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

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NOTE:

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

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

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

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

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Energy Efficient Cook stoves in South Africa
Version: 02.1
Dated: 29/11/2012

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

>> The intention of the proposed small scale Program of Activity ("hereafter SSC-PoA") involves the installation of energy efficient Improved Cooking Stoves (ICS) in the households of South Africa. It is also intended to expand the geographical scope of the PoA to the other SADC countries comprising of Angola, Bostwana, DRC, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Nambia, Seychelles, South Africa, Swaziland, Tanzania and Zambia at a later stage. The programme is named as "ECOS". Implementation of the proposed activity will reduce the usage of non renewable biomass i.e. fuel wood for house hold activities. Thus the PoA will reduce the GHG emission occurring from the combustion of non renewable biomass, i.e. fuel wood, thereby also contributing to sustainable development. ICSs disseminated under this PoA are more efficient in transferring heat from the fuel to the pot than the so called traditional stoves.

The bulk of South Africa's poor are concentrated in the wooded biomes, especially woodlands, in Limpopo, KwaZulu Natal, and the Eastern Cape. Over 80% of these households depend on fuel wood as their primary source of energy[1]. Total demand for fuel wood is estimated at 11.2 million tons per annum, which is equivalent to 40% of residential energy demand. The number of households that depend on fuel wood as their main energy source is estimated at 2.3 – 2.8 million, the majority of which are located in areas. This represents some 12 – 15 million people or 25 – 30% of the South African population.

According to the Statistics SA, 2007 the estimated total South Africa Population is 48.5 Million. ECOS will target all potential households in all the provinces in South Africa. Currently, most of the households in the South Africa use "three-stone" cooking stoves. It is the cheapest stove to produce, which is made off three suitable stones or bricks of the same height and mud on which a cooking pot can be balanced over a fire. These open fires are fairly inefficient at converting energy into heat for cooking. Fuel is wasted, as heat is allowed to escape into the open air. Furthermore, these open fires and primitive cook stoves emit a significant amount of smoke, which fills the home; this indoor cooking smoke has been associated with a number of diseases, the most serious of which are chronic and acute respiratory illnesses, such as bronchitis and pneumonia. ICS have been designed to provide an enclosure for the fire to reduce the loss of radiant heat, protect it against wind and increase heat transfer. The improvement in efficiency is achieved by properly adjusting the dimensions of the combustion chamber and ensuring effective air flow.

Thus, it is essential that adoption of improved cooking stoves on a much larger scale is urgently needed. The current PoA will promote the dissemination of ICS. This will in turn reduce deforestation and degradation of forests in South Africa through participation of the people in adopting fuel efficient stoves. This will also contribute to improvement in quality of lives of the people from South Africa through reduction of drudgery, time and money spent on fuel wood collection and through improvement

[1] http://www.probec.org/fileuploads/fl121155200960516600Synthesis_Report_on_Biomass_Energy_Consumption_and_Availability_in_SA_FINAL.pdf

of indoor air pollution. Globally, the project will contribute by reducing emission of GHG into the atmosphere.

General operating and implementing framework of PoA
CARE

Clean Air Renewable Energy (Pty) Ltd (CARE) is the coordinating/managing entity ("CME") for this SSC-PoA and will be implementing the CDM Programme Activities (CPAs) in South Africa. Under the scheme, it will coordinate the distribution of ICS by the distributor(s) (co-operative societies) to the households. Thus CARE is both the CME and the CPA implementer for the PoA.

The CME will distribute the ICS's to the households through the channel of the representatives' distribution networks created in each province vis-à-vis the distributors. The CME will conduct training programme for the distributors' staff and develop the capacity.

Distributors
The distributors give the ICS to the households through technician/entrepreneurs working on a contractual basis. The distributors will provide the further training to the technicians employed for installation of the ICS and further oversee the implementation of the ICS. Training will be given to technicians on implementation record keeping and maintenance of the ICS. These technicians will be designated for certain number of ICS and will be responsible for data recoding and data storage.

When giving out the ICS, the representative distributors of CME will sign a sale agreement with the end users containing not only information about the transaction, i.e. ICS model, serial number, but also the name, location/address and Identification Number of the user, the unique identification number of ICS and the fuel that was being used earlier along with the type of stove used which is being replaced (the "Sales Agreement")

The Sale Agreement will assert the legal rights of the carbon credits generated by the ICS to the CME. Accordingly, the CME will use the CER proceeds to recover the costs incurred for providing the ICS to users, provide maintenance and to recoup associated costs for the dissemination of stoves, such as training of technicians, marketing activities and building new manufacturing units.

Based on the Sales Agreement, distributors will transfer the information of each ICS to the Installations Record, which will ensure that no ICS is counted more than once under the SSC-CPAs or the PoA. The Installations Record will further be transferred to the CME which is stored in electronic format as well as in the paper format. These records will also serve as the basis for the calculation of CERs.

The monitoring plan will be validated and verified by a Designated Operational Entity ("DOE"). ICS technicians will be educated by distributor, ensuring that the stakeholders involved in the implementation of SSC-CPA are aware and have agreed that their activity is being subscribed to the SSC-PoA.

Core CarbonX Sols Pvt Ltd

CoreCarbonX offer carbon management services to CARE. These range from the development of the PoA-DD, the CPA-DDs and the Monitoring Reports to the management of the entire CDM cycle up to the issuance of CERs.

Policy/measure or stated goal of the PoA

With the implementation of PoA, the ICS will replace the current usage of conventional cook stoves in the households of ECP. This will improve the indoor air pollution and reduce harmful GHG emission evolved into the atmosphere. The installed bio mass cooker posses the advantage efficiently transferring the heat to the cooking medium ensuring the reduced usage of cooking fuel and GHG emission reductions.

Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity
The proposed SSC-PoA is a voluntary action by the Co-ordinating Managing Entity (CME) - CARE Clean Air Renewable Energy (Pty) Ltd.

Contribution of the proposed PoA to sustainable development

Environmental Benefits:

1. ICS adopted households will be subjected to lesser level of indoor air pollution vis-à-vis CO_2, carbon monoxide and particulate matter as a result of implementation of this project activity. Pollutants released from the combustion of firewood fuel form a key factor for many respiratory diseases found in house holds. The ECOS will help in reducing the occurrence many respiratory diseases that happens due to burning of firewood.
2. Efficiently transferring the heat to the cooking medium ensures exact usage of fuel for the cooking activity reducing GHG emissions. The depletion rate of forest reserves in provincial areas will be reduced considerably.

Socio and Economic Benefits:

3. Implementation of project activity results in employment opportunities for people involved with installation, maintenance and sales of these house hold biomass based cookers.
4. Program will improve the status of living of people in house holds since the community level implementation of units of these kinds can be carried out at considerably lower costs. There will be less dependence on firewood and expenses and time associated with firewood buying and collection.
5. Business development component of the *PoA* has resulted in the enhancement of capacity development and technical know how for moderately educated people in the community through workshops, seminars and training programs.
6. Adaptation of locally manufactured technology using available raw materials with optimised energy efficiencies leads to build a technical self-reliance.

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

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Name of party involved ((host) indicates a host party	Private or public entity(ies) project parties (as applicable)	Kindly indicate if the party involved wishes to be considered as a project proponent (Yes/No)
South Africa (Host Country)	Clean Air Renewable Energy (Pty) Ltd	No

Clean Air Renewable Energy (Pty) Ltd (CARE) is a registered Project Participant, Focal Point to all Scopes of Authority and the coordinating and managing entity (CME) of this SSC-PoA.

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

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A.4.1. Location of the programme of activities:

>> Republic of South Africa

A.4.1.1. Host Party(ies):

>> Republic of South Africa

A.4.1.2. Physical/ Geographical boundary:

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All ICS included in the PoA must be installed within the territory of the Republic of South Africa. The addresses where the ICS proposed will be recorded to document this.. The geographical boundary of SSC-PoA in the Republic of South Africa is also given in the below figure.

