can change ex-post during the crediting period based on monitored performance. Refer ER calculator, worksheet 'ER calculations' where it has been demonstrated that even 23,965 stoves are contributing to only 86% of the methodology threshold of 180 GWh<sub>th</sub>/year

<sup>4</sup> Total number of eligible stoves implemented under the CPA is 27,704. Out of these, CH6600 stoves are not being considered for emission reduction calculations, hence the total stoves specified in table above is 23,965.

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Eligibility criteria # 3, 4 and 11 that require information related to project technology / infrastructure are discussed below:

No.	Eligibility criteria		Assessment for CPAs	
	Description	Conditions to be met	Means of proof	Confirmation
#3	Applicability of Methodology AMS-II. G -Technology type	The ICS uses one of the following fuel types: <ul style="list-style-type: none"> <li>Wood fuel</li> <li>Charcoal</li> </ul>	Technical specification of ICS provided	Refer D.1 (b) above for the type and number of stoves distributed in the CPAs till the end of the monitoring period. No other fuel type stove has been disseminated.
#4	Applicability of Methodology AMS-II. G – Minimum ICS efficiency/ specifications of technology including the level and type of service	The ICS has a minimum efficiency of 20% (AMS-II.G, V.3, para 1)	Technical specification of ICS provided (either from manufacturer's specifications or test results using the Emissions & Performance Test Protocol (EPTP))	Same as above. For all the stove models the manufacturer certified efficiency is more than 20%
#11	SSC Limit for CPAs	The annual energy savings of each CPA shall not go beyond the limits of 180 GWh <sub>th</sub> /year over the entire crediting period.  In the case of using option 1 to prove additionality under Eligibility Criteria 7, the limit shall be 60 GWh <sub>th</sub> /year over the entire crediting period.	The maximum number of ICS will be determined in each CPA-DD depending on the technology used (excel sheet will be provided to show calculated energy savings). If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD).	Refer ER calculator, worksheet 'ER Calculations' which demonstrates that CPAs meet 180 GWh <sub>th</sub> /year energy savings methodology threshold.

For detailed information on complete list of eligibility criteria refer the CPA-DDs available on UNFCCC website as mentioned in Section A.1.2, Part I of this monitoring report.

(c) **Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.);**

CPA	5341-0001	5341-0002	5341-0003	5341-0004	5341-0005	5341-0006	5341-0007
Start Date as per CPA-DD	01/01/2012	16/03/2012	06/09/2013	16/03/2012	05/07/2016	05/07/2016	05/07/2016
Date of sale of first	Not applicable	16/03/2012	03/04/2015	08/04/2012	Not applicable	Not applicable	Not applicable

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eligible stove included in the CPA							
Continued operation period	Not applicable	since 16/03/2012	since 03/04/2015	since 08/04/2012	Not applicable	Not applicable	Not applicable

(d) **Total GHG emission reductions or net GHG removals by sinks achieved in this monitoring period for the specific-case CPA(s), including information on how double counting is avoided**

CPA	Emission Reductions tCO <sub>2</sub> e
5341-0001	0
5341-0002	28,072
5341-0003	37,166
5341-0004	34,725
5341-0005	0
5341-0006	0
5341-0007	0
<b>Total</b>	<b>99,963</b>

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Each stove bears a unique serial ID punched on the stove. The same is recorded to trace the stove later and avoid double counting. Further, for each stove included under each CPA, information on the location of the stove has been collected by collecting address of the user at the time of sale in CPA Distribution Record. Thus, location of each stove in CPA distribution database can be traced. Please refer the ER calculator, worksheet 'CPA Distribution data' in which the sales information i.e. Stove unit details and the end user information for each stove is mentioned. The system of recording the unique serial on each stove along with its location serves toward avoiding couple counting of stoves amongst various CPAs.

## C.2. Location of CPAs

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All the CPAs have a common project boundary as follows:

Host Party(ies): Republic of Kenya

The geographical reference of the CPAs is determined by the location of the individual ICS households where the ICSs are distributed which is limited to the territorial area of the host country, Kenya. The capital of Kenya, Nairobi, is located at -1.283249, 36.816663. The distribution commenced in and around Nairobi and has expanded to further regions throughout Kenya.





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Further, for each stove under each CPA, information on the location of the stove has been collected by collecting address of the user at the time of sale in CPA Distribution Record. Thus, location of each stove in each of the CPAs can be traced. Please refer the ER calculator, worksheet 'CPA Distribution data' in which the sales information i.e. Stove unit details and the end user information for each stove are mentioned. This also serves toward avoiding couple counting of stoves amongst various CPAs.

### **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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NA

#### **C.3.2. Corrections**

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NA

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

>>  
NA

#### **C.3.4. Inclusion of monitoring plan**

>>  
NA

#### **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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NA

#### **C.3.6. Changes to project design**

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NA

### **SECTION D. Description of monitoring system of CPAs**

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Stoves were either distributed to end-users by Envirofit Kenya directly or via dealers sub-contracted by Envirofit. Any such third parties were trained by the Envirofit responsible for ensuring correct procedures according to the PoA are fulfilled.

