



**Programme design document form for
small-scale CDM programmes of activities
(Version 04.0)**

PROGRAMME DESIGN DOCUMENT (PoA-DD)

Title of the PoA	Improved Cookstoves Program for Zambia
Version number of the PoA-DD	12.1
Completion date of the PoA-DD	18/03/2016
Coordinating/ managing entity	C-Quest Capital Malaysia Global Stoves Limited (CQC)
Host Party(ies)	Zambia
Sectoral scope(s) and selected methodology(ies), and where applicable, selected standardized baseline(s)	<p>Sectoral scope 3: Energy demand</p> <p>Methodology: AMS II.G, version 3, Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass</p>

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

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Improved Cookstoves Program for Zambia

A.2. Purpose and general description of the PoA

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1. General operating and implementing framework of PoA

This Small-Scale Programme of Activities (SSC-PoA) involves the promotion and distribution/installation of fuel-efficient improved cooking stoves (ICS) in Zambia. The ICS disseminated through this programme will replace the prevailing inefficient three-stone fires or traditional pot support, with stoves that combust wood more efficiently and improve thermal transfer to pots, thus saving fuel and lowering greenhouse gas emissions.

C-Quest Capital Malaysia Global Stoves Limited (CQC) will be the Coordinating Managing Entity (CME) of this SSC-PoA. ICS will be installed/distributed on a commercial or a non-commercial basis by CPA Implementers¹. Carbon finance will be used to facilitate the purchase, distribution² and marketing of stoves, and make the ICS more affordable to users; without carbon finance, these activities would not take place.

The end user will be informed that carbon finance is being generated by the use of the ICS, and this finance is in turn used to lower the sales price of the ICS. The ICS customer will confirm with/to the CME or CPA Implementer that they are transferring rights to the CERs generated by the PoA during the registration process of the ICS. The registration process⁴ can be either in a form of hard copy or electronic copy depends on the means (Direct contact or Indirect contact) chosen by the CPA implementer to collect end-users' information. The CPA implementer is allowed to use either one or both means to gather information from ICS end user. The registration process will record the necessary information regarding the ICS, the user and the distributor/retailer of the ICS, allowing one (eg. the CME or the DOE) to easily trace and identify each ICS uniquely. This information will be stored by the CME in hard copy or soft copy and in an electronic data management system, or monitoring database, in order to ensure no double counting of ICS or CERs. The same database will be used for the monitoring and verification purpose of the ICS distributed.

2. Policy/measure or stated goal of the PoA

The goal of this SSC-PoA is to make cleaner, more efficient improved cooking stoves more affordable and available to rural households⁵ across Zambia who, at present, use wood fuel in three stone fires and traditional pot supports that are inefficient and smoky. The target market will be to install/distribute improved

¹ The CPA Implementer is the entity in charge of the distribution/installation and monitoring of ICSs in each CPA under contract with the CME and as defined in Part II Section A.

² 'Distribution' in this PoA-DD is taken to include sales.

⁴ The term 'Registration Process' as used in this SSC-PoA is taken to include physical/paper copy (hard copy) and electronic data (electronic copy) recording/transfer mechanisms such as Short Message Service (SMS) and/or Information and Communication Technologies ('ICT' – such as PDAs). Information contained in the Registration Process and means of collecting end-users' information is explained in "Data Collection and Transfer" in Part II Section A.⁵ Urban areas in Zambia are defined as per the United Nations Demographic Yearbook as "Localities of 5 000 or more inhabitants, the majority of whom all depend on non-agricultural activities" (<http://unstats.un.org/unsd/demographic/products/dyb/dyb2008.htm>). There is no specific definition for rural areas in Zambia, this is considered to be all areas which are not urban. Hence rural households are those which are physically located in a non-urban area of Zambia.

⁵ Urban areas in Zambia are defined as per the United Nations Demographic Yearbook as "Localities of 5 000 or more inhabitants, the majority of whom all depend on non-agricultural activities" (<http://unstats.un.org/unsd/demographic/products/dyb/dyb2008.htm>). There is no specific definition for rural areas in Zambia, this is considered to be all areas which are not urban. Hence rural households are those which are physically located in a non-urban area of Zambia.

wood-burning stoves to the rural areas. In turn, this will reduce global greenhouse gas emissions by increasing the efficiency of cooking and reducing the quantity of non-renewable biomass consumed. The end users of the ICS provided through this SSC-PoA will benefit from having improved access to the ICS market, a wider choice of high-quality ICS at affordable prices, and added investment in marketing. ICS will also reduce indoor air pollution levels and the various health risks associated with breathing polluted air, thus resulting in a range of social and economic benefits to users. The proposed PoA will deliver a long-term, secure and simple contribution to sustainable development in Zambia that, without carbon finance, would not exist. Many of the improved cooking stoves will be imported from outside the country, including Annex I countries. Thus, there will be technology transfer from abroad.

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

This PoA is a voluntary action, and will be coordinated and managed by the CME. There are no laws, policies or mandatory requirements in Zambia stipulating the adoption of ICS by households.

4. Contribution to sustainable development

The Zambian Census of Population and Housing 2000⁶ indicates that 88% of rural households are using wood fuel as their main source of cooking energy. In urban areas a total of 62% use wood, charcoal or coal. This amounts to around 1.2 million rural households and over 400,000 urban households using wood, charcoal or coal as their main source of cooking energy in 2000. There is a very low prevalence of improved technologies for combusting wood cleanly and efficiently.⁷ The majority of people cooking with wood use three stones to support the pots in an open fire.

The use of inefficient cooking stoves and three-stone fires in homes has been found to cause considerable disease and death, particularly among women and children. The World Health Organisation⁸ has found that 40% of all childhood pneumonia can be attributed to exposure to smoke from fires in homes, and exposure to smoke has been found to cause chronic lung disease in women. Approximately 1.5 million people die from smoke inhalation each year; most are women and children in low-income countries. Ill health can result in loss of productivity and costs associated with health care.

In many parts of Africa wood collection is a time-consuming burden that falls mainly on women⁹. Where wood is purchased it poses a significant financial burden on families. Approximately 88% of the population in Zambia lives below the poverty line, and average per capita income is near USD 430¹⁰.

The inefficient use of wood also places considerable and unnecessary pressure on local ecosystems and biomass resources, including forests. Reducing the consumption of firewood can reduce this pressure.

The proposed PoA contributes to the sustainable development of the Zambian economy in a number of ways:

i. Environmental

- The PoA will help significantly reduce Zambia's greenhouse gas emissions over its lifetime
- The PoA will help reduce the use of non-renewable biomass from Zambian forests assisting the maintenance of existing forest stock, protecting natural forest eco-systems and wildlife habitats
- The protection of standing forests will ensure the maintenance of watersheds that regulate water table levels and prevent flash flooding

⁶ Central Statistical Office, 2000. Housing and household characteristics analytical report. 2000 Census of population and housing. Republic of Zambia: <http://www.zamstats.gov.zm/census.php>

⁷ Zambia Demographic and Health Survey, 2007, Table 2.9, p. 27.

⁸ World Health Organisation World Health Report, 2002.

⁹ Biran, A., J. Abbot, and R. Mace. 2004. Families and firewood: A comparative analysis of the costs and benefits of children in firewood collection and use in two rural communities in Sub-Saharan Africa. Human Ecology 32, no. 1: 1-25.

¹⁰ IFAD: <http://www.ruralpovertyportal.org/web/guest/country/home/tags/zambia>

ii. Social

- Considerably less time will need to be spent collecting wood fuel for the family home thereby reducing the work burden on rural families and presenting alternative opportunities for economic development
- The amount of indoor pollutants from the burning of biomass in the family home will be reduced. Less carbon dioxide, carbon monoxide and particulates will be emitted due to the decrease in total biomass burned and an increase in the temperature of combustion.
- The stove provides a safer method for combusting biomass for cooking, helping to reduce burn injuries, especially for children, in the family home

iii. Economic

- The PoA will help develop a section of the Zambian rural economy; in the distribution/installation maintenance and monitoring activities.
- Household expenditures on cooking fuel will be reduced through the use of the ICS
- Saved household labour can be diverted to more productive economic activities.
- Strengthening the employee base of partner organizations and creation of direct local employment opportunities in operational and management roles, as well as future assembly and/or manufacturing initiatives.

The proposed PoA will deliver a long-term, secure and simple contribution to sustainable development in Zambia that, without carbon finance, would not exist.

A.3. CME and participants of PoA

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1. Coordinating or managing entity of the SSC-PoA as the entity which communicates with the Board

C-Quest Capital Malaysia Global Stoves Limited (CQC) will be Coordinating/Managing Entity of this SSC-PoA and is the entity which communicates with the CDM Executive Board.

2. Project participants being registered in relation to the SSC-PoA. Project participants may or may not be involved in one of the CPAs related to the SSC-PoA.

C-Quest Capital Malaysia Global Stoves Limited (CQC) and Community Markets for Conservation Ltd (COMACO) are currently the only project participants to the SSC-PoA (project participants may or may not be involved in one of the component project activities (CPAs) related to the SSC-PoA.

A.4. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) project participants, CME (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Netherlands	C-Quest Capital Malaysia Global Stoves Limited (CQC)	No
Zambia (host)	Community Markets for Conservation Ltd (COMACO)	No

A.5. Physical/ Geographical boundary of the PoA

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All SSC-CPAs included in this SSC-PoA will be implemented within the geographical boundary of the Republic of Zambia – latitudes 8°13' and 18°3' South, and longitude 22°1' and 33°42' East.

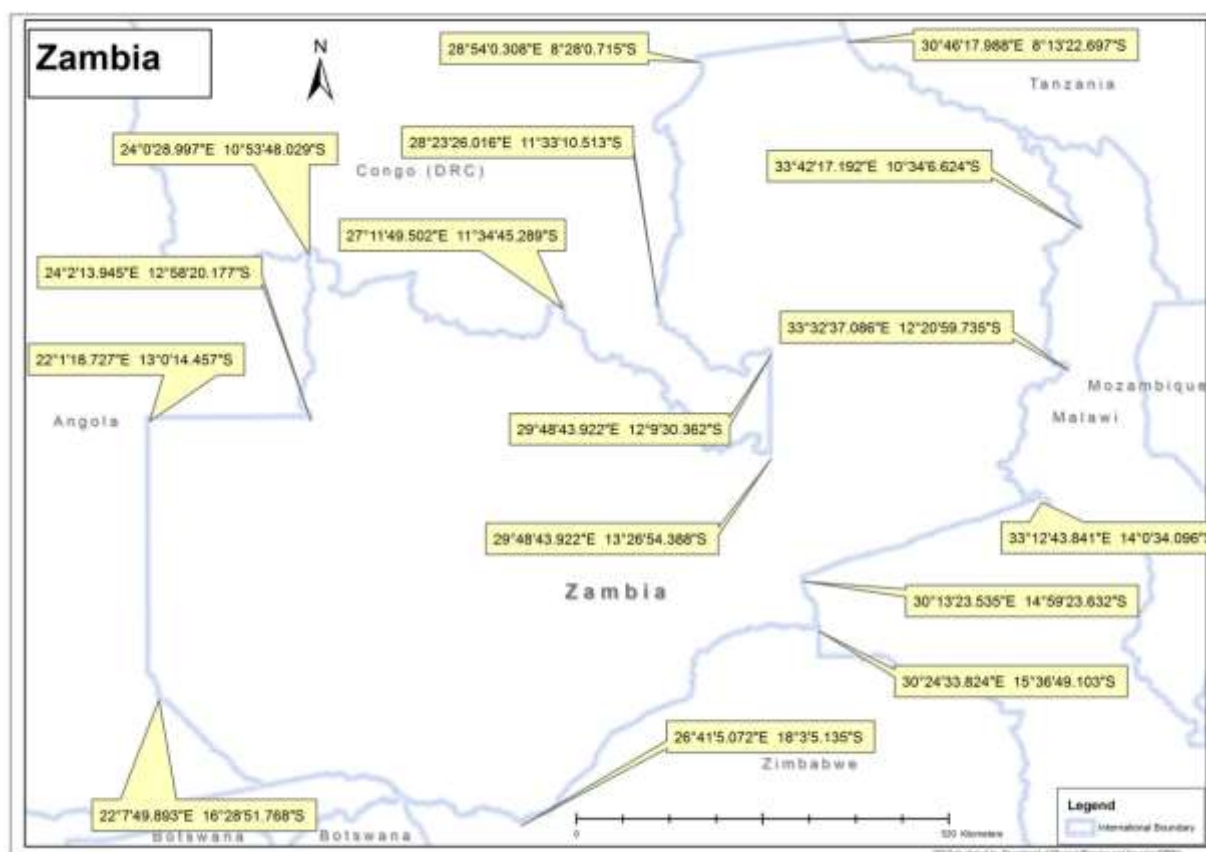


Figure 1: Zambia – the geographical boundary of the proposed PoA

Data source: Department of Physical Planning and Housing (DPPH), Democratic Republic of Zambia

A.6. Technologies/measures

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The activities under the proposed SSC-PoA will promote improved cooking stoves that result in substantially reduced fuel consumption and emissions due to cooking and heating water in homes. The ICS used in this SSC-PoA have characteristics that improve the efficiency of combustion and thermal transfer to the pot compared with a three-stone fire or traditional pot support.



An ICS is a single or multi-pot portable or in-situ cooking stove with specified efficiency of at least 20% (as per methodology AMS II.G. v03). Efficiency of the ICS shall be established by a national standards body or an appropriate certifying agent recognized by it, or alternatively manufacturers' specification shall be used – any selection of these tests shall be approved by the CME prior to inclusion of ICS under any CPA. Each CPA shall clearly describe in detail each type of ICS it is implementing. Below is an indicative description of the several types of ICS that could be implemented under CPAs.

For the purpose of this POA, ICS can be classified using the following characteristics:

1. **Construction material** - Improved Cooking Stoves are commonly made of one or more of the following materials: metal, clay/mud, fired-clay/mud or ceramics and bricks. Classification based on the material helps in selecting an appropriate design on the basis of locally available raw materials, skills for fabrication and necessary production facilities (e.g. centralized/decentralized) in the target area.
2. **Portability** - On this basis, an Improved Cooking Stove can be classified as fixed (in-situ) or portable. Metal and ceramic ICS are normally portable in nature while clay/brick, clay/stone ICS are generally high mass and thus are fixed. Stoves in this category can be further sub-divided into different categories depending on the number of pot-holes, e.g., single, double and triple.

Types of ICS: the list of ICS below is indicative of the types of technologies envisaged to be implemented

under this POA. It is important to note that several other models of ICS using a combination of the above categories (construction material and portability) may be later implemented under this POA-DD. Specific stoves types will be described for each SSC-CPA.

Picture	Category	Material	Portability
	Improved Mud/brick Stoves	Clay, straw, dung, cement, stone, bricks	Fixed (in-situ)
	Improved metal and ceramic stove	Metal with ceramic combustion chamber	Portable

Specific stoves types will be described for each SSC-CPA.

