CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.

(ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

Improved Cooking Stoves Programme of Activities in Africa – CPA No. 00001 (Kenya)
27/11/2012
Version 3.2

A.2. Description of the small-scale CPA:

The purpose of this CDM Programme Activity (CPA) is the dissemination of improved cooking stoves (ICS) in the Republic of Kenya (Kenya). The CPA will replace cooking stoves using charcoal fuel with more efficient stoves using charcoal fuel.

Stoves disseminated under this CPA are portable devices serving domestic charcoal users. These ICS are more efficient in transferring heat from the fuel to the pot, thus saving fuel (charcoal) compared to the charcoal stoves currently used by households. Furthermore, the ICSs applied in this CPA have been designed not only to increase heat transfer, but also to match the traditional utensils and cooking habits of the people in Kenya.

In line with CDM methodology AMS-II.G v.3 it is assumed that in the absence of the programme 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, the replacement of traditional stoves by ICS reduces the amount of greenhouse gases (GHG) CO_2 emitted into the atmosphere due to reduction of non-renewable woody biomass use by the ICS.

The proposed CPA is a voluntary action undertaken by the Coordinating/Managing Entity (CME), Envirofit International Ltd (Envirofit), a company based in the United States of America, and carried out by East Africa Energy Ltd (EAE), the Distributing Organisation (DO), a company based in Kenya.

The CPA will have a maximum energy saving of less than or equal to 60 GWh_{th}/year thus staying within the micro-scale threshold[3]. Based on the estimated energy savings, it is envisaged that about 6,000 stoves will be distributed under the CPA. By the start of the CPA crediting period, which as indicated in Section A.4.3.1 is expected to be 15 December 2012, it is anticipated that all 6000 of the ICS will be in operation. This is based on the following distribution schedule:

- January 2012-June 2012: 3000 units
- June 2012-December 2012: 3000 units

[3] Note: since the threshold is expressed in $MWh_{electric}$ (20 GWh/year), for type II project activities a factor of 3 is used for the conversion of electric to thermal installed capacity and hence the micro scale threshold for CPA energy savings is 60 $GWh_{thermal}$ per year. This approach was confirmed by the SSC-CDM Working Group in regards to the application of methodology AMS-II.G (Clarification F-CDM-SSCwg v.1 SSC_233).

The proposed CPA will be implemented by EAE (the DO), which has signed a contractual agreement with Envirofit (the CME) to participate in the PoA.

Contribution of the proposed CPA to sustainable development

Environmental benefits:

- *Greenhouse gas reductions:* The CPA will result in GHG reductions because it will reduce the consumption of non-renewable biomass in Kenya where the biomass harvested for fuel use is typically non-renewable, as will be demonstrated below.
- *Air quality:* Users (especially women and children) will be exposed to fewer air pollutants through reduced emission of not only CO_2, but also carbon monoxide (CO) and particulate matter. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory, cardiovascular and ocular diseases. According to the "Emissions and Performance Test Protocol", with emissions measurements based on the stove testing protocol developed by Colorado State University the average CO emissions results of the ICS to be installed show a percentage improvement above 60%, compared to a traditional metal charcoal stove[4].
- *Biodiversity:* will be improved as the CPA reduces pressure on remaining forest reserves in Kenya. Charcoal production for domestic energy supply is recognised by the Government of Kenya as being one of the major factors driving deforestation in the country[5].

Social and Economic benefits:

- *Employment:* The CPA will give rise to employment opportunities for new ICS distributors (sales people), assistants, office staff and other related jobs in Kenya. The establishment of an assembly plant on the outskirts of Nairobi is currently being investigated and its set up is planned for 2012. If carbon finance can be obtained to enable the CPA and hence the plant to go ahead in 2012, such a plant would also create employment for local workers. The size of the plant would be driven by the level of demand in Kenya and neighbouring countries and could be scaled-up over time.
- *Livelihood of the poor:* The circumstances of poor families will be improved since the project stoves reduce the amount of spending on fuel, providing financial savings over the medium-long term. Reduction in fuel consumption implies relief from drudgery and more opportunity for productive activity, education and family life arising from less time spent collecting fuel.
- *Access to energy services:* The ICS to be distributed require less fuel, which in many areas can be a scarce resource or very expensive to buy. The ICS are more convenient, due to shortening of the required cooking time.
- *Human and institutional capacity:* The CPA will facilitate capacity development among the staff employed by EAE and the many contractors that are to be engaged for distribution of ICS through the provision of trainings and workshops.

[4] Based on results for the Envirofit CH2200 and CH4400 stoves compared with a traditional metal jiko. See Envirofit product overview available at http://www.envirofit.org/products/?sub=cookstoves

[5], National Environmental Management Authority (2009): National Environment Action Plan Framework 2009-2013, Nairobi

The Government of Kenya has non-mandatory targets of increasing the penetration of improved charcoal cooking stoves to 100% in urban areas and 60% in rural areas by 2020, as well as increasing the efficiency of improved charcoal stoves[6]. The CPA will support the achievement of these objectives.

A.3. Entity/individual responsible for the small-scale CPA:

The entity responsible for the proposed CPA is East Africa Energy Ltd (EAE), based in Nairobi, Kenya (see Annex 1 for details). EAE is the Distributing Organisation (DO). EAE is not a registered project participant.

Envirofit International Ltd (Envirofit) is the coordinating/managing entity (CME) of the PoA. Envirofit is a registered Project Participant and the Focal Point for the PoA.

A.4. Technical description of the small-scale CPA:

Around 80% of Kenyan household energy needs come from biomass (woody biomass for fuelwood and charcoal production)[7]. In urban areas it has been estimated that 80% of households' woodfuel demand is met by charcoal, and even in rural areas, where woodfuel is the dominant energy source, charcoal has been estimated to account for around 30% of demand[8]. The woodfuel that is converted to charcoal is typically done so inefficiently and is often harvested illegally, despite the introduction of a permit system by the Kenyan Government. The impact on the remaining forest cover of the country is significant. For example, charcoal has been identified as one of the key reasons for the deforestation of the Mau Forest Complex, a quarter of which (some 100,000 hectares) has been destroyed since 2000[9]. The degradation and deforestation of rangelands, particularly around urban centers such as Nairobi, Mombasa, Nakuru and Kisumu has been attributed to charcoal production[10]. Over 95% of the kilns used in the country are considered to be inefficient, with conversion efficiencies in the range of just 8-20%[11]. The high level of charcoal use also leads to health impacts due to indoor air pollution (including carbon monoxide emissions) which disproportionately affects women and children. However, the charcoal industry has also been estimated to have a turnover of US$ 375 million per annum and is a major employer of Kenyans[12].

[6] UNEP (2006): Kenya: Integrated assessment of the Energy Policy. With a focus on the transport and household energy sectors. http://www.unep.ch/etb/areas/pdf/Kenya%20ReportFINAL.pdf

[7] National Environmental Management Authority (2009).

[8] Mutimba, S. (2005): Kenya Energy Atlas, UNDP, Nairobi;. These figures are also supported by Ministry of Energy (2002): Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments. KAMFOR Company Limited, Final Report. Nairobi, (2002)

[9] Government of Kenya (2009): p. 9.

[10] Ministry of Energy (2002)

[11] UNEP (2006): Kenya: Integrated assessment of the Energy Policy with focus on the transport and household energy sectors, P. 41. In the emissions reduction calculations in Section B.5.1 the IPCC default factor of 6 for conversion of charcoal to wood is used (i.e. an assumed average efficiency of 16.3%, which is thus conservative).

[12] Mutimba (2005).

Thus charcoal is a major source of energy and economic livelihood as well as a major environmental, social and economic policy challenge for the Kenyan Government.

The charcoal stoves (jikos) mainly used by households in Kenya at present include a mixture of traditional metal stoves and clay or cement lined stoves based on the Kenyan Ceramic Jiko (KCJ) design. The thermal efficiencies of traditional metal stoves can be as low as 10% - comparable to that of a three-stone fire[13]. KCJs vary considerably in terms of quality and efficiency (and price) due to limited quality control over local manufacturing as noted already in 2002: "An issue of concern however is the observed low quality of models of the KCJ available in the market. In particular, the ceramic lining that accounted for increased cooking efficiency has almost been exclusively substituted by concrete moulds, which are less durable."[14]. Thus it is difficult to say what the efficiency of the average "improved" stoves available on local markets is. The most common efficiency improvements resulting from insulation of charcoal stoves are in the range of 20-30% compared with the traditional metal stove, suggesting efficiencies of 12-13%[15].. High quality KCJs which have been designed and manufactured to a high standard can achieve efficiencies in the order of 20% or better.

The CPA will replace the existing cook stoves in households which burn charcoal fuel inefficiently with advanced cook stoves which burn charcoal fuel more efficiently (see below for details). The CPA will be implemented according to version 03 of the approved methodology *AMS-II.G - Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass.* This category comprises appliances involving efficiency improvements in the thermal applications of non-renewable biomass. This includes the introduction of the advanced improved cooking stoves such as those produced by Envirofit International.

Below are pictures of Envirofit's charcoal stoves that are envisaged to be distributed in this CPA.

Figure 1. CH2200 (left) and CH4400 (right) Charcoal Stoves

The Envirofit charcoal 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, two primary aspects of stove performance were explored during

[13] World Bank (2011): Household Cookstoves, Environment, Health, and Climate Change: A new look at an old problem, The World Bank, Washington , p.19; Ministry of Energy (2002), p.56

[14] Ministry of Energy (2002), p. 57

[15] Ministry of Energy (2002)

the development of the stoves: 1) charcoal surface temperature and 2) thermal sinks. 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. The other element is correctly positioning the cook piece in relationship to the stove. This was essential in order to establish the correct radiation view factor and gas flow path needed for optimum heat transfer.

The CH2200 stove has an average thermal efficiency of 38.2% and is therefore significantly more efficient than the stoves to be replaced (including the "improved" locally manufactured stoves); it also reduces carbon monoxide emissions by around 63%, making it highly beneficial from a health perspective[16]. The CH4400 stove encloses a majority of the combustion chamber so that some of the heat radiated from the charcoal is reflected back onto the coal bed. This rapidly increases the temperature of the charcoal, increasing the amount of heat that is transferred to the pot, with an average thermal efficiency of 31.4%; it also destroys 80% of the carbon monoxide that would be seen in a typical charcoal stove making it even cleaner than the CH2200 from a health perspective[17]. In order to achieve the very low carbon monoxide emissions, it is critical to get the inside of the stove to a very high temperature to destroy the carbon monoxide. By making the chamber hotter, more energy is lost through parasitic losses to the stove body. This reduces overall efficiency compared with the CH2200. In addition, since the CH4400 stove is bigger (see pictures above) and has a higher thermal mass, more energy is used in heating up the stove body. These two things account for the lower efficiency on the CH4400 compared with the CH2200.

Operational and management plan

Contractual obligations

The CME will coordinate the activities to be undertaken by the DO under this CPA. As part of the inclusion of the CPA under the PoA, an agreement will be signed by the DO - representing its staff and sub-contracted distributors - and the CME. The agreement will include, but is not limited to the following:

(i) Commercial arrangements between the CME and the DO;

(ii) Arrangements to pass on ownership of the carbon emission reduction rights from DO to CME;

(iii) Specific provisions and declarations that the CPA developer agrees that their activity is being integrated into the PoA;

(iv) Requirements that the CPA is implemented within the regulations and policy requirements of the host countries;

[16] Manufacturers' specifications based on certified test results from testing conducted by the Engines and Energy Conversion Laboratory at Colorado State University available at http://www.envirofit.org/products/?sub=cookstoves

[17] Manufacturers' specifications based on certified testing conducted by the Engines and Energy Conversion Laboratory at Colorado State University available at http://www.envirofit.org/products/?sub=cookstoves

(v) The DO's CDM-specific responsibilities and deliverables during the stove distribution to ensure accurate collection of information from customers;

(vi) A declaration that the CPA has not and will not be registered as a single CDM project, CPA of another PoA or a voluntary carbon market project; and

(vii) Provisions outlining the consequences of non-compliance with the above requirements.

Training and guidance

Suitable training will be provided by the CME to ensure that the DO is fully aware of the rules of the PoA and the correct protocol to be followed during ICS distribution, data collection and ex-post monitoring activities.[18] This includes provision of a *Distribution Manual* to guide the DO and any third parties sub-contracted by the DO. The DO will provide training of sub-contractors itself.