At the CPA level, the dealers ensured that necessary data was correctly obtained from the customer and recorded in the CPA Distribution Record, firstly to avoid double counting and secondly to enable tracking of the ICS for monitoring purposes. This data captured included:

- a. Name of customer
- b. Address / location of the customer
- c. Stove unique serial ID number
- d. Stove Model
- e. Stove distribution date
- f. Type of old stove replaced by ICS r, i.e. the fuel type used in the baseline – wood or charcoal.

All other monitoring activities have been carried out at the PoA level, single stage sampling plan.

**SECTION E. Data and parameters****E.1. Data and parameters fixed ex ante**

(Copy this table for each data or parameter.)

Data/parameter	$Q_{\text{biomass}}$
Unit	Tonnes/year
Description	Annual average biomass consumption per appliance
Source of data	Historical data from literature, as allowed by the methodology
Value(s) applied	3.56 for charcoal 4.176 for woodfuel
Choice of data or measurement methods and procedures	As per registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Used for calculation of $B_{\text{old}}$

Data/parameter	$f_{\text{NRB},y}$
Unit	Fraction
Description	Fraction of woody biomass saved by the project activity in year $y$ that can be established as non-renewable biomass.
Source of data	FAO and IPCC
Value(s) applied	0.92
Choice of data or measurement methods and procedures	As per registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	

Data/parameter	$NCV_{\text{biomass}}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable biomass that is substituted
Source of data	2006 IPCC guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.015
Choice of data or measurement methods and procedures	As per registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/parameter	$EF_{\text{projected\_fossilfuel}}$
Unit	tCO <sub>2</sub> /TJ
Description	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data	2006 IPCC guidelines for National Greenhouse Gas Inventories
Value(s) applied	81.6
Choice of data or measurement methods and procedures	As per registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

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<b>Data/parameter</b>	<b><math>\eta_{old}</math></b>
Unit	Efficiency
Description	Efficiency of the system being replaced
Source of data	AMS-II.G version 03
Value(s) applied	0.129 for charcoal stoves 0.108 for firewood stoves
Choice of data or measurement methods and procedures	As per registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	

<b>Data/parameter</b>	<b>LAF</b>
Unit	Fraction
Description	Net to gross adjustment factor to account for leakages
Source of data	AMS-II.G version 03
Value(s) applied	0.95
Choice of data or measurement methods and procedures	As per registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

**E.2. Data and parameters monitored**

(Copy this table for each data or parameter.)

<b>Data/parameter</b>	<b><math>\eta_{new,y}</math></b>
Unit	Efficiency
Description	Efficiency of the system being deployed as part of the project activity
Measured/calculated/default	Measured
Source of data	As determined through sample testing of stoves by performing WBTs

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Value(s) of monitored parameter	<p><b>Thermometer:</b> Brand: Omega Model: Omegaette HH308 Type K Accuracy: +/- 0.3% reading +1°C Number of units: 1 S/N: 141203675</p> <p><b>Mass balance</b> Brand: Brabantia Model: SF-400 Accuracy: 1 gm Number of units: 5</p> <p><b>Moisture Meter</b> Brand: Delmhorst Model: J2000 Accuracy: +/- 0.2% Number of units: 1 S/N: 38784</p> <p>29.05% for Charcoal stoves in CPA 5341-0002 28.46% for Woodfuel stoves in CPA 5341-0003 29.92% for Charcoal stoves in CPA 5341-0004 28.46% for Woodfuel stoves in CPA 5341-0004</p>
Monitoring equipment	The equipment were either externally calibrated (Omegaette Thermometers) or were newly purchased (Mass Balance, Moisture Meter) at the time of use so measurements were done with the necessary guarantees.
Measuring/reading/recording frequency	WBTs were carried out for a sample of installed ICSs in operation in line with the PoA Sampling Plan on an annual basis.
Calculation method (if applicable)	EPTP Protocol
QA/QC procedures	WBTs were conducted in line with the guidance provided by the CME
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Weighted average efficiency has been calculated as more than one stove model has been distributed

Data/parameter	N <sub>all</sub>															
Unit	Number															
Description	Total number of stoves installed															
Measured/calculated/default	Calculated															
Source of data	CPA Distribution Records and logbooks															
Value(s) of monitored parameter	<table><tr><th>Parameter</th><th>5341-0002</th><th>5341-0003</th><th>5341-0004</th></tr><tr><td>N<sub>all</sub> - Charcoal</td><td>23,173</td><td>0</td><td>11,509</td></tr><tr><td>N<sub>all</sub> - Fuelwood</td><td>0</td><td>16,334</td><td>11,799</td></tr></table>				Parameter	5341-0002	5341-0003	5341-0004	N <sub>all</sub> - Charcoal	23,173	0	11,509	N <sub>all</sub> - Fuelwood	0	16,334	11,799
Parameter	5341-0002	5341-0003	5341-0004													
N <sub>all</sub> - Charcoal	23,173	0	11,509													
N <sub>all</sub> - Fuelwood	0	16,334	11,799													
Monitoring equipment	n/a															
Measuring/reading/recording frequency	<p>The CPA Distribution Records which provided the data used to calculate this parameter. This data was uploaded to the PoA Distribution and Monitoring Database maintained by the CME.</p> <p>The recording of the sales was done in a regular basis during the crediting period and the monitoring in a yearly basis.</p>															
Calculation method (if applicable)	Sum of all stove records in the CPA Distribution Database.															
QA/QC procedures																
Purpose of data/parameter	Calculation of baseline emissions															