Fig: Republic of South Africa in which installations of cooker units are proposed.

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

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CARE will coordinate the Small-Scale Programme of Activities (SSC-PoA) as a PoA Coordinating and Managing entity, and will support the distributor(s) (co-operative societies) in implementing the CDM Programme Activities (CPAs) in South Africa.

Location and energy limitation

South Africa is divided into nine administrative Provinces vis-à-vis Easter cape, Western Cape, Northern Cape, North West, Limpopo, Gauteng, Mpumalanga, Kwazulu-Natal, Free State which are subdivided into Districts and these are further subdivided into Villages. Each CPA will be implemented by a distributor from the province which covers the CPA in the geographical boundary of the SSC-PoA (ie. South Africa) and the total thermal energy savings from the sum of ICSs under a SSC-CPA will not exceed 180 GWh per year.

Operational and management plan

Each distributor is responsible for the installation and maintenance of ICSs.. The operation of the ICS is carried out by the user, and training on how to operate and maintain the ICS is given by the distributor. The CME will provide the initial training for the distributor; and the training will be penetrated through to the users.

Physical maintenance of the ICS will be provided by the distributor and their technicians. The distributors will follow the monitoring plan and procedures for identifying each stove sold during the course of the project and those which are still in use, so the appropriate number of emission reductions is claimed. To facilitate this process, the distributor will assign a serial number to each ICS during its construction and record this number in the Installations Record. The serial Numbers will be present on each ICS and also on the sales agreement corresponding to the ICS. The distributors are also responsible for collecting the Sales Agreement Contract from the users

Sales Contract and Installations record

Before the installation of the ICS, the user shall be informed that CDM finance is being used to fund the ICS installation, and the user shall agree, as per the Sales Contract, to:

- Cooperate with the distributor and the CME for monitoring purposes
- Transfer the rights of the CERs to the CME

The Sales Contract will also contain the following information:

- Name of customer
- Address and ID number of the customer
- Stove model and serial number
- Installation date
- Type of Fuel being used in the cook stove replaced
- Type of cook stove being replaced.

The information collected by the distributor is transferred to an electronic database (the Installations Record) which is updated regularly and shared with the CME. The Installations Record carries all the sales information listed above including the actual installation date. The installations record is a key component of the annual monitoring report, since the actual installation date is used to calculate the emission reductions achieved by the ICS installed.

Monitoring

Each SSC-CPA keeps an Installations Record, which lists all ICS installed with a unique serial number per ICS in addition to a record of the location of the stove and the kitchen. All distributors records are screened by the CME together with cross-checks on the distributors installation records in order to confirm that the installation record is authentic and that no double-counting occurs.

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

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Emission reductions from the ICS units will be calculated using the approved methodology of *AMS. II.G.* Energy efficiency measures in the thermal applications of non-renewable biomass, version 03; hence falling under the Type II project activity – *Energy efficiency improvement projects*.

The ICS will be manufactured locally by Bobfab PTY Ltd using the latest in CNC punching technologies. Bobfab with other 30 years of experience in the stainless steel manufacturing and polishing industry is located 5Km from Oliver Tambo International Airport the gateway to international trade in Sub Saharan Africa. The ICS is manufactured from grade 4302B stainless steel. 430 is part of the Ferritic stainless steel family and were chosen for its affordability and corrosion resistant factors. Also being magnetic it has a relative low scrap value which should help theft of the stoves for scrap metals.

Although based on a rocket stove design which is not unique the clever design and workable materials make the little stove very thermal efficient. The inlet of the stove and draft apertures at the top of the stove create a tornado effect which makes the stove very easy to light and efficient burning of the biomass. The feeding hole is specifically made at an aperture to encourage smaller kindling being used in the stove thus preventing large logs being used and fuel wastage. Once the stove has been lit the top pot can be placed in the stove and cooking can start within a couple of minutes. The only visible smoke will be from the top vents but due to the efficiency of the design this is dramatically less than the traditional three stone cooker.

Inside the stove there is a removable ash tray also made of stainless steel. The top pot in which cooking takes place is also made from stainless steel. In this case grade 304 which is an austenitic food quality grade. This pot is manufactured using a deep draw method. This is easily removed with the fingers holes adding to the air flow of the stove. The stove itself can be moved around via the 8mm stainless steel handle. The stove comes in a kit form and is quick and easy to assemble in a matter of minutes. The efficiency of the ICS is 27.9%[2]

The stove can be used for a variety of meals such as traditional samp, beans, rice, meale meal and stews. The stove can also be used for boiling water to make safe drinking water. The stove itself is constantly evolving and with the input of the people actually using the stove is constantly improving with every new model. The ICS units will be assembled locally by trained technicians working under the distributors. The CME will impart the initial training for the distributors. The distributors will provide the further training to the technicians employed for installation of the ICS's and further oversee the implementation of the ICS's. The CME will oversee the manufacturing process for the quality control. The model which will be decimated to the households will comprise of one pot stove and one grate (for collection of ash). The stove provided under the PoA will be a portable stove.

[2] As per the Water Boiling Test conducted by 'Energy Cybernetics (Pty) Limited'

Fig 1: Improved cooking stoves to be installed in House holds of South Africa

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

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SSC – CPA to be included under this SSC – PoA must involve the following characteristics

1. The geographical boundary of the SSC-CPA area is uniquely defined and located in Republic of South Africa.
2. The ICS that will be distributed to the households by the distributor who will have a standard contractual agreement with the CMEs. Each ICS covered under the PoA and SSC-CPA will have a unique serial number which will ensure that there is no double counting.
3. The CPA will involve replacement of traditional three stone cook stoves without a grate or a chimney. The ICS that will be distributed under CPA will be new cookstoves. The ICS installed under the CPA will designed based on the technology as described in section A.4.2.1 of the PoA DD. If the CME chooses to implement an ICS based on different technology design it will be ensured that the ICS will have an efficiency certified by the manufacturer greater than 27.9%. It will be ensured that the replaced traditional cook stoves will be disposed of and not used within the boundary
4. The Sales Agreement of the 1st ICS in the CPA will be the start date of the CPA. It will be ensured that the start dates of the CPA's will be after the publication of the PoA for the GSC process.
5. Uses the small scale approved methodology AMS.II.G version 03. The CME will verify that all CPA-DDs employ aforesaid version of the methodology
6. The maximum energy saving of each SSC-CPA will be less than 180 GWh/year which is the small scale threshold defined by AMS II.G and SSC CPA will remain within those threshold level throughout the crediting period of the CPA .
7. SSC CPA included in the PoA meet the requirements pertaining to the demonstration of additionality falls under positive list as specified in para 2(c)"Guidelines for demonstrating

additionality of small-scale project activities" that is "Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size1 of each unit is no larger than 5% of the small-scale CDM thresholds;". The energy saving from ICS supplied for SSC CPA will be lower than the 5% of the Type II threshold of 180 GWh_{th} for small scale project activities. The 5% corresponds to maximum of 9 GWh_{th} saving from each ICS.

