



**Monitoring report form for CDM programme of activities
(version 01.0)**

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

MONITORING REPORT

| | | |
|---|---|---|
| Title of the programme of activities (PoA) | Improved Cooking Stoves Programme of Activities in Africa | |
| UNFCCC reference number of the PoA | 5341 | |
| Version number(s) of the PoA-DD(s) applicable to this monitoring report | Version 3.2 dated 27/11/2012 | |
| Coordinating/managing entity (CME) | Envirofit International Limited | |
| Version number of this monitoring report | Version 1 | |
| Completion date of this monitoring report | 04 May 2015 | |
| Monitoring period number and dates covered by this monitoring report | Monitoring Period: 01 Dates: 15/12/2012 - 31/12/2014, Both days inclusive | |
| Monitoring report number for this monitoring period | 01 | |
| Host Party(ies) | Host Party(ies) of the PoA | Is this a host Party to a specific-case CPA covered in this monitoring report?(yes/no) |
| | Kenya | Yes |
| Sectoral scope(s) | Sectoral Scope 3: Energy Demand | |
| Selected methodology(ies) | AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass, version 03.0 | |
| Selected standardized baseline(s) | Not applicable | |
| Total amount of GHG emission reductions or net GHG removals by sinks for all specific-case CPAs in the PoA covered in this monitoring report | GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012 | GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards |
| | 0 tCO ₂ | 31,784 tCO ₂ |

PART I - Programme of activities

SECTION A. Description of PoA

A.1. Brief description of the PoA

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The goal of the Programme of Activities (PoA) is to enable the distribution 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. Generic CPA(s)

| Title, identification/reference number and/or version number of the generic CPA(s) of the PoA | Sectoral scope(s) | Applied methodology(ies) or combination of methodologies and/or standardized baseline(s) |
|--|---------------------------------|---|
| Improved Cooking Stoves Programme of Activities in Africa – Generic CPA-DD (there is only one generic CPA-DD under the PoA) https://cdm.unfccc.int/filestorage/q/w/KG72QSRPWVAIC6905XM83LU14HBDNJ.pdf/SSC_Generic_CPA_PDD_rev3.2?t=ZWN8bm4zc3BvfDB0q8HoAmljof6JwWixr5x | Sectoral Scope 3: Energy Demand | AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass, version 03.0 |

A.1.2. Specific-case CPA(s) covered in this monitoring report

| Reference number of the specific-case CPA included in the PoA as of the end of this monitoring period | Title, identification/reference number and version number of the generic CPA to which the specific-case CPA applies | Crediting period dates of the specific-case CPA | Is this specific-case CPA covered in this monitoring report? (yes/no) |
|---|---|---|---|
| Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya) Version 3.2, dated 27/11/2012 https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/0F78GAM3QVPNLJDK2SHB91ZEC6TXO5/view | Improved Cooking Stoves Programme of Activities in Africa – Generic CPA-DD https://cdm.unfccc.int/filestorage/q/w/KG72QSRPWVAIC6905XM83LU14HBDNJ.pdf/SSCGeneric_CPA_PDD_rev3.2?t=ZWN8bm4zc3BvfDB0g8HoAmljoif6JwWixr5x | 15/12/2012 – 14/12/2022 | Yes |
| Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00002 (Kenya) Version 2.0, dated 11/10/2013 https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/NALJCOB2X1KVTYI9U867DHREGS05ZP/view | Improved Cooking Stoves Programme of Activities in Africa – Generic CPA-DD https://cdm.unfccc.int/filestorage/q/w/KG72QSRPWVAIC6905XM83LU14HBDNJ.pdf/SSCGeneric_CPA_PDD_rev3.2?t=ZWN8bm4zc3BvfDB0g8HoAmljoif6JwWixr5x | 01/01/2014 – 31/12/2023 | Yes |
| Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00003 (Kenya) Version 2.1, dated 18/10/2013 https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/UG1CJXBFO9IVDAPSZY3QN54M0R268/view | Improved Cooking Stoves Programme of Activities in Africa – Generic CPA-DD https://cdm.unfccc.int/filestorage/q/w/KG72QSRPWVAIC6905XM83LU14HBDNJ.pdf/SSCGeneric_CPA_PDD_rev3.2?t=ZWN8bm4zc3BvfDB0g8HoAmljoif6JwWixr5x | 01/01/2014 – 31/12/2023 | Yes |
| Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00004 (Kenya) Version 1.0, dated 27/10/2014 https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/LOXMAUNJQZKSFT295VYB8GH06734PC/view | Improved Cooking Stoves Programme of Activities in Africa – Generic CPA-DD https://cdm.unfccc.int/filestorage/q/w/KG72QSRPWVAIC6905XM83LU14HBDNJ.pdf/SSCGeneric_CPA_PDD_rev3.2?t=ZWN8bm4zc3BvfDB0g8HoAmljoif6JwWixr5x | 01/04/2014 – 31/03/2024 | Yes |