A.7 Public funding of PoA

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No public funding from Annex I parties to the United Nations Framework Convention on Climate Change (UNFCCC) are envisaged to be made available for the proposed PoA, or any CPA under the proposed PoA. If public funding from Annex I parties to the UNFCCC is provided, the CME shall confirm that the funding is not diversion of Official Development Assistance (ODA)¹¹.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

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The following shall be demonstrated here:

- (i) The proposed PoA is a voluntary coordinated action;
- (ii) If the PoA is implementing a voluntary coordinated action, it 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 mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation (not applicable).

¹¹ Official development assistance (ODA) is defined in the *OECD Glossary of Statistical Terms* as follows: Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries ("bilateral ODA") and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions (*OECD Glossary of Statistical Terms*)

The information presented here shall constitute the demonstration of additionality of the PoA as a whole.

i. *The proposed PoA is a voluntary coordinated action:*

There is no mandated government programme or policy in Zambia ensuring the distribution of domestic fuel-efficient cooking stoves. Households may only participate voluntarily in the Improved Cooking Stoves in Zambia SSC-PoA. It is hereby confirmed that the proposed PoA is a voluntary coordinated action by CQC.

ii. *If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA.*

Significant capital is required to invest in a programme which could match the achievements of this proposed PoA, including for import of technologies, developing the brand, widespread marketing, and establishing a distribution and retail network. CQC has been unable to find private investors willing to provide the level of capital necessary to implement such a program without the hard-currency revenues from selling CERs. CQC's team of private investors, which have key roles in providing both debt and equity in the ICS initiative, have all provided letters stating that they would not consider this kind of investment unless this PoA is CDM registered and eligible to sell CERs. CQC has been unable to find any other private investors in this project, given the risks of doing this kind of project. One private investor states, for example, that "Appropriate structuring of the cash flows of the carbon offsets will be essential to ensure the financing and economics feasibility and thus the 'financeability' of the project."

B.2. Eligibility criteria for inclusion of a CPA in the PoA

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SSC-CPAs to be included under this SSC-PoA must fulfill the following eligibility criteria¹²:

1. promote and install/distribute ICS in/to residential households in rural areas that use wood fuel following the PoA specifications;¹³
2. be implemented within the geographical boundary of the Republic of Zambia;
3. have a maximum energy saving of 180 GWh_{th}/ year throughout the CPA's crediting period to conform with the SSC threshold for type II projects as per EB 61 Annex 21 paragraph 3¹⁴;
4. have a database that will uniquely identify and define households in which ICS have been installed or distributed¹⁵. In addition, each stove itself will be uniquely identified with a serial number clearly starting with "CQCZ";
5. comply with the applicability conditions set out in methodology AMS II.G version 3 "Energy efficiency measures in thermal applications of non-renewable biomass" and further described in Part II Section B.2;
6. do not involve households already using an ICS - including households involved in any other CPA or CDM or other voluntary scheme (such as Gold Standard, VCS, VER+¹⁶) project involving the distribution or installation of ICS, and households which have purchased or received an ICS on a commercial or non-commercial basis (eg. NGO distributed or government distributed stoves)¹⁷;
7. not be registered as individual CDM project activities nor included in another registered SSC-PoA, as well as in any other voluntary carbon scheme (such as Gold Standard, VCS, VER+)
8. be approved by the CME prior to its incorporation into the SSC-PoA;

¹² PoA-specific requirements stipulated by the CME related to undertaking local stakeholder consultations are not applicable as eligibility criteria because it was carried out at PoA level.

¹³ The CME will not certify or test any specific organization, but as per eligibility criterion #11, it will require the stove/s used in a particular CPA meets minimum efficiency criteria. The proof of this can be a Water Boiling Test result for the stove model/s identified in the CPA.

¹⁴ At time of inclusion, the CME shall provide the DOE with the calculation as per Part II Section A of the POA-DD demonstrating what the maximum number of ICSs is for that CPA so it remains below the small-scale threshold.

¹⁵ Part II Section A of the POA-DD clarifies how the CME collects information and what information it collects from users when ICSs are distributed and how the information is stored in the database. This information and procedures are also described on the CME manual which shall be provided to the DOE at time of inclusion.

¹⁶ VER+ is TÜV SÜD's standard for voluntary emission reductions.

¹⁷ At time of inclusion the DOE shall confirm that the CPA is using the methods of data collection described in Part II Section A of the POA-DD and in the CME manual, to confirm this eligibility criterion.

9. be able to provide documentary evidence of the start date¹⁸.
10. affirm that no funding is coming from Annex I parties, or if it does, that this is not a diversion of Official Development Assistance¹⁹;
11. ensure that the ICS installed/distributed under the CPA are single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%. The efficiency of the project systems (ICS) are certified by a national standards body or an appropriate certifying agency recognized by it (using the WBT outlined in AMS IIG, Version 3 approved by the CDM Executive Board). Alternatively manufacturers specifications may be used;
12. use baseline fuel consumption (B_{old}) data from the household fuel survey (as per baseline report attached to this PoA-DD and further described in Part II Section B.6.2 of the POA-DD);
13. use the national average non-renewable biomass (NRB) fraction as per national NRB report attached to this PoA-DD or develop their own regional-level NRB survey in accordance with AMS IIG (version 3). The geographical scope of each CPA must be limited to the geographical scope of the NRB analysis applied in that CPA;
14. ensure that the CPA meets the criterion for not being a de-bundled component of a larger project activity and is additional- the debundling rule does not apply if the ICS as independent subsystem, does not exceed 1% of the SSC threshold²⁰ (as per guidance EB 54 Annex 13 and clarification SSC_233) and a CPA is additional if the ICS does not exceed 5% of the SSC threshold (as per guidance of EB68 Annex 27)²¹.
15. include a mechanism that transfers the ownership rights of CERs from the ICS user to the CME (or any affiliate it so designates), the precise mechanism to be established on a CPA basis. For example, SMS, ICT or other means which is signed or received by the end-user upon distribution or installation of the stove, which shall state that the end-user transfers ownership of the carbon assets to the CME for the life of the stove²²;
16. adhere to all requirements related to sampling for a PoA in accordance with Part II section B.7.2 of the PoA-DD;
17. involve the promotion and distribution of ICS through direct distribution/installation, delivery, community distribution events, or distribution through commercial/retail outlets.
18. CPA shall indicate what type of environmental analysis is undertaken and provide evidence of compliance with national and local (eg. province level) regulations.

B.3. Application of technologies/measures and methodologies

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The AMS-II.G methodology pertains to 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 biomass fired cook stoves or ovens or dryers and / or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.

The SSC-PoA complies with the applicability criterions as per paragraphs 1, 2 and 23 of AMS.II.G. (version 3) as described below in Part II Section B.2.

¹⁸ The starting date of a CPA shall be the date of distribution/installation of the first ICS in each CPA, as evidenced by the Registration process, SMS or ICT entries/records.

¹⁹ At time of inclusion, the CME shall provide the DOE a signed self declaration letter confirm the use or not use of public funding and in case of use of public funding, confirmation this is not a diversion of ODA.

²⁰ At time of CPA inclusion the CME shall provide the DOE with the calculations as per Part I Section C (e)(ii) – confirming that the annual energy saving of an ICS as per cent of SSC threshold remains below 1%. Finally, by meeting the 1%, it is clear that an ICS will not exceed 5% of the same SSC threshold, and shall be considered additional.

²¹ As per Paragraph 2(c) of Annex 27 of the 68th meeting of the CDM Executive Board, GUIDELINES ON THE DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES (version 9), projects are considered additional if "project activities are solely comprised of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale thresholds. Annex 21 of EB 61 established 60GWh per year as the SSC threshold. The conversion from 60 GWh to 180 GWhth per year was approved in a clarification by the small-scale working group (SSC_233). Footnote 1 of Annex 27 of EB 68 clarifies that the size of each unit (ICS) has to be below 3000 MWh of energy saving per year which using the same logic of SSC_233 would translate to 9000 MWhth. Thus, if the ICS distributed under a CPA does not exceed 1 % of the SSC threshold (equivalent to 1800 MWhth,per year) and the CPA complies with eligibility criterion 3 (ie. qualify as a SSC CPA), the CPA is considered additional.

²² Part II Section A of the POA-DD and CME manual further describes the methods and mechanisms mentioned in this eligibility criterion.

In addition, the sampling plan for the CPAs under this PoA was developed after the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities version 05.0 and the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities version 04.0. This sampling plan is outlined in Section B.7.2 of Part II PoA-DD.

B.4. Date of completion of application of methodology and standardized baseline and contact information of responsible person(s)/ entity(ies)

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03/09/2015

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SECTION C. Management system

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(a) Definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

A clear definition of roles and responsibilities of the parties involved in this POA has been given in Part II Section A. The CME shall have the competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria before inclusion in the PoA.

CME Competencies:

C-Quest Capital Malaysia Global Stoves Limited (CQC)

CQC has been the leader in the development of Programme of Activities under the CDM, having developed the CFL lighting scheme - "Bachat Lamp Yojana" PoA (CDM Ref 3223) and implemented more than 4 CPAs under it (at the time of validation of this SSC-PoA).

CQC is currently the CME for five SSC-PoAs:

- POA 1: Distribution of fuel-efficient improved cooking stoves in Nigeria
- POA 2: Distribution of ONIL-stoves Mexico
- POA 3: Distribution of ONIL-stoves Guatemala
- POA 4: Distribution of Improved Cook Stoves in Sub-Saharan Africa: CME
- POA 5: Improved Cookstoves Program for Malawi and cross-border regions of Mozambique

CQC staff has over 20 years of experience with ICS, having been involved and leading key operations to provide funding through multiple instruments for improved cook stove distribution in different countries. These operations have proven successful and introduced consumers to the opportunity of ICS. CQC staff has established working relationship with major international stove producers and have been involved in the development of registered methodologies and PDDs and POAs for ICS.

(b) Records of arrangements for training and capacity development for personnel;

Key training needs:

- Baseline survey: Perhaps the most important single variable in terms of quantifying CERs is the baseline fuel usage in households. The quality of the interviewing was key in achieving as accurate a baseline assessment as possible. For this reason, the CME, through HED Consultancy, has established general guidance for interviewers to follow when conducting baseline fuel surveys in homes. This guidance outlines the questions and manner in which the interview should be conducted in order to get the most accurate estimate possible.
- Monitoring: Training, including that of field personnel, is needed to ensure monitoring activities are conducted effectively. This will include spot checking a random sample of homes with ICS to ensure the stoves are continuing to be used, as well as a random sample of homes selected for the stove

efficiency tests (efficiency tests will be carried out by a third party or trained CPA implementer personnel using the Water Boiling Test). The procedures to complete this sampling are described in Part II Section B.7.2 (below) and meet EB 86 Annex 3 confidence/precision requirements.

- ICS distribution/installation: CPA implementers shall provide evidence of their ability to train technicians/instructors/field staff on ICS assembly, manufacture, installation and distribution in accordance with the type of stove implemented under its CPA. Details on training for ICS distribution/installation are found on Part II Section A of the PoA-DD.

(c) Procedures for technical review of inclusion of CPAs.

The CME will undertake the following activities to ensure proper eligibility of the CPAs before they are uploaded for official inclusion into the PoA:

- CME will review each CPA document and methodically go through each and every eligibility/applicability criterion of the PoA to ensure the CPA meets each requirement with certainty. In cases where there is doubt, the CME will not upload the CPA document until the requirements are met to the CME's satisfaction.
- CME will review each of the ICS models that are proposed for distribution/installation under each CPA. If stove models to be introduced in the POA have been in use in other areas of the country or in other countries, CME will attempt to get actual performance data in the field to ensure minimum criteria for the PoA are met, such as the 20% minimum thermal efficiency, and it will review any WBT results to ensure they are in line with established protocols and have been conducted either by certified authorities/researchers or based on manufacturer specifications.
- CME will review database/registration procedures to ensure proper recording of the ICS data collection and management in line with the methodology and PoA eligibility criteria.
- If the CPA is choosing to use a regional or local NRB analysis, CME will review the study completely to ensure it is as robust in method and data as the NRB study approved during the PoA validation. If there are any gaps or problems with the local NRB study, the CPA will not be uploaded for inclusion until the analysis is completed to the CME's satisfaction.
- CME will review all proposed CPA implementer's monitoring procedures to ensure they conform with the Monitoring Plan in the PoA (as per Part II Section B.7.2 of the POA-DD), including stove efficiency testing and procedures such as visual inspection and WBT test (efficiency of stove) to check that ICS are still in operation and at what efficiency. As described in Part II Section A, each CPA Implementer will provide the CME a set of documents (eg. manuals) detailing the training procedures for users and CPA Implementer staff, after sales maintenance, etc, which will be reviewed and approved by the CME prior to CPA inclusion. These documents will be available to the DOE at time of inclusion.
- During implementation of the CPA, and as necessary, the CME personnel will visit each CPA region to ensure all procedures outlined in the PoA are being followed, particularly on stove registration and database updating.

(d) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA);

Each ICS in each SSC-CPA included in this PoA will be identified by a unique combination of customer name and geographical location, as well as a unique serial number. Quality control and quality assurance procedures will minimize any possible double counting. The serial number will start with an identifier "CQCZ" which will allow for a clear distinction between the stoves from this PoA with those of other potential PoAs. Each stove's serial number will be entered into a database that will clearly and unambiguously keep track of the unique stoves in each CPA. No individual serial number can be in more than one CPA, so it will not be possible for one stove to be counted in two different CPAs. In addition, each CPA will be cross-checked with other CPAs in this PoA and with CPAs in any other PoA or in a CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary carbon schemes to ensure that the CPA is not included in any other PoA, CDM project activity or voluntary carbon project activity.

During each registration process of an ICS, the customer will acknowledge that they previously used a three-stone fire or traditional pot support and previously did not own any ICS in order to be included in the CPA. Registration data collected will be verified by spot-checks. This will ensure that no customers will be included in a new CPA if they already own an ICS.

(e) Records and documentation control process for each CPA under the PoA;*(i) A record keeping system for each CPA under the PoA,*

As explained in section “Means of collecting end-users' information” in Part II Section A, detailed information will be collected for each customer at the time of registration of the ICS, using either electronic or paper-based means, directly by the CPA implementer's field personnel or through partner organizations or independent distributors/retailers. This information will allow CPA implementers to track each individual ICS and/or household. The information collected by the CPA implementer (or partner organization, distributors/retailers, as appropriate) will be transferred to an electronic database and will be shared with the CME regularly – additional details can be found on section “Project Data-Base” in Part II Section A. Each CPA's database will be identified with a cumulative maximum number of ICSs below the small-scale limit.

Through the registration process, a customer will consent to an agreement that the household formerly used a wood predominantly on a three stone fire or traditional pot support and is willing to transfer rights to carbon assets created by the ICS to the CME (or any affiliate it so designates). This agreement will be a part of the registration process and the field personal will be responsible to make the customer understand before accepting the consent.

In case a replacement stove is being issued to a customer already registered on the project database, a new registration will not be required. The replacement stove will be recorded in the project database in such a way that it is clear that the replaced stove ceases to be included in the CPA; and the replacement stove is associated with the customer's details as a new ICS, and is included in the CPA as a new ICS with a new serial number.

(ii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

Paragraph 10 of EB54, Annex 13 ‘Guidelines on assessment of de bundling for SSC project activities’ states that:

‘If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.’