8. A Local stakeholder consultation meeting shall be conducted for each of the CPA included in the PoA to gauge the opinions and comments of the stakeholders in the immediate project area. This is a social sector project which will have positive environmental impact through improved indoor air pollution in the households. The use of improved cooking stove technology will reduce the adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel will have sustainable benefit for all households included in the project activity. The distribution of ICS reduce workloads involved in fuel collection, and by reducing indoor air pollution, thus, will reduce the risk of respiratory diseases, especially for women and children. Improved cooking stoves also contribute to environmental protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO2, when the combusted biomass originates from non-renewable stocks. As use of ICS does not entail significant environmental impacts, it is not necessary to undertake an environmental impact assessments for each SSC-CPAs included in the PoA.
9. The ICS distribution under SSC CPA will not result in diversion of official development assistance.
10. The SSC-CPA will involve the distribution of ICS to households. The CPA implementer will distribute the ICS's to the households through the channel of the distribution networks created in each province vis-à-vis the distributors.
11. Sampling plan shall be described in each SSC CPA and consistent with the latest standard /guideline for sampling and survey required by CDM EB.
12. As per the "GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES" in case if each independent subsystem/measures (ICS) included in the CPA of a PoA is no greater than 1% of the small scale threshold defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity. It will be checked that each ICS under SSC CPA is no greater that 1% of the small scale thresholds.
13. The SSC CPA will be a voluntary action.
14. The SSC CPA should in conformance with mandatory laws and regulations.
15. The SSC-CPA is not registered or being registered, as a stand-alone CDM or as a CPA of another PoA.
16. For each verification the number of ICS's installed as the part of the Program that are still operating will be checked for a representative sample of ICS's installed. The representative sample will be determined through the simple random sampling method. Further the CME will depute a third party agency for checking the efficiency of representative sample of the installed ICS's (the representative sample will be determined using the simple random sampling method) annually. Average annual consumption of woody biomass per appliance substituted will also be determined using the simple random sampling procedure for each CPA before the installation of the energy efficient ICS's.

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

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Reduction of anthropogenic GHG emissions by implemented SSC-CPA under PoA

The existing households use traditional stove for cooking purposes which mainly uses non renewable fuel wood, collected from the adjoining areas. Substituting traditionally three stoned cook stoves with that of efficient ICS will help reduce cooking time by effective fuel usage, enhancing the heat transfer rate to the cooking medium. This will also help to reduce the usage of wood used as a fuel by which PoA will be reducing GHG emissions. As per the approved methodology in the absence of project activity baseline scenario will be the use of conventional fossil fuels in the house holds for meeting their energy demands. Hence estimated emission reductions will be calculated based on the annual non-renewable energy savings multiplied by emission factor for fuel pattern used in the area.

The proposed PoA is a voluntary coordinated action

South Africa has no laws and policies mandating the adoption of ICS by house holds. The proposed SSC-PoA is a voluntary action by the CME.

Demonstration of Additionality of Proposed PoA

In accordance with simplified modalities and procedures for small-scale Clean Development Mechanism (CDM) project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in "Guidelines On The Demonstration Of Additionality of Small-Scale Project Activities", Version 09.0, EB 68. As per the paragraph 2 (c) of "Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities", Version 09, EB 68 Annex 27:"2. Documentation of barriers, as per paragraph 1 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of: (c) Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs)[3] and where the size of each unit is no larger than 5% of the small-scale CDM thresholds; "

The PoA involves the dissemination of ICS (isolated units) to the house holds. Furthermore the size of each unit is only 0.0067% of the small-scale CDM threshold.

NCV of Biomass (default value as per AMS II G Version 03)	0.015	TJ/tonne
Conversion from GJ to GWh	3600	GJ/GWh
SSC Type II Limit	180	GWh

[3] That is the size of each unit under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.

Energy per tonne	0.0042	GWh/Tonne
Biomass Saved by Each ICS	2.8871	Tonnes/year
Energy Saved by each ICS	0.0120	GWh/year
Percentage of Type II Limit	**0.0067%**	

Hence the PoA falls under positive list as per paragraph 2 (c) of "Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities", Version 09, EB 68 Annex 27.

Hence additionality is demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur at the PoA level and the same need not be replicated at each SSC_CPA.

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

A.4.4.1. Operational and management plan:

>> The operational and management arrangements as established by the CME for implementing PoA is as follows

(i) A record keeping system for each CPA under the PoA

Pursuant to the sales and installation of ICS units the distributors make sure that data regarding the installations in house hold are electronically archived for claiming emission reductions. This involve various details involving

- Name of customer
- Address and ID number
- Stove model and serial number
- Installation date
- Type of stove(present unit) the cooker is replacing
- Type of fuel which was earlier used in the cook stove

Based on the Sales Agreement, distributors will transfer the information of each ICS to the Installations Record, which will ensure that no ICS is counted more than once under the SSC-CPAs or the PoA. The Installations Record will further be transferred to the CME which is stored in electronic format as well as in the paper format. These records will also serve as the basis for the calculation of CERs.

The information collected by the distributors is screened on a periodic basis by cross checking of the installation records by CME in order to ensure the authenticity of installations.

(ii) a system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA

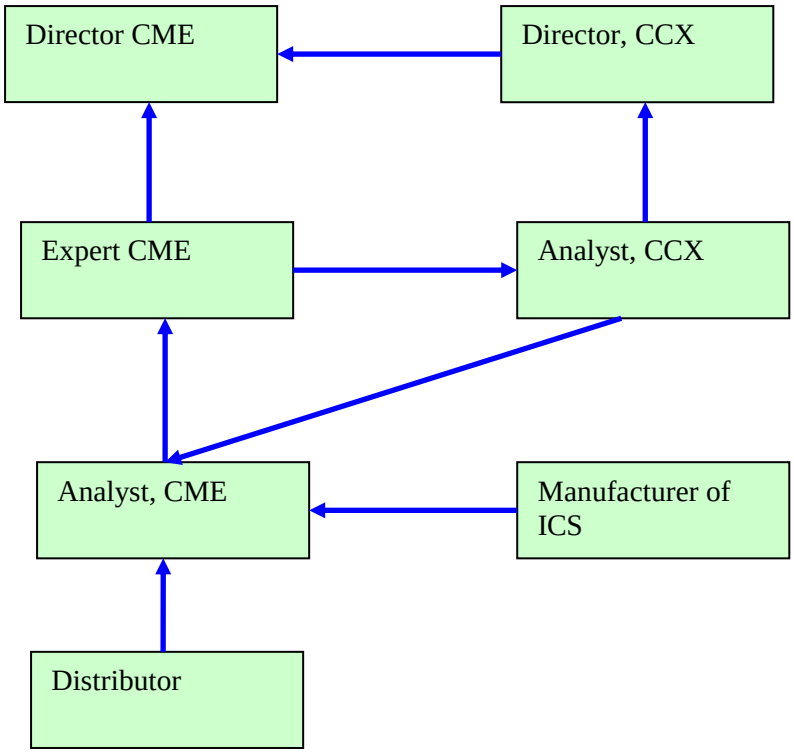
Double counting of the installed biomass efficient cooker is normally avoided by assigning each unit a special Serial number. The record maintaining system with customer's name and address, stove model and serial number, installation date, type of unit the new cooker is replacing ensures that the cooking stove can be traced in a specific CPA to avoid double counting.

As part of the inclusion of a SSC-CPA under the PoA, an agreement will be signed by the distributor and the CME. The agreement will include specific provisions and declarations that confirm the SSC-CPA project distributors agree that the ICS's provided by CME for distribution will be included in the PoA and CME will be the sole owner for the rights of the CER's. a similar agreement will also be signed with the user which details that the ICS distributed by the distributors will be subscribed to the PoA and the CME will be the sole owner of the CER rights.

The CME will impart the initial training for the distributors. The distributors will provide the further training to the technicians employed for installation of the ICS's and further oversee the implementation of the ICS's. Training will be given to technicians on implementation record keeping and maintenance of the ICS. These technicians will be designated for certain number of ICS and will be responsible for data recoding and data storage. Suitable training regarding the rules of the CDM and PoA will be given to each distributor and also to each new ICS technician.