A.2. Contact information of the coordinating/managing entity (CME) and/or responsible persons(s)/entity(ies)

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SECTION B. Implementation of PoA**B.1. Implementation of the management system of the 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 |
|----------|--------------------------|------------------------------|
| CPA00001 | East Africa Energy (EAE) | Not implemented |
| CPA00002 | Envirofit Kenya | Implemented |
| CPA00003 | Envirofit Kenya | Not implemented |
| CPA00004 | Envirofit Kenya | 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 (CPA00002 and CPA00004) follow the same management system as follows:

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 which the ICS replaced, i.e. the fuel type – 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 all stove boxes/warranty cards
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

- c. Ensured the quality of monitoring data obtained through QA/QC
 - d. Used this data for emissions reduction calculations.
6. Checked and recorded the following key parameters in a CPA Monitoring Record. Key monitored parameters were:
- a. Efficiency of project stoves (η_{new})
 - b. Check if project stoves are operational and in use (SOF)
 - c. Check fraction of end users continuing to use replaced stoves (f_{old})
 - d. If replaced stoves are being used, the consumption accounted for by the old stoves (μ_{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. Implementation of single sampling plan(s)

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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 |
|----------|-------|---|-----------------------------------|--|
| CPA00001 | micro | Charcoal | 0 | 15/12/2012 – 31/12/2014 |
| CPA00002 | Small | Charcoal | 24,790 ¹ | 01/01/2014 – 31/12/2014 |
| CPA00003 | Small | Woodfuel | 0 | 01/01/2014 – 31/12/2014 |
| CPA00004 | Small | Charcoal and Woodfuel | 1,195 | 01/04/2014 – 31/12/2014 |

No eligible stoves were distributed in CPA00001 and CPA00003 till the end of monitoring period. Also, in CPA00004 only a small number of woodfuel stoves have been installed. Hence, no ERs are being claimed for CPA00001, CPA00003 and CPA00004 for this entire monitoring period. Only CPA00002 has been monitored under the 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 |
|-----------|--------------------------|
|-----------|--------------------------|

¹ Section A.2, page 2 of the registered CPA-DD, clearly mentions, “CPA will have a maximum energy saving of less than or equal to 60/180 GWh_{th}/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 24,790 stoves are contributing to only 64% of the methodology threshold of 180 GWh_{th}/year

| | |
|--------------|---|
| η_{new} | The thermal efficiency of the ICS distributed (%) |
| SOF | The Stove Operating Fraction, i.e. the fraction of users using the ICS |
| f_{old} | The fraction of stove users still using baseline (replaced) stoves |
| μ_{old} | The amount of woody biomass that continues to be used in the replaced stoves (kg) |

Based on the registered PoA-DD and CPA-DD for CPA00002, 95/10² reliability level was selected for cross-CPA sampling for the four parameters mentioned above.

The initial target population were the stoves distributed and recorded under CPA00002, in this case 24,790 stoves. Simple Random Sampling approach was applied. Since all the models of stoves distributed under the CPA00002 are similar (charcoal stoves) and were distributed to homogenous end users that is domestic households, it was decided based on Envirofit' experience that one single sampling frame would be appropriate for 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 (μ_{old}). Following the provision in the registered PoA-DD, the population is deemed homogeneous according to the following conditions;

- Geographical area of the project: all models are being distributed in the same geographical area, Kenya
- Fuel type: all models are charcoal model
- End users: all stoves are for domestic (household) usage as per their design.