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Additional comments	The sales data has been adjusted based on the samples reported using more than one ICS in the household
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<b>Data/parameter</b>	<b>SOF</b>						
Unit	Fraction						
Description	Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through sampling						
Measured/calculated/default	Measured						
Source of data	Survey of end user behaviour as part of the PoA Sampling Plan						
Value(s) of monitored parameter	<table> <tr> <th>Stove model</th><th>Value (fraction)</th></tr> <tr> <td>Charcoal</td><td>0.884</td></tr> <tr> <td>woodfuel</td><td>0.900</td></tr> </table>	Stove model	Value (fraction)	Charcoal	0.884	woodfuel	0.900
Stove model	Value (fraction)						
Charcoal	0.884						
woodfuel	0.900						
Monitoring equipment	Parameter determined through monitoring survey using a questionnaire, no monitoring equipment has been used						
Measuring/reading/recording frequency	Measured ex-post by investigation of the number of operational ICS installations within the sampled ICS. This was done on an annual basis as per the PoA monitoring requirements						
Calculation method (if applicable)	--						
QA/QC procedures	The CME provided training, guidelines and monitoring templates to ensure that the Monitoring Organization responsible for monitoring followed appropriate procedures.						
Purpose of data/parameter	Calculation of baseline emissions						
Additional comments	The $SOF_{charcoal}$ is applicable to CPA 5341-0002 and charcoal stoves in CPA 5341-0004. The $SOF_{wood}$ is applicable to CPA 5341-0003 and wood stoves in CPA 5341-0004.						

<b>Data/parameter</b>	<b><math>\mu_{old}</math></b>						
Unit	kg/year						
Description	The amount of woody biomass consumption that is consumed through the continued use of old stoves						
Measured/calculated/default	Measured as per option A of CPA-DDs						
Source of data	Data from survey of end user behaviour as part of PoA Sampling Plan combined with the same source of data as for $Q_{biomass}$						
Value(s) of monitored parameter	<table> <tr> <th>Stove model</th><th>Value (tonnes/year)</th></tr> <tr> <td>Charcoal</td><td>0</td></tr> <tr> <td>woodfuel</td><td>1.31</td></tr> </table>	Stove model	Value (tonnes/year)	Charcoal	0	woodfuel	1.31
Stove model	Value (tonnes/year)						
Charcoal	0						
woodfuel	1.31						
Monitoring equipment	Parameter determined through monitoring survey using a questionnaire, no monitoring equipment has been used						
Measuring/reading/recording frequency	<p>Measured ex-post by a representative sample of end users using the deployed ICS, as conducted in line with the PoA Sampling Plan. During the survey, the interviewer conducted an interview with the end user to identify how much the baseline (replaced) stove is being used. The value of <math>\mu_{old}</math> has been determined by comparing the number of meals cooked on traditional cookstove before and after ICS distribution multiplied with the baseline fuel consumption (<math>Q_{biomass}</math>).</p> <p>This was done on an annual basis as per the PoA monitoring requirements</p>						
Calculation method (if applicable)	Based on the registered CPA-DDs, this parameter has been calculated by multiplying the baseline Fuel Consumption, $Q_{biomass}$ , by the ratio of meals cooked by the traditional stove in operation before and after purchasing the Envirofit Stove as reported by households with continued usage of baseline stoves.						

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QA/QC procedures	The CME provided training, guidelines and monitoring templates to ensure that the Monitoring Organization responsible for monitoring followed appropriate procedures
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The $\mu_{old - charcoal}$ is applicable to CPA 5341-0002 and charcoal stoves in CPA 5341-0004. The $\mu_{old - wood}$ is applicable to CPA 5341-0003 and wood stoves in CPA 5341-0004.