The CME shall develop and implement a management system that includes the following
(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

The management structure involved for the review of the inclusion of the CPA in the PoA is as follows:



The roles and responsibilities of the personnel involved in the management structure are as follows:

Role	Responsibility
Distributor	Will evaluate if the ICS replaces traditional three stone cook stoves without a grate or a chimney. Distributors will also be ensured that the replaced traditional cook stoves will be disposed of and not used within the boundary.
Analyst CME	• Obtains the inputs from the Manufacturer of ICS and the Sales Agreement. • Calculates the energy saving from each ICS and evaluates the additionality as per the guidelines described in section E.5.1 of the POA-DD. • Conduct the Local Stakeholder Consultation Meetings for the CPA The Sampling Plan along with the sample size calculation as determined by Analyst CCX will be employed by Analyst CME for: • Conducting the survey for a representative sample for computing the number of ICS's installed as the part of the Program which are still operating. • Coordinating with the third party agency for calculating the efficiency of representative sample of the operating ICS's once every year. • Calculating the average annual consumption of woody biomass per appliance substituted using the sampling survey before the installation of the ICS.
Expert, CME	• Analyzes the computation sheet provided by Analyst CCX for the computations of the energy savings and approves the additionality of the CPA • Checks the survey results as conducted by Analyst CME. • Forwards the CPA to Director CCX for the inclusion in the POA
Analyst CCX	• Determines the energy savings of the CPA • Analyses if the CPA falls under the positive list as specified in para 2(c)"Guidelines for demonstrating additionality of small-scale project activities". • Determines the Sampling Plan latest standard /guideline for sampling and survey required by CDM EB. • Calculates the sample size in accordance with the latest latest standard /guideline for sampling and survey required by CDM EB.
Director, CCX	• Reviews the additionality as determined by the Analyst, CCX • Reviews the Sampling Plan and the sample size calculations as prepared by Analyst CCX. • Forwards the inclusion of the CPA to the Director, CME

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

Each distributor is responsible for the installation and maintenance of ICSs. The operation of the ICS is carried out by the user, and training on how to operate and maintain the ICS is given by the distributor. The CME will provide the initial training for the distributor; and the training will be penetrated through to the users. The training records for the distributors will be maintained in the database of the CME. Further on the recruiting of the new employee by the distributor in the team to disseminate the ICS; the distributor will inform the CME of the same and CME will impart the initial training to the new employee.

Physical maintenance of the ICS will be provided by the distributor and their technicians. The distributors will follow the monitoring plan and procedures for identifying each stove sold during the course of the project and those which are still in use, so the appropriate number of emission reductions is claimed. To facilitate this process, the distributor will assign a serial number to each ICS during its construction and record this number in the Installations Record. The serial Numbers will be present on each ICS and also on the sales agreement corresponding to the ICS. The distributors are also responsible for collecting the Sales Agreement Contract from the users
Sales Contract and Installations record

(c) 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);

Before the installation of the ICS, the user shall be informed that CDM finance is being used to fund the ICS installation, and the user shall agree, as per the Sales Contract, to:

- Cooperate with the distributor and the CME for monitoring purposes
- Transfer the rights of the CERs to the CME

The Sales Contract will also contain the following information:

- Name of customer
- Address and ID number of the customer
- Stove model and serial number
- Installation date
- Type of Fuel being used in the cook stove replaced
- Type of cook stove being replaced.

The information collected by the distributor is transferred to an electronic database (the Installations Record) which is updated regularly and shared with the CME. The Installations Record carries all the sales information listed above including the actual installation date. The installations record is a key component of the annual monitoring report, since the actual installation date is used to calculate the emission reductions achieved by the ICS installed.
Monitoring
Each SSC-CPA keeps an Installations Record, which lists all ICS installed with a unique serial number per ICS in addition to a record of the location of the stove and the kitchen. All distributors records are screened by the CME together with cross-checks on the distributors installation records in order to confirm that the installation record is authentic and that no double-counting occurs.

(d) Records and documentation control process for each CPA under the PoA;
The Sales Contract will also contain the following information:

- Name of customer
- Address and ID number of the customer
- Stove model and serial number

- Installation date
- Type of Fuel being used in the cook stove replaced
- Type of cook stove being replaced.

The information collected by the distributor is transferred to an electronic database (the Installations Record) which is updated regularly and shared with the CME. The Installations Record carries all the sales information listed above including the actual installation date. The installations record is a key component of the annual monitoring report, since the actual installation date is used to calculate the emission reductions achieved by the ICS installed.

(e) Measures for continuous improvements of the PoA management system;

It will be ensured that the PoA management system will be reviewed annually for the continuous improvements for the management system. There will be a systematic collection and analysis of data to ensure that:

- There is relevant and sufficient documentation of management systems for the scope and scale of ICS implementation.
- The system is focused on providing quality training, assessment and support services.
  - arrangements are in place to meet regularly with distributors to seek feedback and make changes in response
  - appropriate selection processes and ongoing professional development for trainers and assessors
  - strong customer service standards
  - maintenance of and improvements to training and assessment of the distributors.
- Staff know and meet their responsibilities for applying the system, e.g.
  - communication through the organisation about management systems and decisions is effective
  - staff are actively engaged in improving the system
  - checks are made to ensure that key policies and procedures are being implemented appropriately.
- establishing key performance indicators and monitoring organisational performance against them
- gaining and analysing stakeholders' feedback about the overall performance
- internal audit and organisational self-assessment

The CME will also monitor their improvements to determine their effectiveness and make further changes if needed.

De-bundling

In accordance with paragraph 7 of Annex 13 to the EB54 Report, "GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES", if each independent subsystem/measures (ICS) included in the CPA of a PoA is no greater than 1% of the small scale threshold defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity.

The small scale threshold defined by AMS II.G is a maximum energy saving of 180 GWh/year. The calculation in the table below shows that energy saving by individual ICS is lower than 1% of the SSC threshold, hence the SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

NCV of Biomass (default value as per AMS IIG Version 03)	0.015	TJ/tonne

Conversion from GJ to GWh	3600	GJ/GWh
SSC Type II Limit	180	GWh
Energy per tonne	0.0042	GWh/Tonne
Biomass Saved by Each ICS	2.8871	Tonnes/year
Energy Saved by each ICS	0.0120	GWh/year
Percentage of Type II Limit	**0.0067%**	

A.4.4.2. Monitoring plan:

>>

(i) Each distributor keeps a record of all stoves it installs and assigns a unique serial number to each of the ICS in its records. In addition the location of the stove, the type of fuel being replaced and the type of cook stove replaced are also recorded. The records are then transferred to the CME who archives the records both electronically and in paper format. The records are also screened by the CME together with cross-checks on the distributor records in order to confirm that the installation record is authentic and that no double-counting occurs.

(ii) The values of the emission reduction parameters required for ex-post measurement (numbers of stoves dropping out of use (DOF), efficiency of stoves (η_{new}) and the $Quantity_{Aplliance}$ are found from sampling procedures as described in Section E.7 below.

(iii) The electronic files holding installation records are duplicated by paper documents received from individual householders.

(iv) The unique serial number provided to each ICS eliminates any risk of double-counting between CPAs.

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

>>

No public funding or official development assistance (ODA) have or will be diverted for the implementation of the PoA

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

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

>>

04/05/2012 which is the date of web hosting of the PoA for global stakeholder comments.

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

>> The length of the PoA is considered as 28 years.

SECTION C. Environmental Analysis

>>

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

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

The PoA involves the distribution and installation of residential and scholar efficient cooking stoves. These efficient cooking stoves do not entail significant negative environmental impacts. For this reason, it is reasonable to undertake a single environmental analysis at the level of the PoA rather than individual assessments for each SSC-CPA.

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

>>

The implementation of PoA does not impose any severe impacts on the ecological system in the surrounding areas. The project activity included in this PoA helps in reducing the consumption of firewood by efficient fuel combustion there by reducing the pressure of deforestation, reducing indoor air pollution. The use of improved cooking stove technology will reduce the adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel will have sustainable benefit for all households included in the project activity. Theses sustainable benefits have been summarily presented in Section A.2 of this PoA DD. The implementation of the POA reduce workloads involved in fuel collection, and by reducing indoor air pollution, they can reduce the risk of respiratory diseases, especially for women and children. Improved cooking stoves also contribute to environmental protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO2, when the combusted biomass originates from non-renewable stocks.