For the thermal efficiency of the stoves(η_{new}), it was decided to have four sampling frames, one for each stove model, as no field experience / data on thermal efficiencies were available to confirm that stove models are indeed similar on their thermal efficiency.

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.

| Parameter | Total population (N) | Expected results | Reliability | Sample Size (n) required | Samples covered during monitoring |
|-----------------------|----------------------|----------------------------|-------------|--------------------------|-----------------------------------|
| SOF | 24,790 | 0.85 | 95/10 | 68 | 100 |
| $f_{non\ old}$ | 24,790 | 0.85 | 95/10 | 68 | 86 |
| μ_{old} | 24,790 | 1780 kg (mean); 356kg (SD) | 95/10 | 18 | 21 |
| η_{new} (CH2200) | 4,061 | 35.0% (mean); 3.5% (SD) | 95/10 | 7 | 7 |
| η_{new} (CH4400) | 10,893 | 30.0% (mean); 3.0% (SD) | 95/10 | 7 | 11 |
| η_{new} (CH5200) | 6,105 | 35.0% (mean); 3.5% (SD) | 95/10 | 7 | 7 |
| η_{new} (CH6600) | 3,731 | 30.0% (mean); 3.0% (SD) | 95/10 | 7 | 7 |

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

Data was collected for SOF, f_{old} and μ_{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 form 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.

² Although the PoA monitoring period is longer than 1 year (15/12/2012 – 31/12/2014), only CPA00002 is being monitored for this monitoring period. The crediting period of CPA00002 started from 01/01/2014 hence the applicable monitoring period for CPA00002 is 01/01/2014 – 31/12/2014. The confidence/precision has therefore been deemed as 95/10 as per page 43 of registered PoA-DD.

As for the thermal efficiency of the stoves, water boiling tests were conducted using EPTP (a water boiling test protocol developed by Shell Foundation and Envirofit). A total of 32 WBT tests were conducted distributed across various models as specified in the table above. Refer ER calculator worksheet “Survey Results” and “WBT Results” for details on data collected during monitoring.

d) Analysis of the collected data;

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

| Parameter | Results |
|-----------------------|------------|
| SOF | 0.860 |
| f_{old} | 0.3348 |
| μ_{old} | 2153.76 kg |
| η_{new} (CH2200) | 32.90% |
| η_{new} (CH4400) | 29.54% |
| η_{new} (CH5200) | 32.53% |
| η_{new} (CH6600) | 28.39% |

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

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

| η_{new} CH2200 | 32.90% | % | Calculated |
|---|----------------|--------|--------------------------|
| total number of stoves | 4061 | number | PoA distribution Records |
| Sample Size for ($\eta_{newCH2200}$) | 7 | number | Sampling Records |
| Mean | 33% | % | Calculated |
| Standard Deviation | 2% | % | Calculated |
| Standard error of mean ($\eta_{newCH2200}$) | 0.0070 | -- | Calculated |
| Precision for $\eta_{newCH2200}$ | 4.18% | % | Calculated |
| Result for $\eta_{newCH2200}$ | ok, acceptable | -- | Calculated |

| η_{new} CH4400 | 29.54% | % | Calculated |
|---|----------------|--------|--------------------------|
| total number of stoves | 10893 | number | PoA distribution Records |
| Sample Size for ($\eta_{newCH4400}$) | 11 | number | Sampling Records |
| Mean | 30% | % | Calculated |
| Standard Deviation | 3% | % | Calculated |
| Standard error of mean ($\eta_{newCH4400}$) | 0.0075 | -- | Calculated |
| Precision for $\eta_{newCH4400}$ | 5.00% | % | Calculated |
| Result for $\eta_{newCH4400}$ | ok, acceptable | -- | Calculated |

| η_{new} CH5200 | 32.53% | % | Calculated |
|---|----------------|--------|--------------------------|
| total number of stoves | 6105 | number | PoA distribution Records |
| Sample Size for ($\eta_{newCH5200}$) | 7 | number | Sampling Records |
| Mean | 33% | % | Calculated |
| Standard Deviation | 3% | % | Calculated |
| Standard error of mean ($\eta_{newCH5200}$) | 0.0111 | -- | Calculated |
| Precision for $\eta_{newCH5200}$ | 6.71% | % | Calculated |
| Acceptance of Result for $\eta_{newCH5200}$ | ok, acceptable | -- | Calculated |

