CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01

CONTENTS

Annexes

NOTE:

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

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

Improved Cooking Stoves Programme of Activities in Africa
19/03/2012
Version 02.0

A.2. Description of the small-scale programme of activities (PoA):

1. General operating and implementing framework of PoA

The purpose of this Programme of Activities (PoA) is the dissemination of improved cooking stoves (ICS) in a number of countries in Sub-Saharan Africa (SSA), starting with the countries listed in Section A.4.1.1[1]. The Programme will promote stove categories that replace existing less efficient cooking stoves using woody biomass (wood-fuel and/or charcoal).

The ICS to be distributed are more efficient in transferring heat from the fuel to the pot when compared to the stoves typically being used in SSA. By replacing inefficient stoves, the PoA will save on consumption of woody biomass (either wood or charcoal made of wood) which is the dominant fuel used for cooking in SSA countries. The ICSs applied in this PoA have been designed to match the traditional utensils and cooking habits of the people in SSA.

It is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. Therefore, by reducing the total amount of fuel required for cooking, the replacement of less efficient stoves with more efficient ICS reduces the amount of Green House Gases (GHG) emitted into the atmosphere. Certified Emission Reductions (CERs) are calculated following version 3.0 of methodology AMS.II.G on the basis of the mass of non-renewable woody biomass saved by the ICSs.

Envirofit International is the coordinating/managing entity (CME) for this PoA. As such, it will coordinate the efforts of different Distribution Organizations (DOs) which will be contracted to distribute ICS in the boundary of the PoA and comply with the requirements of this PoA. DOs will act as CPA implementers. As per Annex 38 to EB55 Report, paragraph 8, "the operators of individual CPAs are not required to be project participants". As such, DOs are not required to be project participants and CDM programme participation is only recorded at the PoA level. The inclusion of new CPAs to the PoA will be requested by the CME to the Designated Operational Entity (DOE) during the lifetime of the PoA.

Each DO will sell ICSs on a commercial basis either directly or through technicians, entrepreneurs or other agents sub-contracted by the DO. If any such 3rd parties are engaged by the DO, the DO will be responsible for providing training and development of ICS technicians/entrepreneurs and ensuring that correct procedures are followed during distribution of ICS, including the correct recording of data required for monitoring activities. The CME will provide training and guidance documents on the

[1] Sub-Saharan Africa (SSA) is here defined as including 45 countries south of the Sahara as listed in UNDP, 2009: The Energy Access Situation in Developing Countries, A Review Focusing on the Least Developed Countries and Sub-Saharan Africa", plus Sudan and South Sudan, which are considered part of the Arab States of North Africa.

correct distribution and monitoring procedures to each DO. Each DO will act individually, implementing the CPA(s) in accordance with local circumstances.

When purchasing an ICS, the customer will provide certain information that will be recorded along with the unique stove serial number to enable tracking of the stove during monitoring. This information will form part of the CPA Distribution Record. The customer will also release ownership of the carbon credits generated by the ICS to the CME. Accordingly, the CME will use the CER proceeds to reduce the costs of ICSs supplied to DOs and subsequently sold to end users. The CER proceeds will also be used to recoup the associated costs incurred in the development and implementation of the PoA, such as for the training of DOs and for marketing of the benefits of ICS to overcome prevailing attitudes, as well as covering the costs of after sales services.

The data collected in each CPA Distribution Record will be transferred by the DO to the CME. The CME will be responsible for cross-checking data and entering it into a PoA Distribution and Monitoring Database. The PoA Distribution and Monitoring Database will also serve as the basis for the calculation of CERs and monitoring of CPAs under the PoA. The monitoring plan will be validated and verified by a DOE.

The parties (DOs and their contractors or any third parties working on their behalf) involved in the implementation of each CPA will be made aware and will have agreed that their activity is being subscribed to the PoA.

Figure 1 below provides a graphic illustration of the overall PoA structure.

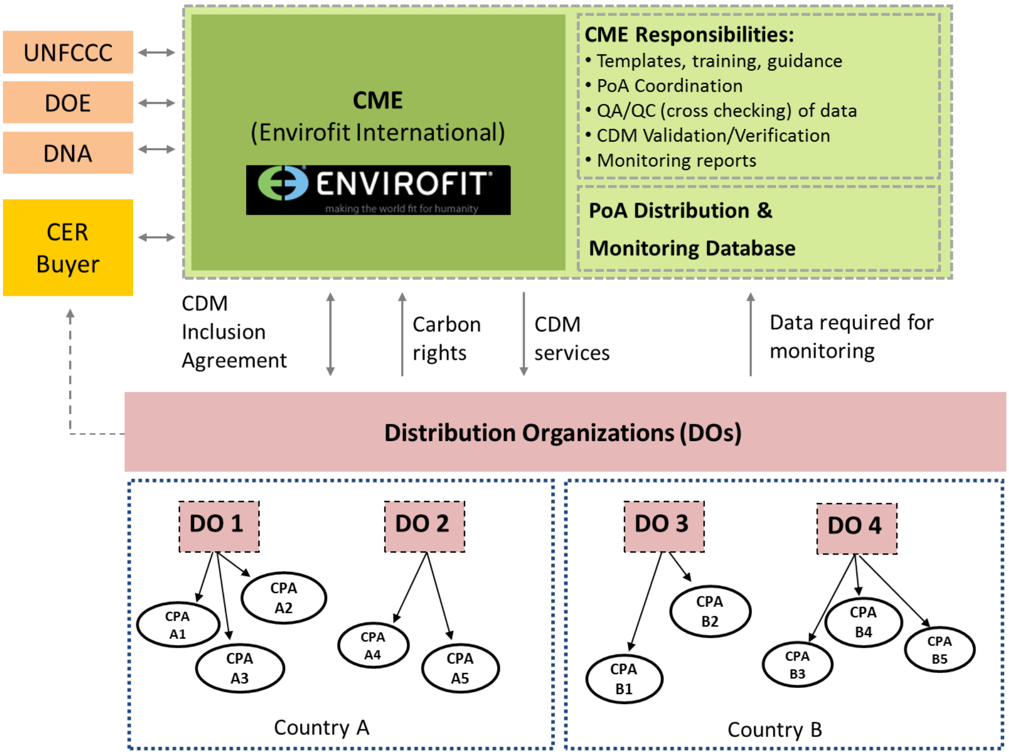

Figure 1: PoA structure

2. Policy/measure or stated goal of the PoA

The goal of the PoA is to enable the large-scale distribution of high efficiency biomass cook stoves in several Sub-Saharan African countries. The PoA will have multiple benefits of reducing global GHG emissions, reducing pressure on forests and woody biomass resources, reducing indoor air pollution associated with use of traditional stoves and freeing up income that can be used for other purposes by reducing the expenditures on fuel for cooking.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

There are no laws/policies mandating the adoption and/or dissemination of ICS in any of the countries within the PoA boundary. Therefore, the proposed PoA is a voluntary action by the CME (Envirofit) and the participating DOs as CPA-developers.

A.3. Coordinating/managing entity and participants of SSC-POA:

The coordinating and managing entity of the PoA and the entity which communicates with the Board is Envirofit International Ltd. Contact details are provided in Annex 1.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants(*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
United Kingdom	Envirofit International (project participant)	No
Kenya (host)	Envirofit International (project participant)	No
South Africa (host)	Envirofit International (project participant)	No
(*) In accordance with the CDM modalities and procedures, at the time of making the PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

A.4.1.1. Host Party(ies):

Republic of Kenya (Kenya) and Republic of South Africa (South Africa).

It is planned to expand this PoA to other countries in Sub-Saharan Africa.

A.4.1.2. Physical/ Geographical boundary:

The geographical area within which all CPAs included in this PoA will be implemented in the territorial boundary of the host countries included in the PoA boundary.

Each CPA will be limited by the territorial boundary of the host country in which it is located, and the physical location of the stoves distributed in that CPA will form the actual CPA boundary.

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

The PoA will be implemented using the approved methodology *AMS. II.G, version 3 - Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass.* This category comprises appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples of these technologies and measures include the introduction of the improved cooking stoves produced by Envirofit. The stoves that will be promoted will burn either wood fuel or charcoal fuel and will replace less efficient stoves burning either wood fuel or charcoal fuel.

Below are pictures of Envirofit's current line of applied stoves.[2]

Figure 2. CH2200 (left) and CH4400 (right) Charcoal Stoves

Figure 3. G3300 (Left) and M5000 (Right) Portable Wood Stoves

Figure 4. Z3000 Built in Stove

All the stoves depicted above 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 emissions results show a per cent improvement above 60% in all cases, compared to a metal stove (charcoal stoves) or three stone fire (wood fuel stoves).

Other wood and charcoal stoves produced by Envirofit and/or other manufacturers could be included in a CPA under the PoA as well. Inclusion of such stoves would be subject to the completion of appropriate tests to prove that stove efficiencies meet the requirements of the methodology and the eligibility criteria of the PoA as further specified in Section A.4.2.2.

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

Envirofit, as the PoA coordinating entity, shall verify that certain eligibility conditions are met before allowing a CPA to be included under the PoA. The eligibility criteria for the inclusion of a CPA in the PoA, which shall be stated and confirmed in each CPA-DD, are as follows:

	Eligibility criteria		Means of proof	Confirm-ation
	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.	Yes/No
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.	Photo or similar proof that stoves have a unique serial ID number or other means of identification. Database and/or Distribution Record showing that end user details including name and address are to be collected along with Stove ID.	Yes/No

3.	Technology requirements	The ICS uses one of the following fuel types: • Wood fuel • Charcoal	Technical specification of ICS provided	Yes/No
4.		The ICS has a minimum efficiency of 20% (AMS II.G, Version 3, para 1)	Technical specification of ICS provided	Yes/No
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.	Yes/No
6.	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 AMSII.G. V 03 are shown to exist in the country	Yes/No
7.	Additionality of CPAs	The CPA 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: (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, then it can be demonstrated that at least one of the	In the case of test 1: energy savings from the individual sub-systems and the overall CPA are estimated using 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. In the case of test 2: For the first CPA in each country it shall be demonstrated that at least one of the barriers outlined in Section A.4.3 applies – e.g. by providing a reference to literature or a similar proof)	Yes/No

		barriers discussed in Section A.4.3. also applies to the CPA. Once this has been demonstrated for the first CPA in each country, further CPAs in that country can use this proof as a reference when demonstrating additionality.		
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) Affirmation by the funding party	Yes/No
9.	End-user group	The CPA is either aimed at households, community organisations (eg. schools) or small/medium enterprises.	The CPA-DD specifies the target end-user group and the appropriate baseline.	Yes/No
10.	Sampling	Sampling of stoves within the CPA must meet the requirements of AMS II G v3 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, or b) if CPA-specific sampling is to be undertaken, the CPA Sampling Plan must meet the requirements of AMS II G v3 and the Sampling Standard	Yes/No
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. If a CPA exceeds the applicable limit, the claimable emission reduction shall be capped based on the stated limit (either 180 GWh_{th}/year in the case of SSC-CPA and 60 GWh_{th}/year in the case of micro-scale CPA).	Yes/No

12.	Exempted from de-bundling	Each ICS reduces energy consumption by less than 1.8 GWh_{th}/year [3].	Specific energy savings for the applied ICS estimated using Excel sheet or similar tool.	Yes/No
13.	Contractual agreement	In the case that the CME is not responsible for implementing the CPA, the organization responsible for CPA implementation, known as the Distributing Organisation (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	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/No

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

In the following it is demonstrated that:

(i) The proposed PoA is a voluntary coordinated action;

None of the countries in the PoA have laws/policies mandating the adoption of ICS. This proposed PoA is a voluntary action by Envirofit, the CME.