<b>Data/parameter</b>	<b><math>f_{old}</math></b>
Unit	Fraction
Description	The fraction of end users that are still using baseline (replaced) stoves
Measured/calculated/default	Measured
Source of data	Survey data of end user behaviour as part of the PoA Sampling Plan
Value(s) of monitored parameter	$f_{old - charcoal} = 0.000$ for charcoal stoves $f_{old - wood} = 0.144$ for woodfuel stoves
Monitoring equipment	Parameter determined through monitoring survey using a questionnaire, no monitoring equipment has been used
Measuring/reading/recording frequency	Measured ex-post by estimation of a representative sample of end users using the deployed ICS, as conducted in line with the PoA Sampling Plan. Sampling estimated the value of this parameter through monitoring the fraction of end users not using baseline stoves ( $f_{non old}$ ).  This was done on an annual basis as per the PoA monitoring requirements
Calculation method (if applicable)	Based on the registered CPA-DDs, the fraction of users not using the baseline stoves ( $f_{non old}$ ) has been monitored. Then $f_{old}$ has been calculated as $f_{old} = 1 - f_{non old}$
QA/QC procedures	The CME provided training, guidelines and monitoring templates to ensure that the Monitoring Organization responsible for monitoring followed appropriate procedures.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The $f_{old - charcoal}$ is applicable to CPA 5341-0002 and charcoal stoves in CPA 5341-0004. The $f_{old - wood}$ is applicable to CPA 5341-0003 and wood stoves in CPA 5341-0004.

Data/parameter	Stove <sub>year</sub>			
Unit	Year			
Description	Calculated average stove year in the monitoring period.			
Measured/calculated/default	Calculated			
Source of data	PoA Distribution and Monitoring Database			
Value(s) of monitored parameter	Parameter	5341-0002	5341-0003	5341-0004
	STOVE <sub>year - Charcoal</sub>	0.65		0.51
	STOVE <sub>year - Wood</sub>		0.91	0.80
Monitoring equipment	Not applicable			
Measuring/reading/recording frequency	Each ICS entered into the PoA Distribution and Monitoring Database was linked to a distribution date (recorded during distribution). Thus for any monitoring period it is possible to calculate the fraction of year covered by stoves for that monitoring period. The recording of the sales date was done in a regular basis during the crediting period and the monitoring on an annual basis.			
Calculation method (if applicable)	Average of stove year of all stoves included in CPA Distribution database.			
QA/QC procedures	The CME was responsible for overseeing the collection of data by DOs during distribution, training the DOs in correct data recording practices, maintaining a secure Database, and back up of files contained in the Database.			

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Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

### E.3. Implementation of sampling plan

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#### a) List of CPAs to which the single sampling was applied

The eligible stoves distributed under the CPAs included in the PoA are as follows:

**Table 1: CPA and Stove Installation**

CPA	Scale	Type of Project stoves eligible under CPA	Total number of stoves in the CPA	CPA monitoring period covered under this PoA monitoring period
5341-0001	micro	Charcoal	0	01/01/2017 – 31/12/2017
5341-0002	Small	Charcoal	23,965	01/01/2017 – 31/12/2017
5341-0003	Small	Woodfuel	17,754	01/01/2017 – 31/12/2017
5341-0004	Small	Charcoal and Woodfuel	24,727	01/01/2017 – 31/12/2017
5341-0005	Small	Charcoal and Woodfuel	0	05/11/2017 – 31/12/2017
5341-0006	Small	Charcoal and Woodfuel	0	05/11/2017 – 31/12/2017
5341-0007	Small	Charcoal and Woodfuel	0	05/11/2017 – 31/12/2017

No eligible stoves were distributed in CPA 5341-0001 till the end of monitoring period. Hence, no ERs are being claimed for CPA 5341-0001 for this entire monitoring period. CPA 5341-0002 to 5341-0004 have been monitored under single sampling plan for this monitoring period.

#### b) Description of implemented single sampling design;

Due to the large number of ICS distributed under the PoA it was not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling was undertaken as part of a PoA-wide Sampling Plan. The sampling plan consisted of monitoring the following four parameters mentioned in section D.2.:

Parameter	Description of parameter
$\eta_{\text{new}}$	The thermal efficiency of the ICS distributed (%)
SOF	The Stove Operating Fraction, i.e. the fraction of users using the ICS
$f_{\text{old}}$	The fraction of stove users still using baseline (replaced) stoves
$\mu_{\text{old}}$	The amount of woody biomass that continues to be used in the replaced stoves (kg)

Based on the registered PoA-DD and CPA-DDs for CPA 5341-0002, 5341-0003 and 5341-0004, 95/10 reliability level was selected for cross-CPA sampling for the four parameters mentioned above.

As per page 43 of the PoA-DD (PoA sampling plan), for the parameter  $\eta_{\text{new}}$ , the population of each stove model shall be deemed homogeneous across CPAs as the stoves have been designed to meet stringent efficiency specifications and are manufactured in factories to specification.

