



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

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**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):**

African Improved Cooking Stoves Programme of Activities  
24/11/2011  
Version 01.0

**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<sup>1</sup>. 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 developers. 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 3<sup>rd</sup> 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

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<sup>1</sup> 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 stakeholders 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 general PoA business model.

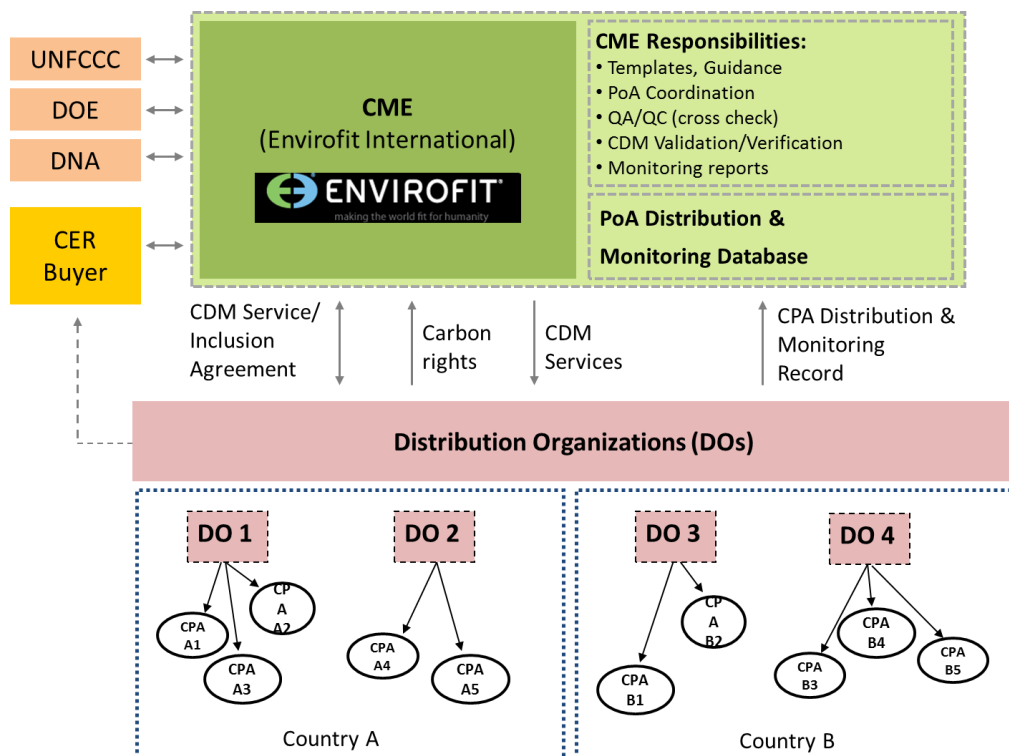


Figure 1: PoA business model



## **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 for households 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:**

#### **1. Coordinating or managing entity of the PoA as the entity which communicates with the Board**

<b>Name of Party involved (*) (host) indicates a host Party)</b>	<b>Private and/or public entity(ies) project participants(*) (as applicable)</b>	<b>Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)</b>
United Kingdom	Coordinating and managing entity (CME) of the PoA:  Envirofit International	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):**

The Republic of Ghana (Ghana) and the Federal Republic of Nigeria (Nigeria).

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 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 and replace either wood fuel or charcoal.

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

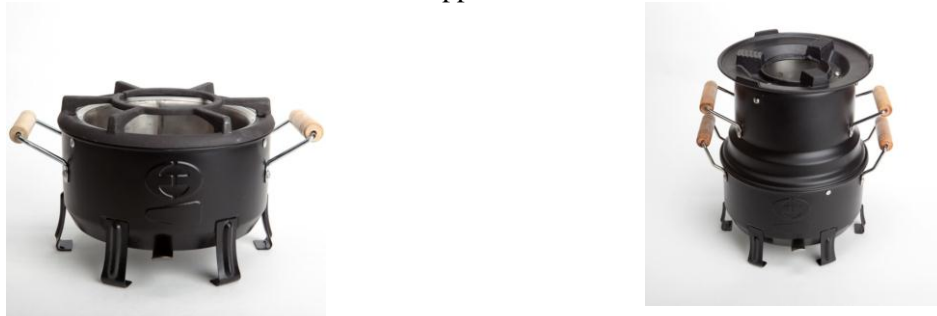


Figure 1. CH2200 (left) and CH4400 (right) Charcoal Stoves



Figure 2. G3300 (Left) and M5000 (Right) Portable Wood Stoves



Figure 3. Z3000 Built in Stove



Other wood and charcoal stoves produced by Envirofit and/or other manufacturers could be included in 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:

No.	Eligibility criteria		Means of proof	Confirmation
	Description	Conditions to be met		
1	Technology requirements	The ICS uses one of the following fuel types: <ul style="list-style-type: none"> <li>• Wood fuel</li> <li>• Charcoal</li> </ul>	Technical specification of ICS provided	Yes/No
2		The ICS has a minimum efficiency of 20% (AMS II.G, Version 3, para 1)	Technical specification of ICS provided	Yes/No
3	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
4	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
5	Start date	The CPA start date shall be after the PoA validation start date.	The start date of the CPA will be specified in each CPA-DD.	Yes/No