Distribution model

The DO (EAE) will purchase improved charcoal stoves from the CME (Envirofit). The DO will utilize its extensive direct sales network to distribute improved charcoal stoves to households on a door to door basis. The core team in EAE will be responsible for managing a group of experienced sales people - the "Team Leaders". Each Team Leader will be responsible for managing several sales people known as "Distributors". Distributors will be paid on a commission basis under a sub-distributor agreement with the Team Leader.

The diagram below provides an overview of the organisational hierarchy involved in the ICS distribution, showing the key contractual arrangements between EAE and its Team Leaders and Distributors.

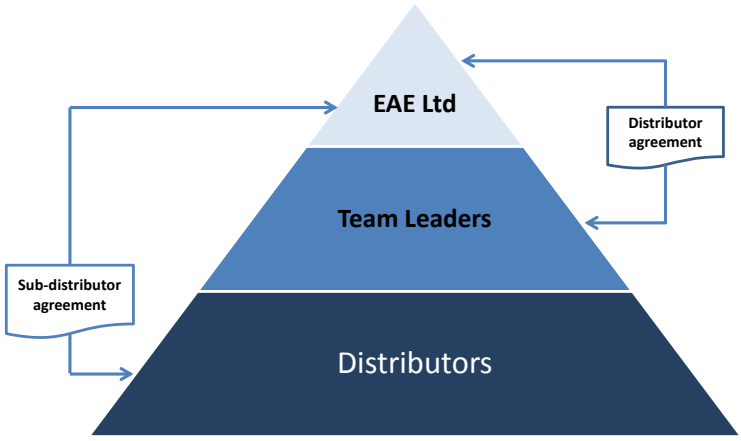

Figure 2: Distribution model - organisational hierarchy

[18] It is likely that for this CPA the CME will contract a third party instead of the DO to undertake the ex-post monitoring activities. In this case the training will be provided to that third party (likely to be either a local university based in Nairobi or a local marketing firm with experience in conducting door-to-door surveys).

The sale of ICS will take place primarily at the front door of the household through the Distributors. Initial interest will be generated by the demonstration of the stove benefits in a local area (e.g. public market) and where appropriate via advertising campaigns in local media. Users will also receive guidance from the Distributor on how to clean and maintain the ICS at the time of sale. A warranty is offered for all Envirofit stoves, giving the customer an added incentive to provide correct contact information at the time of sale. The warranty guarantees the combustion chamber of the Envirofit stoves for 5 years. In this time the customer is able to obtain a replacement stove or part if their stove is found to be defective or stops working properly.

Collection of data

The Team Leaders will be trained by the DO to ensure correct procedures are fulfilled during the distribution. The DO is fully responsible to ensure the correct distribution process and data gathering, as is required of the DO by its agreement with the CME. In turn, the DO and the Team Leaders will link remuneration to the complete and accurate collecting of information during the distribution of stoves (see below).

The Distributors will be required to collect a range of information about the end user of each stove to ensure that the end user is not registered as part of another CDM project, is not double counted within the same PoA and in order to enable tracking of the stove during monitoring. The following information is to be recorded by the Distributor in each CPA Distribution Record (a paper form which has been developed by the CME) at the time of distribution:

- Name/Identification of end user;
- The phone number of the end-user (if available);
- Alternate phone number (e.g. close relative) (if available/necessary);
- Geographical location (fixed address if possible, alternatively other means of locating the stove such as GPS coordinates could be used);
- Serial ID number of ICS (visible on a metal plate riveted to the bottom of the stove and on a sticker on the cardboard box containing the stove);
- Type of old stove being replaced (in the case of this CPA, charcoal stoves);
- Model of ICS (Envirofit stove) being distributed;
- Date of distribution;
- Distributor ID number.

In addition to the Envirofit logo being fixed on each of the ICS units, each CPA Distribution Record clearly displays the logos of both the CME, Envirofit International, and the DO, East Africa Energy. Therefore, this document demonstrates that the corresponding ICS with its unique serial ID number has been distributed to that specific customer under the PoA to which this CPA belongs, and not under another PoA managed by a different CME and/or a CPA implemented by a different DO. Each customer can prove that their stove was distributed under the Envirofit PoA by East Africa Energy as he/she retains a carbon copy of the CPA Distribution Record and can present this during verification. If any customer is unable to do so, for example if they have misplaced it, there are two other copies retained by the DO and the CME as back up and these can be made available during verification.

Figure 3 below provides a graphical overview of the operational and management structure described above, showing responsibilities for distribution, data collection and data verification.

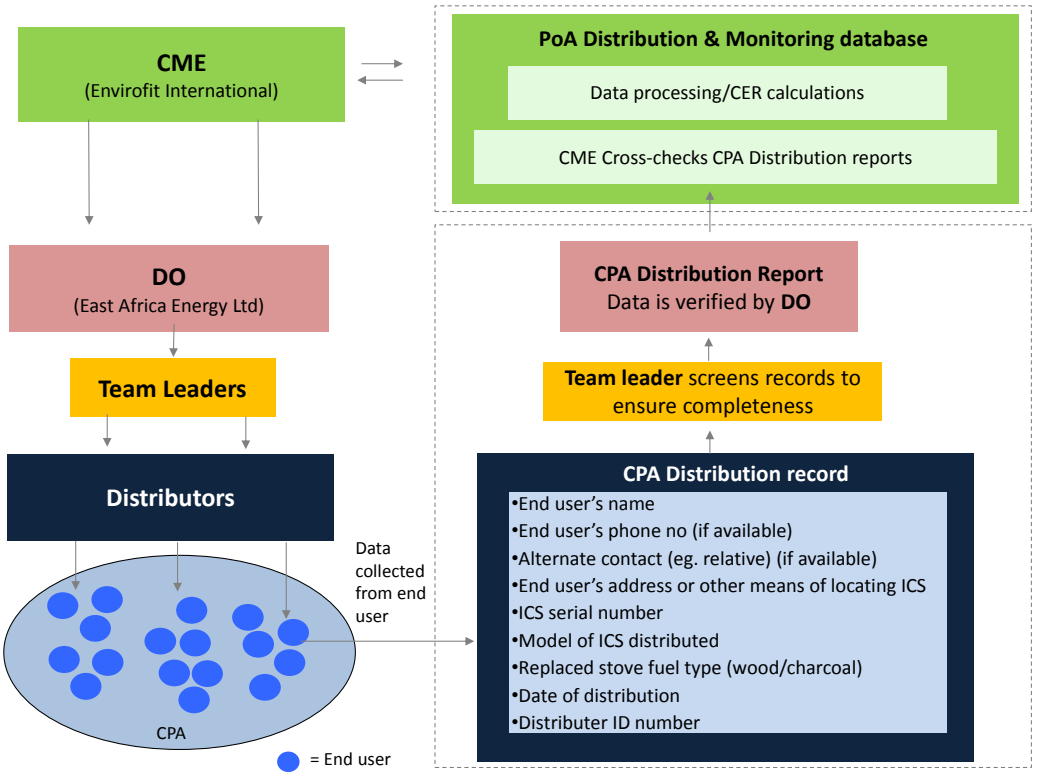

Figure 3: Operational structure and key responsibilities for data collection

Transfer of carbon rights

At the time of sale, the Distributor will obtain the customer's approval to assign his or her exclusive carbon rights to the CME by way of a signature on the paper-based CPA Distribution Record. In the case of customers who cannot sign a thumb print will be obtained. In addition, a sticker will be placed on each box making the end user aware that the revenues from emissions reductions resulting from the use of the stove are being used to subsidise the sale price of the stove.

Transfer of information to the CME

The data contained in CPA Distribution Records will be compiled by the DO and entered directly into the CME's database via an online server. The data is entered in an Excel-based spread sheet format that is referred to in the diagram above as a CPA Distribution Report. This approach has been designed to integrate data seamlessly with the CME's master database covering all CPAs under the PoA (see below for details – this means that the data is always stored securely on the CME's server). The data from each CPA Distribution Record will be accessible to the CME in real time as it is entered by the DO.

Incentive structure

Team Leaders and Distributors are incentivized to fill out the CPA Distribution Records correctly. Team Leaders responsible for each distribution area will undertake an initial screening of CPA Distribution Records before transferring them to the DO. The DO is then responsible for checking the accuracy of the information provided by the Team Leaders prior to compiling a CPA Distribution Report for the CME. As outlined in the contractual agreements between the CME and the DO, and between the DO and its Team Leaders and Distributors, the financial reward flowing to each of the parties is linked to the proper fulfillment of these duties. The contractual relationships are indicated in figure 2.

CME responsibilities

The CME will keep a record of the serial numbers of the ICS units distributed by the DO under this CPA and all other CPAs under the PoA. This will enable cross-checking of the data provided by each of the DOs to ensure no double counting of stoves across CPAs. The CME is responsible for cross-checking the data contained in the CPA Distribution Reports provided by the DO in order to confirm authenticity. If erroneous CPA Distribution Records are identified (e.g. inconsistency between sales claimed by DO and stove serial numbers supplied to the DO) these will not be included in the emissions reduction calculations. Double counting of emissions reductions will be avoided because each CPA and each ICS distributed will have a unique identification number. The CME will maintain the information required for emissions reduction calculations and verification in a secure electronic database, the "PoA Distribution and Monitoring Database". A CPA can be uniquely identified by its identification number allocated in the database and by the serial ID numbers associated with the ICS units that are distributed under that specific CPA. During monitoring it will thus be possible to distinguish between the individual stoves included under each CPA.

The CME is fully in control of the security of the Database and the data contained within it. The stove and customer data used for monitoring and emissions reduction calculations will never be stored on the DO's computers since it is uploaded in real time to the database which remains on Envirofit International's secure server. At present, the PoA Distribution and Monitoring Database is located on the CME's "Sharepoint" system. That system automatically backs up every night any files that have been modified, so there is a constant back up. The files are backed up onto two separate hard drives that are swapped out each month so there is always one drive offsite.

Archiving

The DO will send the original CPA Distribution Records or scanned copies of the paper originals to the CME as requested by the CME. The CME will ensure that all CPA Distribution Records (either original or scanned copy of original) are archived securely to enable verification by the DOE at a later point in time. Archives will be maintained for at least 2 years after end of crediting of each CPA or after last issuance - whichever is later. A copy of the PoA Distribution and Monitoring Database will be kept in an electronic format.

A.4.1. Identification of the small-scale CPA:

Improved Cooking Stoves Programme of Activities in Africa - CPA No. 00001 (Kenya)

A.4.1.1. Host Party:

Republic of Kenya (Kenya).

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

The boundary of the proposed CPA is determined by the location of the individual households where the ICSs are distributed and 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 will commence in and around Nairobi, where the headquarters of the CPA implementer, EAE are located, and will expand to further regions throughout Kenya.

Figure 4: Map of the Republic of Kenya (source: CIA World Factbook, 2011)

The identification of each ICS distributed is possible through the unique serial number attached to each stove, which will be uniquely assigned to an end user within the CPA. See photographs below showing the stove ID numbers, which will be located in two places: riveted to the side of each stove on a metal plate and on a sticker on the side of the cardboard box which contains each stove.

Figure 5: Stove ID numbers located on actual stove and box

This information will be stored securely by the CME in the PoA Distribution and Monitoring Database and will be available to the DOE during verification. Thus the CPA is uniquely defined by its geographic location, the stove ID numbers belonging to it and the associated end user locations.

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

01/01/2012

(This is the date of first shipment of the ICS to be distributed as indicated in the Bill of Lading from the port in China.)

A.4.2.2. Expected operational lifetime of the small-scale CPA:

10 years. The manufacturer of the ICS to be distributed under the proposed CPA, Envirofit International, has undertaken rigorous testing of the stoves both in the laboratory and the field and estimates that with an appropriate education and monitoring process the expected life of the current stove line should be in the range of 7-10 years.

A.4.3. Choice of the crediting period and related information:

Fixed crediting period.

A.4.3.1. Starting date of the crediting period:

15/12/2012

The crediting period start date is the date of registration of the PoA (EB 70, Annex 2).