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

>> As stated above, the typical SSC-CPA will involve the distribution of ICS to households which will have positive environmental impact. The South African law, the National Environmental Management Act 107 of 1998, effective from 1st July 2006, also does not require an environmental impact assessment (EIA) or any other assessment (i.e. basic assessment, scoping report) for the installation/ distribution of ICS. More information on the national EIA law and process available at http://www.eiatoolkit.ewt.org.za/process/what.html

SECTION D. Stakeholders' comments

>>

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

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

Due to the varied demographics amongst the CPA's that will be implemented the CME has decided to conduct the stakeholder meeting for each of the CPA's included in the PoA to gauge the opinions and comments of the stakeholders in the immediate project area.

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

>>
Not Applicable as the stakeholder meeting will be conducted for each SSC CPA.

D.3. Summary of the comments received:

>>
Not Applicable as the stakeholder meeting will be conducted for each SSC CPA.

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

>>
Not Applicable as the stakeholder meeting will be conducted for each SSC CPA.

SECTION E. Application of a baseline and monitoring methodology

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

>>
Type: Type II – Energy Efficiency Improved Projects
Methodology: AMS II.G - Energy efficiency measures in thermal applications of non-renewable biomass
Version: Version 03

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

>>
The implementation of efficient cooking stoves in provincial municipalities of South Africa meets the methodology criteria of AMS II.G version 03 as given.

This category comprises appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples of these technologies and measures include the introduction of high efficiency[4] biomass fired cook stoves[5] or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.	The CPA involved in this POA involves distribution of highly efficient designed cook stoves which reduces the fuel usage ensuring appropriate heat transfer to the cooking medium. The test efficiency conducted by Energy Cybernetics (Pty) Limited[6] using the Water Boiling Test (WBT) protocol indicates that the efficiency of the ICS's distributed will be 27.9%. This project activity results in the saving of

[4] The efficiency of the project systems as certified by a national standards body or an appropriate certifying agent recognized by it. Alternatively manufacturers specifications may be used.
[5] Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.

[6] The testing agency is registered professional member of Council of Measurement and Verification Professionals of South Africa (CMVPSA).

	considerable amount of savings in the biomass which otherwise would have been consumed by less efficient cook stoves.
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.	Non renewable source of energy has been continuously used since 1989. It has been estimated that the total annual demand for the fuel wood consumption is South Africa was 9.8 Million tons in the mid 1980's. The same has been increased to 11.2 Million tons through a recent estimate in 2006 which shows an increase of 1.4 Million tons or an increase of 14%[7]. This substantives that fuel wood has been used in South Africa since 31st December 1989. The value of fuel wood has been increasing from 1990 which was at 27.08 Rand/m^3 to 76.94 Rand/m^3 in 2005, which clearly shows an Increasing trend in fuel wood prices indicating a scarcity of fuel-wood. The values of the fuel wood has been sourced from the section 11.2.3, page Number 44, Global Forest Resources Assessment 2010, Country Report: South Africa[8]. Further it has also been documented in Household Energy Consumption: Community Context and the Fuelwood Transition, Cynthia Macht, William G. Axinn, Dirgha Ghimire, October 2007 that there has also been an increase in the fuelwood collection time "Other factors associated with reduced consumption of fuelwood and instead use of alternative fuels are forest scarcity and increased fuelwood collection time (Heltberg et al. 2000) and household size (Alam et al. 1998; Ouedraogo 2006)"[9]. The increase of fuel wood consumption along with the increase of the number of households coupled with the increase in the price of fuelwood and the increases in time spent for the collection of fuelwood substantiates the fact that Non-Renewable Biomass has been used since 31st December 1989.

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

>>

Emissions sources to be included in, or excluded from, each SSC-CPA boundary in the proposed PoA:

[7] http://www.probec.org/fileuploads/fl1211552009605166 00Synthesis_Report_on_Biomass_Energy_Consumption_and_Availability_in_SA_FINAL.pdf

[8] http://www.fao.org/docrep/013/al630E/al630E.pdf

[9] http://www.psc.isr.umich.edu/pubs/pdf/rr07-629.pdf

Source		Gas	Included	Justification/Explanation
Baseline:	Combustion of non renewable biomass (fire wood) for cooking.	CO_2	Yes	Major Source of emissions
		CH_4	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
		N_2O	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
Project activity:	Implementation of ICS resulting in decrease of combustion of non renewable biomass for cooking	CO_2	Yes	Major Source of emissions
		CH_4	No	Minor source of emissions and limited data available.
		N_2O	No	Minor source of emissions and limited data available.
	Leakage (Diversion of non-renewable biomass saved under the project activity by non-project households that previously used renewable source)	CO_2	Yes	Major Source of emissions
		CH_4	No	Minor source of emissions and limited data available.
		N_2O	No	Minor source of emissions and limited data available.

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

>>

As per Paragraph 4 of the applied methodology AMS IIG Version 03, it is assumed that in the absence of the programme, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

The emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass with an emission factor for fossil fuels. As per AMS-II.G Version 03, the biomass saving is calculated by referring to para 6 of option 2 of the AMS IIG where baseline wood use (B_{old}) was determined through survey methods. As specified in the methodology, a value of 81.6 tCO2/TJ is used as the emission factor for the substitution of non-renewable biomass by similar consumers ($EF_{projected_fossilfuel}$).

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

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

>>

Demonstration of Additionality of Proposed PoA

In accordance with simplified modalities and procedures for small-scale Clean Development Mechanism (CDM) project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in "Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities", Version 09, Annex 27, EB 68. As per the paragraph 2 (c) of "Guidelines on The Demonstration of Additionality Of Small-Scale Project Activities", Version 09, EB 68, Annex 27:
"2. Documentation of barriers, as per paragraph 1 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:
(c) Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs)[10] and where the size of each unit is no larger than 5% of the small-scale CDM thresholds; "

The PoA involves the dissemination of ICS (isolated units) to the house holds. Furthermore the size of each unit is only 0.067% of the small-scale CDM threshold.

NCV of Biomass (default value as per AMS II G Version 03)	0.015	TJ/tonne
Conversion from GJ to GWh	3600	GJ/GWh
SSC Type II Limit	180	GWh thermal
Energy per tonne	0.0042	GWh/Tonne
Biomass Saved by Each ICS	2.8871	Tonnes/year
Energy Saved by each ICS	0.0120	GWh/year
Percentage of Type II Limit	**0.0067%**	

Hence the PoA falls under positive list as per paragraph 2 (c) "Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities", Version 09, EB 68, Annex 27.

Hence additionality is demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur at the PoA level and the same need not be replicated at each SSC_CPA.

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

>>
All the ICSs installations and hence all SSC-CPAs which are going to be included under the registered PoA are deemed additional, if they follow the following key criteria:

- They meet the eligibility criteria for inclusion of a SSC-CPA in the PoA as set in section A.4.2.2
- No public funding or ODA was or will be diverted for the implementation of the SSC-CPA

[10] That is the size of each unit under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.

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

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

>>

The key components in the methodology AMS II.G for calculating net emissions reductions involve differentiation between non renewable biomass and demonstrable renewable biomass and the occurrence of leakage.

Emission reduction calculation

According to paragraph 5 of methodology AMS II.G version 03, emission reductions would be calculated as:

$$ER_y = B_{y,savings} \times f_{NRB} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where:

ER_y : Emission reductions during the year y in tCO_2e

$B_{y,savings}$: Quantity of woody biomass that is saved in tonnes

f_{NRB} : Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass

$NCV_{biomass}$: Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)

$EF_{projected_fossilfuel}$: Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ

From paragraph 6 $B_{y,savings}$ can be estimated from

Option 2

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

Where:

B_{old} : Quantity of woody biomass used in the absence of the project activity in tonnes

η_{old} :

1. Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of system is being replaced;

2. A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney; for other types of systems a default value of 0.2 may be optionally used
As the programme involves replacement of cookstoves without a grate or a chimney the default value of 0.10 is being used.