6	Additionality of CPAs	<p>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):</p> <p>1. If the CPA size is below 60 GWh<sub>th</sub>/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<sub>th</sub>/year; and          (ii) End users of the subsystems or measures are households/communities/SMEs.</p> <p>2. If the CPA size is between 60 and 180 GWh<sub>th</sub>/year, then it can be demonstrated that at least one of the barriers discussed in Section A.4.3. also applies to the CPA as required by the additionality approach outlined in Section E.5.2. 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.</p>	<p>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.</p> <p>In the case of test 2: For the first CPA in each country it shall be demonstrated that at least two of the criteria in section E.5.2. are met. (This shows that barriers outlined in Section A.4.3 apply)</p>	Yes/No
7	SSC Limit for CPAs	<p>The annual energy savings of each CPA shall not go beyond the limits of 180 GWh<sub>th</sub>/year over the entire crediting period.</p> <p>In the case of using option 1 to prove additionality under Eligibility Criteria 6, the limit shall be 60 GWh<sub>th</sub>/year over the entire crediting period.</p>	<p>The maximum number of ICS will be determined in each CPA-DD depending on the technology used. If a CPA exceeds the applicable limit, the claimable emission reduction shall be capped at the stated limit.</p>	Yes/No



8	Exempted from de-bundling	Each ICS reduces energy consumption by less than 1.8 GWh <sub>th</sub> /year <sup>2</sup> .	Specific energy savings for the applied ICS estimated using Excel sheet or similar tool.	Yes/No
9	Contractual agreement	The DO has signed a contractual agreement with the CME to participate in the PoA. This agreement: <ul style="list-style-type: none"> <li>• defines the ownership of the carbon emission reduction rights</li> <li>• covers the DO's distribution and monitoring related responsibilities</li> </ul>	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)	Yes/No
10	Sampling	Sampling to be undertaken as part of the CPA is to be done in line with the requirements of the applied methodology AMS II G V3.0, and the latest applicable guidelines/standards for sampling and surveys.	As specified in the sampling plan in the CPA-DD and/or according to the sampling requirements specified at PoA level	Yes/No
11	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 DO/CME b) Affirmation by funding party	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;

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<sup>2</sup> 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.





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.

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 hot 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.<sup>3</sup> The dominant technology for wood users in SSA countries is still the traditional “three-stone” fire and other conventional cooking stoves while the conventional metal charcoal stove is the most frequently used technology by charcoal users.<sup>4</sup> 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 baseline scenario 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.<sup>5</sup> 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.

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<sup>3</sup> 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.

<sup>4</sup> 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”.

<sup>5</sup> Gaul, Mirco, Subsidy schemes for the dissemination of improved stoves, Experiences of GTZ HERA and Energising Development. GTZ. Eschborn, 2009



The CME has identified the key barriers and 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 will not be implemented the countries listed in Section A.4.1.1 or any of the SSA countries in the absence of the CDM PoA.

***Assessment and Demonstration of Additionality of the Proposed PoA***

The additionality demonstration below is provided for the case of small-scale CPAs. Micro-scale CPAs 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.

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 feasible 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<sup>6</sup>. When broken down by country, the vast majority of SSA countries have ICS use below 10% and several SSA countries including Ghana, Zambia and Burundi have less than 1% penetration of improved stoves according to UNDP<sup>7</sup>. The low penetration rate in Ghana is despite efforts in the 1990s and 2000s to develop and promote “improved” charcoal stoves based on the Kenyan Ceramic Jiko (KCJ) model, known in Ghana as the “Gyapa”, and the “Ahibenso” stove. Indeed, a site visit in Accra in November 2011 confirmed that the Ahibenso stove is not available in market places. Literature suggests that the Ahibenso is also not available in other regions<sup>8</sup>. More than half of households in Ghana (54%) use wood as the main cooking fuel; charcoal ranks second overall (31%) but accounts for more than half of urban cooking needs<sup>9</sup>. Nigeria has also seen some relatively small-scale stove distribution programmes but still has a very low penetration rate - around 6% according to UNDP.<sup>10</sup> Nigeria is a country in which, despite vast fossil fuel resources, 75% of all households still use solid fuels for cooking - over 90% in rural areas – predominantly the fuel used is wood<sup>11</sup>.

It is also important to distinguish between the older “improved” cook stoves, which have been distributed in donor-funded programmes and the new-generation or “advanced” cook stoves to be distributed under the proposed PoA. The older ICSs were typically made by local artisans with the support of donor agencies, but using basic materials, and have varying efficiencies. Many of these stoves performed well in the laboratory or when first installed, but deteriorated quickly due to lack of quality control over local

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<sup>6</sup> UNDP, 2009

<sup>7</sup> The UNDP 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.