| η_{new} CH6600 | 28.39% | % | Calculated |
|--|--------|--------|--------------------------|
| total number of stoves | 3731 | number | PoA distribution Records |
| Sample Size for ($\eta_{newCH6600}$) | 7 | number | Sampling Records |

| | | | |
|--|----------------|----|------------|
| Mean | 28% | % | Calculated |
| Standard Deviation | 2% | % | Calculated |
| Standard error of mean ($\eta_{\text{newCH6600}}$) | 0.0082 | -- | Calculated |
| Precision for $\eta_{\text{newCH6600}}$ | 5.66% | % | Calculated |
| Acceptance of Result for $\eta_{\text{newCH6600}}$ | ok, acceptable | -- | Calculated |

| | | | |
|------------------------------------|----------------|-----------------|-------------------|
| SOF | 0.860 | fraction | Calculated |
| Total number of charcoal stoves | 24790 | number | |
| Sample size for SOF | 100 | Number | Sampling Records |
| Project Stove Operating Fraction | 0.860 | fraction | Calculated |
| Standard error of proportion (SoF) | 0.0346 | -- | Calculated |
| Precision for SoF | 7.89% | % | Calculated |
| Acceptance of Result for SoF | ok, acceptable | | Calculated |

| | | | |
|---|------------------------|-----------------|-------------------|
| f_{old} | 0.3348 | fraction | Calculated |
| Sample Size for (f _{non old}) | 86 | | Sampling Records |
| Households with discontinued usage of baseline stoves (f _{non old}) | 0.756 | fraction | Calculated |
| Standard error of proportion (f _{non old}) | 0.0462 | | Calculated |
| Precision for f _{non old} | 11.99% | | Calculated |
| Acceptance of Result for f _{non old} | user lower bound value | | Calculated |

As per paragraph 11(a) of the Standard - Sampling and surveys for CDM project activities and programmes of activities, f_{non old} has been determined through sampling and f_{old} has been determined as f_{old} = 1-f_{non old}. As the desired precision for f_{non old} was not met from sampling hence as per paragraph 16 (b) (i) (a) of the aforesaid standard the lower bound value for f_{non old} has been determined as a conservative measure to determine f_{old}. For detailed calculations refer ER calculator, worksheet 'Survey Results'

| | | | |
|--|-------------------------|----------------|-------------------|
| μ_{old} | 2153.76 | Kg/year | Calculated |
| Sample Size for (μ _{old}) | 21 | | Sampling Records |
| Mean | 1.82 | | |
| Standard Deviation | 0.78 | | |
| Standard error of mean (μ _{old}) | 0.1709 | | Calculated |
| Precision for μ _{old} | 18.42% | | Calculated |
| Acceptance of Result for μ _{old} | user higher bound value | | Calculated |

As the desired precision for μ_{old} was not met hence as per paragraph 16 (b) (i) (a) of the aforesaid standard the higher bound value for μ_{old} has been determined as a conservative measure. For detailed calculations refer ER calculator, worksheet 'Survey Results'

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

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 a range from 1 to 24790 using online random number generator available at <http://stattrek.com/statistics/random-number-generator.aspx> and the random numbers received were selected from CPA00002 distribution database to identify the samples to be monitored. The approach ensured that the samples picked are random and represent the population.

SECTION C. Post-registration changes to the PoA (including the generic CPA(s))

C.1. Corrections

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NA

C.2. Inclusion of a monitoring plan to the registered PoA-DD (including its generic CPA-DD(s)), if a monitoring plan was not included at the time of registration

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NA

C.3. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline

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NA

C.4. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA

>>
NA

C.5. Types of changes specific to afforestation and reforestation activities

>>
NA

PART II - Specific-case component project activity(ies)

SECTION D. Description of specific-case CPA(s)

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This Monitoring Report covers all the four 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 four CPAs

D.1. Brief description of implemented specific-case CPA(s)