(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;
See below for the demonstration of how the action would not be implemented in the absence of the PoA.

(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;

Not applicable.

(iv) If a mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

Not applicable.

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[3] 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.

The PoA reduces the use and demand for fossil fuels and non-renewable biomass that would have been used in the replaced stove to achieve the same output (i.e. cooking daily meals and boiling water) with the ICS. This directly leads to reduced GHG emissions.

According to UNDP/WHO, the prevailing fuels used for cooking in SSA countries are wood and charcoal, with 69% of people relying on wood and 11% of people relying on charcoal.[4] The dominant technology for wood users in SSA countries is still the traditional “three-stone” fire and other conventional cooking stoves while the traditional metal charcoal stove is the most frequently used technology by charcoal users.[5] As is discussed in detail below, the penetration of improved stoves is still very low in the vast majority of SSA countries.

The wood collected or harvested to fire traditional stoves, or to be converted into charcoal for the same purpose, consists of a high percentage of non-renewable biomass. The substitution of traditional stoves with ICS saves fuel depending on the efficiency of the ICS. According to the approved methodology, in the absence of the project activity, the assumed baseline scenario for the purposes of emissions reduction calculations would be the use of fossil fuel for the community to meet its energy need if the use of non-renewable biomass would be avoided. Therefore, by reducing non-renewable biomass consumption (i.e. fuel wood or charcoal), the PoA is reducing anthropogenic GHG emissions. According to AMS II.G, the emission reductions are calculated based on the annual savings of non-renewable biomass multiplied by an emission factor for the fossil fuel mix.

Previous cook stove distribution programmes in SSA have been supported by donor funding, with mixed results. Programmes involving indirect subsidies tend to face market barriers to the introduction of new and affordable products, while programmes involving direct subsidies struggle with long term sustainability when funding runs out.[6] As a result, many donor-funded stove programmes have been rather limited in terms of size, and problems have resulted when funding has run out for maintaining quality levels and momentum. Negative perceptions of past stove programmes act as a barrier to the acceptance of new ICS among the end-users, which can only be overcome with high-quality products, a long-term programme design, and considerable effort and financial resources that are not available in the absence of carbon finance.

The CME has identified the key barriers and has developed a strategy for the implementation of a large, multi-country, programme for the replacement of conventional or improved cook stoves burning wood or charcoal with higher efficiency improved stoves. As is demonstrated below, such a distribution programme would not be implemented the countries listed in Section A.4.1.1 or in any of the SSA countries in the absence of the CDM PoA.

Assessment and Demonstration of Additionality of the Proposed PoA
The PoA allows for the inclusion of both micro scale and SSC CPAs. The additionality demonstration below is provided for the case of small-scale CPAs. In line with the Guidelines for Demonstrating Additionality of Microscale Project Activities (EB 63 Report, Annex 23, para 3), micro-scale CPAs

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[4] 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.

[5] In the methodology AMS. II G v3 a conventional stove is defined as “one with no improved combustion air supply or flue gas ventilation systems, i.e. without a grate or a chimney”.

[6] Gaul, Mirco, Subsidy schemes for the dissemination of improved stoves, Experiences of GTZ HERA and Energising Development. GTZ. Eschborn, 2009

would be considered additional if they satisfy the micro-scale additionality test specified in Section A.4.2.2 (Eligibility Criteria 6) regardless of the assessment below[7].

The additionality of the proposed PoA is demonstrated using the criteria outlined in Attachment A to *Appendix B of the simplified modalities and procedures for small scale CDM project activities* (Version 8, EB 64). Outlined below are the key barriers which prevent the programme from being possible without the use of CER revenues.

Barrier due to prevailing practice

On average, only 6% of people in SSA that use solid fuels for cooking have access to an improved stove and many SSA countries have even lower penetration rates[8]. Even in Kenya, which is often seen as a success story, penetration rates of ICS in some regions are still relatively low after nearly three decades of donor support for stove distribution programmes (i.a. provided by the German Government through GTZ, the US, the Netherlands, and others). A national survey conducted for the Kenyan Ministry of Energy in 2002 concluded that 47% of households relying on charcoal were using a Kenyan Ceramic Jiko (KCJ) or similar "improved" stoves (penetration of improved wood stoves was much lower – around 4%)[9]. A GTZ survey conducted in 2009, however, found that conventional charcoal stoves were still dominant in two of the three clusters of districts surveyed, and for wood users traditional three stone fires were still dominant in at least one of the three regions[10]. The UNDP cites WHO data from 2003 suggesting that the national average use of improved stoves in Kenya was only around 3%[11]. South Africa is also a case in point. Despite being one of the wealthiest countries in SSA, of the households relying on solid fuels in South Africa, only 32% use an improved stove according the UNDP[12]. A 2008 report prepared for the GTZ-funded Programme for Basic Energy and Conservation (ProBEC) found that many poorer households continue to rely on fuelwood and/or charcoal due to affordability constraints, even when they have access to electricity[13]. This highlights the challenges involved in changing cooking practices in SSA countries. If prevailing practices are hard to overcome in Kenya and South Africa, it is logical that the barriers will be even be higher in many other SSA countries which have seen far less activity on improved cook stoves and face even greater affordability challenges (see below for discussion on affordability).

Many of the improved stoves that have been distributed in the past performed well in the laboratory or when first installed, but deteriorated quickly due to lack of quality control over local materials and

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[7] 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] Legros et al, 2009, p 21 figure 14. The report states that adequate data was found in 30 of the 45 SSA countries assessed, and that this data was representative of 77% of the population (p 20, table 6).

[9] Ministry of Energy, Study on Kenya's energy demand, supply and policy strategy for households, small scale industries and service establishments. Final report prepared by Kamfor Company Ltd. Nairobi, 2002.

[10] Djedje, 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. 2009.

[11] Legros et al, 2009, p91

[12] Legros et al, 2009, p92.

[13] Damm, O. and Triebel, R., A Synthesis Report on Biomass Energy Consumption and Availability in South Africa. A report prepared for ProBEC. 2008.

manufacturing[14]. For example, a site visit to stove manufacturers in Nairobi in November 2011 showed that many local artisans manufacture KCJs using cheap scrap metal and low-grade liners which were not fired properly but simply painted to appear fired. This observation is supported by a report by the company KAMFOR for the Kenyan Ministry of Energy (2002), which noted: "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."[15]

As a result of these past experiences and the variable quality of ICS that have been distributed to date, there is a common perception amongst many people in SSA countries that improved stoves do not live up to expectations. For example, the negative experience with past stove programmes was identified by GTZ as the major barrier to the uptake of improved stoves in the FAFASO programme in Burkina Faso[16]. Financial resources are required to overcome these negative perceptions through education and awareness campaigns, stove use demonstrations and product promotions.

Another reason for negative perceptions is that past stove programmes have often been unable to build up to scale or maintain momentum over the long term. For example, a programme in Burundi funded by the World Bank's International Development Agency (IDA) resulted in the sale of just 1,700 improved stoves when funding ran out; firstly because manufacturing of local stoves was more profitable for local artisans and secondly because ongoing marketing efforts were needed beyond the allocated funding[17]. Similarly, there have been a number of stove projects in South Africa, but never a strong commitment from national government departments to support such interventions over the longer term[18]. The proposed PoA envisages the distribution of stoves on a large scale across multiple countries and covering both urban and rural areas.

Habitual use of conventional stoves and the legacy of problematic experiences with the older ICS distribution programmes present a significant barrier to the uptake of high efficiency, more expensive (i.e. generally unaffordable) stoves. A significant amount of awareness raising, marketing, demonstration and customer relationship building is required to overcome this barrier – particularly if momentum is to be maintained over the longer term. Under the proposed PoA, carbon finance is required to fund these activities because the costs of changing the prevailing practices cannot be recovered on a commercial basis due to investment barriers, as is demonstrated below.

Technology barrier

The technology contained in the stoves that would be distributed under this PoA would not be available to Sub Saharan African countries without the financing provided by the CDM. To explain why, it is important to distinguish between the ICS programmes which have typically been supported by donor-funding and the new-generation of biomass cook stoves such as those that will be distributed under the proposed PoA. The typical "improved" stoves found in Sub Saharan African countries (the term

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[14]World Bank, Household Cookstoves, Environment, Health, and Climate Change: A new look at an old problem, The World Bank, Washington, 2011, p14.

[15] Ministry of Energy, 2002, p 57

[16] GTZ, Energising Development FAFASO Final technical report, 2007.

[17] Hakizimana, G., EAC Strategy to Scale up access to modern energy services, Burundi Country Baseline Report and Workplan, Bujumbura, 2008, p43

[18] Shackleton, C.M., Buiten, E. Annecke, W., Banks, D., Bester J., Everson, T., Fabricius, C., Ham, C., Kees, M., Modise, M., Phago, M., Prasad, G., Smit, W., Twine, W., Underwood, M., von Maltitz, G. & Wenzel, P, Fuelwood and poverty alleviation in South Africa: Opportunities, constraints and intervention options, 2004, p 19.

"improved" here is as per the definition in AMS II.G v3 para 6, Option 2) are made by local artisans with the support of donor agencies, using basic materials, but without standards and with poor quality control. As a result, the locally made stoves tend to have varying thermal efficiencies. As per the methodology, an improved stove might typically have an efficiency of 20% compared with 10% for a three stone fire or traditional metal coalpot. The newer or "advanced" improved stoves on the other hand are being produced using modern production techniques and advanced materials and can achieve efficiencies in the range of 30-40% (see below for an example). Hence, the World Bank uses the term "*Advanced biomass cookstove*" to refer to the new generation of high quality, factory-manufactured stoves, which are based on higher levels of technical research to achieve higher safety, efficiency, emissions, and durability standards[19].These stoves also have higher production costs and hence would need to be sold at higher end user prices which are unaffordable for the typical end user in SSA. Affordability is discussed further below in the *Investment Barrier* section.

The current line of Envirofit charcoal stoves are two of the stoves that would be distributed as part of a typical CPA under the PoA, including the CH2200 and the CH4400 (see pictures above in Section A.4.2.1). These stoves have been developed over several years 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 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. As a result of this work, the CH2200 stove has an average thermal efficiency of 38.2%, making it one of the most efficient charcoal stoves in the world, and it reduces carbon monoxide emissions by around 63%, making it highly beneficial from a health perspective[20]. The CH4400 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, and has a thermal efficiency of 31.4%. 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 of the CH4400 hotter, more energy is lost through parasitic losses to the stove body, which is also significantly bigger. This is why the efficiency of the CH4400 is lower compared with the CH2200, despite being highly efficient when compared with the charcoal stoves typically used in SSA.

To manufacture high quality products such as these to a consistent standard and in order to minimize costs, factory-scale production is unavoidable. That is why Envirofit currently manufactures its stoves for the world market in China, where low cost, high quality, high volume production can be achieved. In addition, the combustion chambers of the Envirofit stoves are made up of a proprietary metal alloy not available within SSA. Envirofit worked with U.S. based Oak Ridge National Laboratory's High Temperature Materials Lab (one of the most prominent high temperature material labs in the world) for over a year to evaluate and tailor various alloys to be able to handle the rigorous conditions within a cookstove while still maintaining a low cost. With these alloys Envirofit can design features into the combustion chamber such as changing the orientation of the air supply holes in the chambers to minimize parasitic losses. These kinds of design features would be impractical with clay chambers. Because of the

[19] World Bank, 2011

[20] Certified test results from testing conducted by the Engines and Energy Conversion Laboratory at Colorado State University available at www.envirofit.org

specific composition of the alloy it is typically only made in highly specialised foundries. of which there are a limited number internationally. As a result, it is not feasible for these stoves to be fully manufactured by local artisans[21] and without the support of carbon finance the introduction of this technology to SSA countries at scale would not be possible.