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

10 years.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Project Year	Annual estimation of Emission Reductions (in tonnes CO_2e)
1 (15th to 31st December 2012)	565
2 (2013)	13,556
3 (2014)	13,556
4 (2015)	13,556
5 (2016)	13,556
6 (2017)	13,556
7 (2018)	13,556
8 (2019)	13,556
9 (2020)	13,556
10 (2021)	13,556
11 (January to 14th December 2022)	12,991
Total Emission Reductions (tonnes of CO_2e)	**135,560**
Total Number of crediting years	**10**
Annual average over the crediting period of estimated reductions	**13,556**

See the emissions reduction calculation sheet for more detailed information on the underlying assumptions and calculation steps for emission reduction calculation and the energy savings associated with each stove.

A.4.5. Public funding of the CPA:

No public funding has been received for the development or implementation of the CPA. Any third party funding that has been received has not resulted in the diversion of Official Development Assistance from any Annex I country. An official statement has been provided to this effect by the CME.

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

In accordance with paragraph 9 of Annex 32 to the EB47 Report, "Guidance for determining the occurrence of de-bundling under a Programme of Activities (PoA)," if each independent subsystem/measures included in the CPA of a PoA is no greater than 1% of the small scale threshold defined by the methodology applied, then that CPA of the PoA is exempted from performing the de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity.

The small scale threshold, as defined by AMS-II.G V.3, is a maximum energy saving of 180 GWh_{th}/year. Hence, 1% of the threshold is 1.8 GWh_{th}/year[19]. The estimated energy savings contributed by each ICS is only around 9.69 MWh_{th}/year, which is around 0.0054% of 180GWh_{th}/year

[19] As noted earlier, a factor of three is used for the conversion from an electric to thermal energy rating.

(see emissions calculation spreadsheet). Therefore, the CPA is exempted from the de-bundling check since the savings from the individual units by far do not exceed 1% of the SSC threshold.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

The CPA is neither registered as an individual CDM project activity nor is it part of another registered PoA. All ICS units distributed under this CPA are uniquely identifiable by a serial number and can be located on the basis of the information that will be collected and maintained by the CME.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

Improved Cooking Stoves Programme of Activities in Africa

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA:

The CPA meets all the eligibility criteria for inclusion as outlined in Section A.4.2.2. of the PoA-DD. This is demonstrated below:

No.	Eligibility criteria		Means of proof	Confirmation
	Description	**Conditions to be met**		
1.	Boundary and location of the CPA	The CPA is located within the boundary of one of the countries within the PoA boundary.	Location and boundary is specified in the specific CPA-DD and supported with GPS coordinates.	Yes (As indicated in A.4.1.2 the CPA is limited to Kenya, a country being within the PoA boundary, as listed in section A.4.1.1 of the PoA-DD)
2.	Avoiding double counting	The CPA includes a means of uniquely identifying the stoves to be distributed and the end-users who will receive stoves. This shall ensure no double counting of stoves within the PoA and ensure that stoves can be identified as belonging to this PoA and not to a PoA managed by any other CME.	Photo or similar proof that stoves have a unique serial ID number or other means of identification. For first CPA, document to be provided: stove	Yes (Stoves to be distributed each have a unique serial number, as indicated in figure 5 in the CPA-DD. These shall be stored in the PoA

			sales receipt ("CPA Distribution Record") showing CME and DO logos, end user details including name and address and stove ID number. For all subsequent CPAs, in addition to the sales receipt the programme logo shall be displayed on the stoves.	Database along with customer data. As this is the first CPA, the CPA Distribution Record has been provided, showing CME and DO logos, end user details and stove serial numbers. A copy is retained by the customer and can be presented during verification. Additional copies are held by the CME and DO.)
3.	Applicability of Methodology AMS-II.G - Technology type	The ICS uses one of the following fuel types: • Wood fuel • Charcoal	Technical specification of ICS provided	Yes (Manufacturer's specifications available at www.envirofit.org indicate that both models to be distributed (CH2200 and CH4400) are charcoal stoves)
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)[20])	Yes (Manufacturer's specifications show average thermal efficiencies, backed by the Emissions and Performance Report conducted by Colorado State University,

[20] Available at http://cdm.unfccc.int/filestorage/I/Z/X/IZX36AE84V1K5NOYQBSU0TWRHD2FGL/Stove%20Emissions%20and%20Performance%20Test%20Protocol.pdf?t=SnJ8bWU1N2V6fDCRpTWl-IHHWKJnPlObQUhM

				following the EPTP testing protocol: CH4400[21]: 31.4% CH2200[22]: 38.2%)
5.	Start date of CPA	The start date of the CPA shall be after the PoA validation start date (i.e. not prior to 13 December 2011, which was the date the PoA was made available online on the UNFCCC website for global stakeholder consultation).	The start date of the CPA will be specified in each CPA-DD and an appropriate proof will be provided (e.g. this could include, but need not be limited to a document showing the stove shipping date, document showing date on which local assembly started or some other means such as the date of contract closure between the CME and DO).	Yes (The start date of the CPA is 1 January 2012, which was the shipping date. See Bill of Lading)
6.	Applicability of Methodology AMS-II.G - Non-Renewable Biomass in use since Dec 1989	The first CPA in each country will demonstrate that non-renewable biomass has been in use since December 1989.	At least two of the factors listed in paragraph 10 of methodology AMS-II.G v.3 are shown to exist in the country	Yes (See Section B.5.2 for details)
7.	Additionality of CPAs	The CPA shall satisfy the latest version of the "Guidelines on the demonstration of additionality of small-scale project activities". Depending on whether the CPA is small scale or micro-scale, the CPA	The level of energy savings from the individual sub-systems and the overall CPA are estimated using	Yes (According to test 1 for micro-scale CPAs, the CPA size (total energy savings) is below

[21] http://www.envirofit.org/images/products/pdf/ch4400/CH4400SpecSheet_01262011.pdf

[22] http://www.envirofit.org/images/products/pdf/ch2200/CH2200SpecSheet.pdf

		shall satisfy one of the two additionality tests below (test 1 is for micro-scale CPAs and test 2 is for small-scale CPAs): 1. If the CPA size is below 60 GWh_{th}/year[23]: (a) The geographic location of the project activity is a LDC/SID or special underdeveloped zone of the host country as identified by the Government before 28 May 2010; or (b) The project activity is an emission reduction activity with both conditions (i) and (ii) satisfied; (i) Each of the independent subsystems/measures in the project activity achieves an estimated annual emission reduction equal to or less than 1.8 GWh_{th}/year; and (ii) End users of the subsystems or measures are households/communities/SMEs. 2. If the CPA size is between 60 and 180 GWh_{th}/year: (a) End users of the subsystems or measures are households/communities/SMEs; and (b) Each of the independent subsystems/measures in the project activity achieves an estimated annual emission reduction equal to or less than 9 GWh_{th}/year.	an Excel sheet or similar tool; the location of the CPA is defined in the CPA-DD; the end user groups are defined in the CPA-DD.	60 GWh_{th}/year (see Emissions Reductions spreadsheet with calculation of maximum number of stoves allowed for micro-scale threshold); and the project activity is an emission reduction activity with both conditions (b) (i) and (ii) satisfied)

[23] Note: a factor of 3 is used for the conversion of electric to thermal installed capacity and hence the energy output is expressed as 1.8GWh_{th}/year and the overall CPA limit is maximum thermal energy savings of 180 GWh per year. This approach was confirmed by the SSC-CDM Working Group in regards to the application of methodology AMS II.G (Clarification F-CDM-SSCwg ver 01 SSC_233).

8.	Official Development Assistance (ODA)	The CPA is either: a) not receiving any funding from Annex I parties; or b) the Annex I party funds do not result in a diversion of ODA.	a) Confirmation by the DO or CME b) Confirmed in the LoA of the host country	Yes (The CPA is not receiving any funding from Annex I parties. See statements provided)
9.	End-user group	The CPA is either aimed at households, community organisations (e.g. schools) or small/medium enterprises.	The CPA-DD specifies the target end-user group and the appropriate baseline (also see EC#17). Supporting documents could include but need not be limited to a copy of the CME's contract with the DO and/or agreements with distributors used by the DO.	Yes (The targeted end user group for this CPA is households (demonstrated by the CME contract with EAE) using charcoal stoves (demonstrated by the stove specification sheets)).
10.	Sampling	Sampling of stoves within the CPA must meet the requirements of AMS-II.G v.3 and the "Standard on Sampling and Surveys for CDM Projects and Programmes of Activities" (the Sampling Standard).	The CPA-DD either specifies a) sampling will be undertaken as part of the PoA Sampling Plan, and in Section B.6.1 describes how the PoA Sampling Plan is to be applied; or b) if CPA-specific sampling is to be undertaken, the CPA Sampling Plan must meet the requirements of AMS-II.G v. 3 and the Sampling Standard. The sampling approach shall follow the	Yes (Option a: Sampling will be undertaken as part of the PoA Sampling Plan, which is contained in the PoA-DD. The approach for applying the PoA Sampling Plan is described in Section B.6.1)

			approach outlined in the PoA Sampling Plan except where the methodology AMS-II.G and/or the Sampling Standard call for a different approach.	
11.	SSC Limit for CPAs	The annual energy savings of each CPA shall not go beyond the limits of 180 GWh_{th}/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_{th}/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[24].	Yes (The annual energy savings are not beyond the limits of 60 GWh_{th}/year over the entire crediting period – see emissions reduction spreadsheet).
12.	Exempted from de-bundling	Each ICS reduces energy consumption by less than 1% of the SSC threshold of 180GWh, or 1.8 GWh_{th}/year[25].	Specific energy savings for the applied ICS estimated using Excel sheet or similar tool.	Yes (The average energy savings of each ICS to be distributed is only

[24] As per EB 65, Annex 5, paragraph 83.

[25] According to the "Guidelines on assessment of debundling for SSC project activities, v03 (EB 54, Annex 13, par. 10) for determining the occurrence of debundling under a Programme of Activities (PoA)", if each of the independent subsystem/measures included in the CPA of a PoA is not larger than 1% of the small scale threshold defined by the methodology applied, then that CPA of the PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity.

				around 9 MWh/year or less, which is roughly 0.0054% of the 180GWh threshold. See emissions reduction calculations spread sheet)
13.	Contractual agreement	The DO has signed a contractual agreement with the CME to participate in the PoA. This agreement: • defines the ownership of the carbon emission reduction rights • covers the DO's distribution and monitoring related responsibilities • confirms that the ICS to be distributed under the CPA have not and will not be distributed under any other carbon project (CDM project, PoA or voluntary carbon market project) • cedes the DO's rights to the carbon credits generated from CPAs under the PoA to the CME	Contractual agreement in place between the DO and the CME including the CDM-specific responsibilities of the DO (e.g. in an Annex to the contract) If the CME is implementing the CPA itself, then this is not necessary.	Yes (Confidential Annex showing the contract between the CME and the DO relating to the CDM responsibilities of the DO has been provided)
14.	Local Stakeholder Consultation	A Local Stakeholder Consultation (LSC) must be conducted prior to inclusion of the CPA in the PoA. If a LSC has already been done at the national level for the first CPA in the country, and the LSC covered the issues relevant to this CPA, then the LSC does not need to be done again.	Copy of the report for the LSC that was conducted either for the first CPA in the country or for the particular CPA to be included in the PoA.	Yes (LSC report has been provided)
15.	Environmental Analysis	An Environmental Analysis must be conducted prior to inclusion of the CPA in the PoA. If the Environmental Analysis has already been done at the national level for the first CPA in the country, and the analysis covered the issues	If required, a copy of the EIA or exemption that was obtained either for the first CPA in the country or for the	Yes (Environmental Analysis is included in Section C and proof that no EIA was required

		relevant to this CPA, then the analysis does not need to be done again. Similarly, if an exemption has been obtained from a government agency exempting the CME from having to conduct an Environmental Impacts Assessment for the first CPA, then this shall count for all subsequent CPAs.	particular CPA to be included in the PoA. If neither of these is required, then CPA-DD should indicate whether there has been any environmental analysis undertaken already for the first CPA. If not, then environmental analysis must be undertaken in the CPA-DD.	by the National Environmental Management Authority has been provided)
16.	CPA crediting period does not exceed PoA life	The duration of the crediting period of each CPA to be included in the PoA shall not exceed the end date of the registered PoA.	CPA-DD shall indicate the duration of the CPA crediting period, either for a single 10 year crediting period or a 7 year renewable crediting period. The final date for which CERs can be credited shall be no later than 28 years after the date of registration of the PoA.	Yes (As indicated in Section A.4.4. the final date of crediting for this CPA is in September 2022)
17.	Baseline parameters to be established at CPA level	Each CPA shall demonstrate how the baseline parameters that are to be calculated at the CPA level have been determined, and shall do so applying the following the approaches: a) f_{NRB}: as per the approach outlined in detail in Annex 3 or using default values where available/approved	CPA-DD shall outline the approach and provide supporting documents including copies of any official government reports, statistics	YES (Approach taken for this CPA is as follows: a) f_{NRB}: as detailed in Section B.5; with separate excel file and

		by the host country DNA; b) B_{old}: as per the approach outlined in Section E.6.2, applying Option (a) of paragraph 7 of AMS-II.G v.3, using either historical data or a survey of local usage; c) n_{old}: as per the approach outlined in E.6.2, applying Option 2 of paragraph 6 of AMS-II.G v.3, using either national statistics, literature values or through representative sampling.	or literature sources used for determining parameters. If local surveys or representative sampling are used then copies of questionnaires, sampling design etc shall be provided.	supporting references provided; b) B_{old}: applying Option (a) of para 7 as detailed in Section B.5 and Annex 3, with supporting references provided; c) n_{old}: applying Option 2 of para 6 as detailed in Section B.5 and Annex 3, with supporting references provided.)