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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:

| CPA | Type of Project stoves eligible | Stove models installed ³ | Total number of stoves installed |
|----------|---------------------------------|-------------------------------------|----------------------------------|
| CPA00001 | Charcoal | -- | 0 |
| CPA00002 | Charcoal | CH2200, CH4400, CH5200, CH6600 | 24,790 |
| CPA00003 | Woodfuel | -- | 0 |
| CPA00004 | Charcoal and Woodfuel | M5000 | 1,195 |

The stove models referred above are shown below:

Woodfuel stoves

³ At the end of monitoring period



Figure 1: M5000

Charcoal Stoves



Figure 2: CH5200



Figure 3: CH2200



Figure 4: CH4400



Figure 5: CH6600

Information required by Eligibility criteria

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"> • Wood fuel • Charcoal | 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. These are same as that described in registered CPA-DDs and no model other than those described therein has been distributed. |
| #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 | Same as above. |

| | | | | |
|-----|--------------------|--|---|--|
| | | | (EPTP) | |
| #11 | SSC Limit for CPAs | <p>The annual energy savings of each CPA shall not go beyond the limits of 180 GWh_{th}/year over the entire crediting period.</p> <p>In the case of using option 1 to prove additionality under Eligibility Criteria 7, the limit shall be 60 GWh_{th}/year over the entire crediting period.</p> | <p>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).</p> | <p>Only CPA00002 has been monitored in the current monitoring period. Refer ER calculator, worksheet 'ER Calculations' which demonstrates that CPA00002 with 24,790 stove installations meets only 117.6 GWh_{th}/year (i.e. 64.53% of the 180 GWh_{th}/year savings methodology threshold).</p> |

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.);**

| Description | CPA00001 | CPA00002 | CPA00003 | CPA00004 | Reference |
|----------------------------------|----------------|------------|----------------|------------|---------------------------------|
| Start Date | 01/01/2012 | 16/03/2012 | 06/09/2013 | 16/03/2012 | Respective CPA-DD |
| Date of first stove distribution | Not applicable | 16/03/2012 | Not applicable | 10/01/2013 | PoA / CPA distribution database |

(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 ₂ e |
|--------------|--|
| CPA00001 | 0 |
| CPA00002 | 31,784 |
| CPA00003 | 0 |
| CPA00004 | 0 |
| Total | 31,784 |

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 'CPA00002 Distribution data' and 'CPA00004 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.

E.6. Changes to project design of the specific-case CPA(s)

>>
NA

E.7. Types of changes specific to afforestation and reforestation specific-case CPA(s)

>>
NA

SECTION F. Description of the monitoring system of specific-case CPA(s)

>>

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 which the ICS replaced, i.e. the fuel type – wood or charcoal.

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

SECTION G. Data and parameters**G.1. Data and parameters fixed ex ante, at registration, inclusion or renewal of crediting period**

(Copy this table for each piece of data and parameter)

| Data/parameter | Q_{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 |
| Choice of data or measurement methods and procedures | As per registered CPA-DD0002 |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | Used for calculation of B_{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-DD |
| Purpose of data | Calculation of baseline emissions |

| | |
|---------------------|--|
| Additional comments | |
|---------------------|--|

| | |
|--|--|
| Data/parameter | NCV_{biomass} |
| Unit | TJ/tonne |
| Description | Net calorific value of the non-renewable biomass that is substituted |
| Source of data | AMS-II.G version 03 |
| Value(s) applied | 0.015 |
| Choice of data or measurement methods and procedures | As per registered CPA-DD |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | - |

| | |
|--|--|
| 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 version 03 |
| Value(s) applied | 81.6 |
| Choice of data or measurement methods and procedures | As per registered CPA-DD |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | - |

| | |
|--|---|
| Data/parameter | η_{old} |
| Unit | Efficiency |
| Description | Efficiency of the system being replaced |
| Source of data | AMS-II.G version 03 |
| Value(s) applied | 0.129 |
| Choice of data or measurement methods and procedures | As per registered CPA-DD |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | |

| | |
|--|--|
| Data/parameter | LAF |
| 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-DD |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | - |

G.2. Data and parameters monitored*(Copy this table for each piece of data and parameter)*

| Data/parameter | η_{new} |
|---------------------------------------|--|
| 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 |
| Value(s) of monitored parameter | 30.65% |
| Monitoring equipment | Not applicable, the WBT is conducted via simple domestic apparatus |
| 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 | Calculation of baseline emissions |
| Additional comments | Weighted average efficiency has been calculated as more than one stove model has been distributed |

| Data/parameter | N_{all} |
|---------------------------------------|--|
| 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 | 23,765 |
| Monitoring equipment | n/a |
| Measuring/reading/recording frequency | 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. The recording of the sales was done in a regular basis during the crediting period and the monitoring in a yearly basis. |
| Calculation method (if applicable) | Sum of all stove records in the CPA Distribution Database. |
| QA/QC procedures | |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | 24790 stoves have been distributed under CPA00002. However, during the monitoring, presence of more than one Envirofit stove in the sampled household was checked. The reported value of parameter has been used to adjust N_{all} by discounting the total installations by the % of samples found using more than one stove. $23765 = 24790 * (1 - 4/100)$ as four samples reported having more than 1 Envirofit Stove (one additional stove in each of the four households) |

| Data/parameter | SOF |
|------------------------------|--|
| 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 | 0.860 |
| Monitoring equipment | No specific monitoring equipment has been used for the surveys. |
| 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) | 86 out of 100 stoves were found to be in operation (0.860 = 86/100) |
| 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 | Calculation of baseline emissions |
| Additional comments | - |

| | |
|---------------------------------------|---|
| Data/parameter | μ_{old} |
| Unit | kg/year |
| Description | The amount of woody biomass consumption that is consumed through the continued use of old stoves |
| Measured/calculated/ default | Measured |
| 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 | 2,153.76 kg/year |
| Monitoring equipment | No specific monitoring equipment has been used for the surveys. |
| 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. During the survey, the interviewer conducted an interview with the end user to identify how much the baseline (replaced) stove as being used. The value of μ_{old} has been determined by comparing the number of meals cooked on traditional cookstove before and after ICS distribution. This was done on an annual basis as per the PoA monitoring requirements |
| Calculation method (if applicable) | Based on the registered CPA-DD, this parameter has been calculated by multiplying the Total Annual Fuel Consumption, 3,560 kg/year, 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. |
| 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 | Calculation of baseline emissions |
| Additional comments | - |

| | |
|------------------------------|---|
| Data/parameter | f_{old} |
| 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 | 0.3348 |
| Monitoring equipment | No specific monitoring equipment has been used for the surveys. |
| 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 ($f_{\text{non old}}$). This was done on an annual basis as per the PoA monitoring requirements |
| Calculation method (if applicable) | Based on the registered CPA-DD, the fraction of users not using the baseline stoves ($f_{\text{non old}}$) has been monitored. Then f_{old} has been calculated as $f_{\text{old}} = 1 - f_{\text{non old}}$ The higher confidence interval of $f_{\text{non old}}$ has been selected since precision level has not been achieved. |
| 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 | Calculation of baseline emissions |
| Additional comments | - |

| | |
|---------------------------------------|--|
| Data/parameter | Stove_{year} |
| 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 | 0.88 |
| Monitoring equipment | No specific monitoring equipment has been used for the surveys. |
| 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. |
| Purpose of data | Calculation of baseline emissions |
| Additional comments | - |

G.3. Implementation of specific-case CPA level sampling plan

>>

A single sampling plan covering all specific-case CPAs covered in this monitoring report has been undertaken to estimate parameter values, therefore, this section is not applicable. Refer Section B.2 and the ER calculation spreadsheet.

SECTION H. Calculation of GHG emission reductions or net GHG removals by sinks

H.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

Where:

| Parameter | Value | Sources |
|------------------------------|-------------------------------|------------|
| $B_{y,savings}$ | 28,225 t _{biomass} | Calculated |
| $f_{NRB,y}$ | 0.92 | Ex ante |
| $NCV_{biomass}$ | 0.015 TJ/tonne | Default |
| $EF_{projected_fossilfuel}$ | 81.6 tCO ₂ /TJ | Default |
| ER_y | 31,784 tCO₂ | |

Where:

| Parameter | Value | Sources |
|------------------------------|-----------------------------------|--------------------------------|
| B_{old} | 48,735 t _{biomass} | Calculated |
| η_{old} | 12.9 % | Ex ante |
| η_{new} | 30.65% | Monitored (ex ante estimation) |
| B_{y,savings} | 28,225 t_{biomass} | |