<sup>8</sup> Energica, 2009: Pre-feasibility study for an improved cook stoves project in Northern Ghana. Report for CARE Denmark and the Danish Energy Agency.

<sup>9</sup> Ghana Statistical Service, 2008: Ghana Living Standards Survey, Report of the Fifth Round.

<sup>10</sup> The UNDP/WHO report cites a personal communication as the source for this figure. It is likely that there is no reliable national data.

<sup>11</sup> National Bureau of Statistics, 2007: Nigeria Multiple Indicator Cluster Survey (2007)



materials and manufacturing<sup>12</sup>. Thus there is a common perception amongst many people in SSA countries that ICS 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<sup>13</sup>.

Another limitation of past programmes is the tendency towards small scale. In Nigeria, for example, a programme to locally manufacture “Ewuk” improved firewood stoves was founded through the support of the Wild Gift Foundation, but had only resulted in an estimated 4500 stoves being manufactured by the time results were assessed some 14 months later<sup>14</sup>. Another 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 but could not be funded<sup>15</sup>.

The “advanced” cook stoves have only been under production for the last five years or so and are still at an early stage of distribution<sup>16</sup>. The advanced stoves are being produced using modern production techniques and advanced materials and have higher efficiencies, in the range of 30-40%, but also higher production costs and hence end user prices<sup>17</sup>.

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 stoves. A significant amount of awareness raising, marketing, demonstration and customer relationship building is required to overcome this barrier. 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.

#### *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 (World Bank, 2011). 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 (ESMAP). Around the same time, the German Government through GTZ (now GIZ) started supporting various programs and has continued to do so, usually in cooperation with local governments and more recently in cooperation with the Dutch Government under the EnDev Programme. Specific examples of GTZ programmes include:

- Kenya – the Kenyan Ceramic Jiko, mud stoves and Jiko Kisasa programmes, which since their commencement have resulted in the distribution of over 1 million stoves;

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<sup>12</sup> World Bank, Household Cookstoves, Environment, Health, and Climate Change: A new look at an old problem, The World Bank, Washington, 2011, p14.

<sup>13</sup> GTZ, Energising Development FAFASO Final technical report, 2007.

<sup>14</sup> <http://www.hedon.info/View+Stove?itemId=11617>

<sup>15</sup> Hakizimana, G., EAC Strategy to Scale up access to modern energy services, Burundi Country Baseline Report and Workplan, Bujumbura, 2008, p43

<sup>16</sup> REN21, 2011: Renewables 2011, Global Status Report. According to the report, only 7 million advanced stoves have been distributed in all of SSA.

<sup>17</sup> World Bank, 2011



- 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.

Later to join were other donor organisations including the World Health Organization (WHO) and the United Nations Development Programme (UNDP) and the World Bank/IDA. In Ghana, the Ministry of Mines and Energy with support from UNDP developed the ‘Ahinbenso’ improved charcoal stove starting in 1989<sup>18</sup>. The US Environmental Protection Agency (EPA), which founded the Partnership for Clean Indoor Air (PCIA), and the US Agency for International Development (US AID) have also supported various programmes. In Ghana, for example, the Gyapa was promoted in an awareness and marketing campaign sponsored by the United States Agency for International Development (USAID) and implemented by EnterpriseWorks, a global NGO. 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.

Other non-governmental donors have also become involved in stove programmes. In Nigeria, for example a programme to locally manufacture “Egaga” improved wood stoves was developed in 2000 in the Southwest of the country with the support of grants from the U.K based Ashden Trust and the Whitley Awards Foundation<sup>19</sup>.

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 EPA grant during its start-up. Another Gold Standard Voluntary Carbon Offset Project “Improved Household Charcoal Stoves in Ghana” is currently under development - the project is based on pilot work by Toyola Energy Limited (TEL) one of the companies which was trained by EnterpriseWorks in 2002 to fabricate the Gyapa charcoal cook stoves with the support of USAID<sup>20</sup>. The company rebranded the stoves as “Toyola” stoves in 2008. 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 ICS distribution programmes:

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<sup>18</sup> Quaye and Stosch, 2008: A study of fuel consumption of three types of household charcoal stoves in Ghana

<sup>19</sup> <http://www.hedon.info/View+Stove?itemId=11437>

<sup>20</sup> UNEP, 2010: Case study, Toyola Charcoal Stove: Improving the Environment and Health of the Poor in Ghana



- 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 because finance is either not available from the market or priced so highly to account for the country risks described above. Financiers will attach a risk premium to investment in any country where there is significant uncertainty about the ability to recover investment.

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<sup>21</sup>:

- Political instability evidenced by the high incidence of wars, frequent military interventions in politics, and religious and ethnic conflicts.
- Macroeconomic instability evidenced by the high incidence of currency crashes, double digit inflation, and excessive budget deficits; 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.

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"*<sup>22</sup>.

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 (discussed below).