B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:

A CPA which is to be included under the registered PoA is considered to be additional, provided that:

1. The CPA meets the eligibility criteria for inclusion of a CPA in the PoA as set in section A.4.2.2.

   Yes, the CPA-DD in section B.2. proves that the CPA meets all eligibility criteria of the PoA.

2. The CPA is consistent with the current mandatory laws and regulations in the Host Country at the time of inclusion.

   Yes, since no mandatory laws and regulations in the Host Country (Kenya) exist requiring the introduction of ICS.

In case of micro-scale CPA:
The CPA is considered additional if it satisfies the latest micro-scale additionality requirements. According to the Guidelines for Demonstrating Additionality of Microscale Project Activities (EB 63 Report, Annex 23, para 3):
A CPA that is limited to energy savings of no more than $60GWh_{thermal}$ energy savings per year is additional if:

a. The geographic location of the project activity is a LDC/SID or special underdeveloped zone of the host country as identified by the Government before 28 May 2010; or

b. The project activity is an emission reduction activity with both conditions (i) and (ii) satisfied;

i. Each of the independent subsystems/measures in the project activity achieves an estimated annual emission reduction equal to or less than 1.8 GWh_{th}/year; and

Yes, since the individual stove stays below this threshold, as demonstrated in the emission reduction calculation spreadsheet.

ii. End users of the subsystems or measures are households/communities/SMEs

Yes, as outlined in section A.2. of the CPA-DD.

Therefore the additionality of the CPA has been demonstrated.

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

The project boundary is the geographical area where the ICS are distributed and in use and this is restricted to the geographical boundary of Kenya, which is located within the geographical boundary of the PoA as defined in Section A.4.1.1. of the SSC-PoA-DD. The table below illustrates the GHG emissions sources included:

Source		Gas	Included?	Justification / Explanation
Baseline	Combustion of non renewable biomass for cooking	CO_2	Yes	Major source of emissions
		CH_4	**No**	Minor source of emissions and limited data available. Exclusion is conservative assumption.
		N_2O	**No**	Minor source of emissions and limited data available. Exclusion is conservative assumption.
Project activity	Combustion of non renewable biomass for cooking	CO_2	Yes	Major source of emissions
		CH_4	**No**	Minor source of emissions and limited data available.
		N_2O	**No**	Minor source of emissions and limited data available.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data / Parameter:	$Q_{biomass}$
Data unit:	Tonnes/year
Description:	Annual average biomass consumption per appliance

Source of data used:	Historical data published by the Government of Kenya has been used to establish a conservative national value, as allowed by the methodology.
Value applied:	3.56
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on literature review and the following conservative assumptions: a. Charcoal consumption per household: 593 kg/year; b. Wood-to-Charcoal conversion factor: 6 Notes/sources: a: value is the average consumption in urban areas, which is conservative compared with rural consumption, which is around 717 kg/household/year, but appropriate given that charcoal use is most prevalent in urban areas. These values are taken from Ministry of Energy (2002): Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments. Produced by the company KAMFOR, Nairobi. (p. 12, table 3.4). See Annex 3 for more detail. b: Default IPCC value taken from http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf (page 1.45)
Any comment:	Used for calculation of B_{old} as per paragraph 7 (a) of methodology The available national statistics in Kenya do not provide the amount of biomass consumption per appliance. Literature suggests that traditionally households in Kenya use the same stove for cooking one dish at a time (typically, ugali and a sauce), even if they own more than one stove[26]. Therefore, the approach taken is to assume that one stove is replaced per household/institution/SME and that this stove accounts for the average household biomass consumption (for which a conservative value is taken, as indicated above). This way, it is possible to use the official Government estimates of household-level biomass consumption as provided in Annex 3. If more than one stove is then found to be in use in a household during monitoring, this will be accounted for in the emissions reductions by: firstly, reducing the baseline consumption value in line with the continued use of baseline stoves; and secondly, by excluding any additional ICS stoves from N_{all} as outlined in Section B.6.1.

[26] See for example: Global Alliance for Clean Cookstoves, Kenya Market Assessment - Sector Mapping, GVEP International, March 2012; and Djédjé, M.; Ingwe, A.; Wanyohi, P.; Brinkmann, V.; Kithinji, J.; Results Assessment: Survey on Impacts of the Stove Project in Transmara, Western and Central Cluster of Kenya Conducted from October 2007 to January 2008 Final report. GTZ, Eschborn

Data / Parameter:	$f_{NRB, y}$
Data Unit:	Fraction
Description:	Fraction of biomass saved by the project activity in year *y* that can be established as non-renewable biomass using national or local statistics, survey results, studies, maps or other sources of information, such as remote-sensing data
Source of data used:	FAO and IPCC
Value applied:	0.92
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per applied methodology AMS-II.G, v.3, f_{NRB} is calculated by applying the following formula: $f_{NRB} = \frac{NRB}{(NRB + DRB)}$ NRB: Non-renewable woody biomass DRB: Demonstrably renewable woody biomass NRB and DRB are determined based on FAO and IPCC data. The detailed calculation and the related references are provided in Section B.5.2 below.
Any comment:	-

Data / Parameter:	$NCV_{biomass}$
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable biomass that is substituted
Source of data used:	AMS-II.G v.3, page 2
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as prescribed by methodology applied
Any comment:	-

Data / Parameter:	$EF_{projected\_fossilfuel}$
Data unit:	tCO_2/TJ
Description:	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data used:	AMS-II.G v.3, page 2
Value applied:	81.6
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as prescribed by methodology applied
Any comment:	This value represents the emission factor of the substitution fuels likely to be

	used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 tCO_2/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO_2/TJ for Kerosene and 63.0 tCO_2/TJ for Liquefied Petroleum Gas (LPG)).

Data / Parameter:	η_{old}
Data unit:	Efficiency
Description:	Efficiency of the system being replaced
Source of data used:	AMS-II G v.3
Value applied:	0.129
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value applied is based on a weighted average of the two default values taken from the methodology AMS-II.G v.3 for "conventional" (0.1) and "improved" (0.2) stoves. As the CPA will involve the replacement of both "conventional" and "improved" stoves, it is necessary to determine a blend of these two default values in the baseline with the weighting based on the estimated penetration of "improved" stoves. The average of two credible literature values (Kenyan Integrated Household Budget Survey, 2005-06; and GTZ; 2009) has been used to derive the weighted average value of η_{old} = 0.129 for the baseline stove efficiency. Detailed information is provided in Annex 3.
Any comment:	-

Data / Parameter:	η_{new}
Data unit:	Efficiency
Description:	Efficiency of the system being deployed as part of each CPA.
Source of data used:	The efficiency will be based on manufacturer's specifications for the purposes of ex-ante emissions reduction calculations. During monitoring, the efficiency will be determined on the basis of sampling, using the Water Boiling Test (WBT) protocol.
Value applied:	34.8%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value chosen is a simple average of the efficiency of the stove models to be distributed as part of this CPA. The efficiencies of the stove models indicated in Section A.4 are: • CH2200: 38.2% • CH4400: 31.4% All the stoves manufactured by Envirofit International have been tested in accordance with the "Emissions and Performance Test Protocol", with emissions measurements based on the stove testing protocol developed by Colorado State University (available at www.eecl.colostate.edu).
Any comment:	During monitoring, WBTs will be carried out for a sample of installed ICSs that are in operation during each monitoring period. The WBTs will be conducted in line with the guidance provided by the CME and according to a methodology

	supported by an appropriate international body such as PCIA.

Data / Parameter:	LAF
Data unit:	Fraction
Description:	Net to gross adjustment factor to account for leakages
Source of data used:	AMS-II. G v.3
Value applied:	0.95
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as prescribed by methodology applied
Any comment:	-

B.5.2. Ex-ante calculation of emission reductions:

Application of the methodology:

1. Governing equation for emission reduction

The equation for calculation of emission reductions is:

$$ER_y = B_{y,savings} \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected\_fossilfuel} \quad (1)$$

Where:

ER_y	Emission reductions during the year *y* in tCO_2e
$B_{y,savings}$	Quantity of biomass that is saved in tonnes
$f_{NRB,y}$	Fraction of biomass saved by the project activity in year *y* that can be established as non-renewable biomass using survey results, national or local statistics or other sources of information.
$NCV_{biomass}$	Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable biomass by similar consumers. Use a value of 81.6 tCO_2/TJ.

Where:

$$f_{NRB,y} = \frac{NRB}{NRB + DRB} \quad (6)$$

Following the methodology (paragraph 10), Non-renewable woody biomass (NRB) is the quantity of woody biomass used in the absence of the project activity (B_{old}) minus the DRB component, as long as at least two of the following indicators are shown to exist:

- A trend showing an increase in time spent or distance travelled for gathering fuelwood, by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel-wood is transported to the project area;
- Survey results, national or local statistics, studies, maps or other sources of information, such as remote-sensing data, that show that carbon stocks are depleting in the project area;
- Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;
- Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.

Woody biomass is demonstrably renewable (DRB) if one of the following conditions is satisfied (paragraph 9 of the methodology):

I. The woody biomass is originating from land areas that are forests where:
(a) The land area remains a forest; and
(b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
(c) Any national or regional forestry and nature conservation regulations are complied with.

II. The biomass is woody biomass and originates from non-forest areas (e.g. croplands, grasslands) where: The land area remains as non-forest or is reverted to forest; and
(b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
(c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

See further below for determination of the value of f_{NRB}.

$B_{y,savings}$ is estimated using option 2 of the methodology AMS-II.G v.3.

$$B_{y,savings} = B_{old} \cdot (1 - \frac{\eta_{old}}{\eta_{new}}) \quad (3)$$

Where:

B_{old}	Quantity of biomass used in the absence of the project activity in tonnes/year
η_{old}	Efficiency of the system being replaced. According to the methodology, a default value of 0.1 can be used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney; for other types of systems a default value of 0.2 can be used. Weighted average values will be used if more than one type of system is being replaced.
η_{new}	Efficiency of the system being deployed as part of the project activity (fraction) as determined by using Water Boiling Test (WBT) protocol. Weighted average values will be used if more than one type of system is being introduced by the project activity.

B_{old} is calculated using **option (a)** of paragraph 7 of the methodology: calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of biomass per appliance (tonnes/year) derived from historical data. As is explained in the table for parameter $Q_{biomass}$ in Section B.5.1 above, it is assumed ex-ante that one appliance is being used per household, based on literature sources, allowing use of official Government statistics for biomass consumption per household. The use of more than one stove (baseline stove or ICS) will be accounted for during monitoring.

As a result of monitoring, the value of B_{old} is adjusted for the proportion of ICS (distributed stoves) still operating during the monitoring period (paragraph 16 of the methodology), leakage (paragraphs 13 (a) and 23 (c) of the methodology), the average operating time of stoves, the continued use of replaced stoves and exclusion of such use from B_{old} if baseline stoves are not disposed of (paragraph 20 (b) of the methodology).