η_{new} : Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Use weighted average values if more than one type of system is being introduced by the project activity.

As detailed in paragraph 7 of AMS II.G version 03, B_{old} can be determined using one of the following 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.
(b) Calculated from the thermal energy generated in the project activity as

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

Where:

$HG_{p,y}$: Amount of thermal energy generated by the project technology in year (TJ)

The methodology requires choosing one of the two options mentioned above for calculating the "Quantity of woody biomass used in the absence of the project activity (B_{old})".
Option a) has been selected to determine B_{old} based on number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance substituted (tonnes/year).

$B_{old} = N_y \times$ Usage rate $\times$ $Quantity_{Appliance}$
N_y: Number of ICS installed in SSC CPA installed in year y
Usage Rate: Proportion of project ICS installed that are still in operation
$Quantity_{Appliance}$: estimated average annual consumption of woody biomass per appliance substituted (tonnes/year)
The average consumption of woody biomass per cookstove is reported as 4.5 tons per annum per household as estimated in "Synthesis Report: Biomass Energy Consumption and availability in South Africa"[11]. However the average consumption of woody biomass per cookstove will also be computed using the sampling procedures for each CPA. The lower of the woody biomass consumption per ICS amongst the reported value of 4.5 and the value obtained from the sampling procedures will be considered for calculating the emission reductions.

As per paragraph 8 of the approved methodology AMS IIG Version 03, "the Project Participants shall determine the shares of renewable and non-renewable woody biomass in B_{old} (the quantity of woody biomass used in the absence of the project activity) the total biomass consumption using nationally approved methods (e.g. surveys or government data if available) and then determine $f_{NRB,y}$

11 http://www.probec.org/fileuploads/fl1211552009605166 00Synthesis_Report_on_Biomass_Energy_Consumption_and_Availability_in_SA_FINAL.pdf

$f_{NRB,y}$ is determined following the methodology as provided in "Information Note Default Values Of Fraction Of Non-Renewable Biomass For Least Developed Countries And Small Island Developing States", EB 67, Annex 22.

$$fNRB = \frac{NRB}{NRB + DRB}$$

Where:
fNRB - Fraction of non-renewable biomass (fraction or %)
NRB - Non-renewable biomass (t/yr)
DRB - Demonstrably renewable biomass (t/yr)

Parameter	Description	Value	Source
$fNRB = \frac{NRB}{NRB + DRB}$ Equation (1)			
fNRB	Fraction of non-renewable biomass (fraction or %)	89.75%	Calculated
NRB	Non-renewable biomass (t/yr)	14319591	Calculated using equation 2 below
DRB	Demonstrably renewable biomass (t/yr)	1634995.5	Calculated using equation 5 below

A national-level default value for fNRB can be derived by calculating Total Annual Biomass Removals (R) from each country as a proxy for B_y and estimating the proportion of R that is demonstrably renewable (DRB) and non-renewable (NRB).

Parameter	Description	Value	Source
NRB = R − DRB (Equation 2)			
NRB	Non-renewable biomass (t/yr)	14319591	Calculated
R	Total Annual Biomass Removals (t/yr)	15954586.5	Calculated using equation 3 below
DRB	Demonstrably renewable biomass (t/yr)	1634995.5	Calculated using equation 5 below

Total Annual Biomass Removals (R) is inferred by calculating the sum of the Mean Annual Increment in biomass growth (MAI) and the Annual Change in Living Forest Biomass stocks (ΔF).

Parameter	Description	Value	Source
R=MAI+ΔF (Equation 3)			

R	Total Annual Biomass Removals (t/yr)	15954586.5	Calculated
MAI	Mean Annual Increment of biomass growth (t/yr)	15954586.5	Calculated using equation 4 below
ΔF	Annual change in living forest biomass (t/yr)	0	Calculated as a product of Annual change in carbon stock in living Forest Biomass 2005-2010[12] and Carbon stock / Biomass Conversion rate[13]

Mean Annual Increment of biomass growth (MAI) is calculated in equation 4 as the product of the Extent of Forest (F) in hectares and the country-specific Growth Rate (GR) of the Mean Annual Increment:

Parameter	Description	Value	Source
MAI = F × GR	(Equation 4)		
MAI	Mean Annual Increment of biomass growth (t/yr)	15954586.5	Calculated
F	Extent of forest (ha)	9241000	FAO Forest Resource Assessment (FRA) 2010 Global Tables, Table 2
GR	Annual Growth rate of biomass (t/ha-yr)	1.7265	Calculated as a weighted average based on FAO reporting on distribution of total forest area by ecological zone[14] and IPCC above-ground biomass growth rates for different ecological zones[15].

Demonstrably renewable biomass (DRB) is calculated in equation 5 as the product of Protected Area Extent of Forest (PA) in hectares and the country-specific Growth Rate (GR) of the Mean Annual Increment:

[12] FAO Forest Resource Assessment 2010 Global Tables, Table 11

[13] 0.5 is used as a default for the carbon fraction of dry matter

[14] FAO Global Forest Resources Assessment 2000, Table 14; <http://www.fao.org/DOCREP/004/Y1997E/y1997e21. htm#bm73)

[15] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9

Parameter	Description	Value	Source
DRB = PA× GR (Equation 5)			
DRB	Demonstrably renewable biomass (t/yr)	1634995.5	Calculated
PA	Protected Area Extent of Forest (ha)	947000	FAO Forest Resource Assessment (FRA) 2010 Global Tables, Table 6
GR	Annual Growth rate of biomass (t/ha-yr)	1.7265	Calculated as a weighted average based on FAO reporting on distribution of total forest area by ecological zone[16] and IPCC above-ground biomass growth rates for different ecological zones[17].

Leakage

As per the paragraph 13 of the methodology AMS II.G Version 03,

Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

> *(a) The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity then Bold is adjusted to account for the quantified leakage. Alternatively, B_{old} is multiplied by a net gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.*

As per the paragraph 14 of the methodology AMS II.G Version 03 "*If equipment currently being utilized is transferred from outside the boundary to the project activity, leakage is to be considered.*"

The project does not involve any transfer of equipments from outside the project boundary to the project boundary. Thus the above provision on leakage is not applicable.

As per the paragraph 23, of the methodology AMS II.G Version 03,
"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 precision for the selection of samples, and accounted for:

[16] FAO Global Forest Resources Assessment 2000, Table 14; <http://www.fao.org/DOCREP/004/Y1997E/y1997e21. htm#bm73)
[17] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9

(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 B_{old} is adjusted to account for the quantified leakage;
(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 biomass outside the project boundary then B_{old} is adjusted to account for the quantified leakage;
(c) As an alternative to subparagraphs (a) and (b), B_{old} can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required."

B_{old} will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages in line with the paragraph 13 and paragraph 23 of the Approved methodology AMS II.G Version 03.

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

>>

According to paragraph 5 of methodology AMS II.G/v03, emission reductions shall be calculated as

$$ER_y = B_{y,savings} \times f_{NRB} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where value of parameters used for estimation of emission reductions are presented in the table 6.2 below.

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

In order to account for leakage, B_{old} is multiplied by a net to gross adjustment factor of 0.95, in which case surveys are not required. The project does not involve any transfer of equipments from outside the project boundary to the project boundary. Thus this provision on leakage is not applicable.