Investment barrier

As stated, past stove distribution projects in SSA have been funded through grants and other forms of donor support. A recent report by the World Bank outlines the history of donor involvement[22]. Starting as far back as the 1970s initial support came from UN agencies including the Food and Agriculture Organisation (FAO) and the Energy Sector Management Assistance Program. Around the same time, the German Government through GTZ (now GIZ) started supporting various programs, usually in cooperation with local governments and more recently in cooperation with the Dutch Government under the EnDev Programme. Specific examples of GTZ programmes in SSA include:

- Kenya – aside from the KCJ distribution programmes, the German-Dutch partnership has also supported the establishment of businesses manufacturing Rocket mud stoves and Jiko Kisasa stoves - by June 2010 more than 2,780 private businesses with an average production of 337 Jiko Kisasa liners per producer per month[23];
- Uganda - the distribution of 250,000 Rocket Lorena stoves in Bushenyi and Rakai and dissemination of improved charcoal stoves in Kampala in 2005 and 2006;
- Ethiopia – the distribution of over 200,000 Mirt stoves since 1999;
- South Africa – market testing of 2,000 StoveTec rocket stoves;
- Malawi – distribution of 4,200 Rocket Stoves for institutional kitchens in 2004-7;
- Mali – the dissemination of over 15,000 stoves in 2005-7 under the FAMALI programme; and
- Burkina Faso- 45,000 stoves distributed since 2008 under the FAFASO programme[24].

Other international donor organisations include the World Health Organization (WHO), the United Nations Development Programme (UNDP), and the World Bank/IDA – see for example a programme in Tanzania in 1988-92 which established a local production capacity of 5,000 improved stoves per month[25]. A number of US agencies have also been involved, including the US Environmental Protection Agency–founded Partnership for Clean Indoor Air (PCIA), and the United States Agency for International Development (US AID), which has supported stove programmes in Kenya, Uganda, and Sudan.

The recently launched Global Alliance for Clean Cookstoves (GACC) under the United Nations Foundation (2010) provides a way of facilitating the efforts of donor organisations and others involved in ICS programmes such as private sector foundations.

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[21] Assembly and manufacture of some other components is realistic, and is currently being planned for Kenya on the back of the proposed PoA.

[22] World Bank, 2011.

[23] EnDev (Energising Development) Kenya, Efficient and Clean Cooking Energy, 2010. GIZ on behalf of the Ministry of Economic Cooperation and Development, Germany, Ministry of Foreign Affairs, Netherlands, 2010.

[24] Various sources on the GIZ website http://www.gtz.de/en/index2.htm accessed in October-November 2011.

[25] World Bank, Rural Energy and Development Improving Energy Supplies for 2 Billion People: A World Bank Best Practice Paper, Washington, 1996.

There are also a number of SSA stove programmes that rely on carbon finance (CDM or voluntary Gold Standard credits). Examples include "Efficient wood fuel stoves for Nigeria" SSC-CDM project, "CDM Lusaka Sustainable Energy Project" (in Zambia) and the Ugastove Gold Standard project (in Uganda), which was supported by a US Environmental Protection Agency grant during its start-up. At the time of writing there were also a number of other PoAs using AMS II.G. under development in SSA countries according to the UNFCCC CDM website.

Without donor support or carbon finance, private capital is not available from either domestic or international capital markets for the multi-country ICS distribution programme proposed to be undertaken by the CME in SSA. This is especially due to the high quality standards of the ICS used and the higher production costs of the ICS compared to the currently available stoves in the local market. The need for carbon finance to overcome this barrier is clearly demonstrated in a letter to the Envirofit CEO from the Director of the Shell Foundation, dated 16 November 2011, which is provided as an Annex.

Two main factors are responsible for the lack of finance for large scale commercial ICS distribution programmes:

- Risk associated with investing in SSA countries that make finance either unavailable or too expensive; and
- Inability to recover costs of the distribution programme due to high ramp-up costs and low ability of local people in SSA countries to pay for high efficiency stoves.

Investment barrier due to real and perceived risks associated with investment in SSA countries.

Past stove distribution programmes in SSA countries have relied on donor funding. Finance for investments in SSA countries is often not available from the market due to a number of country risks which are briefly described below. If they are willing to provide finance, financiers will attach a risk premium to investment in any country where there is significant uncertainty about the ability to recover investment – this premium typically makes such investments unattractive to the private sector.

According to the UN Economic Commission for Africa (UNECA), while a wide range of factors have played a role in discouraging direct investment in Africa, uncertainty manifests itself primarily in three ways[26]:

- Political instability evidenced by the high incidence of wars, frequent military interventions in politics, and religious and ethnic conflicts. (For example, the Kenyan military is currently engaged in a conflict with the al-Shabab terrorist organization on the Somalian border).
- Macroeconomic instability evidenced by the high incidence of currency crashes, double digit inflation, and excessive budget deficits; (For example, between June and November 2011 the Kenyan Central Bank increased the Central Bank Rate from 6.25 per cent to 16.50 per cent in a bid to control inflation[27]) and
- Lack of policy transparency, which is due in part to the high frequency of government as well as policy changes in the region and the lack of transparency in macroeconomic policy.

[26] Dupasquier, C. and Osakwe, P: Foreign Direct Investment in Africa: Performance, Challenges and Responsibilities, Economic Commission for Africa, 2005.

[27] Rates are available online at http://www.centralbank.go.ke/

A major barrier to obtaining finance for investment in even relatively more stable countries is that the real and perceived interdependence of African economies affects investors' assessment of risk in all African countries, regardless of which country the investment is targeted at. As the UNECA states:
"Because of imperfect information, foreign investors associate the outbreak or occurrence of risk in one country with the likelihood of similar risks in other countries in the region. Consequently, for the most part, they do not differentiate between countries in the region—a phenomenon known as statistical discrimination"[28].

The result is that it is either not possible to obtain finance for a SSA stove distribution programme at all, or the risk premium that would be required by private financiers would render such a programme not commercially viable – regardless of the specific countries being targeted. Even if finance were able to be obtained, the costs would need to be factored into the ICS selling price which is already too high for end users to bear unless carbon finance can be used to subsidize the price. This is especially due to the high quality and hence high production costs of the ICS used, compared to the stoves available in the local markets.

Investment barrier due to inability to recover costs through the sale of stoves

Due to the low level of market development, the legacy of past stove distribution programmes, poor infrastructure and the range of country risks discussed above, significant financial resources need to be spent by the CME and the DOs before it is clear whether people are actually willing to purchase the stoves and hence any revenues be generated from the sale of stoves. There is high level of risk that the cost of this initial investment would never be recovered because of the inability of local people in SSA countries to pay the full cost of the stoves. Put simply, the private sector rarely funds stove development as it is not viewed as an attractive investment proposition[29].

Aside from the cost of manufacturing Envirofit's stoves, the distribution programme involves a host of associated costs including:

Costs borne by the CME:

- Search costs to assess opportunities in SSA countries;
- Costs of developing the business model, identifying suitable DOs in each country;
- Cost of shipping stoves from the current manufacturing facilities outside of Africa – in the case of finished end products being imported into the target countries;
- Costs associated with the establishment of a local assembly plant – in the case of such plants being part of a CPA;
- Costs of establishing local manufacturing operations – in the case of such operations being part of a CPA;
- Training of staff involved in local assembly and/or manufacturing;
- Training of DOs to ensure correct procedures are followed during distribution;
- Training of parties involved in monitoring activities.

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[28] Dupasquier, C. and Osakwe, P., 2005, page 17

[29] Rai, K., McDonald, J., Cookstoves and Markets: Experiences, Successes and Opportunities, GVEP International, 2009.

Costs borne by the DO:

- Costs of recruiting and training personnel involved in the distribution and maintenance of stoves;
- Costs of developing, implementing and maintaining monitoring systems, software, databases etc;
- Marketing and awareness raising activities, promotional campaigns (radio and print advertising);
- Educating stove users on correct use of stoves and providing after sales services to maintain customer relationships;
- Taxes and duties paid on any imported components or on final products in the case of countries where local manufacturing is not feasible. In particular, the combustion chamber is likely to be imported even if there is local manufacturing of some components and local assembly.;
- Storage costs and in-country transportation costs;
- Margins required by third party retailers and any financial institutions involved in the provision of loans to customers in target countries.

In SSA it is not feasible to pass on these costs to the end user by simply adding a margin to the retail sales price. Take the Envirofit G3300 wood stove for example, which has an ex-works price of around US$30 when produced in the factory[30]. Once shipping, import duties, local distributor margins and retailer margins have been added, the fully-costed retail price per stove is likely to be between 50-100% higher than this, or around US$45-60. It is anticipated that carbon revenues are the only feasible way to fill the gap between the affordable end-user price and this fully-costed retail price. By comparison, the prices for the improved wood stoves currently available in Kenya vary from around US$1.5–3 for Jiko Kisasa stoves, $2.5–3 for one-pot Rocket Mud Stoves, and $3–6.5 for two-pot Rocket Mud Stoves[31].

To put the end-user price of the Envirofit stoves in perspective, it is noted that thirty-three SSA countries were classified as being LDCs by the UN at the time of writing[32]. These countries all have less than US$905 Gross National Income (GNI) per capita, and twenty of them have GNI per capita of US$600 or less – that is, the full cost of the G3300 stove would represent a full month's income or even more[33].

Non-LDCs also face similar barriers. For example, Kenya, while not classified as an LDC, has a GNI per capita of just US$780[34], suggesting the average Kenyan's monthly income is just US$65 or slightly less than the fully-costed price of the stove in the example above[35]. By contrast, the two main improved stoves manufactured in Kenya with the support of GTZ in recent years are sold for far less; prices range from 300 to 800 Kenyan Shilling (around US$3.30 to US$8.80), depending on the type of stove and the material used in construction[36].

Even in the case of South Africa, which is a relatively wealthy country by comparison (average GNI per capita of US$6,100), many households, and especially the poorer ones, would be unable to pay the fully-

[30] A confidential annex providing a detailed breakdown of the costs can be provided.