Thus,

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

Where:

LAF	Net to gross Adjustment factor (0.95) applied in accordance with paragraph 13 and 23 of AMS-II.G V.3
N_{all}	Total number of stoves installed (number)
$Q_{biomass}$	Average annual biomass consumption per appliance (tonnes/ year)
SOF	Stove Operation Fraction (SOF) (% of stoves operating or replaced by equivalent in-service appliance[27]). The parameter SOF is applied to meet the requirements of the methodology as outlined in its paragraph 16 and will be measured ex post using survey/ user feedback in each monitoring period. The CME will select a sample of stoves from the PoA Distribution and Monitoring Database and visit the premises which received these stoves.
μ_{old}	Average amount of woody biomass consumption that is consumed through the continued use of old stoves (kg/year) (to be established through sampling). This value is divided by 1000 to convert kg/year to tonnes/year
f_{old}	Fraction of end users that are still using their replaced stoves during the monitoring period (established through sampling)
$Stove_{year}$	Calculated average stove operation years in the monitoring period (years). If stoves have been operating for 365 days then $Stove_{year}$ = 1.0. If less than 365 days, then $Stove_{year}$ is represented as a fraction of 365 (eg. 180 days= 0.5).

[27] For example, if an end user has purchased an Envirofit stove and it is found to be defective within the warranty period they will be entitled to a replacement stove.

Determination of DRB, NRB and f_{NRB}

FAO data together with IPCC data has been used to determine f_{NRB} in Kenya as is done by applying the following steps:

Step 1: Demonstrably renewable woody biomass[28] (DRB)

Woody biomass[29] is "renewable" if one of the following two conditions are satisfied:

I. The woody biomass is originating from land areas that are forests[30] where:

(a) The land area remains a forest; and

(b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

(c) Any national or regional forestry and nature conservation regulations are complied with.

II. The biomass is woody biomass and originates from non-forest areas (e.g., croplands, grasslands) where:

(a) The land area remains as non-forest or is reverted to forest; and

(b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

(c) Any national or regional forestry and nature conservation regulations are complied with.

The following argument will demonstrate that none of the conditions above is satisfied:

The figures extracted from FAO (2010)[31] in the table below clearly indicate that the forest area has decreased with time. According to the report, 6.1% (3,467,000 ha) of Kenya was forested. Between 1990 and 2010, Kenya lost an average of 12,050 ha or 0.32% per year. In total, between 1990 and 2010, Kenya lost 6.5% of its forest cover or around 241,000 ha. A similar trend is observed in other wooded land.

Table 1: Forest and other wooded land in Kenya

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	3 708	3 582	3 522	3 467
Other wooded land	29 092	28 829	28 710	28 650

[28] This definition uses elements of decision EB 23, annex 18.

[29] In cases of charcoal produced from woody biomass, the demonstration of renewability shall be done for the areas where the woody biomass is sourced.

[30] The forest definitions as established by the country in accordance with the decisions 11/CP.7 and 19/CP.9 should apply.

[31] http://www.fao.org/docrep/013/al543E/al543e.pdf

Source: FAO (2010): Global Forest Resource Assessment 2010, Country Report Kenya, p. 10.

- **Therefore, conditions (I (a) and II (a)) above are not satisfied.**

There is strong evidence that forests and other wooded land that is used for fuelwood sourcing is not sustainably managed. The FAO Forest Resource Assessment 2010 country report shows a declining trend of carbon stocks in Kenya due to deforestation taking place. If forests or other wooded land was sustainably managed, carbon stocks and growing stock would not systematically decrease over time. However, this declining trend (10% and 9% reduction respectively) can clearly be seen from the tables below.

Table 2: Carbon stock in living forest biomass in Kenya

FRA 2010 Category	Carbon (Million metric tonnes)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Carbon in above-ground biomass	423.6	405.4	394.1	384.0	284.4	281.9	280.7	280.1
Carbon in below-ground biomass	101.7	97.3	94.6	92.2	68.3	67.6	67.4	67.2
Sub-total: Living biomass	***525.3***	***502.7***	***488.7***	***476.2***	***352.7***	***349.5***	***348.1***	***347.3***

Source: FAO (2010): Global Forest Resource Assessment 2010, Country Report Kenya, p. 30.

Table 3: Growing stock of forests in Kenya

Year	1990	2000	2005	2010
Forest area (1 000 ha)	3 708	3 582	3 522	3 467
Growing stock in forest and plantation (mio m^3)	693.3	663.5	645.0	628.5

Source: FAO (2010): Global Forest Resource Assessment 2010, Country Report Kenya, p. 25.

FAO[32] indicates that there is tree planting on farms covering 5-10% of the farm land. Varieties of species are cultivated, but these are mainly for commercial purposes. Eucalyptus trees for instance are grown because of their demand in the construction industry.

- **Therefore, conditions (I (b) and II (b)) above are not satisfied.**

Kenya has a Forests Act, 2005[33] which became operational in February 2007. The overall spirit of the Forests Act is devolution of authority and responsibilities in management of forest, and promotion of partnership through increased access of benefits to the communities. Compliance and enforcement[34] is a challenge due to the lack of awareness and cooperation among prosecutors and investigators; and costs of enforcement. Institutional issues have also been cited as hindrances to the implementation of the law.

[32] http://www.fao.org/docrep/U8995E/u8995e03.htm

[33] http://www.fankenya.org/downloads/ForestsAct2005.pdf

[34] http://inece.org/conference/9/papers/Kimani_Kenya_Final.pdf

Kenya also has a number of policies[35] that recognize charcoal as an important source of energy. They highlight issues pertaining to charcoal production (tree growing and wood conversion to charcoal), transportation, trade and utilization. The key policy documents relevant to charcoal include the following:

- The Sessional Paper No. 4 of 2004 on Energy Policy.
- The Sessional Paper No. 9 of 2005 on Forest Policy.
- The Sessional Paper No. 6 of 1999 on Environment and Development.
- The Strategy for Revitalizing Agriculture of 2004.

The above cited energy, forest and environmental policies allow for production, marketing and use of charcoal. However, these policies require that the wood be produced sustainably to avoid deforestation and land degradation. The wood should be converted into charcoal using modern kilns to reduce waste, and the consumers should use modern energy conserving cook stoves and other techniques.

Between 2000 and 2009, the Government of Kenya (GoK), through the Ministry of Forestry and Wildlife (MoFW) and the Ministry of Energy (MoE), recognized the need to bring order to the charcoal sector. The Ministries jointly formulated policies and legislation to enhance the growth of the charcoal industry. However, despite these efforts, key value chain actors are not sufficiently aware of the existing policies and laws, while others are aware but have not fully understood the provisions, mainly because of the technical or legal language used. Consequently, players in the industry continue to operate just as they did before the policies and legislation were enacted. Therefore the policies do not have the intended impact due to lack of awareness. DFID funded a program to create awareness through a charcoal policy handbook to create awareness and understanding of the provisions to the key players.

During project development, the forest stakeholders who were consulted, including representatives of the "Green Belt" NGO and the Kenya Institute of Forestry Research also decried deforestation and increasing illegal felling of trees. Even though there are existing laws and policies, there is little enforcement[36] and hence the intended results of the policies are not realised.

- **Therefore, condition (I (c) and II (c)) above are not satisfied.**

Step 2: Non-renewable biomass:

Non-renewable woody biomass (*NRB*) is the quantity of woody biomass used in the absence of the project activity (B_{old}) minus the *DRB* component, as long as at least two of the following supporting indicators are shown to exist:

- A trend showing an increase in time spent or distance travelled for gathering fuel-wood, by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel-wood is transported to the project area;

Proof:

It was concluded in one study conducted by FAO that growing trees for charcoal production in areas supplying Nairobi is not an economically competitive land-use system for the farmer[37]. The same document details the trend of growth of charcoal business in Nairobi arguing that charcoal-making grew in magnitude and geographical spread as urbanization accelerated and country roads improved. The trade

[35] http://www.pisces.or.ke/sites/default/files/The%20Kenya%20Charcoal%20Policy%20Handbook.pdf

[36] http://www.profor.info/profor/sites/profor.info/files/publication/AFR_2007_Forest%20Law%20Enforcement%20and%20Governance%20in%20Kenya.pdf

[37] http://www.fao.org/docrep/s4550e/s4550e05.htm

spread to the Rift Valley, Western Kenya and finally to remote arid and semi-arid zones of the northern region.

- Survey results, national or local statistics, studies, maps or other sources of information, such as remote-sensing data, that show that carbon stocks are depleting in the project area;

Proof:
As Table 2 above shows, the carbon stock contained in forests (above-ground biomass and below-ground biomass) has steadily declined in Kenya since 1990, falling by around 10% in the period to 2010.

- Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.

Proof:
According to a background paper[38]prepared for the International Institute for Environment and Development (IIED) for an international ecosystem services for poverty alleviation (ESPA) workshop on biomass energy, Kenya had a woodfuel supply shortfall of 30% in 1980, and by 1995, this shortfall was estimated to have increased to 74%.

Further, Mutimba (2005) concluded that: "Despite the low calorific value, especially of non-woody sources, farm residue comprise an important fuel in areas suffering fuel wood scarcity especially for poor households."[39]

The above literature thus reveals the trend of the charcoal business expanding in terms of geographical spread, as well as the depletion of carbon stock as it is used to provide fuelwood in form of charcoal and firewood; and the trend of scarcity causing some populations find an alternative to woody biomass, even when such alternatives are an inferior energy source. All of the above is in support of the non-renewability of woody biomass.

- **Thus all three conditions above are satisfied and the non-renewability of woody biomass is demonstrated.**

Following the above assessment, one could argue that the quantity of Demonstrably Renewable Biomass is Zero, and thus NRB is 1. However, to be conservative, though the assessment clearly indicates that there is no DRB as none of the three conditions are satisfied and one could argue $f_{NRB} = 1$, it is considered that it is possible in some cases woody biomass may be sourced from dead wood, or from locally practiced agro-forestry systems. We will further consider the proportion of woody biomass harvested for fuelwood in our calculation of f_{NRB}.

The calculated f_{NRB} for Kenya is **0.92** as calculated following the sub-steps below.

Step 3: Calculation of f_{NRB}
The fraction of woody biomass saved by the project activity in year *y* that can be established as non-renewable is:

[38] http://pubs.iied.org/pdfs/G02985.pdf

[39] Mutimba (2005), p. 12.

$$f_{NRB,y} = \frac{NRB}{NRB + DRB}$$

Where:

$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non- renewable biomass using survey methods
NRB	Non- renewable woody biomass
DRB	Demonstrably renewable woody biomass

Where NRB = B_y - DRB

Sub-step 3a: Determination of B_y

B_y is the biomass used in tonnes dry matter in year y in the absence of the project activity in the area for which the f_{NRB} is calculated. This can be either a whole country or a region within it. B_y is calculated using the two following approaches, of which the more conservative result shall be applied.
Approach 1: Based on volumetric wood harvest data and converted to tonnes using the appropriate Biomass Conversion and Expansion Factor for wood removal as:

$$B_y = H_y * BCEF_R$$

Where:

H_y	Volumetric wood harvest in m^3/yr in year y. National and regional data from literature or published reports can be used. FAO data can also be used.[40]
$BCEF_R$	Biomass Conversion and Expansion Factor for conversion to wood removals[41] in ton/m^3. IPCC values can be used.

Approach 2. Calculating Total Annual Biomass Removals (R_y) and use it as a proxy for B_y in line with the SSC WG information note contained in their thirty fifth meeting report annex 20[42].

$$R_y = MAI_y - \Delta BM_y \quad \textbf{(1)}$$

Where:

R_y	Total annual biomass removals in t/yr in year y
MAI_y	Mean Annual Increment of biomass growth in t/yr in year y
ΔBM_y	Annual change in living forest biomass in t/yr in year y

[40] http://www.fao.org/forestry/fra/

[41] IPCC Chapter 4. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf Table 4.5.

[42] http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf

Mean Annual Increment of biomass growth in year y (MAI_y) is calculated in as the product of the Extent of Forest in year y (F_y) in hectares and the country-specific growth rate $r_{G,y}$ of the Mean Annual Increment:

$$MAI_y = F_y * r_{G,y} \quad \textbf{(2)}$$

Where:

MAI_y	Mean Annual Increment of biomass growth in t/yr in year y
F_y	Extent of forest in ha in year y
$r_{G,y}$	Growth rate of biomass, calculated as a weighted average based on FAO reporting on distribution of total forest area by ecological zone and IPCC above-ground biomass growth rates for different ecological zones in t/ha/yr in year y.

The table below illustrates the calculation of B_y using the two approaches.