As per page 47 of the PoA-DD, for other parameters (SOF,  $f_{\text{old}}$ ,  $\mu_{\text{old}}$ ), the homogeneity of the population is demonstrated in compliance with the following conditions;

Homogeneity condition	Characteristic Population of	Status of population
Country	all units have been distributed in the same geographical area, i.e. Kenya	homogeneous

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Fuel Type – charcoal / wood fuel	There are two fuel type in the population: Charcoal and woodfuel.	Charcoal stoves have been considered as one sampling frame and wood fuel stoves have been considered as other sampling frame.
End user – domestic / small-medium enterprises / community	all units are for domestic (household) usage as per their design	Homogeneous within each sampling frame
Stove Type - efficiencies are in a similar range defined as being within +/-10% of each other and they have other common design features	the stove models disseminated have efficiencies within +/-10% of each other	Homogeneous within each sampling frame

The initial target population were the stoves distributed and recorded under CPA 5341-0002, 5341-0003 and 5341-0004. The population was divided into two sampling frames based on fuel type. Simple Random Sampling approach was applied in each sampling frame separately to monitor the three parameters i.e. stove operation (SOF), fraction of traditional stoves still in operation ( $f_{old}$ ) and amount of woody biomass that continues to be used by the replaced stoves ( $\mu_{old}$ ). Thus, the sample size calculations for parameters SOF,  $f_{old}$ ,  $\mu_{old}$  were calculated considering PoA population under two sampling frames.

The following is the number of samples covered during the monitoring activity. Refer ER calculator worksheet 'Sampling plan' for more details on calculation of sample size for each parameter. The expected parameter values (mean, standard deviation and proportion) have been determined based on project developer's knowledge and experience as per para 12(b) and 12(c) of the Sampling and surveys for CDM project activities and programmes of activities, Version 07.0

Parameter	Total population (N)	Expected results	Reliability	Sample Size (n) required <sup>5</sup>	Samples covered during monitoring
$\eta_{new}$ (CH2200)	4,078	29.0% (mean); 2.9% (SD)	95/10	7	9
$\eta_{new}$ (CH4400)	12,151	29.0% (mean); 2.9% (SD)	95/10	7	10
$\eta_{new}$ (CH5200)	7,373	30.0% (mean); 3.0% (SD)	95/10	7	10
$\eta_{new}$ (CH5300)	10,250	31.0% (mean); 3.1% (SD)	95/10	7	10
$\eta_{new}$ (ECCL)	2,015	29.0% (mean); 2.9% (SD)	95/10	7	8
$\eta_{new}$ (M5000)	30,579	29.0% (mean); 2.9% (SD)	95/10	7	11
SOF <sub>charcoal</sub>	35,867	0.85 (proportion)	95/10	68	121
SOF <sub>wood</sub>	30,579	0.85 (proportion)	95/10	68	100
$f_{old}$ - charcoal	30,487	0.15 (proportion), $f_{non\ old} - charcoal = 0.85$	95/10	68	107
$f_{old}$ - wood	25,992	0.15 (proportion), $f_{non\ old} - wood = 0.85$	95/10	68	90

<sup>5</sup> In case of mean parameters, the 'sample size required' mentioned above is the Student T-distribution adjusted sample size, as the initially calculated sample size was less than 30. This is in accordance with para 13 of Sampling and surveys for CDM project activities and programmes of activities, Version 07.0



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$\mu_{old}$ - Charcoal	4,573	2,100 kg/year (mean); 210,0 (SD)	95/10	7	0 <sup>6</sup>
$\mu_{old}$ - Wood	3,899	1,780 kg/year (mean); 178,0 (SD)	95/10	7	13

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The stoves were selected by randomly assigning a number to each stove and sorting in increasing order from lower to higher number. Random numbers were generated using online random number generator and the numbers obtained were used to identify the samples from the population. A higher number of samples were monitored than that required to ensure that the desired precision / confidence is achieved as well as have sufficient number of samples that use both ICS and baseline stove for determining  $\mu_{old}$

**c) Collected data (electronic spreadsheets may be attached and referenced);**

Data was collected for SOF,  $f_{old}$  and  $\mu_{old}$  following a specially design survey form. The information collected was introduced into an electronic database, the CPA Monitoring Record. This survey form was design in a way that would allow the surveyor first to check the validity of the records from the CPA Distribution Records, and secondly to collect the necessary information from field visit for the ER calculations. In order to achieve the 95/10 reliability level for cross-CPA sampling few additional stoves were sampled from the database than that required (as mentioned in the table above) to cover for non-responses, if any.

As for the thermal efficiency of the stoves, water boiling tests were conducted using WBT protocol by PCIA as available on GACC website. The WBT tests conducted, were distributed across various models. Refer ER calculator worksheet "Survey Summary" and "WBT Test Results" for details on data collected during monitoring.

The monitoring suryes and WBTs were conducted from February 2018 – April 2018

**d) Analysis of the collected data;**

Analysis of the data monitored through sampling revealed the following results:

Parameter	Results	Units
Efficiency <sub>new</sub> CH2200	28.71%	%
Efficiency <sub>new</sub> CH4400	28.66%	%
Efficiency <sub>new</sub> CH5200	29.16%	%
Efficiency <sub>new</sub> CH5300	30.71%	%
Efficiency <sub>new</sub> ECCL	28.32%	%
Efficiency <sub>new</sub> M5000	28.46%	%
SOF <sub>charcoal</sub>	0.884	fraction
SOF <sub>wood</sub>	0.900	fraction
$f_{old}$ - charcoal	0.000	fraction
$f_{old}$ - wood	0.144	fraction
$\mu_{old}$ - Charcoal	0	tonnes/year
$\mu_{old}$ - Wood	1.31	tonnes/year