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 will be generated from the sale of stoves in SSA countries. There is high level of risk that the cost of this initial investment would never be recovered because of the inability of

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<sup>21</sup> Dupasquier, C. and Osakwe, P: Foreign Direct Investment in Africa: Performance, Challenges and Responsibilities, Economic Commission for Africa, 2005.

<sup>22</sup> Dupasquier, C. and Osakwe, P., 2005, page 17



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<sup>23</sup>.

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 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.

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 final products in the case of countries where local manufacturing is not feasible (Envirofit's ICS are currently being produced outside of Africa by contract manufacturers);
- 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 countries 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 CH4400 charcoal stove for example, which has an ex-works price of around US\$30<sup>24</sup>. Once shipping from the factory in China, 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. By contrast, the prices of existing charcoal stoves available on the market in Ghana for example are between 3-10 Cide (US\$2-7) for the traditional "coal pot" (depending on size and quality) and around 13-16 Cide (US\$8-10) for the Toyola stoves and other Gyapas<sup>25</sup>. It 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.

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<sup>23</sup> Rai, K., McDonald, J., Cookstoves and Markets: Experiences, Successes and Opportunities, GVEP International, 2009.

<sup>24</sup> A confidential annex providing a detailed breakdown of the costs can be provided.

<sup>25</sup> Energica, 2009: Pre-feasibility study for an improved cook stoves project in Northern Ghana. Submitted to Danish Energy Agency.



To put this end-user price in perspective, thirty-three SSA countries were classified as being LDCs by the UN at the time of writing<sup>26</sup>. 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<sup>27</sup>. Non-LDCs also face similar barriers: Ghana for example has a GNI per capita of US\$1,240, while Nigeria has a GNI per capita of US\$1,180. A fully-costed CH4400 stove would thus represent around half of the monthly income of the average Ghanaian or Nigerian which is a considerable barrier when much cheaper alternatives are readily available. It should be noted that the average income of the lower socioeconomic segment of the population will be even much less than the average GNI for the population in a country.

#### **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 scale and at the same time to maintain the production of high quality products and ensure customer satisfaction over the long term.

None of the CPAs to be included in the PoA “African Improved Cooking Stoves Programme of Activities” 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 a graphical illustration of the distribution and monitoring activities involved in each CPA under the PoA.

<sup>26</sup> A list of LDCs is available at <http://www.unohrrls.org/en/ldc/25/>

<sup>27</sup> Calculated using the World Bank's Atlas method (World Bank, 2011)  
<http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf>

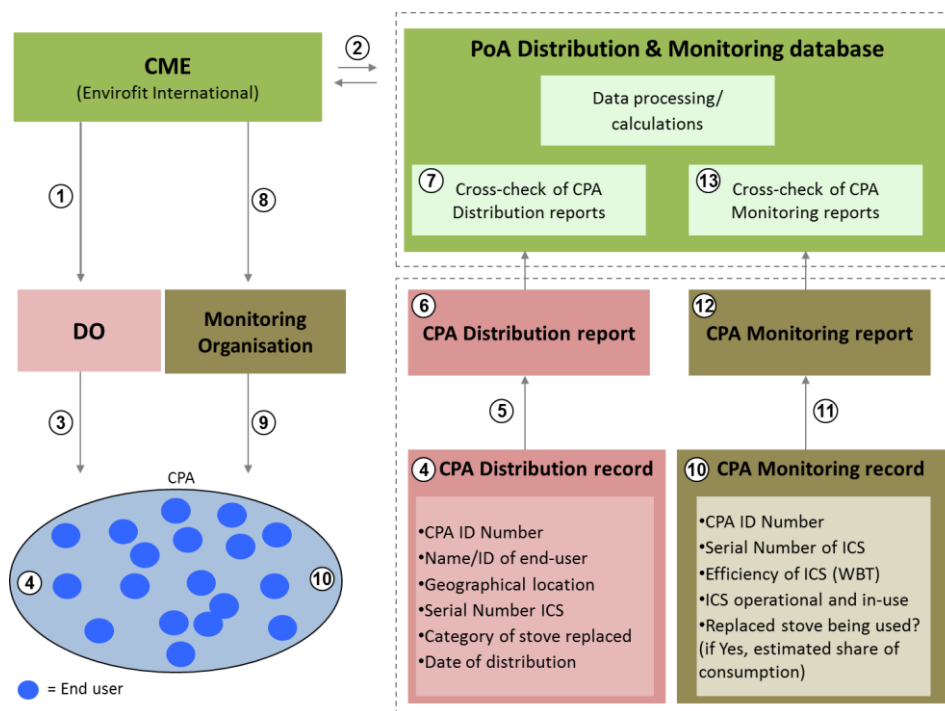


Figure 5. ICS distribution and monitoring plan

### 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, an agreement will be signed by the DO and the CME. The agreement will confirm the DO and any parties it contracts in its role as the CPA developer agree that their activity is being entered into 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.
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 may be distributed to households 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.
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:
  - **CPA ID number**
  - **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**
- **Category of old stove which the ICS is replacing**, i.e. the stove type - conventional or improved<sup>28</sup> - and the fuel type – wood or charcoal. DOs are responsible for excluding from the CPA Distribution Record any ICS which is replacing stoves using fossil fuels (such as kerosene and LPG) from emission reduction calculations.
- **Stove distribution date**