Approach 1	**Parameter**	**Unit**	**Kenya**	**Source**
Biomass removal	**B_y**	**t/year**	**19,972,070**	**Calculated**
Harvest	H_y	(x1000) m3	27,359	FAO Forest Resource Assessment (FRA) 2010. Annex 3 Global Tables, Table 13
BCEF	$BCEF_R$	t/m3	0.73	http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf Table 4.5
Approach 2	**Parameter**	**Unit**	**Kenya**	**Source**
Total Annual Biomass Removals, R	**R_y**	**t/yr**	**13,280,700**	**Calculated**
Annual Change in living Biomass, ΔBM	ΔBM_y	t/yr	(6,000,000)	FAO Forest Resource Assessment (FRA) 2010. Annex 3 Global Tables, Table 11, converted to biomass by dividing by carbon fraction of 0.5 (cf. IPCC GPG)
Mean Annual Increment in Biomass growth, MAI	MAI_y	t/yr	7,280,700	Calculated
Extent of forest, F	F_y	ha	3,467,000	FAO Forest Resource Assessment (FRA) 2010,Annex 3 Global Tables, Table 2

Growth Rate of Biomass, r	$r_{G,y}$	t/ha/yr	2.1	IPCC. Chapter Table 4.9, Vegetation types from http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf Table 4.9 and table 4.10

Sub-step 3b: Calculation of Demonstrably renewable woody biomass (DRB)

DRB is calculated as:

1. Estimating the sum of all demonstrably sustainable managed forests in the area in hectare. Published reports, surveys or literature can be used.
2. Calculating the product of the growth rate of biomass in tonnes dry matter per hectare in the area and the demonstrably sustainable managed forest area.

$$DRB_y = r_{G,y} * F_{protected,y}$$

Where:

$r_{G,y}$ Growth rate of biomass in tonnes dry matter per hectare in year y. Appropriate IPCC default values may be used[43].

$F_{protected,y}$ Demonstrably protected forest extent in hectare in year y. FAO data may be used to determine this[44].

	Parameter	Unit	value	Source
Demonstrably Renewable Biomass	DRB	t/year	1,092,105	Calculated*
Conserved forest areas	$F_{protected,y}$	ha	520,050	FAO Forest Resource Assessment (FRA) 2010, annex 3 Global Tables, Table 6 at http://www.fao.org/docrep/013/i1757e/i1757e.pdf, 15% of Kenyan forest extent assumed to be protected (in line with SSC WG approach)
Annual growth	$r_{G,y}$	t/ha/yr	2.1	IPCC. Chapter Table 4.9, Vegetation types IPCCC chapter 4. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf Table 4.9 and table 4.10
*DRB = 520,050 * 2.1 = 1,092,105				

Sub-step 3c: Calculation of Non-renewable biomass (NRB) and fNRB

[43] IPCCC chapter 4. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf Table 4.9 and table 4.10

[44] http://www.fao.org/forestry/fra/

$NRB = B_y - DRB$

NRB = 13,280,700 – 1,092,105
= **12,188,595**

fNRB = NRB/(NRB + DRB)
= 12,188,595/13,280,700
= **0.92**

B.5.3. Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO2 e)	Estimation of baseline emissions (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
1 (15th to 31st December 2012)	0	565	0	565
2 (2013)	0	13,556	0	13,556
3 (2014)	0	13,556	0	13,556
4 (2015)	0	13,556	0	13,556
5 (2016)	0	13,556	0	13,556
6 (2017)	0	13,556	0	13,556
7 (2018)	0	13,556	0	13,556
8 (2019)	0	13,556	0	13,556
9 (2020)	0	13,556	0	13,556
10 (2021)	0	13,556	0	13,556
11 (January - 14th December 2022)	0	12,991	0	12,991
Total Emission Reductions	0	**135,560**	**0**	**135,560**
Annual average over the crediting period of estimated reductions	0	**13,556**	**0**	**13,556**

B.6.1. Description of the monitoring plan:

Data / Parameter:	η_{new}
Data unit:	Efficiency
Description:	Efficiency of the system being deployed as part of the project activity
Source of data to be used:	As determined through sampling by performing WBTs
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.348
Description of measurement methods and procedures to be applied:	WBTs will be carried out for a sample of installed ICSs in operation in line with the PoA Sampling Plan. For sample size estimation purposes, the thermal efficiency of each ICS model to be distributed will be assumed to vary within a value range of +/- 10% of the certified average thermal efficiency of the stoves: • CH2200: average thermal efficiency: 38.2%; lower bound of 34.8% and upper bound of 42.02%

	• CH4400: average thermal efficiency: 31.4%; lower bound of 28.6% and upper bound of 34.54%
QA/QC procedures to be applied:	The CME will hire a contractor (Monitoring Organisation) to conduct WBTs in line with the guidance provided by the CME and according to a methodology supported by PCIA.
Any comment:	Value chosen for ex-ante emissions reductions estimations in B.5 corresponds to an assumed 50/50 split in the distribution of two stove models, applying the simple average of the average thermal efficiency of the two models (CH4400 and CH2200). The assumption of a 50/50 split is conservative, since the more efficient of the two stoves, namely the CH2200, was shown to be the most popular of the two stove models when distributed as part of a pilot in 2011. This feedback was provided by distributors who had taken part in the pilot during a fact-finding mission in November 2011. During the actual distribution the stove model received by each end user in the CPA will be identified through the serial number of the stoves distributed. The stove model sold to the end user will also be recorded by the Distributor on the CPA Distribution Record. In line with the methodology, a weighted average value of the efficiency will be used based on the actual distribution numbers of the different stove types. Each WBT conducted during monitoring will be matched with a specific serial ID number of the stove tested. Hence, the stove type (i.e. fuel type and specific laboratory efficiency) can be clearly identified allowing an extrapolation of the results of the sampling to all stoves of the same type, distributed within the PoA.

Data / Parameter:	N_{all}
Data unit:	Number
Description:	Total number of stoves installed
Source of data to be used:	Record of all installations and date of each installation as per ICS serial ID numbers contained in the PoA Distribution and Monitoring Database.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	6000
Description of measurement methods and procedures to be applied:	The CME maintains a record of all stove ID numbers supplied to the DO for distribution as part of the CPA. Each DO shall maintain CPA Distribution Records which will provide the data used to calculate this parameter. During monitoring, if it is found that more than one Envirofit ICS is being used per household, the CME will exclude any such additional ICS from the emissions reduction calculations by removing such ICS from the PoA Distribution and Monitoring Database. This way there will be no double-counting of emissions reductions. This situation is expected to be highly unusual for two main reasons. Firstly, the affordability barrier facing typical

	households in Kenya means that buying one Envirofit ICS is already a challenge, let alone buying two or more. Secondly, as discussed above in the section relating to the parameter $Q_{biomass}$, households in Kenya typically cook one dish at a time rather than simultaneously, making the benefit of purchasing a second Envirofit ICS questionable, even if they could afford it.
QA/QC procedures to be applied:	The CME will supervise the activities of each DO, and provide training, guidelines and distribution templates to facilitate accurate record keeping during the ICS distribution. The CME will also maintain a record of the stove serial numbers supplied to each DO, and will be able to cross-check these against the CPA Distribution Reports it receives back from the DO.
Any comment:	-

Data / Parameter:	SOF
Data unit:	Fraction
Description:	Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through survey/ user feedback
Source of data to be used:	Survey of household behavior as part of PoA sampling plan
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.95
Description of measurement methods and procedures to be applied:	The actual value to be applied for emissions reduction calculations and request for issuance of CERs will be measured ex-post by investigation of the number of ICS installations within the sampled ICS which are operational. If for example 90% of the sample is only found to be operational, then SOF is 0.9.
QA/QC procedures to be applied:	The CME will provide training, guidelines and monitoring templates to ensure that the contractor undertaking the monitoring follows appropriate procedures.
Any comment:	A value of 0.95 is assumed for the ex-ante emissions reduction estimation. This assumes that 5% of stoves will either not be found, or will no longer be in use during monitoring. This is seen as conservative because: 1. The customer has paid a relatively high price for the stove compared with the existing alternative, and expects to get a return on this through fuel cost savings over time. If they do not use the stoves, the value of their investment will be lost. 2. Envirofit International offers a 5-year warranty for its stoves and they have an expected lifetime of 7-10 years. Thus there is no technical reason to think the customer will stop using their stove in this timeframe. 3. With training of the CPA implementer on correct data collection, the incidence of incorrect data capture leading to not finding stoves will be minimised. 4. With customer follow-ups through the CPA implementer, East Africa Energy and its network of distributors, the CME can ensure that

	customer data is kept up to date (up to date customer data is also a condition of the 5-year warranty).

Data / Parameter:	μ_{old}
Data unit:	kg/year
Description:	The amount of woody biomass consumption that is consumed through the continued use of old stoves
Source of data to be used:	Survey of household behavior as part of PoA sampling plan combined with the same source of data as used for $Q_{biomass}$
Value of data applied for the purpose of calculating expected emission reductions in section B.5	177.9
Description of measurement methods and procedures to be applied:	The actual value to be applied for emissions reduction calculations and request for issuance of CERs is measured ex-post by estimation of the consumption of a representative sample of end users using the deployed ICS, as conducted in line with the PoA Sampling Plan (see Sampling Plan in PoA-DD for details of the measurement approach). During the survey, the interviewer will conduct an interview with the end user to identify how much the baseline (replaced) stove is being used. The value of μ_{old} will be estimated by comparing the number of meals per month before and after ICS distribution. Where: $u_{old} = \frac{MPM_{after\ ICS}}{MPM_{before\ ICS}} \cdot$ Total annual fuel consumption (kg) Based on the sampling results, an average value for μ_{old} will be determined. The total annual fuel consumption value then needs to be converted from charcoal to woody biomass using the default IPCC conversion factor of 6 (consistent with the approach in B.5.1 for $Q_{biomass}$). The CME will then multiply this value by the fraction of end users continuing to use baseline stoves (f_{old}). The result will be deducted from the total annual biomass consumption and applied to the emissions reduction calculations.
QA/QC procedures to be applied:	The CME will provide training, guidelines and monitoring templates to ensure that the DO or another contracted party responsible for monitoring follows appropriate procedures during the survey.
Any comment:	The value of the parameter μ_{old} cannot be known ex-ante, since even if a replaced stove is retained the end user may continue to use it frequently, only occasionally or not at all. For the purposes of estimation of emissions reductions, a value has been applied by using a simple scenario-based approach.

If it is assumed that 3 hot meals are typically prepared per day[45], and there are on average 30 days per month, then there are 90 meals per month that are cooked/heated up. On this basis, a number of different scenarios for the proportion of use accounted for by baseline stoves can be defined: high, medium, and low. The value chosen for ex-ante emissions reduction calculations is based on a medium scenario of continued baseline stove usage as described in the table below (note: see Annex 3 for details of source used for annual biomass consumption value).

Table A3. Estimating the value of uOLD for ex-ante emissions reduction calculations

Assume 3 hot meals per day and 30 days per month	MPM	Share	u_{OLD} (kg/yr)
Low scenario: 1 meal per month is cooked using old stove	1/90	1.11%	6.59
Medium scenario: 1 meal per week is cooked using old stove	4/90	4.44%	26.36
High scenario: 1 meal per day is cooked using old stove	30/90	33.33%	197.67
Thus medium scenario is rounded up to 5%		5%	177.90

For conservativeness, we have taken the medium scenario value (4.4%) and rounded this up to the equivalent of 5% of the total charcoal consumption per year, multiplied by the IPCC conversion factor of 6, and used this value for ex-ante emissions reduction purposes. Thus μ_{old} = 177.90 kg/year.
This is seen as conservative, since many end users could logically be expected to either discard or otherwise stop using the replaced stove altogether. If some of the users sell or give their replaced stove to a neighbour, relative or friend, such people would logically only use the baseline stove if it is better (newer, more efficient) than their old stove. The emissions reductions resulting from such indirect replacements are not counted in the emissions reduction calculations for this CPA.

Data / Parameter:	f_{old}
Data unit:	Fraction
Description:	The fraction of end users that are still using baseline (replaced) stoves
Source of data to be used:	Survey of end user behavior as part of PoA Sampling Plan
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.1

[45] See for example GTZ, 2009, which states that 77% of surveyed Kenyan households prepare 3 warm meals per day, regardless of whether they use a traditional stove or an ICS. For full reference see Annex 3.