**e) Demonstration of whether the required confidence/precision has been met;**

<sup>6</sup>  $\mu_{old}$  Charcoal is used to determine the usage of baseline stove along with ICS, if applicable, for discounting  $B_{old}$  in line with para 20(b) of methodology AMS II.G. version 3.0 . This parameter is to be monitored only when the sampled users are found using baseline stoves along with ICS. In case of Charcoal ICS all samples monitored were found using ICS only and no sample was found using baseline stove along with ICS. Hence the parameter  $\mu_{old}$  Charcoal is not relevant for the concerned monitoring period and need not be monitored. Initially the sample size for  $\mu_{old}$  Charcoal was calculated based on an initial assumption of  $f_{old}$  as 15% (i.e. 15% pf users might be using baeline stove and ICS together). However, as the monitoring revealed that baseline stove users do not exist, the parameter is redundant for the concerned monitoring period.

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The following tables demonstrate the status of precision/confidence for each of the monitored parameters:

<b>SOF<sub>woodfuel</sub></b>	<b>0.900</b>	<b>Fraction</b>
Population Size	30579	number
Sample Size	100	number
Proportion for SOF <sub>woodfuel</sub>	0.900	fraction
Standard error of proportion for SOF <sub>woodfuel</sub>	3.00%	%
Precision for SOF <sub>woodfuel</sub>	6.52%	%
Result for SOF <sub>woodfuel</sub>	ok, acceptable	--

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<b>fold<sub>woodfuel</sub></b>	<b>0.144</b>	<b>Fraction</b>
Population Size	27521	number
Sample Size	90	number
Proportion for f <sub>n</sub> old <sub>woodfuel</sub>	0.856	fraction
Standard error of proportion for f <sub>n</sub> old <sub>woodfuel</sub>	3.70%	%
Precision for f <sub>n</sub> old <sub>woodfuel</sub>	8.48%	%
Result for f <sub>n</sub> old <sub>woodfuel</sub>	ok, acceptable	--

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<b>μold<sub>woodfuel</sub></b>	<b>1.3117</b>	<b>tonnes/y</b>
Population Size	3975	number
Sample Size	13	number
Mean for μold <sub>woodfuel</sub>	0.314	tonnes/y
Standard Deviation for μold <sub>woodfuel</sub>	0.046	tonnes/y
Standard error of Mean for μold <sub>woodfuel</sub>	1.27%	%
Precision for μold <sub>woodfuel</sub>	7.95%	%
Result for μold <sub>woodfuel</sub>	ok, acceptable	--

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<b>SOF<sub>charcoal</sub></b>	<b>0.884</b>	<b>Fraction</b>
Population Size	35867	number
Sample Size	121	number
Proportion for SOF <sub>charcoal</sub>	0.884	fraction
Standard error of proportion for SOF <sub>charcoal</sub>	2.90%	%
Precision for SOF <sub>charcoal</sub>	6.43%	%
Result for SOF <sub>charcoal</sub>	ok, acceptable	--

<b>fold<sub>charcoal</sub></b>	<b>0.000</b>	<b>Fraction</b>
Population Size	31717	number
Sample Size	107	number
Proportion for f <sub>n</sub> old <sub>charcoal</sub>	1.000	fraction
Standard error of proportion for f <sub>n</sub> old <sub>charcoal</sub>	0.00%	%
Precision for f <sub>n</sub> old <sub>charcoal</sub>	0.00%	%
Result for f <sub>n</sub> old <sub>charcoal</sub>	ok, acceptable	--

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<b>μold<sub>charcoal</sub></b>	<b>0.0000</b>	<b>tonnes/y</b>
Population Size	0	number
Sample Size	0	number
Mean for μold <sub>charcoal</sub>	NA	tonnes/y
Standard Deviation μold <sub>charcoal</sub>	NA	tonnes/y
Standard error of mean μold <sub>charcoal</sub>	NA	%
Precision for μold <sub>charcoal</sub>	NA	%
Result for μold <sub>charcoal</sub>	NA	--

<b>η<sub>new CH2200</sub></b>	<b>28.71%</b>	<b>%</b>	<b>Calculated</b>
total number of stoves	4078	number	PoA distribution Records
Sample Size for (η <sub>new CH2200</sub> )	9	number	Sampling Records
Mean	28.71%	%	Calculated
Standard Deviation	0.54%	%	Calculated

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Standard error of mean ( $\eta_{\text{newCH2200}}$ )	0.0018		Calculated
Precision for $\eta_{\text{newCH2200}}$	1.44%		Calculated
Result for $\eta_{\text{newCH2200}}$	ok, acceptable	--	Calculated