Additional information could be recorded in the case of each individual CPA as is deemed necessary to ensure accurate emissions reduction calculations and monitoring procedures under the particular circumstances of that CPA (for example, where applicable a phone number could 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 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 ex-post monitoring activities by providing guidance and training to the parties involved. Depending on the specific circumstances in each CPA, this role could be fulfilled by the same organisation as the DO or another organisation. In the diagram above this organisation is simply referred to as "Monitoring Organisation".
9. Monitoring activities will involve visiting a sample of households as is required under the PoA Sampling Plan, to be developed in line with the requirements of AMS II. G. v03, the "General guidelines for sampling and surveys for small scale CDM project activities" and any yet to be approved PoA-specific sampling and survey standard.
10. During monitoring, the individuals carrying out the monitoring activities on behalf of the Monitoring Organisation will check and record the following key parameters in the CPA Monitoring Record, which will be provided in a standardised format:

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<sup>28</sup> The distinction between conventional and improved stoves is the same as that outlined in Methodology AMS II.G/Version 03.



- Efficiency of project stoves
  - 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, estimate the use intensity accounted for by the old stoves
11. The Monitoring Organisation is then responsible for ensuring that the data contained in each individual CPA Monitoring Record is compiled into a CPA Monitoring Report. This will have an appropriate format for example, Excel spread sheet or similar.
12. The Monitoring Organisation will then ensure that a CPA Monitoring Report is provided to the CME on a regular basis. Either the originals of the CPA Monitoring Records or scanned copies of each Record will also be provided to the CME. The Monitoring Organisation will take appropriate steps to maintain archives of past CPA Monitoring Records.
13. The CME will perform cross-checks on the monitoring information provided to it by the Monitoring Organisation. The PoA Distribution & Monitoring Database will provide the necessary data for emissions reduction calculations and for verification.

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

In case public funding from Parties included in Annex I is involved, information on sources of public funding for the project activity from Parties included in Annex I, which 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 (EB 41, Annex 12, Part II), will be provided in the Annex 2 of the CPA.

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

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

01/07/2012

The starting date of the PoA is the likely date of commissioning of the first CPA or the date of inclusion of the first CPA, whichever is the latter.

**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     | <input checked="" type="checkbox"/> |
| 2. Environmental Analysis is done at SSC-CPA level | <input type="checkbox"/>            |

The objective of the SSC-PoA and the CPAs is the installation of ICSs in the countries listed in Section A4.1.1. Due to its small scale nature, together with its positive social and environmental benefit and absence of negative impacts, and acknowledging that their impact of the installation of millions of ICSs is best assessed from a macro perspective, as per the requirements of the CDM modalities and procedures, environmental analysis is undertaken at a PoA level.

<p><b>C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:</b></p>
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Environmental benefits:

- *Greenhouse gas reductions:* The PoA will result in GHG reductions because it will reduce the consumption of non-renewable biomass in countries where the biomass harvested for fuel use is typically non-renewable.
- *Air quality:* Users (especially women and children) will be exposed to fewer air pollutants through reduced emission of not only CO<sub>2</sub>, but also carbon monoxide and particulate matter. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory, cardiovascular and ocular diseases.

All the stoves listed under section A.4.2.1 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](http://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).

- *Biodiversity:* will be improved as the programme reduces pressure on remaining forest reserves in the host countries within the PoA boundary. Biomass consumption for fuel has been shown to be a major driving factor in the rate of deforestation in SSA.

No negative impacts can be identified.

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

Unless required by a specific country included within the PoA, an Environmental Impact Assessment will not be conducted for the PoA nor for a typical CPA included in the PoA.

<p><b>SECTION D. <u>Stakeholders’ comments</u></b></p>
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**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 ✗  
Since the PoA boundary consists of more than one host county,  
the local stakeholder consultation would need to be conducted  
once per host country participating in the PoA.
2. Local stakeholder consultation is done at SSC-CPA level ☐

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

The local stakeholders were invited to a consultation meeting that was held on the 14<sup>th</sup> November 2011 at Alisa conference Hall, Accra Ghana. Stakeholders were identified as those whose activities directly or indirectly impact the project, and those who were to be impacted by the project activities (full lists of attendance are in the Local Stakeholder Consultation Report). Invitation letters were sent by DHL to the individual stakeholders, and an advert inviting the public was placed in the local newspaper. The invitations were welcoming written comments as well as physical attendance.

Over 60 stakeholders attended the consultation that was held on the 14<sup>th</sup> November. The stakeholders were encouraged to voice their concerns/issues in the language they were comfortable with. It was not surprising that one of the stakeholders expressed himself in the local language.