The AMS II.G threshold is a maximum energy saving of 180 GWh_{thr}/ year for SSC projects. . The de-bundling rule does not apply to this SSC-PoA as the ICS (the independent subsystem) being installed/distributed do not exceed 1% (as per guidance EB54 Annex 13) of the 180 GWh_{thr}/ year SSC threshold. Each ICS in a typical CPA is in the order of magnitude of 0.01% of the SSC threshold.

This is calculated using the following formula illustrated using the small-scale energy savings threshold of 180GWh_{thr}/year:

Annual Energy Saving of an ICS as per cent of SSC threshold = $((NCV_{\text{biomass}} * B_{y,\text{savings}}) / 180\text{GWh}_{\text{thr}}) * 100$

$$= NCV_{\text{biomass}} * (B_{\text{old}} * (1 - (\eta_{\text{old}} / \eta_{\text{new}})) / 180\text{GWh}_{\text{thr}}) * 100$$

Where:

NCV_{biomass} Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne), calculated as $(0.015\text{TJ/tonne}) * (0.277777\text{GWh/TJ}^{23})$

$B_{y,\text{savings}}$ Total biomass that is saved in tonnes in one year (y)

²³ This is the conversion factor from terajoules to kilowatt hour, ie. 1TJ = **277777.77777778** kWh or 0.277777 GWh

B_{old}	Baseline biomass fuel consumption per appliance (i.e. in the absence of the project activity)
η_{new}	Efficiency of the ICS – 0.90 (using a very high efficiency results in a higher value of annual energy saving of ICS (what can be considered as conservative if referring to the debundling criteria)
η_{old}	Efficiency of the baseline stove – 0.10

(iii) *The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;*

CPA implementers have the operational responsibility for implementing and monitoring the CPAs under this SSC-PoA. The CME will have legal contracts put in place with CPA Implementers and, as appropriate, with entities assisting with the implementation of the CPA. These legal contracts shall clearly state that the implementation of CPA activities are subscribed to this SSC-PoA.

(f) *Measures for continuous improvements of the PoA management system.*

The CME will undertake an annual review of the overall PoA management system, including identifying any problems with stove distribution/installation, stove use once in the homes, monitoring continued stove use and overall database maintenance. This review will ensure that best practices are maintained through the lifetime of the PoA.

SECTION D. Duration of PoA

D.1. Start date of PoA

>>

12/01/2012

D.2. Duration of the PoA

>>

28 years

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

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1. Environmental Analysis is done at PoA level
2. **Environmental Analysis is done a SSC-CPA level** **X**

Due to the different ICS models to be applied under the PoA, a CPA-level Environmental Analysis is deemed most appropriate.

E.2. Analysis of the environmental impacts

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Not applicable as Environmental Analysis is done a SSC-CPA level

In accordance with Zambian regulations, an EIA is not required for the first CPA under this PoA. For CPAs using a different technology than the one used on the first CPA, shall confirm before being included in the POA, whether in accordance with the Zambian laws/regulations, an EIA is required.

SECTION F. Local stakeholder consultation

F.1. Solicitation of comments from local stakeholders

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

Note: If local stakeholder comments are invited at the PoA level, include information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable.

The CPA boundaries are defined primarily by individual ICS/household location, and may extend across the SSC-PoA project area or may be limited to a specific region within the SSC-PoA boundaries. Therefore a PoA-level Stakeholder Consultation is deemed most appropriate, covering the whole project area. The environmental, social and economic impacts of the POA will be broadly consistent across CPAs, so the PP do not expect significantly different comments from stakeholders across CPAs. The PP undertook two PoA level stakeholder consultations in different areas of Zambia and stakeholder comments were consistent and positive.

As per the guidelines (3/CMP.1, Annex, paragraph 1(e)), Stakeholders are the public, including individuals, groups or communities affected, or likely to be affected, by the proposed clean development mechanism project activity. Stakeholder comments are invited with respect to this SSC-PoA through a number of processes, as follows:

- ICS pilots undertaken in households in December 2011, followed by surveys including open ended questions, in a total of 26 houses over 2 locations over 2 weeks.
- A public local stakeholder consultation (LSC) was held on 12 January 2012 at the headquarters of Community Markets for Conservation (COMACO) located at Plot No. 26 Joseph Mwilwa Rd, Rhodespark, Lusaka, Zambia. Local stakeholders were invited via multiple methods including: 1) Notice posted on Shared Value Africa's website (www.sharedvalueafrica.com); 2) Two adverts in the *Times of Zambia* newspaper published Friday 6 January 2012 and Monday 9 January 2012; 3) Personal invites sent via email to 16 key local stakeholders; 4) Hand delivered invitation letters to three key stakeholder groups: Designated National Authority, Zambia Environmental Management Agency and community based organization Women for Change. Fourteen stakeholders attended the LSC meeting, representing women's groups, NGOs, academia, private sector, international donors and CDM project developers.
- A public local stakeholder consultation (LSC) was held on 6 March 2012 at the Pine View Guesthouse, Chipata, Zambia. Local stakeholders were invited via multiple methods including: An advert in *The Post* national newspaper published 2 March 2012; local radio announcements (5) on 1 March 2012, hand-delivered letters of invitations, posted notifications at prominent locations and emails all distributed at or before 3 March 2012.

Comments were invited during both LSC meetings and were compiled in two LSC summary reports and in the feedback form that all LSC participants were requested to fill out. The LSC meetings provided a full explanation of the proposed project activity and actively encouraged comments from all participants and all comments have been fully documented.

F.2. Summary of comments received

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The ICS Pilot Study concluded that: "This study indicates a high degree of acceptance of the EcoZoom stove among participants in Zambia."

Comments from the ICS pilots include the following:

- "It saves time from fetching bigger logs; It cooks faster; Eggs fried on the stove are better than on the 3SF because of the smoke and smell"
- "It uses less fire wood; it cooks very fast as compared to the ordinary way 3SF; it boils water very fast (20 minutes)"
- "It will help us to preserve the forest; pots get damaged on the 3 stone fire; it cooks faster"

- “Cooks faster; it uses less fire wood; it does not burn when using, it does not put the pots to danger of damage”
- “It produces less smoke as compared to 3 stone fire; it uses less wood, so we don't struggle to fetch firewood”

At the end of the pilot study, the team offered the stoves to the participants in the study. Participants purchased all 10 of the stoves used in the pilot.

Comments and questions from the first LSC meeting included the following:

- Question: Has a willingness to buy test been performed for the stoves? Response: Yes, a willingness to buy test was performed during the in-home tests, all offered stoves had been purchased.
- Question: Do you anticipate a problem with people selling the stove instead of using it themselves? Response: CME is aware there exists the possibility that recipients could sell the stove when experiencing difficulties and explained the sales contract will stipulate that the subsidy for the stove is in exchange for stove usage by the household receiving the stove.
- Question: How long will the stove use need to be monitored and followed up on? Response: Reiterated that the stove usage will be monitored and verified throughout the duration of the project, which is 7 years with the possibility to renew twice.
- Question: What is the durability of the pot skirt, and how long will the stove last? Response: This is not verified as yet, however per discussions with the stove manufacturer, we anticipate the pot skirt and stove to last a minimum of 5 years.
- Question: What will be the process to ensure free and informed consent by the end stove user? Response: The project is completely voluntary for stove users, those interested in participating will receive written and, where possible/appropriate, verbal explanation in the local language before agreeing to the rights transfer.
- Question: Does that stove work with charcoal? Response: The Ecozoom stove shown at the LSC is designed for firewood use.
- Question: Have gender issues been taken into consideration? Particularly who the contract will be within the household – man or woman? Response: It is anticipated that the primary user and beneficiary of the stove will be women and children. We anticipate most contracts will be with the head of household.
- Question: How are emissions to be quantified? Response: The AMS II G methodology under the UNFCCC is exactly followed.
- Question: Often people cook with very large logs; will they be able to continue using such large logs? Response: The size of the firewood used is limited to the size of the stove (explained by showing the prototype stove), therefore very large logs would have to be chopped up in order to use in the stove.
- Question: Who is eligible to buy the stove? Response: Individual households who voluntarily choose to join the programme.
- Question: Have you considered suppressed demand in your PoA. Response: We are aware that the suppressed demand is being discussed at the Executive Board level but this project follows the AMS II G methodology that does not explicitly make provision for suppressed demand at this time.
- Question: Have you tested the Save 80 Stove? Response: We have tested the Save 80 stove and found it very efficient.
- Question: Has it been found that people will cook more because it is easier and requires less wood? Response: The CME has not found any evidence of this.
- Question: Where is the stove made and can we produce it in Zambia? Response: The stove under consideration, for the initial CPAs is the EcoZoom Dura Stove, which is manufactured in China. The CME is open to purchasing the stove or parts of the stove locally if the price and quality is on par with the current technologies available globally.
- Question: Considering on-going issues with getting CPAs included in PoAs, have you considered doing a bundle of projects instead of a PoA? Response: The CME has evaluated all potential options and determined the PoA to be the best way forward.

Comments and questions from the second LSC meeting included the following:

- Question: (Monica Banda). Can you put the stove in the house?
- Answer: Yes
- Question: (Agnes Chinyama): How will you monitor the carbon reductions from the use of the stove?
- Answer: The project will use statistically sound techniques following the methodologies and guidelines laid out by the UN
- Question: (Benedicto Phiri): Can you clarify what is a CME and what is COMACO's role?

- Answer: CME is an acronym for Coordinating Management Entities. COMACO is a local partner in the first CPA or Clean Development Mechanism Program Activity.
- Question: (Samuel Banda): What is the target number of farmers you will be looking at in the first year
- Answer: The project aims to distribute over 3,000 stoves under the first CPA in the Eastern Province, but expects to expand beyond this and include COMACO members as well as rural community members generally in the Luangwa Valley.
- Question: (Agnes Chinyama): There was a CDM cookstove project called Save 80, are you in touch with them. You could learn from their lessons. In fact their stove is very expensive, and even if subsidized is 800,000. Find out why theirs can't be reduced
- Answer: We have been in touch with the Save 80 project, their project is limited to Lusaka. Our stove will be sold at a reduced price of around 50-60,000 ZMK.
- Question: (Benedicto Phiri): One of our ladies visited and saw a cookstove project in Katete.
- Answer: That would most likely be 3 Rock. We are also aware of their activities and have been in contact with them
- Question: (Agnes Chinyama): Can you give us a background on the CME?
- Answer: The CME has been involved in carbon projects throughout the world. Specifically CQC has cookstove projects in Nigeria Guatemala and Southern America. The CME has also been working with COMACO which promotes conservation agriculture and tree planting in Zambia.

Comments from both LSC feedback forms were all extremely positive, aspects participants indicated that they liked about the project included:

- "It is need for a wide range of different reasons – health, environment, economy, gender, etc."
- "Its impacts on environment, maternal health, and social life of rural communities in Zambia"
- "Its focus on firewood reduction and efficiency"
- "As a gender organisation, its delighting that the project reduces women's workload in terms of cooking time, collection of firewood and allows women to engage into other productive activities"
- "Economic viability, health enhancing and environmental friendly".
- "Project is best for rural women"
- "The average price for a similar one made locally would be above K250,000"
- "The concept of commercial international financing subsidising/paying rural households to act in a more environmentally sound fashion, with multiple social benefit"
- "The project will help improve the living standards of the rural Zambia"
- "low cost, rural focused and modified stove"
- "Has a great bearing on livelihood and the women would indeed benefit from this project"
- "The project addresses the much affecting issue of deforestation which has an adverse impact on climate change which a lot of other partners are dealing with and as such it brings a plus to the community"
- "It will help me save the amount of firewood that I would use if I had this stove"
- "It is a good programme that will enable us to use less fuel"
- "It is a nice programme that would help me to have an opportunity to cook on a stove and reduce the amount of smoke emanated from firewood"
- "I have like the introduction and ways of reducing fuel use and yet you can cook a lot of food or use it for one whole day"
- "That it will contribute towards environmental conservation"
- "The concept about improving small scale farmer livelihoods. Plus the potential to positively impact on the environment"
- "The introduction of cook stoves to the farmers is welcome as there will be a reduction in carbon emissions to the environment"
- "I like that the project want to improve the health and livelihood of the people"
- "As a rural development worker, I believe that the benefits are equal to plus more economy"

While a majority of the LSC forms indicated there is nothing they did not like about the PoA, challenges and dislikes as indicated on the LSC feedback forms include:

- "The stove is not assembled in Zambia" & "Importation of stoves, ideally it has to be produced locally, if possible" & "The stove has to be imported, it would be nice to produce it locally"
- "All is fine but need more bigger stoves to accommodate bigger pots" & "The Stove is too small"
- Challenge – why should this succeed when literally thousands of improved stove projects have failed?" & "The major concern is the commercial viability given the low price of carbon credits currently"

- “The targeting of the beneficiaries needs to be revised so that the use of fuel is addressed”
- “Maybe it would have been better to start with more than one implementing organisation at community level”
- “That it is concentrating only on COMACO farmers. Is there no modality to include other farmers?”
- “The targeting/distribution should be urban/peri-urban”
- “The target group not complete as those from the rural Were not incorporated. Only those affiliated with COMACO will currently benefit”

F.3. Report on consideration of comments received

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Comments to the project, particularly those that were are negative, have been addressed in the following ways:

1. Local assembly and manufacturing: The CME will continue to explore cost-effective ways to either manufacture or assemble stove parts in Zambia.
2. Stove is too small comments: CME is working with the manufacturer to test a larger stovetop (32 cm as compared to the 26 cm stove tested and shown in the LSC). CME will explore the feasibility of using the larger stove but our in-home tests have shown the 26 cm stove to be acceptable.
3. Gender concerns will be continually evaluated by project to ensure the project is sensitive to any and all possible negative gender consequences including around contracting issues.
4. The CME will ensure that all households voluntarily select to join the programme and they fully understand the project. Terms of the contract will be explained verbally (in local language) and in a written contract to ensure informed and full voluntary consent.
5. The CME has already identified a local partner, COMACO, but as it expects to expand out across the Luangwa Valley to offer stoves to all rural community members currently using wood, it will look to work with other local partners in this programme.

SECTION G. Approval and authorization

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Letters of Approval were issued by each of the Parties acknowledging the contributions of the POA to sustainable development. The letters authorize the implementation of PoA by the CME and have been made available to the validating DOE.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

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Each SSC-CPA will involve the promotion, distribution and/or installation of affordable improved cooking stoves (ICS) to individual households, on a commercial or non-commercial basis.

Implementation and management

CPA Implementers

These are entities which will manage and coordinate the promotion, distribution and/or installation of the ICS in the Zambia. CPA implementers are also responsible for monitoring activities of the SSC-CPAs. Examples of CPA implementers are: NGOs, religious, environmental, social organizations, farmers associations and private, public or governmental entities. CPA implementers will have an agreement with the CME establishing roles and responsibilities for the successful implementation of the SSC-CPA.

Each CPA implementer will define and establish its distribution channel. Three distribution channels are envisaged to achieve the SSC-POA objective:

- The first channel will leverage community organizations including NGOs, religious organizations and farmers associations.
- The second channel will market directly to consumers through direct distribution/installation in communities, at local market days and other large community events.
- The third channel will utilize existing local, experienced commercial distributors or retailers. Each of the distributors will have their own established network of retailers.

