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

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NOTE:

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

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

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

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

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

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

>>
Installation of Energy Efficient Cookstoves in [Name of the town] in [Name of the province], South Africa: CPA xxx
Version: [Version Number]
Date: dd/mm/yyyy
Version Number of Generic CPA: 02.1
Date of Revision for Generic CPA: 29/11/2012

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

>>
The proposed small scale CPA xxx involves the installation of energy efficient improved biomass based improved cooking stoves (ICS) in the households of [Name of the towns] in [Name of the province], South Africa. The total number of households which will constitute in the CPA xxx is [Number of households]. Thus the estimated number of ICS that will be installed as a part of CPA will be [Number of cookstoves]. The ICS installed as part of the CPA xxx will replace the traditional three stone cook stoves without a grate or a chimney. The three stone cook stove 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 wood, which is non renewable biomass is wasted, as heat is allowed to escape into the open air. Furthermore, these open fires and primitive cookstoves 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.

The project will reduce deforestation and degradation of forests in the Republic of 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 of indoor air pollution. Implementation of the CPA xxx will reduce the usage of non renewable biomass i.e. fuel wood for house hold activities. Thus the CPA xxx will reduce the GHG emission occurring from the combustion of non renewable biomass, i.e. fuel wood, there by also contributing to sustainable development.

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 (CPA xxx) in South Africa. Under the scheme, it will coordinate the distribution of ICS by the distributor(s) (co-operative societies) to the households in the region xxxx.

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 CPA xxx 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 CPA xxx are aware and have agreed that their activity is being subscribed to the SSC-PoA.

Core CarbonX Sols Pvt Ltd

Core CarbonX 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.

The proposed SSC-CPA is a voluntary action by the Co-ordinating Managing Entity (CME) - Clean Air Renewable Energy (Pty) Ltd (CARE). The annual emission reduction from CPA xxx will be xx,xxx tCO2e.

Contribution to sustainable development

Environmental Benefits:

- ICS adopted households will be subjected to lesser level of indoor air pollution viz 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.

- 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:

- Implementation of project activity results in employment opportunities for people involved with installation, maintenance and sales of these house hold biomass based cookers.
- Program will improve the status of living of people in house holds since the community level implementation of units of these kind 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.
- Business development component of the CPA xxx 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.
- Adaptation of locally manufactured technology using available raw materials with optimised energy efficiencies leads to build a technical self-reliance.

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

>> Clean Air Renewable Energy (Pty) Ltd (CARE) is the coordinating/managing entity ("CME") for this SSC-PoA will be implementing the CDM Programme Activities (CPA xxx) in the region xxxx of South Africa.

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

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 ICS and draft apertures at the top of the ICS create a tornado effect which makes the ICS 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 ICS thus preventing large logs being used and fuel wastage. Once the ICS has been lit the top pot can be placed in the ICS 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 ICS 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 ICS. The ICS itself can be moved around via the 8mm stainless steel handle.

The ICS 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%[3].

The ICS can be used for a variety of meals such as traditional samp, beans, rice, meale meal and stews. The ICS can also be used for boiling water to make safe drinking water. The ICS itself is constantly evolving and with the input of the people actually using the ICS 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 and further oversee the implementation of the ICS. 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.

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

>>
Installation of Energy Efficient Cookstoves in [Name of the town] in [Name of the Province], South Africa: CPA xxx

A.4.1.1. Host Party:

>>
Republic of South Africa

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

>>
The proposed small scale CPA ("hereafter SSC-CPA") involves the installation of energy efficient improved biomass based cooking stoves (ICS) in the households of [Name of the towns] in [Name of the Province(s)], South Africa. The total number of households which will constitute in the CPA is [number of households]. The GPS Co-ordinates of the districts are provided in the below table.