Stakeholders attending the consultation at Alisa conference Hall, Accra Ghana



Group Photo at the end of the consultation

### **D.3. Summary of the comments received:**

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

- How they could enjoy the carbon credits,
- whether the project stoves could be locally made and source of raw materials,
- timeframe for the project implementation to cover the whole of Ghana,
- including the project in the school feeding program,
- concern about their capacity to handle heavy weights (cooking is normally done for large families using large pots); and
- Whether local people are to be involved in the distribution and how one becomes a retailer.

Other stakeholders raised concern about the risk of not registering the programme, and further that when the programme of activities is registered, the carbon revenues come only after about 2-3 years upon project start and that the crediting period is limited. What happens with the subsidies after the crediting period is over?

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

The stakeholders were informed that the purchasing price of the stoves will be lower than the actual price it would have been sold without developing this PoA. In addition they expect fuel savings of approximately 50% after purchasing the stove. Therefore, buying the stove and using it, they will enjoy the carbon credits deriving from the project.

It was highlighted that some parts such as the combustion chamber are built using a special alloy which currently may not be locally available. However, in future there are plans to set up a factory to serve the west African region, and will use as much local material as can be found.



The programme of activities intends to register the first CPA and target distribution in the two districts in the Ashanti region. When the PoA is registered all other regions can be included. Other distributors can join and help to upscale the roll-out. The program is looking into an aggressive roll-out schedule. First gateway is the registration of the PoA. Later, partners can join the Programme and help to scale-up the geographical area of distribution.

On the concern of the stoves capability to handle weight, the stakeholders were informed that the stove can take the weight of two people of about 80kgs each indicating that they are very strong, but having realised the sizes of the pots and the comments from the stakeholders, Envirofit considers to start manufacturing stoves of the sizes that are required by the users. A lot of stoves on the market are not properly tested and lack of reliable information on emissions. Charcoal stoves might have large carbon monoxide emissions. Our stoves reduce CO by up to 70%. Further, our product line keeps on getting improved according to the local requirements.

Regarding distribution of the stoves, the stakeholders were informed that the distribution model clearly indicates stoves being sold in the case of the first CPA through local sales man, door to door. This is to create jobs for the local people. The sales man builds up a direct relationship to the customer and supports whenever problems occur in relation to the cook stove. Generally speaking retailers should have high integrity and should service the customer properly. Key is that they are able to collect relevant data when selling the stove to enable carbon revenues to flow and therefore sell the stoves on a subsidized price.

The stakeholders were informed that the PoA will be run for 28 years. During this time new CPAs can be included and hence new stoves can be sold continuously. The discounted stove price is calculated based on the expected carbon revenues assuming the limited crediting period. The user can already enjoy the subsidized price of the stove while the carbon revenues will stream in at a later stage.

The team is aware of the deadline and have a tight timeline to achieve a registration of the programme of activities in time. Validation will start some time in December and registration must be achieved before end of 2012. If the deadline is not achieved, the voluntary market would be the other alternative to sell credits. However, market price is less predictable and stoves might not be able to be distributed for the same price as it would have been possible in the compliance market.

## **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:**

<b>AMS-II.G, version 3 requirements</b>	<b>SSC-CPA qualification justification</b>
1. This category comprises appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples	As stated in the Eligibility Criteria in Section A4.2.2., the SSC-CPAs to be included in this PoA



<p>of these technologies and measures include the introduction of high efficiency<sup>29</sup> biomass fired cook stoves<sup>30</sup> or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.</p>	<p>will involve the introduction of high efficiency cook stoves. 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 manufacturers specifications may be used.</p>
<p>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.</p>	<p>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.</p> <p>At least two of the following supporting indicators are shown to exist for the first CPA in each country:</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• 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;</li> <li>• Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;</li> <li>• Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.</li> </ul> <p>Subsequent CPAs in the same country will be assumed to meet this requirement.</p>

<b>E.3. Description of the sources and gases included in the <u>SSC-CPA boundary</u></b>
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<sup>29</sup> 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.

<sup>30</sup> Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.



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<sub>2</sub>/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<sub>2</sub>/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO<sub>2</sub>/TJ for Kerosene and 63.0 tCO<sub>2</sub>/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 and data 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 (Eligibility Criteria 6, test 1). In the case of small-scale CPAs, one of the barriers demonstrated in Section A.4.3 must be demonstrated to apply (Eligibility Criteria 6, 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 in the countries including in the PoA boundary. 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. A large-scale high efficiency stove 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.

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, as per the approach outlined in section E.5.2. All subsequent SSC-CPAs in the same country can then reference this first CPA and argue that the same barriers apply.

<b>E.5.2. Key criteria and data for assessing additionality of a <u>SSC-CPA</u>:</b>
--

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, in the case of the first CPA to be included in a new country that is added to the PoA post-registration, at least two of the following criteria must also be satisfied:

- a. The country is classified as an LDC;
- b. Lack of access to capital without carbon finance - as demonstrated by a letter from a major investor or lender or other appropriate documentation;
- c. At least one of the barriers in Section A.4.3. can be demonstrated to also apply in that country. For example, this could be done by providing a reference document from a credible source, no older than seven years, that supports the demonstration of the barrier.