[31] World Bank, 2011 page 61

[32] A list of LDCs is available at http://www.unohrlls.org/en/ldc/25/)

[33] Calculated using the World Bank's Atlast method (World Bank, 2011) http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf

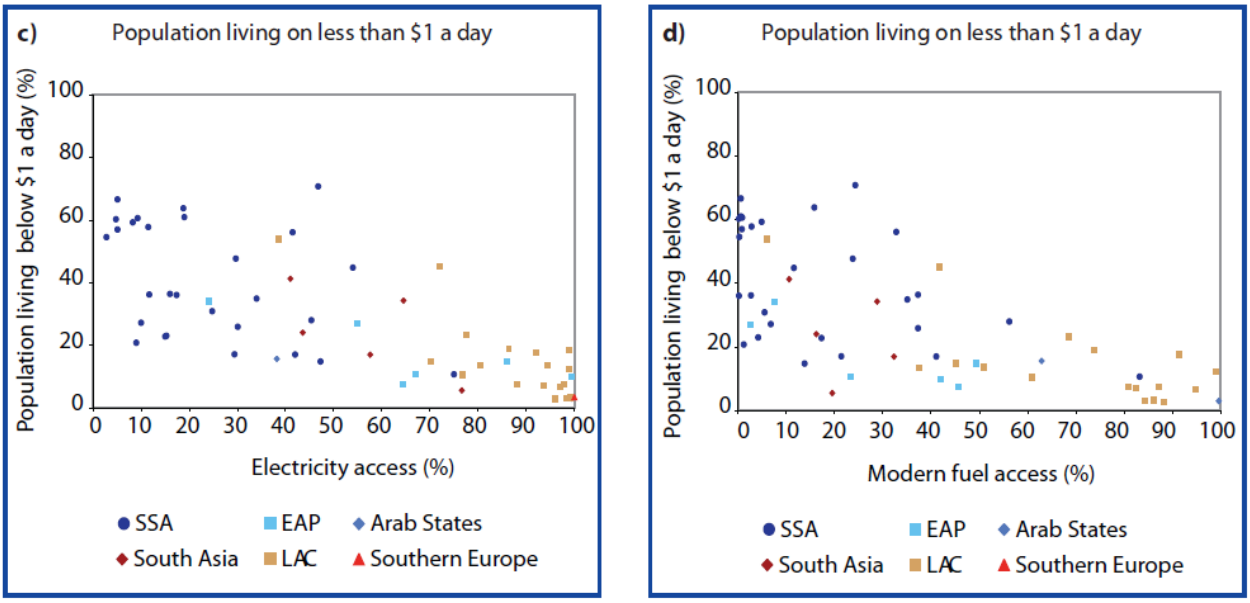
[34] Income is just one of the elements of defining an LDC.

[35] World Bank, 2011

[36] EnDev, 2010

costed retail price of a high efficiency stove. For example, a recent feasibility study for a distribution project funded by GTZ suggested willingness to pay for the StoveTec Rocket woodfuel stoves of around R100 – R200 (US $12 – 25)[37]. Even taking the conservative upper end of this range into account, this suggests that the willingness to pay (WTP) is well below that required to recover the full costs associated with implementing the proposed PoA. As a relatively wealthy nation, South Africa provides an indication of the upper bound of the WTP for improved cook stoves in SSA countries - it is logical that poorer countries would face even higher barriers from an affordability perspective and would hence not be able to afford to pay the full price of an Envirofit stove. Carbon finance is thus required to subsidise the retail price.

It must also be remembered that in reality the people who are dependent on biomass for their energy needs are considerably worse off than is suggested by official GNI per capita figures, since these figures tend to be skewed by the income disparity between the elite wealthy minority and the average citizen in SSA countries (often due to the control these minorities exert over the income generated by key resources such as oil, minerals, diamonds etc). In SSA countries it is typical that access to modern energy supplies is negatively correlated with poverty, as is shown in the graphs below from UNDP/WHO (2009)[38].



The graphs clearly show that the predominant situation in SSA countries (the blue dots) is that up to 70% of people are living on less than US$1 per day and less than 50% of people have access to electricity or modern fuels. Thus the people who are dependent on woodfuel and charcoal can be expected to face significantly greater affordability challenges than is suggested by official GNI per capita figures.

Conclusion and CDM consideration

The CDM has been identified as the only realistic and adequate source of finance to overcome the existing barriers to the implementation of the proposed stove distribution programme. Carbon finance is needed in order to successfully develop, promote and implement the programme, to reach the intended

[37] Restio Energy, StoveTec Stoves, A distribution Framework. Final report prepared for GTZ. Somerset West, 2009

[38] Legros et al, 2009

scale and to provide customers with high quality products at an affordable price, whilst ensuring customer satisfaction over the long term.

None of the CPAs to be included in the PoA “Improved Cooking Stoves Programme of Activities in Africa” will start prior to the commencement of validation of the PoA.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

The detailed steps involved in the operational, management and monitoring plan for the proposed PoA are described below. The numbering of the steps corresponds with the diagram provided below the text.

A.4.4.1. Operational and management plan:

Figure 5 below provides an overview of the distribution and monitoring activities involved in each CPA under the PoA. Each numbered step has a corresponding descriptive paragraph in the text below.

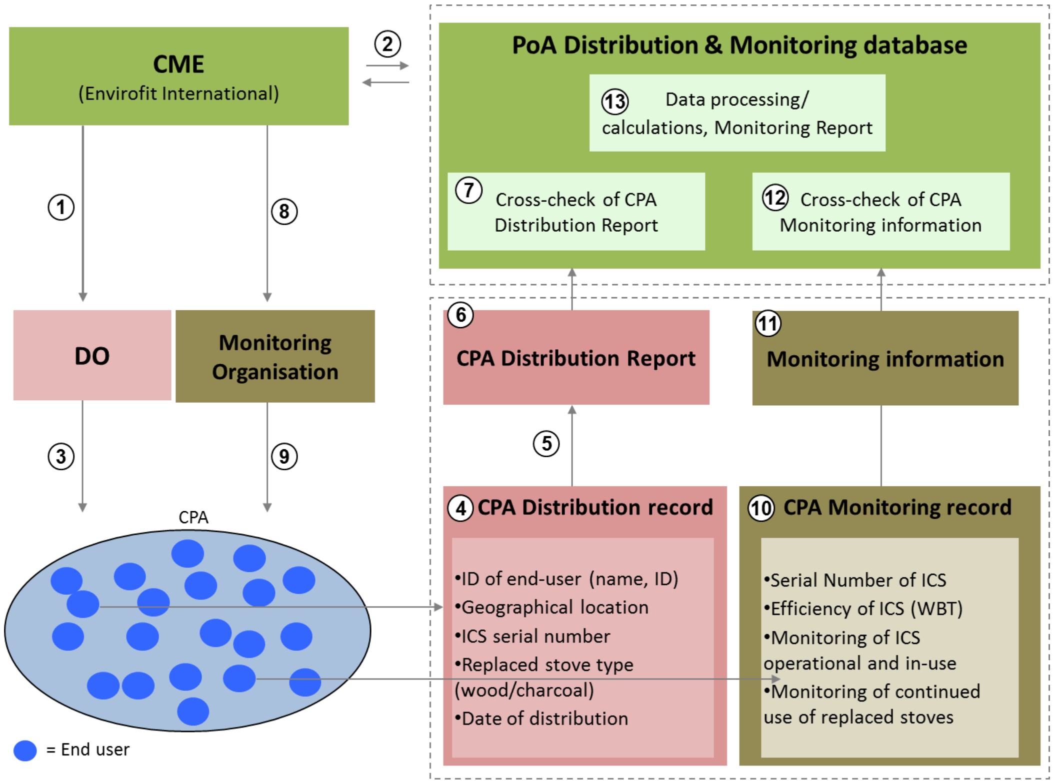


Figure 5. ICS distribution and monitoring plan

Procedures for distribution of ICS

1. The CME will coordinate the activities to be undertaken by each DO involved in the PoA. As part of the inclusion of a CPA under the PoA, a legally-binding contractual agreement will be signed by the DO and the CME. Under the agreement, the roles and responsibilities of the CME and the DO will be clearly spelled out. Further, the DO will ascribe its activity to the PoA as part of entering into this agreement. Any parties the DO contracts in its role as the CPA developer will also be required to enter into a contractual agreement with the DO, similarly ascribing their activities to the PoA. Suitable training will be conducted for DOs taking part in new CPAs to make them aware of the rules

of the CDM and the PoA and their requirements in terms of distribution and data collection. Guidance will be provided to each DO on the correct procedures to be followed during distribution. The agreement will also define carbon ownership rights.

2. The CME will keep a record of the serial numbers of the ICS units distributed by each DO. This will enable cross-checking of the individual units claimed to have been distributed by each DO during the proposed PoA, thus helping to avoid double counting and improve accountability.

3. The DO will be responsible for the implementation of the distribution programme within a specific CPA or CPAs. Stoves will be distributed to end users by the DO directly or via technicians, retailers, agents or other third parties that are sub-contracted by the DO. Any such third parties will be trained by the DO which will be responsible for ensuring correct procedures according to the PoA are fulfilled, as will be required of the DO by its agreement with the CME. The third parties will be required to sign a training record to confirm their participation. This record will then be provided by the DO to the CME to prove that those third parties actually took part in the training.

4. During the distribution itself, each DO shall make sure that necessary data is correctly obtained from the customer and recorded in the CPA Distribution Record, firstly to avoid double counting and secondly to enable tracking of the ICS for monitoring purposes. This data will include:
   - **Name/Identification of end user that will be using the stove**
   - **Geographical location of stove**, which could be determined by a fixed address/location if applicable, or by using GPS data.
   - **Stove unique serial ID number**
   - **Type of old stove which the ICS is replacing**, i.e. the fuel type – wood or charcoal.
   - **Stove distribution date**

   Additional information will be recorded in the case of each individual CPA if deemed necessary to ensure effective tracking of stoves, accurate emissions reduction calculations and effective monitoring procedures under the particular circumstances of that CPA (for example, where applicable a phone number will also be collected).

   At the time of distribution, the DO will also obtain the customer’s approval to exclusively assign carbon rights to the CME.

5. The DO is responsible for ensuring that the data contained in each individual CPA Distribution Record is provided in the correct format and is complete and accurate. Incentive structures will be put in place by the CME and the DO as part of the operation and management plan to ensure the accuracy of the data to be compiled in a CPA Distribution Report. This Report will be compiled in an appropriate format - for example, in an Excel spread sheet or similar.

6. The DO will provide a CPA Distribution Report to the CME on a regular basis. Either the originals of the CPA Distribution Records or scanned copies of each Record will also be provided to the CME. The DO will take appropriate steps to maintain archives of past CPA Distribution Records.

7. The CME will perform cross-checks on the distribution information received from each DO. The CME will be responsible for maintaining a secure database, the PoA Distribution and Monitoring

Database, covering the CPAs within the PoA. The unique serial number linked to each stove and the unique CPA ID number eliminates any risk of double-counting of ICSs between CPAs.

A.4.4.2. Monitoring plan:

8. The CME will also oversee all ex-post monitoring activities in the PoA. The CME may undertake the actual monitoring activities itself (i.e. testing of ICS selected during sampling) or it may coordinate third parties contracted to the CME who would undertake the actual monitoring activities. In the case of using contractors, the CME will be responsible for oversight and providing guidance and training to the parties involved. The choice between conducting the actual monitoring activities itself or employing another organization (for example, local marketing firm, university etc) to do so will depend on locational and operational factors. For example, in a particular country the CME may identify a local partner that is better able to gain physical access to households to conduct the required tests during monitoring. For this reason, in Figure 5 above and in the text below the organisation conducting the monitoring activities is simply referred to as “Monitoring Organisation”.

9. Monitoring activities will involve selecting a sample of stoves from the PoA Distribution and Monitoring Database and visiting the premises where these stoves are located to monitor the required parameters as part of the PoA Sampling Plan (see Section E.7.2).