<b><math>\eta_{\text{new CH4400}}</math></b>	<b>28.66%</b>	<b>%</b>	<b>Calculated</b>
total number of stoves	12151	number	PoA distribution Records
Sample Size for ( $\eta_{\text{newCH4400}}$ )	10	number	Sampling Records
Mean	28.66%	%	Calculated
Standard Deviation	1.84%	%	Calculated
Standard error of mean ( $\eta_{\text{newCH4400}}$ )	0.0058		Calculated
Precision for $\eta_{\text{newCH4400}}$	4.59%		Calculated
Result for $\eta_{\text{newCH4400}}$	ok, acceptable	--	Calculated

<b><math>\eta_{\text{new CH5200}}</math></b>	<b>29.16%</b>	<b>%</b>	<b>Calculated</b>
total number of stoves	7373	number	PoA distribution Records
Sample Size for ( $\eta_{\text{newCH5200}}$ )	10	number	Sampling Records
Mean	29.16%	%	Calculated
Standard Deviation	0.33%	%	Calculated
Standard error of mean ( $\eta_{\text{newCH5200}}$ )	0.0010		Calculated
Precision for $\eta_{\text{newCH5200}}$	0.80%		Calculated
Result for $\eta_{\text{newCH5200}}$	ok, acceptable	--	Calculated

<b><math>\eta_{\text{new CH5300}}</math></b>	<b>30.71%</b>	<b>%</b>	<b>Calculated</b>
total number of stoves	10250	number	PoA distribution Records
Sample Size for ( $\eta_{\text{newCH5300}}$ )	10	number	Sampling Records
Mean	30.71%	%	Calculated
Standard Deviation	0.59%	%	Calculated
Standard error of mean ( $\eta_{\text{newCH5300}}$ )	0.0019		Calculated
Precision for $\eta_{\text{newCH5300}}$	1.38%		Calculated
Result for $\eta_{\text{newCH5300}}$	ok, acceptable	--	Calculated

<b><math>\eta_{\text{new ECCL}}</math></b>	<b>28.32%</b>	<b>%</b>	<b>Calculated</b>
total number of stoves	2015	number	PoA distribution Records
Sample Size for ( $\eta_{\text{newECCL}}$ )	8	number	Sampling Records
Mean	28.32%	%	Calculated
Standard Deviation	0.18%	%	Calculated
Standard error of mean ( $\eta_{\text{newECCL}}$ )	0.0006		Calculated
Precision for $\eta_{\text{newECCL}}$	0.54%		Calculated
Result for $\eta_{\text{newECCL}}$	ok, acceptable	--	Calculated

<b><math>\eta_{\text{new M5000}}</math></b>	<b>28.46%</b>	<b>%</b>	<b>Calculated</b>
total number of stoves	30579	number	PoA distribution Records
Sample Size for ( $\eta_{\text{newM5000}}$ )	11	number	Sampling Records
Mean	28.46%	%	Calculated
Standard Deviation	1.25%	%	Calculated
Standard error of mean ( $\eta_{\text{newM5000}}$ )	0.0038		Calculated
Precision for $\eta_{\text{newM5000}}$	2.95%		Calculated
Result for $\eta_{\text{newM5000}}$	ok, acceptable	--	Calculated

For detailed calculations refer ER calculator.

- f) **Demonstration of whether the samples were randomly selected and are representative of the population.**

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Stoves were selected by randomly after arranging them in chronological order of date of sale and assigning a number to each stove. Random numbers were generated using online random number generator available at <http://stattrek.com/statistics/random-number-generator.aspx> and the random numbers received were selected from sampling frame to identify the samples to the monitored. The approach ensured that the samples picked are random and represent the population.

### SECTION F. Calculation of emission reductions or net anthropogenic removals

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

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$$ER_y = B_{y,savings} \cdot f_{NRB} \cdot NCV_{biomass} \cdot EF_{projected\ fossil\ fuel}$$

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

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

Data Ex Ante	Value	Unit	Source
$Q_{biomass}$ (charcoal)	3.56	tonne/year	Ex-ante, CPA-DD
$Q_{biomass}$ (Firewood)	4.176	tonne/year	Ex-ante, CPA-DD
$f_{NRB}$	0.92	fraction	Ex-ante, CPA-DD
$NCV_{biomass}$	0.015	TJ/tonne	Ex-ante, CPA-DD
$EF_{fossil\_fuel}$	81.6	tCO <sub>2</sub> /TJ	Ex-ante, CPA-DD
Efficiency <sub>old</sub> (charcoal)	0.129	fraction	Ex-ante, CPA-DD
Efficiency <sub>old</sub> (firewood)	0.108	fraction	Ex-ante, CPA-DD
LAF	0.95	fraction	Ex-ante, CPA-DD

Data Ex Post	Value	Unit	Source
<b>Monitored</b>			
Efficiency <sub>new</sub> CH2200	28.71%	%	WBT Summary
Efficiency <sub>new</sub> CH4400	28.66%	%	WBT Summary
Efficiency <sub>new</sub> CH5200	29.16%	%	WBT Summary
Efficiency <sub>new</sub> CH5300	30.71%	%	WBT Summary
Efficiency <sub>new</sub> ECCL	28.32%	%	WBT Summary
Efficiency <sub>new</sub> MS000	28.46%	%	WBT Summary
SOF charcoal	0.884	fraction	Survey Summary
SOF wood	0.900	fraction	Survey Summary
$f_{old}$ - charcoal	0.000	fraction	Survey Summary
$f_{old}$ - wood	0.144	fraction	Survey Summary
$\mu_{old}$ - Charcoal	0	tonnes/year	Survey Summary
$\mu_{old}$ - Wood	1.31	tonnes/year	Survey Summary