Coordinating/Managing Entity

CQC as CME will manage and coordinate activities of the CPA implementers and also provide necessary marketing and promotion assistance to the businesses. The CME will also coordinate the monitoring of the SSC-PoA and all the communications with the UNFCCC Executive Board.

ICS installation/distribution methodology

In order to succeed in replacing three stone fires or traditional pot support, CPA implementers have the ability to design and distribute/install a variety of types of ICS in Zambia²⁴. Below is a description of how CPA implementers may distribute/install ICS according to two different portability categories:

- Portable stoves:
 - No training of technicians/instructors/field trainers will be required for stoves that are imported as finished units;
 - CPA implementer shall describe in the CPA how stoves will be distributed;
 - If portable stoves are manufactured or assembled locally, CPA implementers shall describe the training materials, type of training and performance test required
- Fixed ICS: these are usually brick/clay stoves that are generally built on-site, though these could also be metal-based stoves or prefabricated ICSs that need to be assembled/installed on-site. Designs of fixed ICS vary, but can include one or more pot-holes and other accessories (eg. grate, chimney). CPA implementer installing fixed ICSs shall demonstrate on CPA its capacity and provide specific details on how it will distribute/install stoves, including but not limited to the following:

²⁴ Part I Section A.6 provides additional details on the technology to be implemented under this SSC-PoA

- Design the training material for: stove technicians/instructors/field trainers as well as for stove users; though the specific trainings material shall be presented per CPA to the CME at the discretion of the CPA Implementer, at a minimum, the CME will require the following: 1) a Manual for training the technician/instructors/field personal responsible for building the stove, as well as user's manual; 2) documentation on maintenance and after-sales services (if any); 3) description of process for delivery to users any part of the stove which is pre-fabricated (eg. chimney or grate); 4) a complete list of personal responsible for each step of installation and distribution. These materials will be made available for the DOE at CPA inclusion.
- Indicate the type of training (field-based/practical, classroom or both) that shall be conducted.
- Conduct performance tests in the field to test the technicians/instructors/field trainers' ability to build/install the ICS.
- Conduct performance tests in the field to test end-users ability to build and repair the ICS (when appropriate).
- Develop and present a promotion and awareness plan with designated responsible staff

Data Collection and Transfer

Registration Process

CPA implementers must gather the necessary information to identify households using its ICS during the course of the project. To facilitate this process, each ICS will be assigned a unique serial number²⁵. This number will be recorded during the registration process together with the following information (as appropriate and as available):

- Name of ICS user or head of the household
- Address of ICS user or household
- Phone number of ICS user or household, where available.
- GPS location of household
- Stove model
- Date of distribution/installation
- ICS serial number
- Retailer/distributor information

Means of collecting end-users' information

CPA implementers shall ensure that the information contained in the Registration process is collected and transferred to the CME. Collection of end-users' and stove-related information can be achieved through different means. Below are a couple of options:

- Direct contact: CPA implementer instructs their distributors/retailers to fill in hard copy form in the Registration process with users' information when distributing/installing the ICS. This is initially envisaged to be done manually with paper and pen, but new Information and Communication technologies (ICT) to increase the efficiency of data collection and data transfer may be used. An example of these technologies would be a personal digital assistant (PDA) - a handheld device that transfers data over the internet.,
- Indirect contact: the users' data may be transferred to the CPA implementer via Short Message Service (SMS) also known as a text messaging service. In this instance, the CPA implementer will provide the user with instruction on how to submit the SMS to the CPA implementer.

Users' participation on the SSC-POA, transfer of Carbon Rights to the CME and use of three-stone fire/traditional pot support

During the distribution/installation of the ICS, the user shall confirm that he/she is a household, the ICS is replacing a traditional three-stone fire or pot support and shall be informed by the CPA implementer of their participation on the SSC-PoA and that CDM finance is being used to fund the ICS. Users shall agree, as per the Registration process, that it previously did not own an ICS and to transfer the rights of any emission reduction generated by the ICS to the CME.

²⁵ In cases where the stove is fixed and a serial number plate is difficult to be assembled to the ICS (eg. mud stoves which are constantly being repaired by users with a new layer of mud), a serial number will be attached to the household (eg. a name plate fixed on the kitchen's wall, or just an identification card kept by the household), instead of to the stove. For instances where the serial number plate can be attached to the ICS itself, it will be.

In case of direct contact, the collection of users' information can be achieved by instructing the CPA implementer's sales/field or retailer team members to read out the required information to users (ie. that user previously did not own an ICS and transfer of carbon rights).

When SMS is used, this clause can be written on the instruction for the user on how to submit the information to the CPA implementer. By sending the SMS, users are acknowledging that it is voluntarily participating in the SSC-PoA, that the ICS is replacing a three-stone fire or traditional pot support and that it agrees to transfer the carbon rights to the CME.

Project Data-Base

The information collected by the CPA implementer is stored in the electronic database which will also be the CPA Implementer database and CME will have an access to the same to monitor the implementation at regular intervals.

The electronic data is transferred from the ICT device to the database managed by the CPA implementer. Similarly, SMS data is transferred directly to the electronic database managed by the CPA implementer. The CPA implementer will give full access to the database to the CME. The database will be backed up by the CME regularly throughout the lifetime of the project.

The CME will maintain copies of the database from all of the CPAs and will also act as a backup to CPA implementers' database/s. The CPA implementer personnel entering the data from each ICS will be trained in the basic functions of Excel (or other appropriate software used to build the database) by CPA implementer to reduce the chance for errors. CPA implementer staff will sample and cross-check the data at minimum once every three months by randomly selecting at least 20 database (across all its CPAs) entries and comparing the information in the cells with the information collected from Registration process. The database will be sortable by the information collected as per Registration process and will be made available to the DOE at verification.

The CPA implementer will verify accuracy and completeness and confirm that there is no double entry of serial numbers in the database. The CPA implementer will identify any discrepancy and the correct information will be entered into the database.

In case a replacement stove is being issued / sold to a customer already registered on the project database, a new registration will not be required. The replacement stove will be recorded in the project database in such a way that it is clear that the replaced stove ceases to be included in the CPA; and the replacement stove is associated with the customer's details as a new stove, and is included in the CPA as a new stove with a new serial number.

Responsibilities of Operational and Management Entity and CPA Implementer

CQC is the CME for this SSC-POA. CQC or other third parties may act as CPA Implementers. The responsibilities of each party are summarized below.

Entity	Responsibilities
CME	<ul style="list-style-type: none"> - Review all CPAs to confirm that all eligibility requirements are met before a CPA is proposed for inclusion; - Manage the inclusion of new CPAs with DOE - Maintain copies of the CPAs database and back-up records necessary to verify stoves sold within each CPA and the SSC-PoA overall; - Provide overall coordination of ICS distribution across the geographical boundary of the SSC-PoA; - Oversee day-to-day operation of the POA; - Coordinate with a DOE to verify emissions reductions from CPAs; and - Communicate in all matters with the UNFCCC CDM Executive Board.
CPA implementer	<ul style="list-style-type: none"> - Coordinate and manage the market promotion necessary for successful distribution; - Coordinate and manage the implementation of the monitoring plan; - Manage the process of stove selection, stove testing and stove use surveys in the field on designs agreed with CME - Develop and undertake stove distribution, installation and after sales service

	<p>systems</p> <ul style="list-style-type: none"> - Develop and maintain a stove tracking and monitoring and reporting system with a high level of data integrity; - Maintain an accurate database of stove location for verification and issuance of carbon credits under a design agreed with CME; - Keep all records necessary to verify sold stoves within each CPA; - Implement and oversee day-to-day operation of the Programme, including ensuring users of the stoves are aware of how they should be used; - Track stoves to end users and verify use; - Facilitate the field work of commissioned DOEs for inclusion and verification services - Supervise and provide training to local personnel for, monitoring and stoves distribution: <ul style="list-style-type: none"> • Organize training sessions • Distribute training materials
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Local partners will be required to conform with CPA implementation and monitoring systems designed by CME under services agreements signed with CME which will cover the above mentioned role and responsibilities.

Location and scale

CPAs will be defined as the sum of identified locations of in-use ICS installed or distributed to consumers previously using three stone fires or traditional pot support within Zambia, based on the detailed registration record described above (including ICT/SMS data as applicable). The sum of the location of these ICS will define the spatial boundary of the SSC-CPA, which in turn will fall entirely within the geographical boundary of this SSC-PoA.

Each CPA will define a limit to the number of stoves based on the specific technology and context, such that each is under the small-scale limit of 180 GWh_{th}/year.

The maximum number of ICS in any one CPA will be dependent on the biomass saved by each ICS ($B_{y,saving}$) in one year and shall be calculated in the following manner

$$\text{Maximum ICS per CPA} = 180 \text{ GWh} / (\text{NCV}_{\text{biomass}} * B_{y,savings})$$

Where:

$\text{NCV}_{\text{biomass}}$

Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne) – which can be calculate as $(0.015 \text{ TJ/tonne}) * (0.277777 \text{ GWh/TJ})$

$B_{y,savings}$

Total biomass that is saved in tonnes in one year (y)

SECTION B. Application of a baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology(ies) and standardized baseline(s)

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

B.2. Applicability of methodology(ies) and standardized baseline(s)

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The AMS-II.G methodology pertains to 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 biomass fired cook stoves or ovens or dryers and / or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.

The SSC-PoA complies with the applicability criteria as per paragraphs 1, 2 and 23 of AMS.II.G. (version 3) as described below:

Applicability Criterion	How a CPA Complies
<p>Eligible technologies and measures include the introduction of high efficiency biomass fired cooking stoves or ovens or dryers and / or improvement of energy efficiency of existing biomass fired cooking stoves or ovens or dryers.</p> <p>The efficiency of the project systems will be certified by a national standards body or an appropriate certifying agent recognized by it. Alternatively manufacturers' specifications may be used. Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.</p>	<p>This PoA will only allow the use of high efficiency biomass fired improved cooking stoves (ICS). The efficiency of the stoves will not be less than 20% as measured by water boiling tests. The efficiency of the project systems (ICS) will be tested by the CPA Implementer, CME or a third party certified by a national standards body, or by an appropriate certifying agent recognized by it. CPA eligibility criterion 11 in this PoA-DD ensures that this applicability criterion is met for each CPA before inclusion and therefore for the PoA as a whole.</p>
<p>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 harvesting of non-renewable biomass is commonplace in Zambia and can be reasonably concluded that has been the case since 31 December 1989. Between 1990 and 2000, Zambia lost, on average, 444,800 hectares of forest per year. This amounts to an average annual deforestation rate of 0.91%.</p> <p>Between 2000 and 2005, the rate of forest change increased by 10.0% to 1.00% per annum. In total, between 1990 and 2005, Zambia lost 13.6% of its forest cover, or around 6,672,000 hectares. Measuring the total rate of habitat conversion (defined as change in forest area plus change in woodland area minus net plantation expansion) for the 1990-2005 interval, Zambia lost 14.3% of its forest and woodland habitat²⁶ (more detail provided below).</p>
<p>The use of this methodology in a project activity under a programme of activities is legitimate if the following leakages are estimated and accounted for, if required on a sample basis using a 90/30 confidence/precision for the selection of samples, and accounted for:</p> <p>(a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities then Bold is adjusted to account for the quantified leakage;</p> <p>(b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of nonrenewable woody</p>	<p>This POA, and hence all CPA under this POA, opt to use option (c) of paragraph 23 of AMS.II.G. (v.03). I.e. calculations for emission reductions shall be multiplied by a net to gross adjustment factor of 0.95 to account for leakages and no surveys on leakage are required.</p>

²⁶ <http://rainforests.mongabay.com/deforestation/2000/Zambia.htm>

biomass outside the project boundary then Bold is adjusted to account for the quantified leakage; (c) As an alternative to subparagraphs (a) and (b), Bold can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.	
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Additional Evidence that the non-renewable biomass has been in use since 1989

The Food and Agriculture Organization of the United Nations' Global Forest Resources Assessment Country Report of Zambia indicates that forested and other wooded land has been steadily decreasing since 1990:

FRA 2005 Categories	Area (1000 hectares)		
	1990	2000	2005
Forest	49,124	44,676	42,452
Other wooded land	4,081	3,468	3,161
Other land	21,134	26,195	28,726
...of which with tree cover	-	-	-
Inland water bodies	922	922	922
TOTAL	75,261	75,261	75,261

The national fNRB Report has shown that the fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass is 84% in Zambia (see national NRB report attached to this POA-DD). It therefore may be concluded that non-renewable biomass has been in use since 31 December 1989.

B.3. Sources and GHGs

The project boundary is the physical, geographical site of the efficient systems (ie. ICS) using biomass

	Source	Gas	Included?	Justification/Explanation
Baseline	Combustion of non-renewable biomass for cooking (3-Stone fire or traditional pot support)	CO ₂	Yes	Major source of emissions
	Combustion of non-renewable biomass for cooking (3-Stone fire or traditional pot support)	CH ₄	No	Minor source of emissions and limited data available
	Combustion of non-renewable biomass for cooking (3-Stone fire or traditional pot support)	N ₂ O	No	Minor source of emissions and limited data available
Project Activity	Combustion of non-renewable biomass for cooking (Improved cookstove)	CO ₂	Yes	Major source of emissions
	Combustion of non-renewable biomass for cooking (Improved cookstove)	CH ₄	No	Minor source of emissions and limited data available
	Combustion of non-renewable biomass for cooking (Improved cookstove)	N ₂ O	No	Minor source of emissions and limited data available

B.4. Description of baseline scenario

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According to 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. In this particular project, the baseline is the avoidance of non-renewable biomass, which actually has a higher emissions factor than many fossil fuels. As a result, using the default EF of 81.6 tCO₂/TJ is conservative.

B.5. Demonstration of eligibility for a generic CPA

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Each CPA must meet the following eligibility criteria before inclusion in to the PoA:

Inclusion Criteria

[abbreviation CPA implementer]-CPA-[number of CPA]

1. Promote and install/distribute ICS in/to residential households in rural ²⁷ areas that use wood fuel following the PoA specifications; ²⁸	[Description of how CPA meets this criterion]
2. Be implemented within the geographical boundary of the Republic of Zambia	[Description of how CPA meets this criterion]
3. Have a maximum energy saving of 180 GWh _{th} /year throughout the CPA's crediting period to conform with the SSC threshold for type II projects as per EB 61 Annex 21 paragraph 3 ²⁹	[Description of how CPA meets this criterion]
4. Have a database that will uniquely identify and define households in which ICS have been installed or distributed ³⁰ . In addition, each stove itself will be uniquely identified with a serial number clearly starting with "CQCZ"	[Description of how CPA meets this criterion]
5. Comply with the applicability conditions set out in methodology AMS II.G version 3 "Energy efficiency measures in thermal applications of non-renewable biomass" and further described in Part II Section B.2	[Description of how CPA meets this criterion]
6. Do not involve households already using an ICS - including households involved in any other CPA or CDM or other voluntary scheme (such as Gold Standard, VCS, VER+ ³¹) project involving the distribution or installation of ICS, and households which have purchased or received an ICS on a commercial or non-commercial basis (eg. NGO distributed or government distributed stoves) ³²	[Description of how CPA meets this criterion]
7. Not be registered as individual CDM project activities nor included in another registered SSC-SSC-PoA, as well as in any other voluntary carbon scheme (such as Gold Standard, VCS, VER+)	[Description of how CPA meets this criterion]

²⁷ Urban areas in Zambia are defined as per the United Nations Demographic Yearbook as "Localities of 5 000 or more inhabitants, the majority of whom all depend on non-agricultural activities" (<http://unstats.un.org/unsd/demographic/products/dyb/dyb2008.htm>). There is no specific definition for rural areas in Zambia, this is considered to be all areas which are not urban. Hence rural households are those which are physically located in a non-urban area of Zambia.