DITRICT	TOWN	GPS CO-ORDINATES	HOUSEHOLDS
XXX	XXX	XXX	XXX

Name/contact details of the entity/individual responsible for the CPA:
Mr. Ricki Allen
Clean Air Renewable Energy (Pty) Limited
Telco House, 9 Brands Hatch Close, Kyalami Business Park
Johannesburg, Gauteng 1684
South Africa

[3] As per the water boiling test (WBT) done by M/s. Energy Cybernetics (Pty) Limited

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

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

>>
The first User Agreement in the CPA xxx is entered on xx/xx/20xx which will be the start date of the CPA

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

>>
10 years

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

Fixed Crediting period

A.4.3.1. Starting date of the crediting period:

>>
xx/xx/20xx or Date of Registration of PoA-DD, whichever comes later.

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

>>10 years

NOTE: Please note that the duration of crediting period of any *CPA* shall be limited to the end date of the *PoA* regardless of when the CPA was added

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

>>

Year	Estimations of emission reductions
Year A	xxxxx
Year B	xxxxx
Year C	xxxxx
Year D	xxxxx
Year E	xxxxx
Year F	xxxxx
Year G	xxxxx
Year H	xxxxx
Year I	xxxxx
Year J	xxxxx
Total estimated reductions(tCO_2e)	xxxxx
Total number of crediting years	10
Annual average emission reductions (tCO_2e)	xxxx

A.4.5. Public funding of the CPA:

>>

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

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

>>

All CPA included under this PoA are exempted from the de-bundling check as energy savings from each ICS is less than 1% of the small scale threshold defined by the methodology AMS II.G. This is based on the para 10 from EB 54, Annex 13, II. Guidance for determining the occurrence of debundling under a Program of Activities (PoA): " 10. If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in the CPA of a PoAis no greater 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. considered as not being a de-bundled component of a large scale activity."

The calculation in the table below shows that energy savings for individual subsystem dont exceed 1% of the SSC threshold, hence the CPA xxx 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	[Biomass Savings]	Tonnes/year
Energy Saved by each ICS	[Energy Saving]	GWh/year
Percentage of Type II Limit	**[% of Type II Limit]**	

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

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<Text showing that the CPA xxx is neither an individual CDM project activity or is part of another registered PoA>. It follows that the proposed CPA xxx is neither registered as an individual CDM project activity or is part of another registered PoA.

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

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

>>

Energy Efficient Cook stoves in South Africa

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

>>

Serial Number	Eligibility Criteria for inclusion in the PoA	Verification of the eligibility condition
1.	The geographical boundary of the SSC-CPA area is uniquely defined and located in Republic of South Africa.	The CPA xxx is implemented in the households of [Name of the towns] in [Name of the province], in the Republic of South Africa.
2	The ICS distributed to the households by the distributor will have a standard contractual sale 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.	All the ICS will be distributed through distributors through contractual sale agreement. The ICS in the CPA xxx will have unique serial number from [initial serial number] to [final serial number] which ensures 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 in 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	The CPA xxx will be replacing traditional three stone cook stoves without a grate or a chimney. The sales agreement contains the record of the disposal of the replaced traditional cook stoves. The CPA xxx will either install the ICS based on the design technology as described in section A.4.2.1 of the PoA DD or implement ICS with the efficiency as specified by the manufacturer greater than 27.9%.
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 global stakeholder consultation (GSC) process through a dedicated interface on the UNFCCC CDM website	The Sales Agreement of the 1st ICS in the CPA xxx will be the start date of the CPA xxx and the same is after the publication of the PoA for the GSC process dated 04/05/2012
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	The CPA xxx will use version 3 of the AMS II G methodology.
6	The maximum energy saving of each SSC-CPA will be less than 180 GWh thermal /year which is the small scale threshold defined by AMS II.G and SSC CPA remain within those threshold level throughout the crediting period of the CPA .	The maximum energy saving of the CPA xxx is [Amount of Energy Saving] GWh/year is less 180 GWh thermal/year which is the small scale threshold defined by AMS II.G

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.	The energy saving from ICS supplied for CPA xxx is less 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.	A local stake holder meeting for the implementation of Installation of Energy Efficient Cookstoves for CPA xxx in [Name of the town(s)] in [Name of the Province], South Africa: was conducted at [Name of the location] on [Date]. The proposed small scale CPA xxx involves the installation of energy efficient improved biomass based cooking stoves (ICS) in the households of [Name of the towns] in [Name of the province], South Africa. As their use does not entail significant environmental impacts, it is not necessary to undertake an environmental impact assessments for CPA xxx.