All subsequent CPAs in that same country can reference the demonstration of additionality in the first CPA.

In case of micro-scale-CPA:

The CPA is considered additional if it satisfies the micro-scale additionality requirements according to the latest guidelines:

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<sub>th</sub>/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 SSC-CPA under the PoA consists of the installation of ICS, 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.

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

The SSC-CPAs will calculate ex-ante emission reductions through application of the following equations:

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

Where:

$ER_y$	Emission reductions during the year y in tCO <sub>2</sub> e
$B_{y,savings}$	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 . FAO data will be used wherever possible
$NCV_{biomass}$	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 <sub>2</sub> /TJ.

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

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

Where:

$B_{old}$	Quantity of biomass used in the absence of the project activity in tonnes/ year
$\eta_{old}$	Efficiency of the system being replaced. 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.
$\eta_{new}$	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.



Following option (a) of paragraph 7 of the methodology,  $B_{old}$  is 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.

Where:

$$f_{NRB\ y} = NRB/NRB + DRB$$

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>E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:</b>
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<b>Data / Parameter:</b>	$Q_{biomass}$
<b>Data unit:</b>	Tonnes/year
<b>Description:</b>	Annual average biomass consumption per appliance
<b>Source of data used:</b>	Historical data or survey of local usage, as required by the methodology
<b>Value applied:</b>	-
<b>Justification of the choice of data or description of measurement methods</b>	Requirements as per methodology AMS-II.G, version 3.



and procedures actually applied :	
Any comment:	<p>Used for calculation of <math>B_{old}</math> as per paragraph 7 (a) of methodology.</p> <p>The approach for setting <math>B_{old}</math> values will be to use either historical data or a local consumption survey in the first CPA 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.</p> <p>National studies can also be complemented by field studies if necessary. If no reliable historical data is available, a local survey will be used if deemed to be appropriate either by the DOE or the CME. Such a local household consumption survey will be conducted for the first CPA in a country to establish an appropriate value for each fuel type. If 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 wood stoves. This may be done either by covering both fuel types in the initial survey, or by undertaking separate surveys for each CPA.</p> <p>If credible new national data becomes available after having established the baseline values in the first CPAs, then future CPAs could use such national data instead to define the baseline consumption value.</p>

<b>Data / Parameter:</b>	$f_{NRB,y}$
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:	-
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.

<b>Data / Parameter:</b>	$NCV_{biomass}$
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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:	-

<b>Data / Parameter:</b>	$EF_{\text{projected fossilfuel}}$
Data unit:	tCO <sub>2</sub> /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 <sub>2</sub> /TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO <sub>2</sub> /TJ for Kerosene and 63.0 tCO <sub>2</sub> /TJ for Liquefied Petroleum Gas (LPG)).

<b>Data / Parameter:</b>	$\eta_{\text{old}}$
Data unit:	Fraction
Description:	Efficiency of the system being replaced,
Source of data used:	AMS-II. G version 03
Value applied:	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 value 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.
Any comment:	-

<b>Data / Parameter:</b>	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:**

**Application of the methodology:**

**1. Governing equation for emission reduction**

The equation for calculation of emission reductions is:

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

Where:

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

Following option (a) of the methodology,  $B_{old}$  is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of biomass per appliance (tonnes/year) derived from historical data/ survey of local usage.

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

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 (% of stoves operating or replaced by equivalent in-service appliance) – to be measured ex post using survey/ user feedback

In compliance with the monitoring requirements of the methodology  $B_{old}$  is adjusted for Leakage and average stove operation period during monitoring period, as follows:

$$B_{old} = LAF \cdot N_{all} \cdot SOF \cdot Q_{biomass} \cdot Stove_{year}$$



Where:

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

Stove<sub>year</sub> Calculated average stove operation years in the monitoring period (years)

Where:

$$f_{NRB\ y} = NRB/NRB + DRB$$

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

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

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

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

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

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

- (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.

This will be done at the CPA level for the first CPA in each country. In order to determine the  $f_{NRB}$  in a country, FAO will be used wherever possible, complemented with IPCC data if necessary. In cases such data does not exist,  $f_{NRB}$  can be established by using national or local statistics, survey results, studies, maps or other sources of information, such as remote-sensing data (refer to CPA-DD for further information).

## 2. Continued use of displaced traditional stoves



*Methodology document: Monitoring shall ensure that the replaced low efficiency appliances are disposed of and not used within the boundary or within the region or continued usage of baseline stoves needs to be monitored and taken into consideration for the baseline emission calculations.*

The efficiency tests on a sample of ICS will also investigate the extent to which baseline stoves are no longer used, even in a secondary role, in the houses adopting the ICS. If it is found that a portion of kitchens exists in which a traditional stove is still used, even in a secondary role, emission reductions will be calculated taking into account only the portion of the wood used in ICS.

### ***Representative sampling***

Sampling will be undertaken as part of a Sampling Plan that is in line with the requirements of AMS II.G V.03 and the latest version of the “General guidelines for sampling and surveys for small scale CDM project activities”. A PoA-wide sampling plan will be developed if allowed by the “Standard for sampling and surveys for small scale CDM project activities”.