²⁸ The CME will not certify or test any specific organization, but as per eligibility criterion #11, it will require the stove/s used in a particular CPA meets minimum efficiency criteria. The proof of this can be a Water Boiling Test result for the stove model/s identified in the CPA.

²⁹ At time of inclusion, the CME shall provide the DOE with the calculation as per Part II Section A of the SSC-PoA-DD demonstrating what the maximum number of ICSs is for that CPA so it remains below the small-scale threshold.

³⁰ Part II Section A of the POA-DD clarifies how the CME collects information and what information it collects from users when ICSs are distributed and how the information is stored in the database. This information and procedures are also described on the CME manual which shall be provided to the DOE at time of inclusion.

³¹ VER+ is TÜV SÜD's standard for voluntary emission reductions.

³² At time of inclusion the DOE shall confirm that the CPA is using the methods of data collection described in Part II Section A of the POA-DD and in the CME manual, to confirm this eligibility criterion.

8. Be approved by the CME prior to its incorporation into the SSC-PoA	[Description of how CPA meets this criterion]
9. Be able to provide documentary evidence of the start date ³³	[Description of how CPA meets this criterion]
10. Affirm that no funding is coming from Annex I parties or if it does, that this is not a diversion of Official Development Assistance ³⁴	[Description of how CPA meets this criterion]
11. Ensure that the ICS installed/distributed under the CPA are single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%. The efficiency of the project systems (ICS) are certified by a national standards body or an appropriate certifying agency recognized by it (using the WBT outlined in AMS IIG, Version 3 approved by the CDM Executive Board). Alternatively manufacturers specifications may be used.	[Description of how CPA meets this criterion]
12. Use baseline fuel consumption (B_{old}) data from the household fuel survey (as per baseline report attached to this PoA-DD and further described in Part II Section B.6.2 of the POA-DD)	[Description of how CPA meets this criterion]
13. Use the national average non-renewable biomass (NRB) fraction as per national NRB report attached to this PoA-DD or develop their own regional-level NRB survey in accordance with AMS IIG (version 3). The geographical scope of each CPA must be limited to the geographical scope of the NRB analysis applied in that CPA	[Description of how CPA meets this criterion]
14. Ensure that the CPA meets the criterion for not being a de-bundled component of a larger project activity and is additional- the debundling rule does not apply if the ICS as independent subsystem, does not exceed 1% of the SSC threshold ³⁵ (as per guidance EB 54 Annex 13 and clarification SSC_233) and a CPA is additional if the ICS does not exceed 5% of the SSC threshold (as per guidance of EB68 Annex 27) ³⁶	[Description of how CPA meets this criterion]

³³ The starting date of a CPA could either be the date of distribution/installation of the first ICS in each CPA, as evidenced by the Registration process, SMS or ICT entries/records.

³⁴ At time of inclusion, the CME shall provide the DOE a signed self-declaration letter confirm the use or not use of public funding and in case of use of public funding, confirmation this is not a diversion of ODA.

³⁵ At time of CPA inclusion the CME shall provide the DOE with the calculations as per Part I Section C (e) (ii)– confirming that the annual energy saving of an ICS as per cent of SSC threshold remains below 1%. Finally, by meeting the 1%, it is clear that an ICS will not exceed 5% of the same SSC threshold, and shall be considered additional.

³⁶ As per Paragraph 2(c) of Annex 27 of the 68th meeting of the CDM Executive Board, GUIDELINES ON THE DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES (version 9), projects are considered additional if "project activities are solely comprised of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale thresholds. Annex 21 of EB 61 established 60GWh per year as the SSC threshold. The conversion from 60 GWHe to 180 GWhth per year was approved in a clarification by the small-scale working group (SSC_233). Footnote 1 of Annex 27 of EB 68 clarifies that the size of each unit (ICS) has to be below 3000 MWh of energy saving per year which using the same logic of SSC_233 would translate to 9000 MWhth. Thus, if the ICS distributed under a CPA does not exceed 1 % of the SSC threshold (equivalent to 1800 MWhth,per year) and the CPA complies with eligibility criterion 3 (ie. qualify as a SSC CPA), the CPA is considered additional.

15. Include a mechanism that transfers the ownership rights of CERs from the ICS user to the CME (or any affiliate it so designates), the precise mechanism to be established on a CPA basis. For example, SMS, ICT or other means which is signed or received by the end-user upon distribution or installation of the stove, which shall state that the end-user transfers ownership of the carbon assets to the CME for the life of the stove ³⁷	[Description of how CPA meets this criterion]
16. Adhere to all requirements related to sampling for a SSC-PoA in accordance with Part II section B.7.2 of the SSC-PoA-DD	[Description of how CPA meets this criterion]
17. Involve the promotion and distribution / installation of ICS through direct distribution/installation, delivery, community distribution events, or through commercial/retail outlets	[Description of how CPA meets this criterion]
18. CPA shall indicate what type of environmental analysis is undertaken and provide evidence of compliance with national and local (eg. province level) regulations.	[Description of how CPA meets this criterion]

This CPA therefore meets the eligibility criteria for inclusion set out in the SSC-POA-DD

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

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The choice of methodology for a typical SSC-CPA will be AMS II.G Version 03. The activities of each SSC-CPA will entail the distribution/installation of improved cooking stoves, which result in energy efficiency improvements to some application of non-renewable biomass, as required by AMS II.G Version 03.

In the absence of the project activity, for the purposes of emissions reductions, the baseline is assumed to be the use of fossil fuels to meet similar thermal needs. In this case, as per AMS II.G Version 03, the default value of Emission factor for the substitution of non-renewable woody biomass by similar consumers 81.6tCO₂/TJ is applied. In addition, Version 3 allows a default leakage adjustment factor of 0.95 to be applied to B_{old} to account for leakages. This PoA will also use this default.

Because of the nature of traditional baseline stoves in Zambia – including three stone fires and traditional pot supports – it is not possible to ensure that these are disposed of. Therefore, this PoA will monitor the continued use of baseline stoves amongst users of ICS that are in operation in order to ensure that fuel-wood consumption of those stoves is excluded from B_{old} (option (b) Paragraph 20 AMS II.G Version 3.0).

According to the methodology, B_{y,savings} may be calculated in a number of ways (as per Options 1, 2 and 3 in Paragraph 6) and this PoA will allow the use of Option 2 only. To ensure that ICS continue to meet or exceed the specified efficiency listed in AMS II.G Version 3 (ie. 20%) a WBT test will be performed.

B.6.2. Data and parameters fixed ex-ante

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Data / Parameter:	B _{old}
Data unit:	Tonnes per annum
Description:	Quantity of woody biomass used in absence of the project activity in three-stone fires or traditional pot supports per household

³⁷ Part II Section A of the POA-DD and CME manual further describes the methods and mechanisms mentioned in this eligibility criterion.

Source of data:	Baseline survey
Value(s) applied:	5.0735
Choice of data or Measurement methods and procedures:	The baseline survey assessed the average biomass usage per household per annum amongst users of 3-stone fires or traditional pot supports, according to interviews. This data was gathered according to: Standard for Sampling And Surveys for CDM Project Activities and Programme of Activities (Version 05.0).
Purpose of data	Calculation of baseline emissions
Additional comment:	For the purposes of calculating ex-ante emission reductions a baseline adjustment factor has been applied to Bold to account for fuel-wood used in a second baseline stove for the 23% of households in the baseline study who reported using a second stove at least once per week. This baseline adjustment factor is based on the mean number of stoves used per household averaged across the entire baseline sample, calculated to be 1.028 stoves/household, and equates to $1/1.028 = 0.973$. The value of Bold applied in this PoA-DD for wood fuel baseline stoves (5.0735 tonnes/year) incorporates this 0.973 baseline adjustment factor.

Data / Parameter:	η_{old}
Data unit:	Fraction
Description:	Efficiency of 3-stone fire or traditional pot support cooking method (system being replaced)
Source of data:	Methodology default
Value(s) applied:	0.10
Choice of data or Measurement methods and procedures:	AMS II.G version 3, option 2
Purpose of data	Calculation of baseline emissions
Additional comment:	-

Data / Parameter:	$f_{NRB,y}$
Data unit:	Fraction
Description:	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data:	Independent report C4 EcoSolutions
Value(s) applied:	0.84
Choice of data or Measurement methods and procedures:	An independent consultant assessed the overall biomass usage in Zambia and, according to independently published sources, ascertained the proportion of that biomass which is non-renewable nationally. Note that CPA implementers can choose to develop their own NRB study for the particular region in which a CPA will be located.
Purpose of data	Calculation of baseline emissions
Additional comment:	See national NRB report attached to this POA-DD

Data / Parameter:	$NCV_{biomass}$
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted
Source of data:	IPCC default
Value(s) applied:	0.015
Choice of data or Measurement methods and procedures:	AMS II.G, version 3

Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$EF_{projected_fossilfuel}$
Data unit:	tCO ₂ /TJ
Description:	Emission factor: substitution of non-renewable woody biomass by similar consumers
Source of data:	IPCC default
Value(s) applied:	81.6
Choice of data or Measurement methods and procedures:	AMS II.G, version 3
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	L
Data unit:	Leakage
Description:	Leakage adjustment Factor
Source of data:	Default
Value(s) applied:	0.95
Choice of data or Measurement methods and procedures:	A net to gross adjustment factor (0.95 default) is applied in order to adjust Bold to account for leakages as per paragraph 13 (a) of the AMS II.G, version 3 methodology.
Purpose of data	Calculation of baseline emissions
Additional comment:	

B.6.3. Ex-ante calculations of emission reductions

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Ex-ante emissions calculations:

Emission reductions for each SSC-CPA will be calculated according to the following formula:

$$ER_y = B_{y,savings} \cdot f_{NRB_y} \cdot NCV_{biomass} \cdot EF_{projected_fossilfuel} \cdot L$$

where:

ER_y	Emission reductions during the monitoring period y in tCO ₂ e
$B_{y,savings}$	Total biomass that is saved in tonnes during the monitoring period (y)
f_{NRB_y}	Fraction of biomass saved by the project activity in monitoring period y that has been established as non-renewable biomass
$NCV_{biomass}$	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. The IPCC default value is selected (81.6 TCO ₂ /TJ)
L	A net to gross adjustment factor (0.95 default).is applied above (equation (1) of AMS II.G, version 3) in order to adjust B_{old} to account for leakages as per paragraph 13 (a) of the methodology.

Calculating $B_{y,savings}$

According to the AMS II.G (version 3) methodology, $B_{y,savings}$ may be calculated in a number of ways (as per Options 1, 2 and 3 in Paragraph 6) and this PoA will allow the use of Option 2 in CPAs under this POA. Option 1 is excluded because of the need to perform a Kitchen Performance Test, which will not be used in this PoA. Option 3 is excluded because WBTs tend to be more accurate and easier to implement than controlled cooking tests, and WBTs can use a default for the original efficiency (thus efficiency tests only

have to be conducted once on ICS). In all instances, the possible variation in performance of stoves of different vintages will be accounted for in calculating $B_{y,savings}$.

Option 2.

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

Where:

B_{old}	Baseline Quantity of woody biomass used in the absence of the project activity in tonnes
η_{old}	Efficiency of the baseline system/s being replaced. The 0.10 default value is used as the replaced systems are three-stone fires or conventional systems lacking improved combustion air supply mechanism and flue gas ventilation system i.e., traditional stoves.
η_{new}	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

In order to account for stoves which have been in operation for fractions of the monitoring period, the following formula is used:

$$N_{y,i} = \sum_{j=1}^{J_y} n_{y,j} \times t_{y,j}$$

Where:

$N_{y,i}$	Total number of stoves in operation for a full monitoring period equivalent within each SSC-CPA
$n_{y,j}$	Number of ICS operating in monitoring period y for j days,
j	days since installation or distribution of the ICS or the start date of monitoring period for ICS installed/distributed in prior monitoring periods) (whichever is later), until end of monitoring period
$t_{y,j}$	Fraction of monitoring period y that the stove is in operation ($t_{y,j} = j/J_y$). Note, for ICS installed in prior monitoring periods $t_{y,j} = 1$.
J_y	Total number of days in the monitoring period y

For the purposes of calculating ex-ante emission reductions a baseline adjustment factor has been applied to B_{old} to account for fuel-wood used in a second stove for the 23% of households in the baseline study who reported using a second stove at least once per week. This baseline adjustment factor is based on the mean number of stoves used per household averaged across the entire baseline sample, calculated to be 1.028 stoves/household, and equates to $1/1.028 = 0.973$. The value of B_{old} applied in this PoA-DD for wood fuel baseline stoves (13.90kg/day) incorporates this 0.973 baseline adjustment factor.

The percentage of households continuing to use a baseline stove in addition to an ICS will be monitored in order to address paragraph 20 (b) of the AMS II.G (version 3) methodology. The monitored (ex-post) percentage of ICS users continuing to use a baseline stove in addition to the ICS (parameter SS_y) will be compared to the ex-ante percentage found in the baseline (23%) and B_{old} will be adjusted proportionally based on the proportional change in the percentage. The parameter used to calculate ex-post $B_{y,savings}$ will be $B_{old, adjusted}$ in order to account ex-post for fuel-wood used in baseline stoves in addition to ICS. This procedure is outlined here:

$$B_{y,savings} = B_{old,adjusted} \times \left[\sum_{i=1}^n N_{y,i} \left(1 - \frac{\eta_{old}}{\eta_{new,i}} \right) \right]$$

Where:

$N_{y,i}$	Total number of stoves of vintage (i) ³⁸ in operation for a full monitoring period equivalent within each SSC-CPA
η_{old}	Efficiency of the baseline system/s being replaced. The 0.10 default value is used as the replaced systems are three-stone fires or conventional systems lacking improved combustion air supply mechanism and flue gas ventilation system i.e., traditional stoves.
$\eta_{new,i}$	Efficiency of the systems of vintage (i) being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

and

$$B_{old,adjusted} = B_{old} \times \left[\frac{1.028}{1 + (SS_y / 0.23) \times (1.028 - 1)} \right]$$

B_{old}	Baseline Quantity of woody biomass used in the absence of the project activity in tonnes
SS_y	is the percentage of households that continue to use baseline stoves simultaneously with ICS at least once per week (see Part II section B.7.1. of the PoA-DD);

Note in the formula above that wood-fuel baseline data is used when calculating $B_{old,adjusted}$. The value 0.23 is the percentage of households in the baseline study who use a second stove simultaneously at least once per week and 1.028 is the mean household stove usage found in the wood fuel baseline, based on 23% of households using a second stove.