$B_{old} = N_y \times$ Usage rate $\times$ $Quantity_{Appliance}$
N_y: Number of ICS in SSC CPA installed in year y

Usage Rate: Proportion of project ICS installed that are still in operation
$Quantity_{Appliance}$: estimated average annual consumption of woody biomass per appliance substituted (tonnes/year)

Table 6.2: Parameters used in the estimation of emission reductions with their respective notations, values units

Parameter	Notation	Value	Units	Reference
Number of ICS in SSC CPA installed in year y	N_y		Number	Data base about the installations
Annual average biomass consumption per appliance substituted	$Quantity_{Appliance}$	Lower of 4.5 or the value obtained through simple random sampling procedures for each CPA	Tonnes	Lower of 4.5 tons per household per annum as estimated in "Synthesis Report: Biomass Energy

				Consumption and availability in South Africa"[18] and x.y tons per annum per household as determined through the simple random sampling for the CPA
Efficiency of the system replaced	η_{old}	10.00%	Percentage	Default Value As specified in the approved methodology AMS II.G, Version 03:
Efficiency of the system deployed as a part of project activity	η_{new}	27.90	Percentage	Lower of 27.9% , the efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol or the mean value of the Efficiency of the cook stoves in operation as determined through the simple random sampling for the CPA.
Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass	f_{NRB}	89.75%	Percentage	Calculated as described in E.6.1
Net Calorirific value of the non-renewable woody biomass which is substituted	$NCV_{biomass}$	0.015	TJ/tonne	As specified in the approved methodology AMS II.G, Version 03 IPCC default for wood fuel,

18 http://www.probec.org/fileuploads/fl1211552009605166 00Synthesis_Report_on_Biomass_Energy_Consumption_and_Availability_in_SA_FINAL.pdf

				0.015 TJ/tonne
Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ	$EF_{projected_fossilfuel}$	81.6	tCO_2/TJ	As specified in the approved methodology AMS II.G Version 03. Use a value of 81.6 tCO2/TJ
Gross Adjustment Factor	AF	0.95		As per methodology AMS II.G, version 03.
Leakage emissions	L_y	0	tCO_2	

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

Data / Parameter:	η_{old}
Data unit:	Percentage
Description:	Efficiency of the system being replaced (Traditional Cooking Stoves)
Source of data used:	Paragraph 5 of AMS II.G, Version03
Value applied:	10%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The default value of 0.10 is used as the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney.
Any comment:	This parameter shall remain fixed for the monitoring periods.

Data / Parameter:	f_{NRB}
Data unit:	Percentage
Description:	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data used:	Calculated as described in Section E.6.1
Value applied:	89.75%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data available from public domain has been used to calculate f_{NRB}
Any comment:	This parameter shall remain fixed for the monitoring periods.

Data / Parameter:	$NCV_{biomass}$
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted

Source of data used:	Paragraph 5 of AMS II.G/v03
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the methodology AMS II.G/v03
Any comment:	This parameter shall remain fixed for the monitoring periods.

Data / Parameter:	$EF_{projected_fossilfuel}$
Data unit:	tCO_2/TJ
Description:	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data used:	AMS IIG Version 03
Value applied:	81.6
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per methodology has been applied
Any comment:	This parameter shall remain fixed for the monitoring periods.

Data / Parameter:	**AF**
Data unit:	Fraction
Description:	Gross adjustment factor
Source of data used:	Paragraph 13a. of AMS II.G, Version 03
Value applied:	0.95
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value applied as per the methodology
Any comment:	This parameter shall remain fixed for the monitoring periods.

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

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

Data / Parameter:	$Quantity_{Appliance}$
Data unit:	tonnes/appliance/year
Description:	Average annual consumption of woody biomass per appliance substituted
Source of data to be used:	Estimated using Historical data and Local Survey

Value of data applied for the purpose of calculating expected emission reductions in section B.5	The value lower of 4.5 or the value obtained through sampling procedures for each CPA will be considered
Description of measurement methods and procedures to be applied:	Average annual consumption of woody biomass per appliance substituted for each CPA before the installation of the energy efficient ICS's will also be calculated using the simple random sampling procedure as described in section E.7.2. The value lower of 4.5 or the value obtained through sampling procedures for each CPA will be considered.
QA/QC procedures to be applied:	The sample size shall be chosen for a 90/10 precision (90% confidence interval and 10% margin of error). In cases where the result indicates that 90/10 precision is not achieved, the lower bound of 90% confidence interval of the parameter value will be chosen as an alternative to repeating the survey efforts to achieve the 90/10 precision.
Any comment:	The data will be archived for the period of crediting period of CPA + 2 years or the date of last issuance + 2 years whichever is later

Data / Parameter:	$\mathbf{N_y}$
Data unit:	Number
Description:	Number of ICS in SSC CPA installed in year y
Source of data to be used:	Records of the installation as per the Sales agreement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Varies according to each SSC CPA
Description of measurement methods and procedures to be applied:	The Sales agreement will be stored in paper format as well as the same will be transferred to electronic database which will be maintained by the CME.
QA/QC procedures to be applied:	The database is periodically checked by the CME for consistency and accuracy. Each stove will have unique serial Number which will ensure there is no double counting
Any comment:	The data will be archived for the period of crediting period of CPA + 2 years or the date of last issuance + 2 years whichever is later

Data / Parameter:	η_{new}
Data unit:	Percentage
Description:	Efficiency of stove being deployed as part of the project activity
Source of data to be used:	Annual Water-Boiling test on a representative sample

Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.279
Description of measurement methods and procedures to be applied:	Water boiling test will be carried annually on representative samples of improved stoves in use, by third party. The efficiency check will be carried out annual. The efficiency of the ICS's operating will be determined through the representative sampling method. The mean value of the efficiency of the ICS's in operation will be considered for the emission reduction calculation.
QA/QC procedures to be applied:	The CME will supervise WBT with expert independent assistance/ third parties. Water Boiling Test will be carried out for a random sample of deployed efficient stoves. Each SSC-CPA will test stove efficiency among a statistically significant sample of end users using a water-boiling test. The sample size shall be chosen for a 90/10 precision (90% confidence interval and 10% margin of error). In cases where the result indicates that 90/10 precision is not achieved, the lower bound of 90% confidence interval of the parameter value will be chosen as an alternative to repeating the survey efforts to achieve the 90/10 precision.
Any comment:	The test efficiency conducted by Energy Cybernetics (Pty) Limited indicates that the efficiency of the ICS's distributed will be 27.9% which is the specified efficiency assumed for ex-ante emission reduction of the PoA. For the purpose of ex-post emission reduction calculation for the CPA's, the ex-post monitored value of the efficiency of the operating ICS shall be used. The data will be archived for the period of crediting period of CPA + 2 years or the date of last issuance + 2 years whichever is later

Data / Parameter:	Usage rate
Data unit:	Fraction
Description:	Proportion of project ICS's installed that are still in operation
Source of data to be used:	Survey
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-
Description of measurement methods and procedures to be applied:	Surveys will be conducted on a representative sample of end-users taken from the CPA sales database
QA/QC procedures to be applied:	The sample size shall be chosen for a 90/10 precision (90% confidence interval and 10% margin of error). In cases where the result indicates that 90/10 precision is not achieved, the lower bound of 90% confidence interval of the parameter value will be chosen as an alternative to repeating the survey efforts to achieve the 90/10 precision.
Any comment:	The data will be archived for the period of crediting period of CPA + 2 years or

	the date of last issuance + 2 years whichever is later

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

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As per approved methodology AMS IIG, Version 03:

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

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

Due to the large number of ICS that will be installed the annual check of efficiency will be done as per the latest standard /guideline for sampling and survey required by CDM. For each verification the number of ICS's installed as the part of the Program that are still operating will be checked for a representative sample of ICS's installed.
Further the CME will depute a third party agency for calculating the efficiency of representative sample of the operating ICS's (the representative sample will be determined using the simple random sampling method), once every year. The mean value of the efficiency of the sample of ICS's in operation will be used for the calculation of the emission reductions. Water Boiling Test (WBT) will be performed on the representative sample to check the efficiency of the operating ICS's.

The average annual consumption of woody biomass per appliance substituted will also be determined using the sampling procedure for each SSC CPA before the installation of the ICS.