Wherever reasonably possible, the PoA Sampling Plan will ensure that sample sizes are large enough to meet 95/5 precision in the case of biannual sampling, and 90/10 precision in the case of annual sampling. In cases where such precision is not achieved, the lower bound of a 90%/95% confidence interval of the parameter value will be used as allowed by the methodology.

Depending on the CPAs that are included in the PoA, simple random sampling may be appropriate; in other cases stratified random sampling may be more appropriate – for example, one strata covering woodfuel users and another covering charcoal users.

The CME will provide guidance to the DO and/or any other parties that will be involved in carrying out sampling activities as part of the monitoring plan.

The following parameters shall be monitored ex post:

<b>E.7.1. Data and parameters to be monitored by each SSC-CPA:</b>	
<b>Data / Parameter:</b>	$\eta_{\text{new}}$
<b>Data unit:</b>	Fraction
<b>Description:</b>	Efficiency of the system being deployed as part of the project activity
<b>Source of data to be used:</b>	As determined using the Water Boiling Test protocol
<b>Value of data applied for the purpose of calculating expected emission reductions in section B.5</b>	The efficiency of the different ICS systems to be distributed will be included in each CPA-DD.
<b>Description of measurement methods and procedures to be</b>	Water Boiling Tests (WBTs) will be carried out for a sample of installed ICSs in operation in line with the PoA Sampling Plan.





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applied:	
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.

<b>Data / Parameter:</b>	N <sub>all</sub>
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:	-

<b>Data / Parameter:</b>	SOF
Data unit:	Fraction
Description:	Stove Operation Fraction – used to determine only stoves that are still operating, measured ex-post through survey/ user feedback
Source of data to be used:	Survey of household behavior
Value of data applied for the purpose of calculating expected emission reductions in section B.5	A value of 1.0 will be used for estimating emissions reductions ex-ante for the first year. For each CPA, local circumstances will be considered to determine whether this value should be reduced for the purposes of ex-ante estimation in subsequent years or not.
Description of measurement methods and procedures to be applied:	This is 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:	-
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<b>Data / Parameter:</b>	$\mu_{old}$
Data unit:	Tonnes/year
Description:	Amount of woody biomass for the continued use of old stoves
Source of data to be used:	Survey of household behavior
Value of data applied for the purpose of calculating expected emission reductions in section B.5	A value of 0 will be applied for estimating emissions reductions ex-ante.
Description of measurement methods and procedures to be applied:	This is measured ex-post by household survey and according AMS II.G v03. The survey will be done on the basis of the end user's estimation of the amount of wood or charcoal used per day, the number of times per week/month/year.
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:	-

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

The CME will enter into a contract with each DO involved in the implementation of CPAs under the PoA. This contract will include inter alia CDM-specific requirements relating to monitoring activities that occur during the distribution of stoves including the collecting of the necessary data required for ex-post monitoring, and ensuring that the CPA Distribution Records are completed correctly, as outlined in Section A.4.4.1.

The CME will also oversee ex-post monitoring activities by providing guidance and training to the parties involved, which could include its own staff, DOs or other parties (for example, local marketing firm, university etc) contracted by the CME – “Monitoring Organisations”. This will ensure that the correct procedures are carried out during monitoring activities.

Ex-post monitoring activities will involve visiting a sample of households as is required under AMS II. G. V3.0 and the latest version of the “General guidelines for sampling and surveys for small scale CDM project activities”. This will be done as part of a PoA-wide sampling plan wherever possible.

During ex-post monitoring, the following key parameters will be recorded in the CPA Monitoring Record:

- Efficiency of project stoves by carrying out Water Boiling Tests (WBTs)
- 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, estimate the use accounted for by the old stoves (for example, this could be done on the basis of the end user's estimation of the amount of wood or charcoal used per day, the number of times per week or some other appropriate means of estimation). This value is referred to as the continued use of the replaced stove  $\mu_{old}$ .



In line with the methodology, if biomass fuel is found to be consumed in replaced stoves, this amount ( $\mu_{old}$ ) will be excluded from  $B_{old}$  and considered when calculating  $B_{y,savings}$ .

The data contained in each individual CPA Monitoring Record will be compiled into a CPA Monitoring Report by the responsible party carrying out the ex-post monitoring activities. The CPA Monitoring Report will be transferred to the CME from the Monitoring Organisation. 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 perform cross-checks on the distribution and monitoring information received for each CPA. The CME will be responsible for maintaining a secure PoA Distribution and Monitoring Database, covering the CPAs within the PoA. The Database will provide the necessary data for emissions reduction calculations and for verification.

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

<b>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)</b>
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13 November 2011.

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**Annex 1**

**CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and  
PARTICIPANTS IN THE PROGRAMME of ACTIVITIES**

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING



Annex 3

**BASELINE INFORMATION**



Annex 4

MONITORING INFORMATION

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