As specified in the AMS II.G (version 3) methodology, B_{old} is determined by using one of the following two options:

- (a) Calculated as the product of the number of systems multiplied by the estimated average annual consumption of woody biomass per appliance (tonnes/year). This can be derived from historical data or a survey of local usage,

Or

- (b) Calculated from the thermal energy generated in the project activity as:

$$B_{old} = \frac{HG_{p,y}}{NCV_{biomass} \times \eta_{old}}$$

The project proponents select option (a) directly above to determine B_{old} .

For each SSC-CPA, certain parameters indicated in the methodology for the calculation of emissions are fixed. Default values have been selected for the following parameters:

1. $NCV_{biomass}$ The IPCC default value is selected, as indicated in the methodology (0.015 TJ/tonne) put in unit
2. $EF_{projected_fossilfuel}$ The IPCC default value is selected (81.6 TCO₂/TJ)
3. η_{old} , The methodology default value for 3-stone fires and traditional pot supports is selected (0.10 if Option 2 is used)
4. The 0.95 leakage adjustment factor is applied in line with AMS II.G version 3.

The following parameters have been assessed by independent experts, using appropriate assessment techniques (see the Baseline and national NRB reports attached to this POA-DD for more details):

³⁸ Vintage shall be defined as the “age” of the ICS – ie. Number of years it has been in operation. – ie. all stoves below 1 year (or 365 days) of use belong to vintage 1, all stoves between 1 and below 2 years of use to vintage 2 and so on. Note that i will match the efficiency of the stove at a certain “age”; e.g. stoves vintage 2 will be grouped together and WBTs will dictate their $\eta_{new,i}$.

1. $f_{NRB,y}$ The fraction of woody biomass saved by the project activity that can be established as non-renewable biomass. This has been established through a research paper conducted by the independent experts C4 EcoSolutions, the details of which are outlined in national NRB report attached to this POA-DD.
2. B_{old} The average quantity of woody biomass used per stove in the absence of the project in three stove fires or traditional pot supports. This is derived from baseline surveys conducted in Zambia by HED Consulting. Baseline household wood fuel usage has been surveyed across Zambia for a national estimate that was found to be homogenous (see baseline report attached to this POA-DD of this PoA-DD).
3. $\eta_{new,i}$ The efficiency of the new appliance (ICS). The thermal efficiency of ICS used in each CPA will meet or exceed the 20% minimum thermal efficiency required by AMS II.G Version 3 as certified by a national standards body or an appropriate certifying agent recognized by it, or by manufacturers specifications, before CPA inclusion.

Note: Methodology AMS II.G (version 3), requires that monitoring ensures 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 prorated in B_{old} . In this PoA option (b) is used B_{old} will be adjusted ex-post to account for the wood used in any baseline stoves that continue to be in used in addition to the ICS. The baseline survey determined the percentage of households that are currently using more than one wood-burning stove and are likely to use more than one stove after the ICS is provided (see baseline report attached to this POA-DD). This survey provides an adjustment factor to account for the amount of wood used by that second stove, thus B_{old} is adjusted based on this factor.

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

Data / Parameter:	$n_{y,i}$
Data unit:	Quantity
Description:	Number of stoves still in operation during the monitoring period as determined by the monitoring survey. This includes total number of stoves distributed/installed in the entire CPA.
Source of data:	ICS registration data and data from sampling plan
Value(s) applied	For the purposes of calculating ex-ante emission reductions, assumption is 11,241 stoves based on the first CPA.
Measurement methods and procedures:	The percentage of stoves found to be still in operation based on the sampling plan in each monitoring period will be applied to the total number of stoves distributed/installed in each CPA (according to the ICS registration records in the monitoring database and the applicable sample frame). The proportion of sampled ICS found to be in operation during each monitoring period will be applied to the total number of stoves for each CPA when calculating emission reductions. If, based on the sample size selected in any monitoring period, the confidence/precision requirements set out in EB 86 Annex 3 are not satisfied, then CPA implementers will follow the procedures outlined in the Monitoring Plan (Part II Section B.7.2 of the PoA-DD) to ensure the required level of confidence/precision are met.
Monitoring frequency:	No less frequently than once every two years
QA/QC procedures:	The unique reference number of each stove shall be logged in the monitoring database showing the total number of stoves. Data from the sampling plan will be collected in each monitoring period by trained project staff and applied in the emissions reductions calculations. Internal cross-checks by the CME or CPA implementer will be undertaken as QC.
Purpose of data	Calculation of baseline emissions
Additional comment:	See Part II Section B.7.2 of the PoA-DD for more detail on monitoring procedures

Data / Parameter:	$t_{y,j}$
Data unit:	Fraction
Description:	Fraction of monitoring period the stove is in operation (days in operation/total days in monitoring period)
Source of data:	ICS registration data in monitoring database and length of monitoring period
Value(s) applied	For the purposes of calculating ex-ante emission reductions, assumption is 1.0 – ie. assumes no stove has dropped-out (drop-out rate of 0)
Measurement methods and procedures:	The fraction will be calculated by dividing the number of days from the registration date of the stove, or the start date of the monitoring period (whichever is later), until the end of the monitoring period by the total number of days in the monitoring period.
Monitoring frequency:	No less frequently than once every two years
QA/QC procedures:	The unique reference number of each stove shall be logged in the monitoring database. The date of registration shall be utilized to determine the portion of the monitoring period that the stove has been in operation. Any interruption in the stoves' operation (e.g. where stoves are replaced or drop out) will register as missed operating time in the monitoring database for emissions calculation purposes.
Purpose of data	Calculation of baseline emissions
Additional comment:	See Part II Section B.7.2 of the PoA-DD for more detail on monitoring procedures

Data / Parameter:	$\eta_{new, i}$
Data unit:	Fraction
Description:	Continuing efficiency of ICS
Source of data:	Efficiency tests in each monitoring period
Value(s) applied	CPA-specific
Measurement methods and procedures:	The tests will be coordinated by the CME and undertaken following WBT protocol 3.0 (or more recent version at the discretion of the CME) by a trained professional from the CME or CPA Implementer or an experienced third party.
Monitoring frequency:	No less frequently than once every two years
QA/QC procedures:	The WBT Protocol 3.0 or a more recent version will be used at CME discretion
Purpose of data	Calculation of baseline emissions
Additional comment:	See Part II Section B.7.2 of the PoA-DD for more detail on monitoring procedures

Data / Parameter:	SS_y
Data unit:	Percentage
Description:	The percentage of ongoing baseline stove use within the population of in-use ICS during a monitoring period.
Source of data:	Monitoring of ongoing baseline stove use will be undertaken using the sampling approach outlined in Part II Section B.7.2 of the PoA-DD (to meet EB 86 Annex 3 confidence/precision requirements).

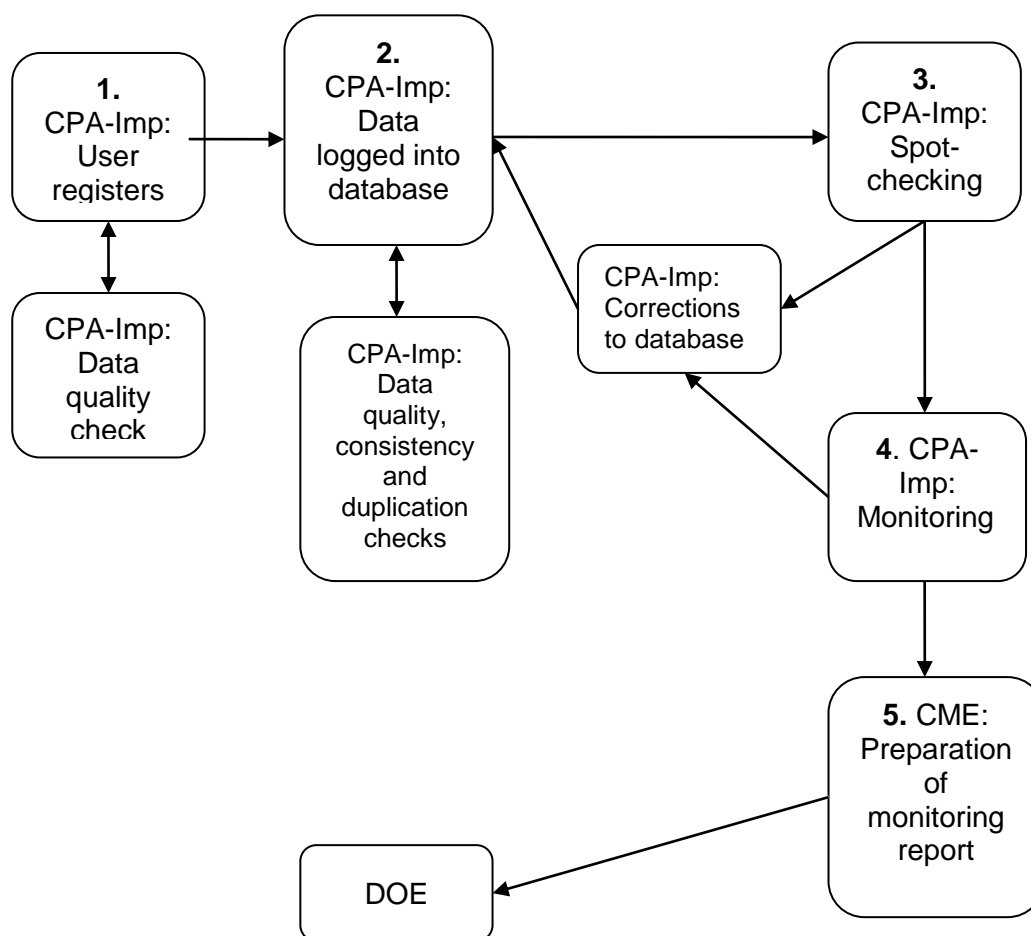
Value(s) applied	<p>This will be a monitored parameter, so will only be available ex-post.</p> <p>As a conservative approach to ex-ante calculations, the percentage of households in the baseline study using a second stove at least once per week (23%), resulting in a mean total household stove usage 1.028, has been used to calculate the ex-ante baseline adjustment factor of $1/1.028 = 0.973$. This ex-ante baseline adjustment factor has been applied to B_{old} in order to subtract fuel-wood used in these second stoves resulting in the B_{old} estimate of 5.0735 tonnes/year applied for the purpose of calculating expected emission reductions in section D.6.3 of the CPA-DD.</p>
Measurement methods and procedures:	A survey will be conducted asking households if they use a second (baseline) stove at least once per week, as per the monitoring plan outlined in Part II Section B.7.2 of the PoA-DD. SS_y will be calculated in each monitoring period as follows: the number of sampled households with in-use ICS that also continue to use a baseline stove divided by the total number of in-use ICS in the sample.
Monitoring frequency:	No less frequently than once every two years
QA/QC procedures:	Data for this parameter will be collected using the same survey for the parameter $n_{y,j}$ (in-use appliances) conducted by trained project staff members. Internal cross-checks by the CME or CPA implementer will be undertaken as QC.
Purpose of data	Calculation of baseline emissions
Additional comment:	See Part II Section B.7.2 of the PoA-DD for more detail on monitoring procedures This parameter is used to address paragraph 20 (b) of the AMS II.G (Version 3) methodology.

B.7.2. Description of the monitoring plan for a generic CPA

The Monitoring Plan applied in this PoA involves a number of key elements that ensure that the CME and CPA-Implementer have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating Certified Emission Reductions (CERs) following AMS II.G version 3.0 on the basis of the amount of non-renewable biomass saved by the ICS in the project activity. The key elements are the following:

- Data collection procedures
- Distribution and Monitoring Database
- Spot Checking of ICS (ongoing)
- Sample Plan for the Monitoring Survey
- Data Quality, Consistency and Duplication Checks
- Monitoring Reporting

The below flow-chart illustrates the roles and responsibilities of the parties during the implementation of the monitoring plan for the SSC-CPA. In the schematic, the CPA implementer is abbreviated to “CPA-Imp”, and can be the CME or another party authorized by the CME.



Below is the description of the above steps on the flow-chart.

- 1. CPA-Imp: User registers stove:** CPA implementer will collect/receive the necessary information requested in the Registration process from the user. Means of collecting this information may be through a hard copy form or ICTs by CPA-Imp staff, retailers, end-users or partner organization's staff, or through the use of ICTs or SMS. CPA Implementers' staff shall double check the accuracy of information provided, and request for field staff additional clarifications if needed;
- 2. CPA-Imp: Data logged into database:** CPA implementer trained staff will input the data in the database either manually (if data collected using hard copy form) or this will be automatically input if data was collected using ICTs or SMS. CPA implementer staff shall double check the information included on the database and check for duplications. Any duplicate information shall be investigated and errors corrected or excluded from the database if it is a true duplicate entry.
- 3. CPA-Imp: Spot- checking (ongoing):** CPA implementer field staff will continually randomly select households included in the database and visit them to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (eg. change in the address of a user) will be updated on the database , and in the case ICS are found to be no longer in use, they will be clearly marked as such and excluded from emission reductions calculations.
- 4. CPA-Imp: Monitoring:** CPA implementer will follow the requirements as per POA-DD to collect the necessary information for a monitoring report.
- 5. CME: Preparation of monitoring report:** the CPA implementers or the CME will prepare the final monitoring report to be provided to the verifier DOE for verification of emission reductions. A copy of the monitoring report will remain with the CME

The CME will coordinate and manage each CPA Implementer and assist them in implementing each element of the monitoring plan. The monitoring plan shall be elaborated per CPA and in accordance with the Sampling Plan below.

Sampling Plan

As per the *Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 05.0*, the sampling plan is the following:

(a) Sampling Design

Due to the large number of ICS envisioned 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 (by grouping and sampling across CPAs) that is designed in line with the requirements of the “Standard for sampling and surveys for CDM project activities and programme of activities”, version 05.0.

(i) Objective and Reliability Requirements:

The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period, and with 95/10 confidence/precision (as per paragraph 21 of EB 86 Annex 3) for annual and 95/5 for biennial sampling across CPAs (as per Methodology AMS-II.G version 03 paragraph 22). In case a single CPA is sampled 90/10 confidence/precision for annual and 95/5 confidence/precision shall be required for biennial sampling.⁴⁰

Monitored Parameters:

Parameter	Description of Parameter
$n_{y,i}$	Proportion of ICS still in operation
SS_y	Percentage of continued baseline stove use among ICS households in the database
$\eta_{new,i}$	Thermal Efficiency of operational ICS

(ii) Target Populations:

- The target population for the proportion of ICS still in operation ($n_{y,i}$) and for percentage of continued baseline stove use among ICS households in the database (SS_y) of this POA are all households in the POA database which are using fuel wood in ICS distributed under the POA for cooking.
- The target population for efficiency of new appliances ($\eta_{new,i}$) is the set of stoves (same model and manufacturer) installed in vintage i across CPAs that are working and are in the database.

(iii) Sampling Frame

⁴⁰ Single CPA sampling will only be applicable when a Primary Sampling Unit only consists of one CPA.

To ensure the homogeneity of the CPAs included for a single sampling plan, two sampling frames shall be defined. Overall, all CPAs will have same group of end users which is from rural area. The CPAs are to be implemented in Zambia (specifically in rural area), thus it is expected that the geographical locations do not have influence on the parameter of interest. Therefore all these 3 parameters can be assumed to be highly homogeneous for each ICS model regardless of how the end user group and distribution/installation location is defined.