10. During monitoring, the individuals carrying out the monitoring activities on behalf of the Monitoring Organisation will follow the instructions provided during training, to check and record the following key parameters in a document referred to as the CPA Monitoring Record, which will be provided in a standardised format by the CME:

    - **Efficiency of project stoves (**η_{new})
    - **Check if project stoves are operational and in use** (SOF)
    - **Check if there is any on-going use of replaced stoves**
    - **If replaced stoves are being used, the consumption accounted for by the old stoves will be excluded from** B_{old}

11. The Monitoring Organisation is then responsible for ensuring that the data contained in each individual CPA Monitoring Record is provided to the CME (eg. by uploading an Excel spread sheet or in a similar format). 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.

12. The CME will perform cross-checks on the data provided to it by the Monitoring Organisation to ensure that the sampling plan has been followed. This data will be contained in a secure database that will form part of the PoA Distribution and Monitoring Database, which will be maintained by the CEM.

13. The PoA Distribution & Monitoring Database will provide the necessary data for emissions reduction calculations and will provide the outputs which will form the basis of the Monitoring Report to be produced by the CME at the end of each monitoring period. The data contained in the database will be made available to the DOE during verification.

A.4.5. Public funding of the programme of activities (PoA):

No public funding from Parties included in Annex I is involved in the development or implementation of this PoA. In the case that any sources of public funding from Parties included in Annex I are received for a specific CPA to be included under the PoA, then the CPA-DD will specify the sources of such funding and shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties. Such affirmation will be provided in the Annex 2 of the CPA-DD.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

13/12/2011

The starting date of the PoA is the start of validation, which is the date that the PoA documentation was uploaded on the UN website and made available for global stakeholder consultation.

B.2. Length of the programme of activities (PoA):

28 years

SECTION C. Environmental Analysis

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:

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at SSC-CPA level ✔

Due to its small scale nature and its overall positive environmental benefits, it is unlikely that the proposed distribution of efficient ICS will result in any negative environmental impacts. However since the PoA is intended to cover multiple countries, and the laws of those countries may differ, the environmental analysis will be undertaken at the CPA level.

If an Environmental Impact Assessment (EIA) were to be required by a DNA, then this would be conducted for the first CPA in that country, but not for subsequent CPAs unless specifically required by the DNA. Subsequent CPA that are similar in terms of technology, distribution model, and potential environmental impacts would include the results of the initial EIA in their CPA-DDs when being put forward for inclusion in the PoA. Similarly, if an exemption from an EIA is required by the DNA, then this would be obtained for the first CPA in that country. The subsequent CPA-DDs would simply include a confirmation that exemption from conducting an EIA has been obtained.

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

Not applicable – done at CPA level.

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

No record from any National regulations implemented in the countries currently listed in Section A 4.1.1 was found to require either an Initial Environmental Examination or an Environmental Impact Assessment (EIA) for the installation of ICS.

If required by a specific country included within the PoA, an EIA will be conducted. It is anticipated that a typical CPA included in the PoA would not require an EIA as there are no foreseeable negative environmental impacts.

SECTION D. Stakeholders' comments

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

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at SSC-CPA level ✔

Since the PoA boundary consists of more than one host country, a local stakeholder consultation (LSC) would need to be conducted once per host country participating in the PoA. Therefore, a national-level LSC will be conducted in conjunction with the first CPA to be included in each host country, ensuring that the issues covered and stakeholder comments invited are representative of the country. It is not envisaged that a separate LSC would be held for each subsequent CPA. Rather, for subsequent CPAs, the CPA-DDs will include the results of this initial national-level LSC.

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

Done at CPA level for the first CPA in each country.

D.3. Summary of the comments received:

Done at CPA level for the first CPA in each country.

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

Done at CPA level for the first CPA in each country.

SECTION E. Application of a baseline and monitoring methodology

This section shall demonstrate the application of the baseline and monitoring methodology to a typical SSC-CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a SSC-CPA in this PoA (PoA specific CDM-SSC-CPA-DD).

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

AMS-II.G, version 3: Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

AMS-II.G, version 3 requirements	SSC-CPA qualification justification
1. This category comprises appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples of these technologies and measures include the introduction of high efficiency[39] biomass fired cook stoves[40] or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.	As stated in the Eligibility Criteria (EC3 and EC4) in Section A4.2.2., the CPAs to be included in this PoA will involve the introduction of high efficiency cook stoves burning either wood or charcoal. Technical specifications of each stove to be deployed in a CPA for the first time will be provided to show a minimum stove efficiency of 20%. Subsequent CPAs involving the deployment of the same stoves will be assumed to meet this requirement. An appropriate standards body or an appropriate certifying agent recognized by it shall certify the efficiency levels. Alternatively manufacturer's specifications may be used.
2. Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	The first CPA of a country will provide sufficient evidence to show the use of NRB since 31 December 1989. Any CPA following the inclusion of the first CPA in the same country will not have to do so. At least two of the following supporting indicators are shown to exist for the first CPA in each country: • 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; • 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

[39] The efficiency of the project systems as certified by a national standards body or an appropriate certifying agent recognized by it. Alternatively manufacturers specifications may be used.

[40] Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.

	biomass. Subsequent CPAs in the same country will be assumed to meet this requirement.

E.3. Description of the sources and gases included in the SSC-CPA boundary

According to the methodology, the gas included is carbon dioxide in the baseline as well as in the project activity.

Specifically, and according to AMS II.G (version 03) an emission factor of 81.6 tCO_2/TJ will be used, which 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).

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

According to the applied methodology, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

In accordance with EB60 Annex 26, paragraph 4, CPAs do not require a full additionality assessment. The confirmation of CPA additionality would be by means of meeting the eligibility criteria for inclusion in the PoA as stated in Section E.5.2. If the proposed CPA meets the key criteria stipulated in section E.5.2, the CPA shall be deemed additional.

The PoA could include either small-scale or micro-scale CPAs. In the case of micro-scale CPAs these will be considered additional provided they satisfy the micro-scale additionality requirements specified in Section A.4.2.2 (EC7, test 1). In the case of small-scale CPAs, one of the barriers demonstrated in Section A.4.3 must be demonstrated to apply (EC 7, test 2).

As has been demonstrated in section A.4.3, the CDM is clearly required in order to overcome the barriers that are faced by the CME and the DOs in the implementation of the proposed PoA. Donor funding has been involved in past ICS distribution programmes in SSA countries. Despite this, and partly due to the limitations of such programmes, the enduring prevailing practice in SSA is using inefficient stoves for cooking. In addition, the type of stoves envisaged to be distributed under the proposed PoA utilise technology that is not available to SSA countries at present. Finally, it is concluded that a large-scale “advanced” ICS distribution programme in SSA countries is only possible with carbon finance since the market is unable to supply finance at competitive rates due to country risk in SSA countries and the inability to recover the full costs of preparing for, developing and implementing such a programme.

It can be assumed that a CPA that is eligible for inclusion in the PoA would face similar barriers to those being faced by the PoA, and without the PoA, no CPA would be implemented. Hence, assessment of additionality is done on PoA level and a typical CPA implemented by the CME under the PoA is deemed to be additional if it meets the criteria outlined in section E.5.2.

Even in the case of Kenya and South Africa, which have relatively higher penetration rates of improved stoves, and – in the case of South Africa at least – relatively higher income per capita, the barriers prevent the proposed PoA from going ahead without carbon finance. Thus it can be assumed that the barriers must also apply to other countries in SSA in which the population is relatively worse off and the prevailing practices involving traditional cooking methods are even stronger.

The first SSC-CPA in any other country to be added to the list of host countries in the PoA boundary will be required to demonstrate that at least one of the barriers applies. All subsequent SSC-CPAs in the same country can then use the arguments demonstrated in the first CPA to show that the same barriers apply.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

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.

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

In case of small-Scale CPA:

For small-scale CPAs, at least one of the barriers in Section A.4.3 of the PoA-DD must apply to the CPA. In the case of the first SSC-CPA in a new country added to the PoA post-registration, this can be demonstrated by providing a reference to literature or a similar proof that shows that the barrier/s also apply to CPAs in that country.

In case of micro-scale-CPA:

The CPA is considered additional if it satisfies the micro-scale additionality requirements according to the guidelines (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 of 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
    ii. End users of the subsystems or measures are households/communities/SMEs

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

A typical CPA under the PoA consists of the distribution of multiple ICS units, which by definition are small appliances providing energy efficiency improvements in the thermal applications of non-renewable biomass, in accordance with AMS-II.G, version 3. In accordance with the methodology, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. A number of choices have been made in applying specific options provided for in the methodology, as is described below in the equations to be used for calculation of emissions reductions.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

The emissions reductions of a CPA will be calculated by application of the approved methodology AMS-II.G version 3, by using the following equations (equation number from methodology AMS II G v3 indicated in brackets):

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

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 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;

- 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:
(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, agriculture and nature conservation regulations are complied with.

$B_{y,savings}$ is estimated using **option 2** of the methodology:

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

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 0.10 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) as derived from historical data/local consumption survey.

$B_{old} = N \cdot Q_{biomass}$

Where:

B_{old}	Quantity of biomass used in the absence of the project activity in tonnes/year
N	Total number of systems (number)
$Q_{biomass}$	Average annual biomass consumption per appliance (tonnes/ year).

Furthermore, $N = N_{all} \cdot SOF$

Where:

N_{all}	Total number of stoves installed (number)
SOF	Stove Operation Fraction (SOF) (% of stoves operating or replaced by equivalent in-service appliance). The parameter SOF is applied to meet the requirements of the methodology as outlined in paragraph 16. To 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.

In compliance with paragraph 23 (c) of the methodology, B_{old} is adjusted for Leakage. It is also adjusted for the average stove operation period and the proportion of stoves still operating during monitoring period. Further, paragraph 20 (b) of the methodology requires monitoring of the continued use of replaced stoves and exclusion of such use from B_{old} if baseline stoves are not disposed of.

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

Where:

LAF	Net to gross Adjustment factor (0.95) applied in accordance with paragraph 13 and 23 of AMS-II. G version 03
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)
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 reduced (eg. 180 days= 0.5).

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

Data / Parameter:	$Q_{biomass}$
Data unit:	Tonnes/year
Description:	Annual average biomass consumption per appliance
Source of data used:	Historical data or survey of local usage, as required by the methodology
Value applied:	-
Justification of the choice of data or description of measurement methods	Requirements as per methodology AMS-II.G, version 3.

and procedures actually applied :	
Any comment:	Used for calculation of B_{old} as per paragraph 7 (a) of methodology. The approach for setting B_{old} values will be to use either historical data or a local consumption survey at the CPA level in each country to determine the average annual consumption of biomass per appliance for each fuel type – i.e. wood and charcoal. If possible, this will be done by utilizing national statistics or publicly available field studies. National studies can also be complemented by undertaking local field studies if necessary. If the value established in the first CPA is only limited to one fuel type (e.g. charcoal), then a baseline value will also need to be established for the other fuel type (e.g. wood) for any subsequent CPAs replacing stoves that burn the other type of fuel (i.e. wood).. If credible new data becomes available after having established the baseline values in the first CPAs (either on the basis of literature values or surveys), then future CPAs could use such updated data instead to define the baseline consumption value.

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 data will be used wherever possible, complemented with IPCC data if necessary. Where no FAO data exists, or where deemed more appropriate, survey results, national or local statistics or other sources of information will be used.
Value applied:	This value will be established at the CPA level for the first CPA in each country.
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	The approach will be to set $f_{NRB,y}$ for the first CPA in each country, using FAO data wherever possible, complemented with IPCC data if necessary, or by an alternative means (eg. survey) if deemed more appropriate. The specific approach will be stated in the CPA-DD. For subsequent CPAs in that country, the $f_{NRB,y}$ value established in the first CPA can be used.