Description of measurement methods and procedures to be applied:	The actual value to be applied for emissions reduction calculations and request for issuance of CERs is measured ex-post by estimation of a representative sample of households using the deployed ICS, as conducted in line with the PoA Sampling Plan. The survey will be done on the basis of a visual inspection of the household and if necessary an interview with the stove user to confirm whether they are still using a baseline (replaced) stove or not. In the case of this CPA, it is anticipated that the majority of end users will stop using baseline stoves once they have started using the ICS. Thus, during monitoring, the CME will estimate the value of this parameter using Option B from the PoA Sampling Plan, by estimating the fraction of end users *not* using baseline stoves ($f_{non,old}$), where: $f_{old} = 1 - f_{non,old}$
QA/QC procedures to be applied:	The CME will provide training, guidelines and monitoring templates to ensure that the DO or another contracted party responsible for monitoring follows appropriate procedures for the survey.
Any comment:	The actual value for this parameter cannot be known ex-ante. For the purposes of ex-ante emissions reduction estimation a value of 0.1 is assumed, which means that 10% of all end users are assumed to continue using baseline stoves.

Data / Parameter:	$Stove_{year}$
Data unit:	Years
Description:	Calculated average stove operation years in the monitoring period. If stoves have been operating for 365 days then $Stove_{year} = 1.0$. If less than 365 days, then $Stove_{year}$ is represented as a fraction of 365 (e.g. 180 days= 0.5).
Source of data to be used:	PoA Distribution and Monitoring Database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	1.0
Description of measurement methods and procedures to be applied:	Each ICS entered into the PoA Distribution and Monitoring Database will be linked to a distribution date (recorded during distribution). Thus for any monitoring period it is possible to calculate the period of time that the stoves included in the emissions reduction calculations for that period have been operating.
QA/QC procedures to be applied:	The CME is 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.
Any comment:	

Summary of Monitoring activities
As outlined in Section A.4, the CME has entered into a contract with the DO and this contract includes inter alia CDM-specific requirements relating to monitoring activities that occur during the distribution of stoves including the collecting of the necessary data required for ex-post monitoring. The CME has provided training to the DO to help ensure that the CPA Distribution Records are completed correctly. The information contained in the CPA Distribution Records and hence the PoA Distribution and Monitoring Database enables the tracking of stoves back to the household level. The CME will manage the PoA Distribution and Monitoring Database, from which a representative sample will be drawn for the purposes of monitoring of parameters after the distribution of ICS has taken place (referred to as ex-post monitoring).

The CME will oversee ex-post monitoring activities and provide guidance and training to the actual persons responsible for carrying out the sampling whenever these are not direct employees of the CME, Envirofit International. This includes the use of sub-contractors or the CPA Implementer, EAE. Two main options are currently foreseen for this: 1) engaging a locally-based marketing firm with experience in conducting door-to-door surveys of consumer behavior; and/or 2) contracting a local university department that has experience in conducting surveys of biomass energy consumption, cooking habits and water boiling tests. If either of these parties are engaged, the training and guidance provided by the CME will ensure that the correct procedures are carried out during monitoring as part of the PoA Sampling Plan and to meet the requirements of the methodology.

The CME will provide the persons carrying out the activities (referred to in the diagram below simply as Monitoring Agents) with the necessary resources (monitoring templates to be filled out etc).

The following checks will be carried out as part of the overall PoA Sampling plan, which is outlined in the PoA-DD. The below is simply a description of the approach to be undertaken and does not replace the PoA Sampling Plan.

Check (parameter)	**Method**	**Frequency required in methodology/envisaged**
Efficiency of project stoves (η_{new})	Carrying out WBTs	At least bi-annually, but likely to be done annually.
Check if project stoves are operational and in use (SOF)	Observation and if necessary interview with end user, asking them to demonstrate that project stoves are still operational and being used.	At least bi-annually, but likely to be done annually.
Estimate the share of total consumption accounted for by replaced stoves (μ_{old})	Observation and interview with end users to estimate the amount of consumption that is accounted for by the baseline (replaced) stove. This will be done by using a simple means such as estimating the number of meals per day/week/month that the end user cooks using the baseline stove post-ICS receipt compared with pre-ICS receipt.	Not specified in methodology AMS-II.G, but will be done as part of the PoA Sampling Plan either applying Option A (monitored annually) or Option B (monitored once and then fixed).
Estimate the proportion of end users that continue to use baseline stoves (f_{old})	Observation and if necessary interview with end users to determine if they continue to use baseline (replaced)	Not specified in methodology AMS-II.G, but envisaged to be

	stoves. Option being applied for estimation: Option B: Monitoring the fraction of end users *not* using baseline stoves ($f_{non,old}$)	done annually as part of the PoA Sampling Plan

The results of the checks will be recorded by the individuals conducting the field measurements (referred to in the diagram below simply as "Monitoring Agents"), using the CPA Monitoring Record template provided by the CME. The Monitoring Organisation (envisaged to be either a local university or marketing firm) is then responsible for ensuring that the data contained in each individual CPA Monitoring Record is provided to the CME. Either the originals of the individual CPA Monitoring Records or scanned copies of each Record will also be provided to the CME to prove the authenticity of the data. The CME will maintain archives of past CPA Monitoring Records and make these available during verification.

The CME will cross-check the ex-post monitoring information received from the Monitoring Organisation. The data obtained from the ex-post monitoring activities will be kept in the secure PoA Distribution and Monitoring Database, along with the data obtained during distribution, and will be used for calculating the parameters outlined above, which will feed into emissions reduction calculations and made available to the DOE during verification.

Figure 5 below provides a graphical illustration of the ex-post monitoring activities to be carried out in the Monitoring plan.

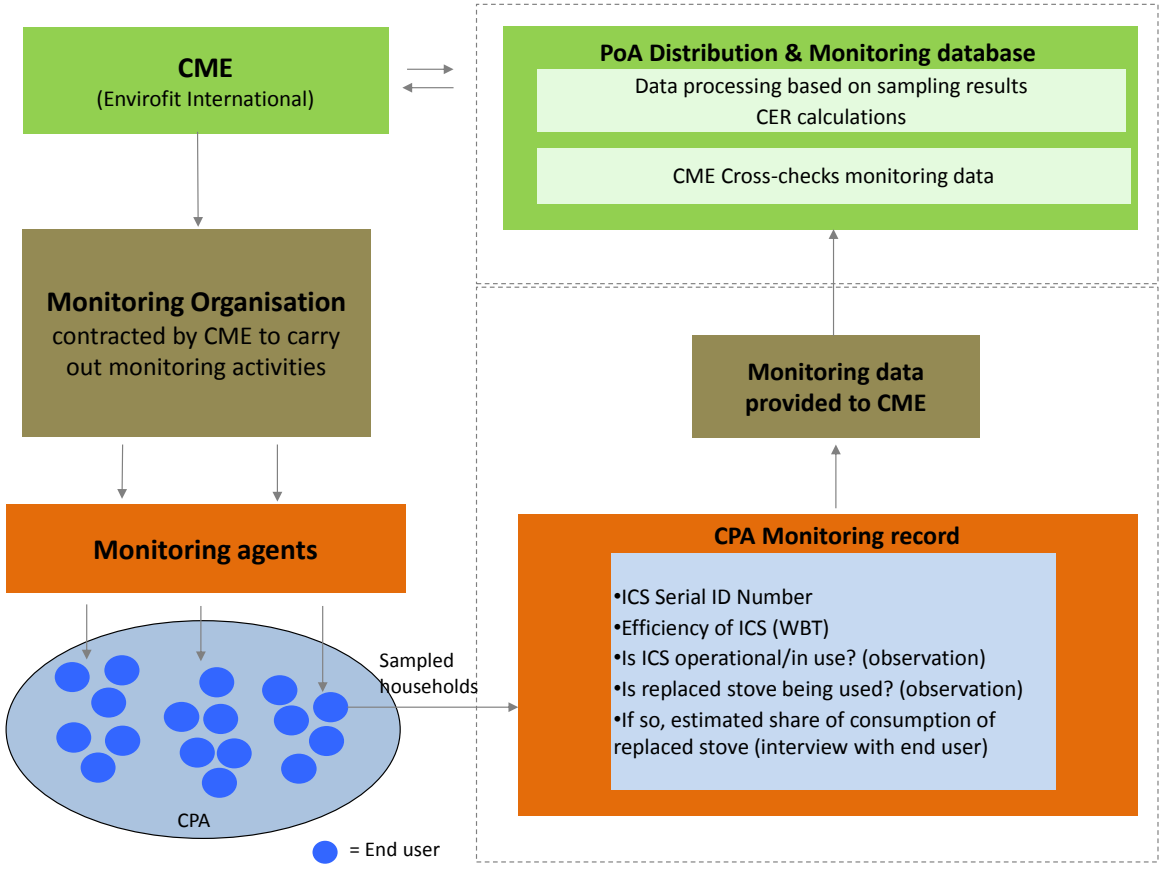

Figure 6: Monitoring plan

SamplingPlan application

Step 1: Pre-check for cross-CPA sampling applicability	This CPA is the first CPA to be included in the PoA, and it will form part of a group of similar CPAs which will all involve the distribution of charcoal ICS to households in Kenya. It will be monitored together with these similar CPAs in line with the Sampling Plan that has been developed at the PoA level.
Step 2: Selection of applicable reliability level	This CPA will be monitored using cross-CPA sampling. As annual sampling is envisaged, 95/10 confidence/accuracy will be applied.
Step 3: Selection of applicable sampling frame	This CPA involves the distribution of portable charcoal stoves to households in Kenya. Based on the two types of stoves to be distributed, the following pre-defined sampling frames apply (see PoA-DD Annex 4, Step 3 for definition of sampling frames): **Sampling Frame KHC-1** (appropriate for the CH2200) **Sampling Frame KHC-2** (appropriate for the CH4400)
Step 4: Sample size estimation	The sample sizes can only be estimated once the total population of the cross-CPA group is known for the monitoring period. This will be undertaken during monitoring at the cross-CPA level applying the approach in the PoA Sampling plan. The equations outlined in the PoA Sampling Plan will be applied.

	For the monitoring of ICS efficiency (n_{new}), the anticipated mean and upper and lower bounds outlined in Section B.6.1 will be applied. A minimum sample size of 30 will be applied as a general principle.

Sampling will be undertaken in line with the requirements of AMS-II.G V.3 and the "Standard for sampling and surveys for CDM project activities and programmes of activities" (EB 65 Report, Annex 2) (the Sampling Standard). The Sampling Standard (paragraph 20, footnote 18) allows for sampling across a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation and 95/10 confidence/precision is applied. Please refer to the PoA Sampling Plan provided in the PoA-DD for more detail.

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

The environmental analysis will be undertaken at the CPA level due to the inclusion of multiple countries in the PoA. It is possible that some countries may have different laws relating to environmental impacts and assessments.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

Environmental benefits:

- *Greenhouse gas reductions:* The CPA will result in GHG reductions because it will reduce the consumption of non-renewable biomass in Kenya where the biomass harvested for fuel use is typically non-renewable. According to the World Bank (2011), in some regions of Kenya practically 100% of biomass consumed for fuel use is non-renewable[46]. As was demonstrated above, using a conservative approach for determining f_{NRB} produced a value of 0.92.

- *Air quality*: Users (especially women and children) will be exposed to fewer air pollutants through reduced emission of not only CO_2, but also carbon monoxide and particulate matter. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory, cardiovascular and ocular diseases.

  All the stoves listed under section A.4.1 have been tested in accordance with the "Emissions and Performance Test Protocol", with emissions measurements based on the stove testing protocol developed by Colorado State University (available at www.eecl.colostate.edu). The average CO

[46] World Bank, Household Cookstoves, Environment, Health, and Climate Change: A new look at an old problem, The World Bank, Washington, 2011

emissions results show a per cent improvement above 60% in all cases, compared to a conventional metal charcoal stove.

- *Biodiversity*: will be improved as the CPA reduces pressure on remaining forest reserves in the host country. Biomass consumption for fuel has been shown to be a major driving factor in the rate of deforestation in Kenya as was outlined in the discussion in Section A.4.

No negative impacts can be identified.