- 1) Sampling frame for proportion of ICS still in operation ($n_{y,j}$) and percentage of continued baseline stove use among ICS households in the database (SS_y)

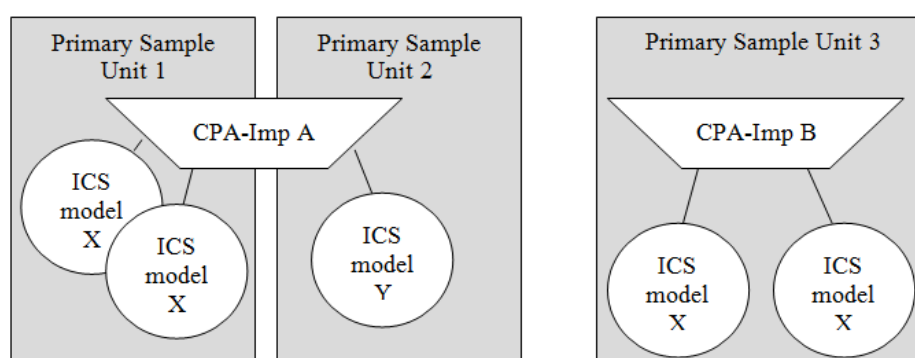
The sample frame refers to all the information sources on the Database. There are two primary mechanisms for data collection: the Registration process for newly distributed/installed ICS and the Monitoring Survey (which includes a household questionnaire and visual inspection of ICSs) that will be used throughout the lifetime of the PoA. The detailed information collected from Registration process is used to populate the stoves Database and the Monitoring Survey follows “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 05.0.

The POA is open to different CPA Implementers and different models of ICS. As explained below (on section “sampling method”), to take the different characteristics of different CPA Implementer and ICS models into consideration, CPAs shall be grouped together to create a Primary Sampling Unit which is homogenous. As per EB 86 Annex 3, section 5, paragraph 21, footnote 20, for the use of a single sampling plan covering a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation, a 95/10 confidence/precision is applied for annual sampling. As per Methodology AMS-II.G version 03 paragraph 22, a 95/5 confidence/precision shall be achieved for biennial sampling. In case a single CPA is sampled, 90/10 confidence/precision for annual and 95/5 confidence/precision shall be required for biennial sampling.⁴¹

The first step is to identify the Primary Sampling Units. Primary sampling units are CPAs which have:

1. The same CPA Implementer
2. The same ICS model

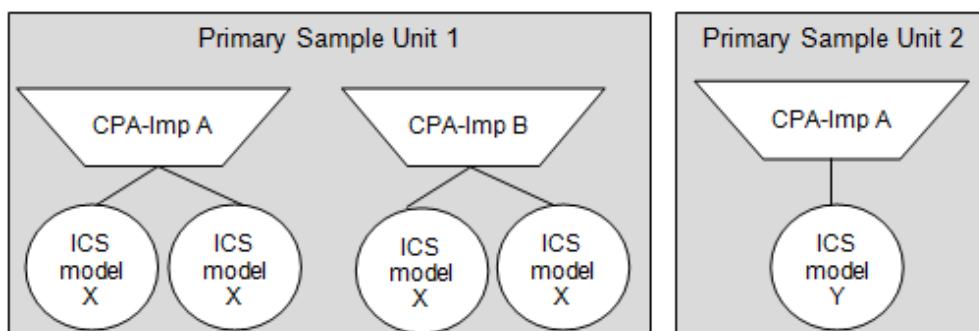
I.e. CPAs with the same CPA Implementer and same ICS model can therefore be grouped together and form a Primary Sampling Unit. In the event the POA has CPAs with two different CPA Implementers using the same ICS model, these form two different Primary Sampling Units. Same is true if the same CPA Implementer has two different ICS models being implemented – this will form two Primary Sampling Units. The below schematics illustrate the example used above. This is justified by the fact that CPA Implementer might vary in terms of performance and it is important for the CME to collect and monitor accurate data for each CPA Implementer distributing each stove model.



⁴¹ As per Methodology AMS-II.G version 03 paragraph 22

2) Thermal Efficiency of operational ICS ($\eta_{new,i}$)

The thermal efficiency of operational ICSs shall vary in accordance with its model, but not within different CPA Implementers. Hence for parameter $\eta_{new,i}$ the Primary Sampling Unit shall be defined as the group of ICSs of the same model and same vintage. If the same CPA Implementer has two different ICS models being implemented in the same vintage – this will form two Primary Sampling Units. Finally, two primary sampling units will be formed by ICS from two different vintages and all other factors (ICS model and CPA Implementer) remaining equal. The below schematics illustrate the example used above assuming all stoves in the schematic are in one vintage.



For example, if different CPA Implementers are implementing CPAs using an ICS model “Y” for the past 3 years. In order to evaluate the thermal efficiency of the different vintages of the same stove “Y”, the primary group shall consist of all ICSs implemented in different CPAs under the POA (regardless of CPA Implementer) which are of the same vintage and same model – in this example there are three primary sampling units which are: 1) ICSs of Model Y and vintage 1 (less than one year in operation); 2) ICSs of Model Y and vintage 2 (between one and two years of operation); and 3) ICSs of Model Y and vintage 3 (between two and three years old in operation).

(iv) Sampling Method

The sampling method for all three monitored parameters $n_{y,j}$, SS_y and $\eta_{new,i}$ is Simple Random Sampling and samples will be randomly selected from the primary sampling units as illustrated above. To ensure a random selection of ICS, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its unique 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. 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.

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

- $n_{y,j}$: 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)
- SS_y : Interview with end user and visual inspection to determine if a baseline (replaced) stove is still being used in addition to ICS (Yes/No)
- $\eta_{new,i}$: ICS will be tested using WBTs (ICS thermal efficiency)

The efficiency of ICS ($\eta_{new,i}$) as determined by the water boiling test evaluated during the monitoring period.

The efficiency of ICS will be determined across CPAs using the same stove model and same vintage (Primary Sample Unit). Using the formulas in the section “Sample Size” below, the CME will randomly sample the required number of ICS from the primary sampling units. It is important to note that $\eta_{new,i}$ and hence the thermal efficiency test must take into consideration --and be conducted for-- each ICS vintage. As an illustrative example, consider a PoA that distributed a single ICS manufacturer/model but had two vintages: 75% of the total ICS distributed have been in use for less than 365 days (ie. vintage 1) and 25% have been in operation for over 365 days but less than 730 days (ie. vintage 2). In this case, 2 Primary Sampling Units shall be formed with each sampling unit represents one vintage. For each vintage, a number of ICSs are to be randomly selected and sampled and the sample sizes are to be determined using the below equations. The mean thermal efficiency of each vintage shall be used for calculating emission reductions for all stoves of vintage i . ie. if $\eta_{new,i}$ for stoves of vintage 1 is 26% and for vintage 2 is 24%, then

all ICS which have been in use for less than a year (vintage 1) will use a thermal efficiency of 26% in its calculations, while stoves vintage 2 will use 24%. In the event the monitoring period is over one year (let's use the example of 2 years) and an ICS has began its operation on the first day of the monitoring period, the stove shall apply the equivalent number of days in operation under vintage 1 and the equivalent number of days of operation under vintage 2. For avoidance of doubt, in every monitoring period, all ICS vintages will be sampled and the thermal efficiency for each vintage shall be established and used for the calculation of emission reductions for that monitoring period.

(v) Sample Size

For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision for annual⁴³ and 95/5 confidence/precision for biennial sampling.⁴⁴ In case a single CPA is sampled, a 90/10 confidence/precision is required for annual sampling and 95/5 confidence/precision shall be required for biennial sampling.⁴⁵

The procedure to determine the sample of households will ensure that they adequately represent the broader project population, minimizing sampling error. Using, a 95 per cent confidence level, and a 10 per cent margin of error, random samples will be selected from each Primary Sampling Unit. There are three parameters that will be estimated through sampling: the number of stoves still in operation during the monitoring period as determined by the monitoring survey ($n_{y,j}$), the fraction of baseline stoves in use within the population of operational ICS during a monitoring period (SS_y), and the average ICS efficiency, ($\eta_{new,i}$). The parameters $n_{y,j}$ and SS_y will be sampled in a single survey with a random sample of households using the above described confidence/precision levels depending on annual or biennial monitoring frequency. Of the three parameters to be monitored, two are proportion/percentage parameters (SS_y and $n_{y,j}$) and one is a mean value parameter ($\eta_{new,i}$).

In order to calculate the required sample size estimates, values for the proportions, mean values, and standard deviations are required. As per Guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 04.0 Appendix 1 paragraph 5, there are different ways available to obtain the estimates of the parameter of interest:

- Refer to the result of previous studies and use these results;
- In a situation where information from previous studies is not available, a preliminary sample as a pilot could be conducted and use that sample is used to provide the estimates;
- Use best guesses based on the researcher's own experiences.

For the registration/inclusion purpose of CPA-DD, option C shall be applied. For the first monitoring period, values from a pilot shall be applied. For the following monitoring periods, the estimates shall be adjusted taken into account the results of the previous monitoring period(s) or the result from recent pilot study which is conducted after the previous monitoring periods.

To estimate the sample size for parameters $n_{y,j}$ and SS_y the following equation⁴⁶ is used:

$$n \geq \frac{1.96^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 p(1-p)}$$

Where:

n	= Sample size
N	= Population size (Total number of households/ICS)
p	= Expected proportion
1.96	= Represents the 95% confidence required (In the case of 90% confidence, 1.645 shall be used)
0.1	= Represents the 10% relative precision

⁴³ As per EB 86 Annex 3 Section 5 paragraph 21, footnote 20

⁴⁴ As per Methodology AMS-II.G version 03 paragraph 22

⁴⁵ As per Methodology AMS-II.G version 03 paragraph 22

⁴⁶ Equation 1 of Appendix 2, *Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 4)*

The following assumptions are made to exemplify the sample size calculation for parameters: $n_{y,j}$, SS_y and $\eta_{new,i}$.

1. The CME envisage that over the next 7 years of operation, a total of 400,000 ICSs would have been distributed in Zambia. Hence, population size, N , is taken as 400,000 households/ICS (Assuming one ICS for one household).
2. It is expected at least 80% of ICS still in operation, hence the expected proportion p for $n_{y,j}$ is taken as 0.8.
3. As per baseline study, it is expected that 23% of baseline stove still in use. As per Standard for sampling and surveys for CDM project activities and programme of activities, a proportion can describe either of the two possible scenarios of the success rate or the failure rate and project proponents may use the larger of the two proportions in the sample size calculation, which is p or $(1-p)$. The sample size calculation is therefore based on anticipating a discontinued use of 77%, which is the value of the larger proportion. Hence the expected proportion p for SS_y is taken as 0.77.
4. The expected mean of ICS thermal efficiency is 0.25 and its standard deviation is 0.05 for $\eta_{new,i}$.

Sample size calculation:

The calculation of the required sample size for each parameter in the first monitoring period is illustrated below for a 95/10 level of confidence and precision (for biennial monitoring periods the sample sizes will be recalculated using 95/5 confidence/precision values). In all cases a conservative approach is taken, however if for any parameter the required 95/10 confidence/precision is not met then the CME will randomly select an additional sample and collect further data from this sample to ensure the pooled data meet or exceed the required thresholds.

Parameter $n_{y,j}$:

Based on the above assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated as:

$$n \geq \frac{1.96^2 \times 400,000 \times 0.8(1-0.8)}{(400,000-1) \times 0.1^2 \times 0.8^2 + 1.96^2 \times 0.8(1-0.8)} = 96.02$$

Therefore, in this case a sample size of 97 is to be sampled from each primary sampling unit.

In case the resulting sample size to achieve the desired confidence/precision levels is smaller than 30 ICS, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion.

Parameter SS_y :

Based on the above assumptions, the sample size calculation for a 95/10 confidence/precision would be:

$$n \geq \frac{1.96^2 \times 400,000 \times 0.77(1-0.77)}{(400,000-1) \times 0.1^2 \times 0.77^2 + 1.96^2 \times 0.77(1-0.77)} = 114.72$$

The required sample size to be sampled from each Primary Sampling Unit is at least 115.

As in the case of parameter $n_{y,j}$, if the resulting sample size based on the above equation is smaller than 30 ICS, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion.

Parameter $\eta_{new,i}$:

For the purposes of determining sample size in the first monitoring period, the performance of ICS can be categorized into two groups, which are characterized by the range of likely mean efficiency and the likely values of SD relative to the mean, according to the type of ICS. The ICS models that are manufactured in modern factories tend to be very highly efficient (30-50% thermal efficiency) and have been designed to meet stringent efficiency specifications so the standard deviation is expected to be relatively low. Where key components of ICS (e.g. the combustion chamber and flue) are not manufactured but instead are installed on-site or handmade, then the mean efficiency is expected to be in the range of 20-30% with relatively higher variability.

To estimate the sample size for parameter $\eta_{new,i}$ the following equation⁵⁹ is used:

$$n \geq \frac{1.96^2 NV}{(N-1) \times 0.1^2 + 1.96^2 \times V}$$

Where:

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

n	= Sample size
N	= Population size (Total number of households/ICS)
$mean$	= Expected mean of ICS thermal efficiency
SD	= Expected standard deviation
1.96	= Represents the 95% confidence required (In the case of 90% confidence, 1.645 shall be used)
0.1	= Represents the 10% relative precision

Based on the above assumptions, the sample size calculation for a 95/10 confidence/precision would be

$$n \geq \frac{1.96^2 \times 400,000 \times \left(\frac{0.05}{0.25} \right)^2}{(400,000 - 1) \times 0.1^2 + 1.96^2 \times \left(\frac{0.05}{0.25} \right)^2} = 15.37$$

If the resulting sample size based on the above equation is smaller than 30, since $\eta_{new,i}$ is a numeric mean value (i.e. not a proportion or percentage) the Student's t-distribution shall be used as per paragraph 13 of "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 05.0.

The sample size for parameter $\eta_{new,i}$ under t-distribution is referred to the equation below⁶³:

$$n = \left(\frac{t_{n-1} \times SD}{0.1 \times mean} \right)^2$$

Where t_{n-1} is the value of the t-distribution for 95% confidence when the sample size is n. Since the sample size is not known yet, the first step is to use the value for 95% confidence when the sample is large, i.e. 1.96 and then redefine the calculation.

$$n = \left(\frac{1.96 \times 0.05}{0.1 \times 0.25} \right)^2 = 15.37$$

⁵⁹ Equation 4 of Appendix 2, *Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities* (version 04.0)

⁶³ Equation 38, *Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities* (version 04.0)

Thus n is rounded up to 16.

The calculation now need to repeat using t -value for 95% confidence and $n = 16$

$$n = \left(\frac{2.131 \times 0.05}{0.1 \times 0.25} \right)^2 = 18.17$$

And n is rounded to 19.

The calculation now need to repeat using t_{n-1} value for $n = 19$. The process should be iterated until there is no change to the value of n .

t_{19-1}	2.101
$n=$	17.66
Round up	18

t_{18-1}	2.110
$n=$	17.81
Round up	18

The repeated calculation shows that $n = 18$. Thus the sample size to be sampled from each sampling unit is 18.