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 version 03, 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 version 03, 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 version 03
Value applied:	This value will be established at the CPA level for the first CPA in each country using the default values of 0.1 for conventional stoves and 0.2 for improved stoves
Justification of the choice of data or description of measurement methods and procedures actually applied :	The default values are taken from the methodology AMS-II.G version 03. A default value of 0.10 will 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 will be optionally used. If both conventional and improved stoves are to be used, then a weighted average combination of 0.1 and 0.2 will be applied, based on the estimated penetration rate of conventional and improved stoves using literature values where available. If no literature values are available a baseline survey may be undertaken.
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 protocol.
Value applied:	The efficiency of the different ICS systems to be distributed will be included in each CPA-DD.
Justification of the choice of data or description of measurement methods and procedures actually applied :	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, Water Boiling Tests (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 version 03
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:	-

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

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 using the Water Boiling Test protocol
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The efficiency of the different ICS systems to be distributed will be included in each CPA-DD.

Description of measurement methods and procedures to be applied:	Water Boiling Tests (WBTs) will be carried out for a sample of installed ICSs in operation in line with the PoA Sampling Plan.
QA/QC procedures to be applied:	WBTs will be conducted in line with the guidance provided by the CME and according to a methodology supported by an appropriate body such as PCIA.
Any comment:	Each WBT conducted 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 sample 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
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-
Description of measurement methods and procedures to be applied:	Each DO shall maintain CPA Distribution Records which will provide the data used to calculate this parameter.
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 end user behavior
Value of data applied for the purpose of calculating expected emission reductions in section B.5	An assumed value will be used in each CPA-DD for estimating emissions reductions ex-ante. The results of monitoring will be considered to determine whether this assumed value should be adjusted for the purposes of ex-ante estimation in subsequent CPAs.
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 90%.

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.
Any comment:	-

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 end user behavior and 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	An assumed value will be applied at the CPA level for the purposes estimating emissions reductions ex-ante. Depending on the results of monitoring, the CME may adjust the assumed value for future CPAs.
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 end users 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 and a questionnaire with the stove user involving the end user's estimation of the number of meals that are cooked using the baseline stove during the monitoring period compared with the situation pre-distribution. This amount will be used to adjust the total amount of wood or charcoal consumed per annum in the baseline. Further detail on the approach is provided in the PoA Sampling Plan in Section E.7.2
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:	-

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
Value of data applied for the purpose of calculating expected emission reductions in section B.5	An assumed value will be applied at the CPA level for the purposes estimating emissions reductions ex-ante. Depending on the results of monitoring, the CME may adjust the assumed value for future CPAs.
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 stove or not.

	Sampling will estimate the value of this parameter through one of two approaches: A. Monitoring the fraction of end users using baseline stoves (f_{old}) B. Monitoring the fraction of end users *not* using baseline stoves ($f_{non,old}$), where: $f_{old} = 1 - f_{non,old}$ The decision to apply either Option A or Option B will be made by the CME based on the expected proportion of end users continuing to use baseline stoves in the group of CPAs that are being sampled as part of the PoA Sampling Plan (see Sampling Plan for discussion of cross-CPA sampling approach). In cases where it is anticipated that the majority of end users will stop using baseline stoves once they have started using the ICS, then it is most likely that Option B will be applied.
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:	-

Data / Parameter:	$Stove_{year}$
Data unit:	years
Description:	Calculated average stove operation years in the monitoring period
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	If stoves have been operating for 365 days then $Stove_{year}$ = 1.0. If less than 365 days, then $Stove_{year}$ is reduced (eg. 180 days= 0.5). An assumed value will be applied at the CPA level for the purposes estimating emissions reductions ex-ante.
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:	-

E.7.2. Description of the monitoring plan for a SSC-CPA:

Following the methodology AMS II G v3 and applying the equations outlined in Section E.6.2, the monitoring plan consists of monitoring the following parameters:

1. η_{new} (fraction)

Monitoring shall consist of checking the efficiency of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating at the specified efficiency (η_{new}) or replaced by an equivalent in service appliance. Where replacements are made, monitoring shall also ensure that the efficiency of the new appliances is similar to the appliances being replaced.
(paragraph 15)

2. SOF (fraction)

Monitoring shall also consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating or are replaced by an equivalent in service appliance.
(paragraph 16)

3. u_{old} (kg)

Monitoring shall ensure that:
(a) Either the replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or
(b) If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is excluded from B_{old}
(paragraph 20)

This parameter is monitored to establish the average amount of woody biomass consumed per annum (in kg) using the baseline (replaced) stoves. In order to monitor the parameter u_{old} the CME may choose one of two options:

Option A involves monitoring the amount of fuel consumption using baseline (replaced) stoves in each monitoring period by interviewing a sample of ICS users and calculating the average value (kg).

Option B involves monitoring the amount of fuel consumption using baseline (replaced) stoves at the beginning of the crediting period to establish an average value for u_{old} and fixing this amount for the subsequent monitoring periods. The CME will then monitor the fraction of end users still using baseline stoves over time. This parameter is called f_{old} (see below). The value of u_{old} can then be confirmed or updated at an appropriate later stage in the crediting period (e.g. at the halfway point after 5 years, or after improvements to the PoA have been made).

Alternatively, the CME may decide to dispose of replaced stoves. In this case, there is no need to estimate u_{old} and the value is automatically zero if proof of the disposal is provided by the CME (eg. photograph of baseline stoves being destroyed).

4. f_{old} (fraction)

This parameter is monitored to establish the fraction of end users still using baseline (replaced) stoves during each monitoring period. During monitoring, sampling will be used to estimate the value of this parameter by applying one of two approaches:

Option A involves estimating the fraction of end users using baseline (replaced) stoves (f_{old}). This will be done by observation of end user behavior, checking for the existence of baseline stoves, and interview with the end user if necessary (if there is clearly no baseline stove in existence or in use this would not be necessary).

Option B involves estimating the fraction of end users *not* using baseline (replaced) stoves , where:

$$f_{old} = 1 - f_{nonold}$$

This will also be done by observation of end user behavior, checking for the existence of baseline stoves, and interview with the end user if necessary (if there is clearly no baseline stove in existence or in use this would not be necessary).

The decision to apply either Option A or Option B will be made by the CME based on the expected proportion of end users continuing to use baseline stoves in the group of CPAs that are being sampled as part of the PoA Sampling Plan, as is described below under *Sampling Frame*. In cases where it is anticipated that the majority of end users will stop using baseline stoves once they have started using the ICS, then it is most likely that Option B will be applied.

If baseline stoves are disposed of as part of a CPA, then the value of f_{old} would be automatically zero.

The total number of ICS deployed (N_{all}) is also determined ex-post. However, since this value is automatically calculated using the PoA Distribution and Monitoring database, which contains all serial ID numbers of stoves sold, there is no need for further discussion of the approach involved.

PoA Sampling Plan

Due to the large number of ICS envisaged to be distributed as part of the CPAs to be included in the PoA, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling will be undertaken as part of a PoA-wide Sampling Plan that is designed in line with the requirements of AMS II.G v3 and the "Standard for sampling and surveys for CDM project activities and programme of activities" (the Sampling Standard)[41]. The Sampling Standard (paragraph 19, footnote 13) 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. The methodology requires 90/10 confidence/precision if annual sampling is applied, or 95/5 confidence/prevision if biennial (every two years) sampling is applied.

Flexibility to apply cross-CPA sampling is likely to be critical for the feasibility of the proposed PoA due to the large number of CPAs envisaged. In particular, this is the case for the parameter η_{new} which involves carrying out WBTs in the field. For this parameter, there is likely to be a very high level of homogeneity since the ICS to be distributed have been designed to meet stringent efficiency specifications and are manufactured in modern factories. There is no reason to think the actual efficiency of similar ICS models will vary significantly from CPA to CPA or even country to country.

Sampling design

i. *Objectives and reliability requirements*

The objective is to obtain a reliable estimate of the following key variables over the course of the crediting period and meeting the indicated confidence/precision levels. The most stringent confidence/precision levels will be applied as required by the circumstances (and indicated below):

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[41] EB 65 Report, Annex 2

Parameter	Description of parameter	Confidence/precision level[a] (frequency of sampling)[b]	CPA grouping[c]
η_{new}	The thermal efficiency of the ICS distributed (%)	Whenever sampling across CPAs, then 95/10 will be applied if sampling annually. If biennial sampling is chosen, then 95/5 must be applied. 90/10 can only be applied if annual sampling is undertaken at the CPA level.	Sampling across CPAs up to the PoA level
SOF	The Stove Operating Fraction, i.e. the fraction (up to 1.0) of users using the ICS	As above	Sampling across CPAs up to the country level
u_{old}	The amount of woody biomass that continues to be used in the replaced stoves (kg)	As above	Sampling across CPAs up to the country level
f_{old}	The fraction of stove users still using baseline (replaced) stoves (up to 1.0)	As above	Sampling across CPAs up to the country level

Notes:

a. In cases where such precision is not able to be achieved, the lower bound of the 95% confidence interval of the parameter value will be used as is allowed by the methodology (paragraph 22).

b. The frequency of sampling will comply with the requirements of the methodology, but will be determined on the basis of experience gained during the distribution and monitoring of ICS.

c. The CPA grouping is indicative only, as this will be driven by factors such as sampling economics, the nature of arrangements put in place with different CPA implementers and improvements made to the PoA over time.

ii. Target population

The overall target population is the ICS distributed as a result of the CPAs implemented under the PoA. The ICS to be sampled will be drawn from the list of individual ICS serial ID numbers contained in the PoA Distribution and Monitoring Database, which is maintained by the CME. Each ICS is assigned to a CPA in the PoA Distribution and Monitoring Database and linked to an end user whose premises will be visited during monitoring. See Section below on Sampling Frame for a detailed discussion of the approach for differentiating the target population during sampling, so as to ensure homogeneity.

iii. Sample Method

The CME will draw a single sample for each defined sampling frame. It is likely that the required sample size for the parameters will be different, since the variance in values can be expected to differ (see below for discussion of sample size). The required number of ICS to be selected for sampling of each parameter will be determined by the CME according to the level of reliability required for that parameter.

Simple random sampling will be used whenever the homogeneity of the population within the sampling frame can be expected to be sufficiently high. The definition of the sampling frame as described below can help ensure an appropriate level of homogeneity. It is also possible that cross-country (PoA-wide) sampling may be considered by the CME in the case of monitoring η_{new} (for estimating the efficiency of the same stove models), since the variance in values obtained during sampling is not likely to differ between countries. If necessary, or deemed to be appropriate by the CME, other sampling methods could also be applied.

To ensure a random selection, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its Serial ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined sampling frame (see below – this could be defined according to the country-level DO-level , or user-group etc). Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the CME. The CME will also account for the differences in ICS vintages, by ensuring a representative share of stove vintages in the sample selected. It is not envisaged that geographical or demographic representativeness is required, given the highly homogenous characteristics of the end users within each defined sampling frame.