The old stoves would be disposed of during installation of ICS and records shall be maintained. Alternatively, the efficiency tests on a sample of ICS will also investigate the extent to which traditional stoves are destroyed and no longer used, even in a secondary role, in the houses adopting the ICS,

As per approved methodology AMS IIG, Version 03 the following guidance is being used for the representative sampling method:A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the .General guidelines for sampling and surveys for small-scale CDM project activities. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision is not achieved, the lower bound of a 90% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10.

Sample size will be chosen for a 90/10 precision (90% confidence interval and 10% margin of error); in cases where survey results indicate that 90/10 precision is not achieved, the lower bound of a 90% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve a 90/10 precision.

As per Annex 5, EB 69, "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", Version (02.0) the following Sampling plan has been developed

(a) Sampling Design:

(i) Objectives and Reliability Requirements:

The objective of the sampling effort is to determine Number of project ICS's that are still in operation and to calculate the mean value of the efficiency of representative sample of appliances that are in operation.

Further the average annual consumption of woody biomass per appliance substituted will also be determined using the simple random sampling procedure for each CPA before the installation of the energy efficient ICS's.

As per approved methodology AMS IIG, Version 03 the following guidance is being used for the representative sampling method:

A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the .General guidelines for sampling and surveys for small-scale CDM project activities. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision is not achieved, the lower bound of a 90% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10.

(ii) Target Population:

The target population represents the households in the areas which the specific CPA will cover. The target population vis-à-vis the number of ICS's will vary according to the specific CPA. However maximum energy saving of each CPA will be less than 180 GWh/year which is the small scale threshold defined by AMS II.G. The saving of 180 GWh/year corresponds to maximum of 14,963 ICS's per CPA. Thus the target population for each CPA will be less than 14,963 ICS's.

(iii) Sampling Method:

As population is homogenous with respect to the use of the ICS's the selected sampling method is simple random sampling. The samples will be selected using the Random Number tables.

(iv) Sample Size:

The Sample size will be calculated using the Annex 5, EB 69, "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", Version (02.0)

The parameters of interest includes:

- For each verification of the CPA: Proportional Parameter: (a) Number of project ICS that are still in operation
- Once every year after the start date of each CPA: Mean Value Parameter: (a) the mean value of the efficiency of representative sample of appliances that are in operation
- One time for each CPA before the installation of the energy efficient ICS's: the Mean value parameter: (b) the average annual consumption of woody biomass per appliance substituted

For all of the parameters 90% confidence is required that the margin of error in the estimate is not more than ±10% in relative terms.

Sample Size calculation for Proportional parameter of interest ((a) Number of project ICS that are still in operation):

For each CPA, the following have to be pre-determined in order to estimate the sample size:
(a) The value that the proportion is expected to take;
(b) The level of precision, and confidence in that precision (90/10 for all small-scale examples).

The minimum sample size is calculated using the procedure outlined in para 48, Annex 5, EB 69, "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", Version (02.0).

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(1-p)}$$

Where:
n = sample size
N = N_y = Number of ICS in SSC CPA installed in year y = Total number of households (ICS users) (varies according to the CPA, but is considered in the below calculation as maximum of 14,963 ICS's per CPA)
p = our expected proportion (0.8 assuming 80% of the installed ICS's will be in use and operating at the specified efficiency as per the Project Planner's knowledge in accordance with the para 12 (b) of "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities", Version 03, EB 69, Annex 04)
1.645 = represents the 90% confidence required
0.1 = represents the 10% relative precision

Substituting the values in above equation gives the value of n = 68 households (rounded up). If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 will be chosen.

Sample Size Calculation for Mean value parameter of interest: (a) the mean value of the efficiency of representative sample of appliances that are in operation (b) the average annual consumption of woody biomass per appliance substituted:

The minimum sample size is calculated using the procedure outlined in para 83, Annex 5, EB 69, "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", Version (02.0).

$$n \geq \frac{1.645^2 NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

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

Where:
n = sample size. If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 will be chosen.
N = N_y = Number of ICS in SSC CPA installed in year y = Total number of households (ICS users) (varies according to the CPA, but is considered in the below calculation as maximum of 14,963 ICS per CPA)
1.645 = represents the 90% confidence required
0.1 = represents the 10% relative precision
mean = Our expected mean
SD = Our expected standard deviation

(v) Sampling Frame:

The sampling frame consists of all the households which will have the Energy Efficient Improved Cooking stoves (ICS) installed. The sample to be surveyed will be drawn randomly with a geographical spread within the project boundary of the specific CPA.

(b) Data:

(i) Field Measurements:

The objective of the sampling effort to check the Number of project ICS that are still in operation and to calculate the mean value of the efficiency of representative sample of appliances that are in operation.

Further the average annual consumption of woody biomass per appliance substituted will also be determined using the simple random sampling procedure for each CPA before the installation of the energy efficient ICS.

The survey will be conducted with the objective to target 10 percent precision and to achieve 90 percent confidence.

The consumption of woody biomass per appliance substitute might depend on season. During the survey, the consumption of firewood would be determined separately for first week of 4 quarters of the year. The

average values of consumption of woody biomass per appliance substituted during 4 quarters would be combined to determine the annual consumption of woody biomass per appliance substituted. Beside this parameter, other parameters not subject to seasonal fluctuations.

(ii) Quality Assurance/Quality Control:

The overall monitoring and the implementation of the sampling plan will be co-ordinated by the CME and the management staff. They will ensure successful monitoring of the emission reductions of the proposed project during its crediting period. Furthermore, the survey of the representative sample for the parameters will be carried out by the Distributor in conjecture with the CME. The CME will employ third party agencies to undertake the efficiency tests for the representative samples of ICS installed and in operation.

During the survey, in order to anticipate any low response rate and answers bias, minimum of 10% oversampling will be applied over the determined sample size. The survey team will ensure that all questionnaires are filled. To remedy the incomplete questionnaires, additional households will be drawn randomly until the required number is met at per the sample size determined.

There might be changes of getting outliers while sampling. The following approach will be used to identify and address outliers for the samples during monitoring. Outliers will be defined as those data points with values greater than three standard deviations from the mean of the sample.

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.

(iii) Analysis:

The data from the survey will be analyzed to

- determine the mean value of the efficiency of the ICS that are still operating (η_{new}),
- to determine Number of project ICS that are still in operation and
- the average annual consumption of woody biomass per appliance substituted ($Quantity_{Appliance}$).

(c) Implementation:

(i) Implementation Plan:

Survey Implementation Schedule:

The survey for the representative sample to determine the consumption of woody biomass per appliance substitute will be carried out once before the CPA implementation. The consumption of woody biomass per appliance substitute would be determined separately for first week of 4 quarters of the year. Hence the survey for the determination o consumption of woody biomass per appliance will be scheduled during the first week of the each quarter.

The survey for collecting the details of the number of ICS in operation will be conducted every year and will be scheduled during the last month of the monitoring period.

The survey for the operating efficiency of the ICS's will be conducted once every year and will be scheduled during the last month of the monitoring period.

The overall monitoring and the implementation of the sampling plan will be co-ordinated by the CME and the management staff. They will ensure successful monitoring of the emission reductions of the proposed project during its crediting period. Furthermore, the survey of the representative sample for the parameters will be carried out by the Distributor in conjecture with the CME. The CME will employ third party agencies to undertake the efficiency tests for the representative samples of ICS's installed.

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

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Date: 14/04/2012.
Core CarbonX Solutions Pvt Ltd.
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Core CarbonX Solutions Private Limited is not a project participant as listed in Annex 1.

Annex 1

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

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding or ODA have or will be diverted for the implementation of the PoA

Annex 3

BASELINE INFORMATION

Please refer Section E.6.1 of SSC-PoA-DD

Annex 4

MONITORING INFORMATION

Please refer Section E.7.2 of SSC-PoA-DD

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