The sampling for parameter $\eta_{new,i}$ shall comprise of ICS installed/distributed during the current vintage and oldest vintage. The annual efficiency loss of ICS established from these two vintages may be used to correct the initial efficiency of the ICS installed/distributed later on.

The CME may choose to use the same samples to monitor more than one parameter. For instance, the CME can sample SS_y , $n_{y,j}$ and $\eta_{new,i}$ –or a combination of these parameters- in the same samples. Since parameters $n_{y,j}$ and SS_y sharing the same sampling units, CME may choose to have one common survey for these two parameters with largest number of sample size between these two parameters is chosen, then a separate sampling effort may be arranged for parameter $\eta_{new,i}$. Sampling more than one parameter within the same sample (household) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter.

Oversampling is strongly encouraged, not only to compensate for any attrition, outliers or non-response associated with the sample, but also to prevent a situation at the analysis stage where the required reliability is not achieved and additional sampling efforts would be required. The sample size shown above will be adjusted upwards to account for non-responses, CME shall determine the appropriate non-responses rate based on previous experience.

(b) Data:

(i) Field Measurements:

To monitor the number of stoves that continue to be in use ($n_{y,j}$) and the percentage of continued baseline stove use among ICS households in the database (SS_y), the data collected will be a representative number of stoves in the database for the monitoring period. The scope is a representative sample of stoves across all CPAs with the same CPA Implementer and same ICS model in this PoA. The method of collecting data will be field surveys of required sample size of ICS users in the database. Frequency of data collection is one survey per monitoring period. Data will be collected from the field surveys, entered in the database and included in the monitoring report. To monitor the efficiency of the stove at least every two years (as required by the AMS II.G version 3 methodology) a new test will be conducted to determine the rate at which a sample of stoves from a given vintage year deteriorate in efficiency. The method to collect the efficiency data will be the Water Boiling Test.

The table below summarizes field measurement data requirements

Parameter	Timing (indicative)	Frequency (required by AMS II.G –Version 3)	Methods to be applied	Comments on seasonal fluctuation
$n_{y,j}$	Monitoring will likely occur	No less frequently than every two years	Visits to the premises, visual	Unlikely to be due to any seasonal

	every 12 months		inspection and interview with ICS end-user	fluctuation.
SS_y	Monitoring will likely occur every 12 months	No less frequently than every two years	Visits to the premises, visual inspection and interview with ICS end-user.	Unlikely to be due to any seasonal fluctuation.
$\eta_{new,i}$	Monitoring will likely occur every 12 months, and will include ICS from all vintages for which emissions reductions are to be claimed in that monitoring period.	No less frequently than every two years	Water Boiling Test (WBT) Protocol Version 3.0 (or more recent at the discretion of the CME).	Not due to any seasonal fluctuation.

(ii) Quality Assurance/Quality Control

The CME will apply measures to ensure the required confidence/precision for each sampled parameter is met, allowing for non-response and the possible removal of outliers from the sample, as part of a Quality Control/Quality Assurance system. The choice of measure applied to each parameter will depend on the cost of each data collection approach and logistics required. The CME will determine the most effective measure for each parameter from the following list (illustrated using a required sample size of 20 and an effect of non-response of 2 to 4 ICS⁶⁴):

- Oversampling: Randomly draw a sample of at minimum 24 ICS and collect data from each
- Buffer Group: Randomly draw a sample of at minimum 24 ICS and collect data from only 22 ICS. If this would not result in the required sample size data would be collected from the additional 2 ICS that were selected in the sample.
- Draw an additional sample: Randomly draw a sample of 22 ICS and collect data from these. If the required sample size is not achieved, an additional sample of 2 elements will be drawn and included in the sample.
- Use lower confidence bound (of $n_{y,j}$ or $\eta_{new,i}$) or, with a conservative approach according to the parameter definitions, the upper confidence bound of **SS_y**.

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. As an example, 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%).

The sampling plan has the following procedures in place to ensure good quality data. The CME will ensure that field personnel have reviewed, understand and have agreed to follow the monitoring plan procedures, including provisions for maximizing response rates, documenting out-of-population cases, refusals and other sources of non-response. A quality control and assurance strategy will be documented. Quality control and assurance strategies include addressing non-sampling errors, such as non-response or bias from interviewer. The CME or a competent third party designated by the CME with the proper skills will train the monitoring personnel on how to properly survey households to prevent bias from interviewer. In the case a

⁶⁴ The 2 to 4 values help exemplify variations in response rates. The value of 2 corresponds to higher response rates; the value of 4 is for lower response rates. The actual non-response rates applied to the final sample size shall be determined by CME.

household refuses to participate, another household will be chosen at random. To reduce interviewer bias, good questionnaire design and well-tested questionnaires will be used.

The calculation of the sample size will be carried out using estimates for parameter proportions, mean values, variances, 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 including estimating the bounds of the confidence interval, the standard error of the mean value or proportion, and the t-value as derived from the t-distribution⁶⁵. 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 raw data and summary statistics are scrutinized and after additional samples have been collected⁶⁶, the sampling may be repeated with an increased sample size. Alternatively, the CME may choose to apply the lower bound (or higher bound according to the more conservative approach, as for example in the proportion of end-users who continue to use a baseline stove, SS_y) of the sampling results as is allowed for by the methodology (AMS II G v3, paragraph 22).

As the continued use of ICS and the incidence of baseline stove usage among ICS users are binary parameters, there can be no outliers in the sampled data and no treatment for outliers is required. The sample data for $\eta_{\text{new},i}$ is continuous and therefore the presence of outliers is possible. To identify and address outliers for the parameter $\eta_{\text{new},i}$, outliers will be defined as those data points with values greater than three standard deviations from the mean of the sample for each vintage.

Data points identified as outliers according to the above analysis will be examined further to correct for possible transcription and data entry errors, but will be omitted from the analysis if no such administrative errors exist.

(i) Data archiving

Hard copies of the surveys will be kept and the database will have back up. Original stove purchase contracts, information collected from the Registration process) or other means of acceptance by the users will be stored in the main office for the coordinating entity. A back-up of the project database will also be stored on an electric medium by the CME. All data monitored and required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

(ii) Analysis

The CME will manage a project database that includes the following data that can be directly attributable to each CPA within the PoA, thereby allowing unambiguous determination of the emission reductions attributable to each CPA:

- A list of households participating in each CPA, including name, community/location, distribution/installation date and unique serial number;
- Testing to ensure that the stoves are still operating above the minimum 20% efficiency required by the AMS II.G (version 3) methodology, by the CPA Implementer, CME or a third party certified by a national standards body or an appropriate certifying agency recognized by it.
- Where replacements are made, assurance that the efficiency of the new ICS is similar to the specified.

Data obtained from the samples will be used to estimate proportions and mean 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 – the primary sampling Units. The parameters are applied for emission reduction calculations as outlined in Part II Section B.6.3 of the PoA-DD. The stoves that are not in use will be excluded from emissions reductions calculations and will not be counted towards the total number of ICS in operation during the monitoring period. The thermal efficiency of new stoves ($\eta_{\text{new},i}$) will be used in the calculation of the per stove emission reduction, which will be multiplied by the number of stoves in operation in the CPA to obtain the emission reductions per CPA.

(c) Implementation

Sampling for the purpose of emission reduction calculation and elaboration of the monitoring report will occur at the end of each monitoring period. This sampling will be conducted by trained personnel either part of the

⁶⁵ As provided by the *Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities* (EB 86, Annex 4 Appendix 4)

⁶⁶ As per EB 86 Annex 4 Appendix 4

CPA Implementer or CME team, or an experienced third party entity. The credentials and/or training materials for the sampling personnel will be provided to the DOE at verification. The maximum length of one monitoring period will be two years (duration, not calendar years), as AMS II.G., version 3, provides the option for annual or biennial monitoring. The CPA Implementer will be responsible for managing household data collection and entry into the project database. Field personnel will receive training on how to properly deal with surveying techniques and reduce errors and sign a document certifying that there is no conflict of interest of those involved in data collection and analysis. If there is conflict of interest, the personnel will not be allowed to participate in data collection and analysis. The project database will record the start and end dates of each monitoring period, and record the emission reductions attributable to each monitoring period. Appropriate record keeping procedures will be implemented to ensure that each monitoring period data set can be transparently attributed to its corresponding CPA, preventing any occurrences of double counting. An internal review of the project database will be able to determine the current status of each SSC-CPA—the duration of previous monitoring periods, the households delivering monitoring data, and current verification activities.

(i) *Assessment for Leakage*

According to methodology II.G, version 3, leakage related to the non-renewable woody biomass saved by the project activity shall be assessed on *ex-post* surveys of users and the areas from which the woody biomass is sourced. The methodology offers the alternative that if B_{old} is multiplied a net to gross adjustment factor of 0.95 to account for leakages, surveys are not required. This PoA will use the 0.95 leakage adjustment factor instead of *ex-post* surveys.

The other source of leakage occurs if equipment currently being utilised is transferred from outside the boundary to the project activity. All ICS in the PoA will be newly manufactured/assembled or newly installed. Where second-hand/used ICS are distributed to an end-user the ICS will be from within the project (ie previously newly manufactured/assembled and either a demonstration model or transferred from one end-user within the project to another new or existing end-user). In both of these cases there will no equipment (ICS) being utilized outside the project area (any project non-participant) that is transferred to the project area (included as an ICS in the database) so leakage defined in paragraph 14 of the AMS II.G (version 3) methodology is not considered. Where second-hand/used ICS are transferred within the project area (between end-user project participants) the database will be updated to reflect this change to ensure there is no double counting of ICS.

(ii) *Disposal of Low Efficiency Appliances and Use of Baseline Stoves*

When an ICS is installed the end user receives information explaining that the conventional open fire appliance must no longer be used. Follow-up meetings with end users will ensure that those who have received an ICS are using it properly and that the conventional open fire is no longer in use. As per methodological condition 20 (b), if it is determined that the conventional open fire is still in use and the ICS is also in use, the wood used in conventional open fire will be subtracted from B_{old} . The number of households continuing to use a baseline stove in addition to their ICS, will be monitored throughout the project lifetime. This will be achieved using a single sample for in-use appliances ($n_{y,j}$) described above, and will meet EB 86 Annex 3 confidence/precision requirements. The number of households continuing to use a baseline stove, in addition to their ICS, will be used to calculate the percentage of households with operational ICS that also use a baseline stove (SSy).

(iii) *Monitoring Reporting*

The CME will assess all monitoring data and produce a monitoring report for each CPA for the DOE to verify corresponding to the preceding monitoring period of all CPAs. This report will present the data relating to the emission reductions generated by those CPAs during the monitoring period.

Appendix 1. Contact information of coordinating/managing entity and responsible person(s)/ entity(ies)

CME and/or responsible person/ entity	<input checked="" type="checkbox"/> CME <input checked="" type="checkbox"/> Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	C-Quest Capital Malaysia Global Stoves Limited (CQC)
Street/P.O. Box	Brumby Centre
Building	Lot 42, Jalan Muhibbah
City	Brumby Centre
State/Region	FT
Postcode	87000
Country	Malaysia
Telephone	+6 087 423828
Fax	
E-mail	cqc-operations@cquestcapital.com
Website	www.cquestcapital.com
Contact person	Ken Newcombe
Title	
Salutation	
Last name	Newcombe
Middle name	
First name	Kenneth
Department	
Mobile	
Direct fax	
Direct tel.	+1-202-416-2400
Personal e-mail	cqc-operations@cquestcapital.com

CME and/or responsible person/ entity	<input type="checkbox"/> CME <input type="checkbox"/> Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Community Markets for Conservation Ltd (COMACO)
Street/P.O. Box	No. 26 Joseph Mwila Rd
Building	
City	Rhodespark, Lusaka
State/Region	Lusaka
Postcode	
Country	Zambia
Telephone	+260-211-226082
Fax	+260-211-234-286
E-mail	dlewis@itswild.org
Website	
Contact person	Dale Lewis

CME and/or responsible person/ entity	<input type="checkbox"/> CME <input type="checkbox"/> Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Title	Director
Salutation	Mr
Last name	Dale
Middle name	
First name	Lewis
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	dlewis@itswild.org

Appendix 2. Affirmation regarding public funding

No public funding from Annex I parties to the United Nations Framework Convention on Climate Change (UNFCCC) are envisaged to be made available for the proposed PoA, or any CPA under the proposed PoA. If public funding from Annex I parties to the UNFCCC is provided, the CME shall confirm that the funding is not diversion of Official Development Assistance (ODA)⁶⁸.

Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

See details in Section B.2 of Part II PoA-DD.

Appendix 4. Further background information on ex ante calculation of emission reductions

The baseline fuel consumption survey of wood-burning rural households in Zambia was commissioned by CQC to HED and is of exclusive use by CQC. The full baseline report is attached to the POA-DD.

A national NRB report was commissioned by CQC to C4 solutions to assess the national fNRB in Zambia. The report is attached to the POA-DD and is of exclusive use by CQC.

⁶⁸ Official development assistance (ODA) is defined in the *OECD Glossary of Statistical Terms* as follows: Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries ("bilateral ODA") and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions (*OECD Glossary of Statistical Terms*)

Appendix 5. Further background information on the monitoring plan

See details in Section B.7.2 of Part II PoA-DD.

Appendix 6. Summary of post registration changes

1. The following has been changed from registered monitoring plan:
 - a) During the registration, the sampling method applied in the monitoring plan is multi-stage sampling. Multi-stage sampling is a sophisticated method which is not easy to be implemented and the data analysis is difficult. Given that the population being studied is relatively homogeneous with respect to the parameter being studied, therefore simple random sampling is chosen to replace the existing sampling method. Accordingly, sampling frame, sampling method and sample size calculation of monitoring plan is revised with information correlated with simple random sampling.
2. The following corrections have been done in the PoA-DD:
 - a) To provide better clarity on the registration process, the term of “registration card” is removed/ replaced with “registration process” in all sections of PoA-DD.
 - b) In Part I Section A.2 has been updated to provide additional clarification on the options available to be adopted by CPA implementer when collecting end user information.
 - c) In Part 1 Section A.6, the reference to EcoZoom Dura stove is removed since different type of stove was implemented under first CPA.
 - d) Under Part I Section B.2, Part I Section C (d) and Part II Section B.5, it was proposed that the serial number of ICS will start with an identifier “CQC-Z”. A correction has been made to remove the dash “-“, thus the identifier is corrected to CQCZ.
 - e) In Part 1 Section C, edit is made on the procedure to avoid double counting and record keeping system for each CPA under the PoA.
 - f) In Part II Section A.1, minor edit is made on the procedure for Data Collection and Transfer.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	9 March 2015	<p>Revisions to:</p> <ul style="list-style-type: none"> • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Editorial improvement.
03.0	25 June 2014	<p>Revisions to:</p> <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the programme design document form for small-scale CDM programme of activities (these instructions supersede the "Guideline: Completing the programme design document form for small-scale CDM programme of activities" (Version 03.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from <i>F-CDM-SSC-PoA-DD</i> to <i>CDM-SSC-PoA-DD-FORM</i>; • Editorial improvement.
02.0	13 March 2012	<p>EB 66, Annex 13</p> <p>Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities".</p>
01.0	27 July 2007	<p>EB33, Annex43</p> <p>Initial adoption.</p>
<p>Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document, SSC project activities</p>		