To determine the parameters, sampling will involve the following approaches (outcome in brackets):

- η_{new}: ICS will be tested using WBTs. (ICS efficiency)
- SOF: visual inspection of the premises to see if ICS is operational and in use. Interview with end user if required to verify that ICS is still in use. (Yes/No)
- f_{old}: visual inspection of the premises to see if baseline (replaced) stove continues to be used. Interview with end user if required to verify that baseline (replaced) stove is still in use. (Yes/No)

  Where Option B as described above is applied, then:

  $$f_{old} = 1 - f_{non,old}$$

- u_{old}: interview with end user to establish the share of cooking that is done using baseline stove compared with the scenario prior to receipt of the ICS, multiplied by total annual fuel consumption (kg/year). This will be done by using a simple estimation technique such as asking the end user to estimate the number of meals they use the baseline stove for cooking now, compared with previously (prior to receiving the ICS). Depending on the user, the frequency of using the baseline stove may be quite rare (equivalent to once a month or less, e.g. for special occasions), semi-regularly (e.g. once a week for family gatherings) or quite frequent (e.g. every day for a particular meal). Thus, the proportion of meals cooked using the baseline stove during the monitoring period, compared with prior to receiving the ICS, can be used to estimate u_{old} in the following way:

$$u_{old} = \frac{MPM_{after\ ICS}}{MPM_{before\ ICS}} \cdot \text{Total annual fuel consumption (kg)}$$

Where:

$MPM_{after\ ICS}$ meals per month cooked using the baseline (replaced) stove after the receipt of the ICS
$MPM_{before\ ICS}$ meals per month cooked using the baseline (replaced) stove before the receipt of the ICS

Note: in the case of estimating u_{old} for charcoal stoves, the value of charcoal consumption needs to be converted into an amount of woody biomass (fuelwood) using the IPCC conversion factor of 6[42].

More ICS will be selected for sampling than is required by the sample size, to ensure that if there are any ICS that are unable to be reached the required accuracy is still achieved. The size of the buffer will be

[42] http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf (page 1.45)

driven by the required sample size – if the sample size is a relatively small number (eg. 30), then a relatively large buffer may be necessary (say, 20-30%); if the sample size is a relatively large number (eg. 100 or more), then a smaller buffer may be sufficient (eg. 10%). The CME may choose to stop monitoring a particular parameter once the required level of confidence/precision has been reached, as long as the calculated minimum number of samples has been achieved. The following steps could logically be followed for the case of applying a 30% buffer:

1. Visit first 10% of premises required for the 30% buffer. If the number of responses is sufficient to achieve the required reliability level, then stop sampling.
2. If step 1 is not sufficient to achieve the required reliability level, then visit the next 10% of premises (increases the additional sampling to 20% of the 30% buffer). If this additional sampling is sufficient, then stop sampling.
3. If step 2 is not sufficient to achieve the required reliability level, then complete the final 10% of the additional sampling buffer (bringing the total to 30%).

An additional round of sampling may be completed if necessary in order to achieve the required confidence/precision level (as is discussed below under Quality Assurance/Quality Control).

iv. Sample size

The size of the CPA sample for each sampling frame is determined by the requirement to achieve 90/10, 95/5 or 95/10 confidence/precision (as appropriate) for the estimation of the proportion or mean value of the parameter investigated. Whenever the CME chooses to apply cross-CPA sampling, it will select a sample size sufficient to achieve 95/10 confidence/precision unless it is sampling biennially, in which case it will apply 95/5 confidence/precision. Alternatively, the CME may choose to apply the lower bound of the sampling results as is allowed for by the methodology (AMS II G v3, para 22).

An overview of the estimated sample sizes for a hypothetical population of 100,000 ICS units applying 95/10 precision is provided below. Note: of the four parameters to be monitored, two are proportions/percentages (SOF and f_{old}) and two are mean values (η_{new} and u_{old}).

In order to calculate the required sample size estimates for the proportions and the mean values are required. Furthermore, the standard deviation needs to be assumed in case of sampling for a mean value. For the first monitoring period, the values as described in Annex 4 are applied. For the following monitoring periods, the estimates shall be adjusted taken the results of the previous monitoring period(s) into account.

For the parameters SOF and f_{old} the following equation[43] is applied:

$$n \geq \frac{c^2 \times N \times V}{(N-1) \times precision^2 + c^2 \times V} \qquad (1)$$

Where:

[43] Equation according to the *Draft Best Practices Examples: Focusing on Sample Size and Reliability Calculation (Agenda of EB 66)*

$$V = \frac{p \times (1 - p)}{p^2} \quad (2)$$

n = Number of elements to be sampled
N = Total number of elements in the population
p = Proportion
c = Constant referring to the level of confidence (e.g. 1.645 for 90 % confidence and 1.96 for 95 % confidence.
precision = Required precision (e.g. 10% = 0.1)

For the parameters η_{new} and u_{old} the following equation[44] is applied:

$$n \geq \frac{c^2 \times N \times V}{(N-1) \times precision^2 + c^2 \times V} \quad (3)$$

Where:

$$V = \left(\frac{SD}{mean}\right)^2 \quad (4)$$

n = Number of elements to be sampled
N = Total number of elements in the population
mean = Average value of the parameter that is expected in the total population
SD = Standard deviation of the parameter that is expected in the total population
c = Constant referring to the level of confidence (e.g. 1.645 for 90 % confidence and 1.96 for 95 % confidence.
precision = Required precision (e.g. 10% = 0.1)

The calculation of the required sample size is illustrated below for a 95/10 level of confidence and precision.

η_{new}:

$$n \geq \frac{1.96^2 \times 100{,}000 \times V}{(100{,}000 - 1) \times 0.1^2 + 1.96^2 \times V} \geq 14 \quad (5)$$

Where:

$$V = \left(\frac{0.02}{0.21}\right)^2 \quad (6)$$

A sample size of 30 would be sufficient to achieve the required confidence/precision for η_{new} values ranging from 0.2 to 0.326. This relates to the example of the Envirofit G3300 wood cook stove, which has a rated efficiency of 32.6%. The anticipated mean of η_{new} for ex-ante emissions reduction purposes is 0.263 and the standard deviation is 0.0315.

SOF:

[44] Equation according to the *Draft Best Practices Examples: Focusing on Sample Size and Reliability Calculation (Agenda of EB 66)*

$$n \geq \frac{1.96^2 \times 100{,}000 \times V}{(100{,}000-1)\times 0.1^2 + 1.96^2 \times V} \geq 21 \qquad (7)$$

Where:

$$\mathrm{V} = \frac{0.95 \times (1-0.95)}{0.95^2} \qquad (8)$$

A sample size of 100 would be sufficient to achieve the required confidence/precision for SOF values ranging from 1.0 to 0.8. (The anticipated value of SOF for ex-ante emissions reduction purposes is in the order of 0.95; to be applied in the emissions reduction calculations at the CPA level).

u_{old}:

$$n \geq \frac{1.96^2 \times 100{,}000 \times V}{(100{,}000-1)\times 0.1^2 + 1.96^2 \times V} \geq 59 \qquad (9)$$

Where:

$$\mathrm{V} = \left(\frac{245}{526}\right)^2 \qquad (10)$$

In the case of CPAs involving residential woodfuel users in Kenya for example, a sample size of 100 would be sufficient to achieve the required confidence/precision for u_{old} values ranging from 34kg to 1018kg, which is equivalent to 1.1-33% of annual woodfuel consumption in rural Kenya (3,394kg)[45]. In this example, the anticipated mean of u_{old} for ex-ante emissions reduction purposes is 526 kg and the standard deviation is 245 kg. (An assumed value will be applied to each CPA for ex-ante emissions reduction calculation purposes, however, the actual values estimated during monitoring will help determine the values to be assumed for future CPAs).

f_{old}:

There is a need for some flexibility in the sampling approach for this variable. The purpose of this flexibility is to avoid having an estimated sample size that is so large that it makes the cost of monitoring prohibitive to the economics of the whole programme. This could occur if the CME is required to estimate very low values of either f_{old} or $f_{non,old}$ through sampling (for example, if it expects the range of values for fold to be below say 10% and it cannot estimate $f_{non,old}$ instead).

Thus, to decide which approach to apply for sampling of this parameter, the CME needs to take a view on whether the majority of end users will or will not continue to use the old stoves after they have received the ICS. It is possible that the circumstances in a particular country or end user group could influence end user behaviour and hence the choice of either Option A or Option B as described above for the different groups of CPAs to be monitored.

Here we provide an estimate of the sample size required for monitoring this parameter under circumstances where the CME expects that the fraction of end users continuing to use baseline (replaced) stoves (f_{old}) is lower than the fraction of end users *not* continuing to use baseline (replaced) stoves

[45] Ministry of Energy, Study on Kenya's energy demand, supply and policy strategy for households, small scale industries and service establishments. Final report prepared by Kamfor Company Ltd. Nairobi, 2002, Table 3.1 p10

($f_{non,old}$). Arguably, this is a logical outcome since once end users have made the decision to purchase the more expensive ICS they have perceived an opportunity to save on fuel costs through an investment that will only pay off if they stop cooking with their inefficient stove. In this case, the CME would logically apply Option B for the sampling of f_{old} whereby:

$$f_{old} = 1 - f_{non,old}$$

Applying this approach for example, the parameter will be determined by sampling as follows.

$$n \geq \frac{1.96^2 \times 100{,}000 \times V}{(100{,}000 - 1) \times 0.1^2 + 1.96^2 \times V} \geq 43 \qquad (14)$$

Where:

$$V = \frac{0.9 \times (1 - 0.9)}{0.9^2} \qquad (15)$$

A sample size of 100 would be sufficient to achieve the required confidence/precision assuming a range of the proportion of end users not using the old stoves ($f_{non,old}$) from 1.0 to 0.8. (The anticipated value of the proportion of end users not using the old stoves for ex-ante emissions reduction purposes will be applied at the CPA level, and is expected to be in the order of 0.9. Experience gained during the actual monitoring of this parameter will help inform the value assumed for future CPAs).

It should be noted that the parameter $f_{non,old}$ is not the same as the parameter SOF, and that f_{old} is not mutually exclusive to SOF, since it is possible that end users will use both stoves at the same time.

v. Sampling Frame

The sampling frame could logically be differentiated by the CME on the basis of certain criteria:

a) Fuel type. Wood fuel ICS are eligible for selection in one sample group, and charcoal ICS are eligible for selection in another. This is a logical differentiation because rural populations tend to be wood fuel users, while urban populations tend to be charcoal users.

b) Distributing Organisation (DO) responsible for the implementation of CPAs. In this case, all users within CPAs implemented by the same DO would be treated as one target population. This is a logical differentiation in cases where DOs are responsible for a particular technology (stove model), class of end user (for example, schools or SMEs) or geographic region.

c) Country or distribution region. In some cases, all users within CPAs in a particular country or region could be treated as one target population. For example, this would be logical in cases where there is likely to be high homogeneity between end user behaviour in that region, but no reason to differentiate between DOs or fuel types.

d) User groups. In this case, all residential users could be treated as one sample population, while institutional and commercial users could be treated as another population.

The above criteria can be combined to define individual sampling frames. Figure 6 below provides a graphical overview of a hypothetical sampling frame differentiation of the target population using a number of the above criteria. In this example, the sampling frame for monitoring wood stoves has been differentiated between the CPAs included in Country A and Country B and by DO in the case of Country B. This separates the two types of end users (residential and commercial) and technologies (wood stoves and charcoal stoves) to ensure a high level of homogeneity of the monitored parameters. The PoA Distribution and Monitoring Database can then be used to produce a list of all the ICS fitting within the defined sample eligible for selection during sampling. In the figure below:

- For Sample 1, the sampling frame is "all residential wood stove ICS distributed in Country A by DO A-1".
- For Sample 2, the sampling frame is "all residential charcoal stove ICS distributed in Country A by DO A-1 and Country B by DO B-1". This would be appropriate for estimating n_{new}.
- For Sample 3, the sampling frame is "all commercial wood stove ICS distributed in Country B by DO B-2".