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Data Ex Post	5341-0002
$N_{CH2200}$	405
$N_{CH4400}$	1089
$N_{CH5200}$	609
$N_{CH5300}$	292
$N_{ECCL}$	
$N_{MS000}$	
$N_{all}$ - Charcoal	2356
$N_{all}$ - Fuelwood	
STOVE <sub>year</sub> - Charcoal	0.9
STOVE <sub>year</sub> - Fuelwood	
Efficiency <sub>new</sub> - Charcoal	29.05%
Efficiency <sub>new</sub> - Fuelwood	
$B_{old}$ - Charcoal	67156.3
$B_{old}$ - Fuelwood	0.0
$B_{y,savings}$ - Charcoal	37,332.0
$B_{y,savings}$ - Fuelwood	
$B_{y,savings}$ - TOTAL	37,332.0
Total Annual Energy savings	155.5
Scale?	Sma
Capacity Utilization	86%
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Data Ex Post	5341-0002	5341-0003	5341-0004	Unit	Source
NCH2200	4055	0	23	number	Monitored - CPA database
NCH4400	10893	0	1258	number	Monitored - CPA database
NCH5200	6091	0	1282	number	Monitored - CPA database
NCH5300	2926	0	7324	number	Monitored - CPA database
NECCL	0	0	2015	number	Monitored - CPA database
NM5000	0	17754	12825	number	Monitored - CPA database
Nall - Charcoal	23173	0	11509	stoves	Calculated
Nall - Fuelwood	0	16334	11799	stoves	Calculated
STOVE <sub>year</sub> - Charcoal	0.65		0.51	fraction	Calculated
STOVE <sub>year</sub> - Fuelwood		0.91	0.80	fraction	Calculated
Efficiency <sub>new</sub> - Charcoal	29.05%		29.92%	%	Calculated
Efficiency <sub>new</sub> - Fuelwood		28.46%	28.46%	%	Calculated
B <sub>old</sub> - Charcoal	44844.66	0.00	17554.40	t biomass	Calculated
B <sub>old</sub> - Fuelwood	0.00	53192.31	33606.80	t biomass	Calculated
B <sub>y,savings</sub> - Charcoal	24,929.0		9,985.1	t biomass	Calculated
B <sub>y,savings</sub> - Fuelwood		33,004.9	20,852.4	t biomass	Calculated
B <sub>y,savings</sub> - TOTAL	24,929.0	33,004.9	30,837.6	t biomass	Calculated
Total Annual Energy savings	103.87	137.52	128.49	GWh	Calculated
Scale?	Small	Small	Small	-scale	
Capacity Utilization	58%	76%	71%	%	Calculated
ER <sub>y</sub>	28,072	37,166	34,725	tCO <sub>2</sub> e	Calculated

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

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As explained above, the methodology directly provides equation for emission reductions; without separate baseline, project or leakage emission reduction equations. Calculation of Emission Reductions has already been explained above as per the methodology. Thus, this section is not applicable

## F.3. Calculation of leakage emissions

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As explained above, the methodology directly provides equation for emission reductions; without separate baseline, project or leakage emission reduction equations. Calculation of Emission Reductions has already been explained above as per the methodology by application of Gross to Net Leakage adjustment factor of 0.95 to baseline emissions. Thus, this section is not applicable.

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

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
5341-0001	0	0	0	0	0	0
5341-0002	28,072	0	0	0	28,072	28,072
5341-0003	37,166	0	0	0	37,166	37,166
5341-0004	34,725	0	0	0	34,725	34,725
5341-0005	0	0	0	0	0	0
5341-0006	0	0	0	0	0	0
5341-0007	0	0	0	0	0	0
Total	99,963	0	0	0	99,963	99,963

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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 <sub>2</sub> e)	Amount estimated ex ante (t CO <sub>2</sub> e)
5341-0001	0	13,556
5341-0002	28,072	43,063
5341-0003	37,166	42,811
5341-0004	34,725	43,384
5341-0005	0	6,906
5341-0006	0	6,906
5341-0007	0	6,906
<b>Total</b>	<b>99,963</b>	<b>163,532</b>

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F.6. Remarks on increase in achieved emission reductions

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There is no increase in the GHG emission reductions or net GHG removals by sinks achieved by the specific-case CPA(s) during this monitoring period.

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Document information

Version	Date	Description
02.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 01.0 of the "CDM project standard for programmes of activities (CDM-EB93-A07-STAN);</li> <li>Make editorial improvements.</li> </ul>
01.0	1 April 2015	Initial publication.

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