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

As evidenced by the letter from the National Environmental Management Authority (NEMA), dated 21 December 2011, NEMA has advised that no EIA is required for the stove distribution and that the project is expected to enhance environmental sustainability.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

The local stakeholders were invited to a consultation meeting that was held on the 11th November 2011 at the YMCA Conference Hall in Nairobi, Kenya. Stakeholders were identified as those whose activities directly or indirectly impact the project, and those who were to be impacted by the project activities (full lists of attendance are in the Local Stakeholder Consultation Report). Invitation letters were sent by mail to the individual stakeholders, an advert was placed in the local newspaper (see figure below), and the invitation was also hosted on Carbon Finance in Africa Network website.

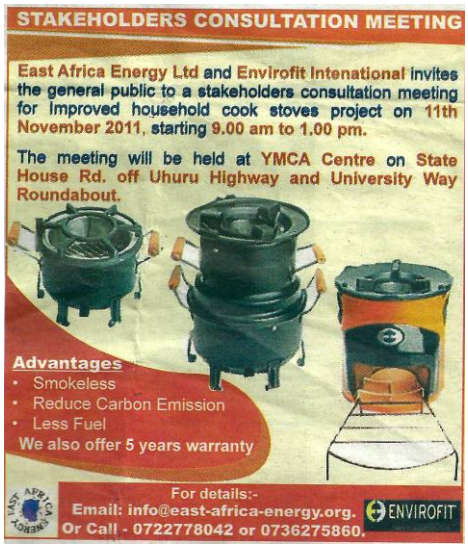

Figure 7: advert in Daily Nation, Thursday 10 November 2011.

Over 100 stakeholders attended the consultation, including a good cross-section of different groups including government agencies (including the Ministry of Energy), local business people involved in the sale of stoves and other household products, artisans, NGOs and international development organisations (including GIZ and SNV).

The stakeholders were encouraged to voice their concerns/issues in the language they were comfortable with.

Figure 8: Stakeholders attending the consultation at the YMCA conference Hall Nairobi

Figure 9: Stakeholders listening to a presentation on how the programme works

D.3. Summary of the comments received:

The stakeholders expressed a number of interests and concerns relating to the stoves and the distribution programme:

- whether the project stoves could be locally made;
- concern about their capacity to handle heavy weights (cooking is normally done for large families using large pots); and
- Whether local people are to be involved in the distribution.

Some stakeholders (in particular, those involved in other stove manufacturing and distribution activities) were concerned about how they can be beneficiaries of the project.

Stakeholders wanted to know how they benefit from the carbon credits and whether people could continuously receive credits over time rather than a discounted price up front. One stakeholder asked how the CME would ensure continuous use of the stoves.

Above all, there was strong interest in the benefits of participating in the stove project and how the project reduces the emission of greenhouse gases.

D.4. Report on how due account was taken of any comments received:

Regarding the question of whether the stoves can be locally manufactured, the stakeholders were informed that certain components of the stoves, in particular the combustion chambers, are built using a special alloy which currently cannot be produced in Kenya to a sufficient quality standard. However, when the assembly plant is up and running (expected in the first quarter of 2012), the assembly of the stoves will be shifted to Kenya using as much local material as can be found (components such as the combustion chamber will continue to be imported). It was also indicated that for job creation, most employment is generated through assembling and distribution of the stoves, rather than the manufacturing of such components, and these activities shall be done in Kenya.

On the concern of the stoves capability to handle weight, the stakeholders were informed that the stove can actually take the weight of two people of about 80kgs each standing on top, indicating that they are very strong. However, having received the comments regarding sizes of the pots from the stakeholders, Envirofit is planning to start manufacturing stoves of larger sizes as are required by some users.

Regarding distribution of the stoves, the stakeholders were informed that the distribution model clearly indicates stoves being sold in the case of the first CPA through local sales man, door to door. This is to create jobs for the local people. The sales man builds up a direct relationship to the customer and supports whenever problems occur in relation to the cook stove. The stakeholders were invited for a further discussion if they wished to learn more about the distribution model.

Stakeholders were also informed about the progress being made to establish an Envirofit International assembly plant on the outskirts of Nairobi. This plant will assemble stoves using a mixture of local and imported components, to supply Kenya and the East African region. People engaged in manufacture of the local stoves were informed that soon as the assembly plant opens (expected in 2012), a number of vacancies will be available and offer employment for local people that can utilise their skills and knowledge.

On the issue of benefiting from carbon credits and whether one can continuously receive credits over time, the stakeholders were informed that by assigning the rights to the carbon credits to Envirofit, this allows the stove sale price to be significantly subsidised. The stakeholders benefit by obtaining the

stove at a discounted price and enjoying the use of the stove, which saves money on fuel costs. The consultation showed that consumers generally want to have a direct cost subsidy rather than an amount of revenues in the future. The key goal is to bring down the stove costs to reasonable prices and allow the consumer to save money immediately.

Each stove has a Serial ID number and will be tracked from the production facility to the end user. The verifying entity will check all relevant data and checks households on sample basis to assure the correctness of the data. Only with the correct provision of such data can carbon revenues be received.

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

Organization:	East Africa Energy Ltd
Street/P.O.Box:	Statehouse Road/ P.O. Box 1880-0200
State/Region:	Nairobi
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Country:	Kenya
Telephone:	+254 715 061262
FAX:	
E-Mail:	david.dickie@advanceaid.org
URL:	www.east-africa-energy.org
Represented by:	David Dickie
Title:	Board Member
Salutation:	Mr
Last Name:	David
Middle Name:	James
First Name:	Dickie
Department:	
Mobile:	+44 7818 420977
Direct FAX:	
Direct tel:	+44 208 444 9697
Personal E-Mail:	David.dickie@advanceaid.prgh

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State/Region:	Colorado
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Country:	United States of America
Telephone:	
FAX:	+001 970 221-1550
E-Mail:	
URL:	www.envirofit.org
Represented by:	Nathan Lorenz
Title:	Vice President – Engineering
Salutation:	
Last Name:	Lorenz
Middle Name:	
First Name:	Nathan
Department:	

Mobile:	
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Direct tel:	+001 970-372-2874
Personal E-Mail:	nathan.lorenz@envirofit.org

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding has been received for the development or implementation of the SSC- CPA.

Annex 3

BASELINE INFORMATION

Household biomass consumption values

Source: Ministry of Energy (2002). Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments: Final Report, KAMFOR Company Limited, Nairobi, p. 158

Table 3.4: Rural and Urban Charcoal Consumption (Year 2000)

	Rural Areas				Urban areas			
	HPZ	MPZ	LPZ	Rural average	High Income	Medium Income	Low income	Urban average
Household size	4.5	4.4	4.8	**4.6**	4.1	4.2	3.8	**3.9**
Charcoal consumption (kg/hse/yr.)	725	786	603	717	793	620	557	593
Per capita consumption (kg/ yr.)	160	178	125	**156**	193	149	147	**152**
Percentage using charcoal (%)	31	51	27	34	83	79	83	82

Nationally, 47% of households use charcoal, with per capita consumption being slightly higher in rural areas at 156 kg (717 kg/household/year) as compared to that in urban areas at 152 kg (593 kg/household/year).

For conservativeness in setting the baseline consumption value at a national level, the value taken from the table above is 593kg/household/year, the urban average. This approach is seen as reasonable because the above report found that over 80% of urban households were using charcoal, whereas only 34% of rural households reported use of charcoal (nearly 90% of rural households rely on fuelwood). Therefore, since the value chosen is below the national average, it is likely that there will be some emissions reductions resulting from stove replacements in rural households which are not credited, if these households have a higher actual consumption that than the assumed value, which is the (lower) urban average. This effect is limited by the prevalence of charcoal use in urban households.

Establishing baseline stove efficiency value

The CPA will replace both “conventional” and so-called “improved” cook stoves for which default values are provided in the methodology AMS-II.G v. 3. According to the methodology, the default value for a conventional stove (no chimney or grate) is 0.1. Due to the wide range of quality standards of locally-manufactured choarcoal stoves (jikos), there is no single accurate value for the efficiency of the “improved” stoves that are currently available on the market. However, the default value of 0.2 for improved stoves from the methodology AMS-II.G v.3 can be applied if a penetration rate can be established.

Research on the penetration of improved stoves in Kenya resulted in estimates being found in the following literature sources:

1. UNDP (2009 report[47], 2003 data from WHO):

a. national average 2.8%;
b. rural average 2.7%;
c. urban average 3.5%. (page 91)

Notes:

- This report does not distinguish between wood and charcoal stoves.
- Compared with the other two sources, the penetration rate suggested is very low. This could be due to the older vintage of the data

2. Kenyan Integrated Household Budget Survey (2005-06)[48]:

a. Urban penetration of improved charcoal jikos of around 46%
b. Rural penetration of improved wood stoves of around 12%

Notes:

- Since it is highly unlikely that the penetration of improved jikos is as high amongst non-urban users who use charcoal stoves, using only this value for all end users in Kenya may be overly conservative.

3. **GTZ (2009 report[49], 2008 data):**

A survey of 500 households in twelve districts in three provinces of Kenya was undertaken: Central, Western and Transmara, including both rural and urban (ratio of 2:1) households.
The results are (page 34):

a. KCJ penetration of 9.9% in Western Cluster
b. KCJ penetration of 12% in Central/Kisumu Cluster
c. KCJ penetration of 12.8% in Transmara Cluster

Notes:

- The simple average of the above values (a,b,c) from the GTZ survey is 11.57%.
- The survey produced separate values for wood stoves and charcoal stoves; the above values are for improved charcoal stoves only, which is appropriate for this CPA.

After considering the strengths and weaknesses of the three sources, it was decided for conservativeness to disregard the lowest of the three values (2.8%); which is also based on the oldest data source (2003). Although the GTZ study is the most recent, and surveyed a large number of households (500) from both urban and rural areas, it was not national in coverage. The Kenyan household budget survey results for on

[47] Legros, G., Havet, I., Bruce, N. and Bonjour, S., The Energy Access Situation in Developing Countries; A review focusing on the least developing countries and Sub-Saharan Africa. UNDP/WHO. New York, 2009

[48] Kenya Integrated Household Budget Survey (KIHBS) 2005/06 (Revised Edition) BASIC REPORT, 2006

[49] Djédjé, M.; Ingwe, A.; Wanyohi, P.; Brinkmann, V.; Kithinji, J.; Results Assessment: Survey on Impacts of the Stove Project in Transmara, Western and Central Cluster of Kenya Conducted from October 2007 to January 2008 Final report. GTZ, Eschborn

the other hand are only relevant for urban end users, and may therefore be inappropriate if simply assumed for all end users. Thus, it was decided to apply a weighted average blend of 0.1 and 0.2 based on the average penetration rates provided by the GTZ study (2009) and the Kenya Integrated Household Budget Survey (2006). The table below provides a summary of the source values and the calculated average value for η_{old}**:**

Source	data year	ICS share
GTZ	2008	11.57%
KIHBS	2005	46%
Average		*28.92%*
Stove penetration rates based on literature		**AMS.II.G Default value n_{old}**
improved	28.92%	0.2
conventional	71.08%	0.1
Weighted avg. n_{old}		*12.89%*

Thus the estimated value for η_{old} is 12.9%.

Demonstration of NRB in use since December 1989

Between 1990 and 2010, Kenya lost an average of 12,050 ha or 0.32% per year. In total, between 1990 and 2010, Kenya lost 6.5% of its forest cover, or around 241,000ha.

FOREST COVER (excluding planted forests) (1000 ha)				**ANNUAL CHANGE RATE (Negative number represents deforestation)**					
1990	2000	2005	2010	1990-2000		2000-2005		2005-2010	
				1000ha	*percent*	*1000ha*	*Percent*	*1000ha*	*percent*
3,470.0	3,370.0	3,320.0	3,270.0	- 10.0	- 0.3	- 10.0	- 0.3	- 10.0	- 0.3

Figure 6: Kenya: Trends in Natural Forest Cover (Deforestation), 1990-2010[50]

"Deforestation is a serious problem in Kenya. In the last 30 years Kenya's forests have declined by two-thirds. And in the last 2 decades Kenya has lost at least half of its initial forests. "Kenya's forests have been declining from about 5% of national treasury in 1960, to only 2.5% today"" [51]

[50] Kenya Forest Information and Data available online at http://rainforests.mongabay.com/deforestation/2000/Kenya.htm#03-deforestation (downloaded in November 2011).

[51] Dhirendra K. Vajpeyi, Deforestation, environment, and sustainable development: a comparative analysis, Praeger Publishers, Westport, 2001

Annex 4

MONITORING INFORMATION

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