Where:

| Parameter | Value | Sources |
|------------------------|-----------------------------------|-------------------------|
| LAF | 0.95 | Default |
| N_{all} | 23,765 stoves | Monitored. Sales record |
| SOF | 0.860 | Monitored. Survey |
| $Q_{biomass}$ | 3.56 t _{biomass} | Ex Ante |
| μ_{old} | 2,153.76 kg _{biomass} /a | Monitored. Survey |
| f_{old} | 0.3348 | Monitored. Survey |
| Stove _{year} | 0.88 | Monitored. Calculated |
| B_{old} | 48,735 t_{biomass} | |

H.2. Calculation of project emissions or actual net GHG removals by sinks

>>

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.

H.3. Calculation of leakage

>>

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.

H.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

| Specific-case CPA reference number | Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e) | Project emissions or actual net GHG removals by sinks (tCO ₂ e) | Leakage (tCO ₂ e) | GHG emission reductions or net GHG removals by sinks (tCO ₂ e) achieved in the monitoring period | | |
|------------------------------------|---|--|------------------------------|---|-----------------|---------------|
| | | | | Up to 31/12/2012 | From 01/01/2013 | Total amount |
| CPA00001 | 0 | 0 | 0 | 0 | 0 | 0 |
| CPA00002 | 31,784 | 0 | 0 | 0 | 31,784 | 31,784 |
| CPA00003 | 0 | 0 | 0 | 0 | 0 | 0 |
| CPA00004 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 31,784 | 0 | 0 | 0 | 31,784 | 31,784 |

H.5. Comparison of GHG emission reductions or net GHG removals by sinks with estimates in the included CPA-DD(s)

| Specific-case CPA reference number | Value estimated in ex ante calculation in the included CPA-DD(s) | Actual values achieved by the specific-case CPA(s) during this monitoring period |
|------------------------------------|--|--|
| CPA00001 | 13,556 | 0 |
| CPA00002 | 40,212 | 31,784 |
| CPA00003 | 42,811 | 0 |
| CPA00004 | 32,538 | 0 |
| Total | 129,117 | 31,784 |

H.6. Remarks on difference from the estimated value in the included CPA-DD(s)

>>

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.

Appendix 1. Contact information of coordinating/managing entity and/or responsible persons/entities

| | |
|--|---|
| Coordinating/managing entity and/or responsible person/entity | <input checked="" type="checkbox"/> Coordinating/managing entity <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM |
| Organization name | Envirofit International Ltd. |
| Street/P.O. Box | 109 N Colleague Ave Suite 200 |
| Building | - |
| City | Fort Collins |
| State/Region | Colorado |
| Postcode | CO 80524 |
| Country | United States of America |
| Telephone | - |
| Fax | +1 970 221-1550 |
| E-mail | - |
| Website | www.envirofit.org |
| Contact person | Nathan Lorenz |
| Title | Vice-president - Engineering |
| Salutation | - |
| Last name | Lorenz |
| Middle name | - |
| First name | Nathan |
| Department | - |
| Mobile | - |
| Direct fax | +1 970 221-2874 |
| Direct tel. | +1 970 372-2874 |
| Personal e-mail | nathan.lorenz@envirofit.org |

| | |
|--|---|
| Coordinating/managing entity and/or responsible person/entity | <input type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM |
| Organization name | Envirofit International Ltd. |
| Street/P.O. Box | 109 N Colleague Ave Suite 200 |
| Building | - |
| City | Fort Collins |
| State/Region | Colorado |
| Postcode | CO 80524 |
| Country | United States of America |
| Telephone | - |
| Fax | +1 970 221-1550 |
| E-mail | |
| Website | |
| Contact person | Rohit Lohia |
| Title | Carbon Project Development Manager |

| | |
|------------------------|--|
| Salutation | Mr |
| Last name | Lohia |
| Middle name | - |
| First name | Rohit |
| Department | - |
| Mobile | - |
| Direct fax | - |
| Direct tel. | - |
| Personal e-mail | rohit.lohia@envirofit.org |

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