The actual differentiation will be determined by the CME to suit the circumstances of the ICS distribution under CPAs included in the PoA. It will be driven by factors such as the economics of sampling and the expected level of homogeneity of the parameters to be sampled across different regions, user groups and ICS types. The CME may choose to change the sampling frame definition over time to suit the circumstances and as it makes improvements to the PoA. It must be remembered that if the CME fails to achieve the required level of reliability through sampling in a particular monitoring period (for example, if it has overestimated homogeneity in the sampling frame), the result will be that the CME must either do more sampling or take the lower boundary of the results (thus ensuring conservativeness). This outcome would also inform the CME's future decisions about sampling frame definition and help achieve outcomes closer to expectations.

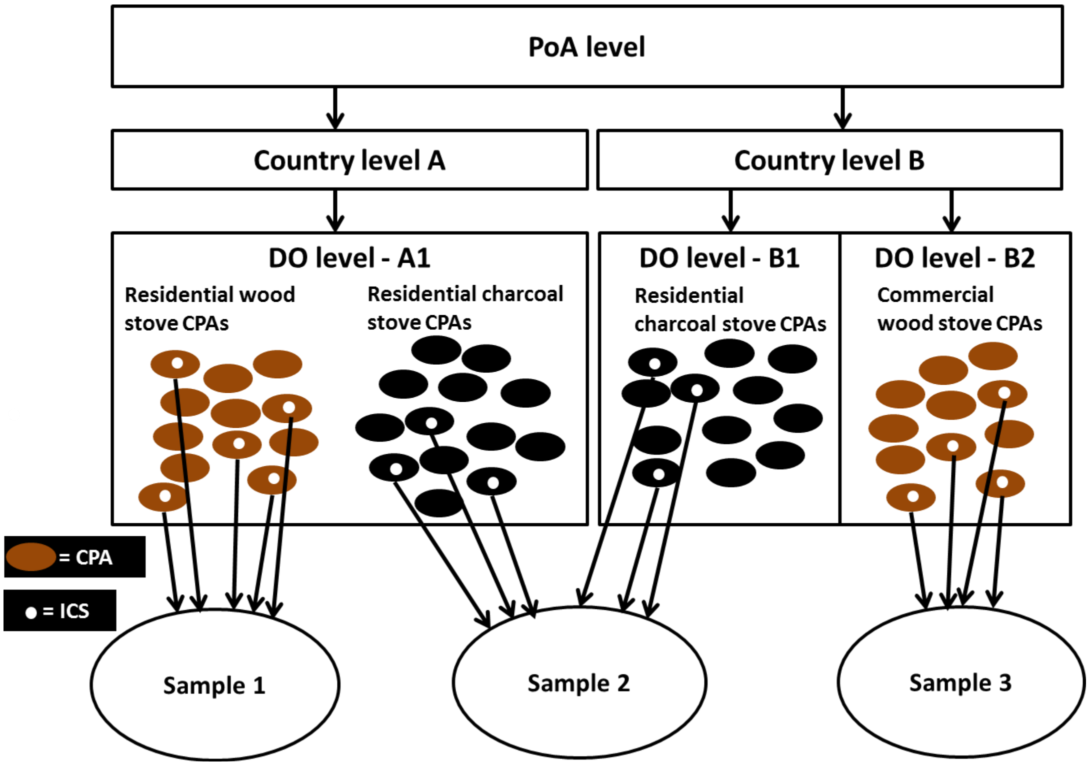

Figure 6: Example of sampling frame definition

<u>Data</u>

vi. Field measurements

The following parameters will be measured as indicated below:

Parameter	Timing (indicative)	Frequency (required by AMS II G)	Methods to be applied	Comments on seasonal fluctuation
η_{new}	First monitoring will occur within 24 months of ICS distribution at the latest, but will include ICS of different vintages	At least every two years – but may be done more frequently	WBTs	Not due to any seasonal fluctuation
SOF	First monitoring is likely to occur within 12 months of ICS distribution, but will include ICS of different vintages	At least every two years – but may be done more frequently	Visit to premises, visual inspection and interview with owner of ICS if required (if ICS is clearly in use, then no interview required)	Unlikely to be due to seasonal fluctuation
u_{old}	First monitoring is likely to occur within 12 months of ICS distribution, but will include ICS of different vintages	Not specified in methodology – likely to be monitored once at the start of crediting period to establish average value of consumption using baseline stoves for the target population and then again later in the crediting period to update/confirm this value.	Visit to premises and interview with owner of ICS to estimate share of annual consumption accounted for by baseline stoves (approach described under Sampling Method above)	Unlikely to be due to seasonal fluctuation if interview questions are explained properly
f_{old}		Not specified in methodology – likely to be monitored simultaneously with SOF (at least every two years, but may be more frequently)	Visit to end user premises, visual inspection and interview with owner of ICS if required (if the end user is clearly not using a baseline stove then no interview is required)	Unlikely to be due to seasonal fluctuation if interview questions are explained properly

vii. Quality assurance/Quality control

The potential for non-responses, refusals and related issues will be considered by the CME during sample selection. If the sampling results are insufficient to achieve the target reliability levels, the CME has a number of options to address this (see below). By selecting a larger than necessary sample size before commencing monitoring, the CME can help ensure that an adequate number of responses are obtained during sampling.

If it is necessary to engage third parties for carrying out field measurements, the CME will ensure that any such third parties engaged for carrying out field measurements are credible, experienced and adequately trained for the tasks they are contracted for (eg. carrying out of WBTs in line with a methodology supported by an appropriate international body such as PCIA). Training will also be provided to the parties carrying out the actual field measurements (Monitoring Agents) on how to deal with non-responses etc if necessary.

The data contained in each individual CPA Monitoring Record and collected during field measurements will transferred to the CME by the Monitoring Agents. Either the originals of the CPA Monitoring Records or scanned copies of each Record will also be provided to the CME to enable cross-checking.

The calculation of the sample size will be carried out using estimates for proportions, mean of values and standard deviations as the actual characteristics of the population/sampling frame are unknown. In order to ensure the quality of the sampling results, the CME can draw on the provisions for reliability calculations as provided by the Draft Best Practices Examples: Focusing on Sample Size and Reliability Calculation (Agenda of EB 66). In the event that the sampling results do not fulfil the required level of confidence and precision, the CME can undertake additional samples. If the reliability is still not sufficient after additional samples, the sampling may be repeated with an increased sample size. Alternatively, the CME may choose to apply the lower bound of the sampling results as is allowed for by the methodology (AMS II G v3, para 22).

The data contained in each individual CPA Monitoring Record and collected during field measurements will transferred to the CME by the Monitoring Agents. Either the originals of the CPA Monitoring Records or scanned copies of each Record will also be provided to the CME to enable cross-checking.

The CME will be responsible for maintaining a secure PoA Distribution and Monitoring Database, which includes all the data relating to the CPAs within the PoA. The Database will be located on the CME's secure server. The system automatically backs up on regular basis any files that have been modified. The files are backed up onto separate hard drives that are regularly swapped to ensure there is always one drive located securely offsite. The CME may improve this system over time with new technology.

i. Analysis

The data obtained from sampling of each group of CPAs will be used to estimate values for the parameters described above. The values will then be factored into the emissions reduction calculations and result in the request for issuance of CERs for that group of CPAs.

If more than one sample is taken during a monitoring period, the approach will be to take the values obtained during the first sampling phase and the values obtained during the second sampling phase and calculate the average of these values. This average value will then be applied for the purposes of the emissions reduction calculations.

Implementation

It is envisaged that the CME will implement the Sampling Plan over the course of the first 12 months of the PoA, including contracting all necessary third parties who would be responsible for actual field measurements. The actual timing will depend on the speed of CPA inclusion and ICS distribution, as well as the decisions made by the CME to either hire and train direct staff to conduct field measurements or to sub-contract these responsibilities. The CME will train any such third parties to ensure that field measurements are undertaken in line with the standards required of the Sampling Plan (eg. WBTs will follow a procedure that meets an internationally-recognized standard such as that approved by PCIA).

The skills and experience required for the data collection activities under the Sampling Plan include:

- Experience conducting WBTs;
- Experience conducting door-to-door surveys of biomass consumption
- Local language skills and English language skills
- Cultural awareness
- Numerical proficiency
- Data entry skills

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

19 March 2012.

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Annex 1

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding has been received.

Annex 3

BASELINE INFORMATION

The key baseline information such as the fraction of non-renewable biomass, annual amount of fuel consumption, and efficiency of stoves to be replaced will be established in the first CPA in each country.

Annex 4

MONITORING INFORMATION

The Monitoring Plan is detailed in Section E.7 above. Below is an overview of the value ranges used for sample size estimation for the parameters to be monitored (see Sampling Plan in Section E.7.2).

Parameter	Value range applied	Reasons for value range
η_{new} (efficiency of deployed ICS)	20-32.6%	The lowest possible range of eligible ICS is 20% according to Methodology AMS II G v3. The highest possible value of the G3300 wood stove used in the example is the rated efficiency of the stove (32.6%).
SOF (Stove Operating Fraction – fraction of ICS operational and in use)	1.0-0.8	This value cannot be known in advance. However, this is seen as a reasonable range for the purposes of estimating sample size. There is no reason to think that end users would purchase stoves at a considerable cost compared with cheaper alternatives, and then not use them unless they are defective. Envirofit International's stoves which are envisaged to be distributed as part of CPAs under this PoA have been tested in the laboratory and field over several years, are manufactured to a high quality standard in modern factories, and come with a 5 year warranty on the combustion chamber.
u_{old}	34-1018kg	This range is provided as an example for the purposes of sample size estimation. It is equivalent to 1.1-33% of annual household woodfuel consumption (3,394kg per annum) in rural Kenya, which is an example of an end user group that could be targeted by CPAs under this PoA. The source for this value is a comprehensive report prepared for the Kenyan Ministry of Energy in 2002 by the company KAMFOR[46]. The range of 1.1-33% has been chosen because it covers three scenarios for the proportion of the amount of cooking that is done using baseline (replaced) stoves compared with the amount of cooking that was done previously using the baseline stove. (This assumes 3 meals per day and 90 meals per month are cooked in total using stoves): Low Scenario: one meal per month (1/90 = 1.1%) Medium Scenario: one meal per week (4/90 = 44.4%) High Scenario: one meal per day (30/90 =33%).
f_{old} fraction of users still using baseline (replaced) stoves.	0.0 – 0.2 Where: $f_{old} = 1 - f_{non,old}$ and $f_{non,old}$ is expected to be in the range of 0.8-1.0	The value of f_{old} cannot be known in advance. If it is expected that more end users will stop using baseline stoves once they have received the ICS, then monitoring will actually estimate the fraction of end users *not* using baseline (replaced) stoves ($f_{non,old}$) (Option B). As a reasonable assumption for ex-ante sample size estimation purposes, a range of 0.8-1.0 is seen as reasonable for $f_{non,old}$. The learnings gained during the actual distribution and monitoring will help determine the real value of f_{old} to be applied at the CPA level and the appropriate choice of estimation approach (Option A or B).

[46] Ministry of Energy, Study on Kenya's energy demand, supply and policy strategy for households, small scale industries and service establishments. Final report prepared by Kamfor Company Ltd. Nairobi, 2002, Table 3.1 p10

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