9	The ICS distribution under SSC CPA will not result in diversion of official development assistance.	The CPA xxx doesn't involve diversion of public funding or ODA. The same is confirmed by the letter from [Implementer]
10	The SSC-CPA will involve the distribution of ICS to households. The CME will distribute the ICS's to the households through the channel of the distribution networks.	The target group for the implementations involves the households. The CME will distribute the ICS's to the households through the channel of the distribution networks.
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.	Sampling plan is carried out for CPA xxx and it is 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.	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 AMS IIG. Thus, the CPA xxx is considered as being not a de-bundled component of a large scale activity.
13	The SSC CPA will be a voluntary action.	The CPA xxx is a voluntary action[Name of the Implementer]. The same is confirmed by the letter from [Implementer]
14	The SSC CPA should in conformance with mandatory laws and regulations.	The CPA xxx is 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.	CPA xxx 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	The average annual consumption of woody biomass per appliance substituted has been determined using the simple random sampling procedure for CPA: xxx as [Average fuel wood consumption in tonnes / household / annum]

	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.	

Thus the CPA xxx meets the eligibility criteria for the inclusion in the PoA titled "Energy Efficient Cook stoves in South Africa"

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

>>

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

The existing households use traditional stove for cooking purposes which mainly uses non renewable fire wood, collected from the adjoining areas. Substituting traditionally used three stone cooking conventional 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 CPA xxx 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 CPA is a voluntary coordinated action

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

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, 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)[4] and where the size of each unit is no larger than 5% of the small-scale CDM thresholds; "

[4] 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.

The CPA xxx involves the dissemination of ICS (isolated units) to the house holds. Furthermore the size of each unit is only [%] of the small-scale CDM threshold which is less than 5% of the small scale threshold.

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	[Biomass Savings]	Tonnes/year
Energy Saved by each ICS	[Energy Saving]	GWh/year
Percentage of Type II Limit	**[% of Type II Limit]**	

Hence the CPA xxx 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.

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

>>

As per the paragraph 3 of the methodology AMS II.G - Energy efficiency measures in thermal applications of non-renewable biomass "The project boundary is the physical, geographical site of the efficient systems using biomass".

The CPA xxx is limited to the [Name of the town] in [Name of the Province], South Africa. Hence the CPA xxx is within the geographical boundary of the PoA.

Source		Gas	Included	Justification/Explanation
Baseline:	Combustion of non renewable biomass for cooking.	CO_2	Yes	Major Source of emissions
		CH_4	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
		N_2O	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
Project activity:	Implementation of energy efficient ICS's 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.

B.5. Emission reductions:

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

>>

Data / Parameter:	$Quantity_{Appliance}$
Data unit:	tonnes/appliance/year
Description:	Average annual consumption of woody biomass per appliance substituted
Source of data used:	Estimated using Historical data and Local Survey
Value applied:	Lower of 4.5 tones per household per annum as estimated in "Synthesis Report: Biomass Energy Consumption and availability in South Africa"5 and [Fuel wood consumption in tonnes per annum per household] as determined through the simple random sampling for the CPA xxx
Justification of the choice of data or description of measurement methods and procedures actually applied :	Average annual consumption of woody biomass per appliance substituted for each CPA before the installation of the ICS 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 xxx will be considered.
Any comment:	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. The Average annual consumption of woody biomass per appliance substituted is fixed ex-ante as [Fuel wood consumption in tonnes per annum per household] for the CPA xxx for the entire crediting period

Data / Parameter:	η_{old}
Data unit:	Percentage

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

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 of the PoA
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.

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

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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.

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

As detailed in paragraph 7 of AMS II.G version 03, B_{old} can be determined as:

(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.

$B_{old} = N_y \times$ Usage rate $\times$ $Quantity_{Appliance}$

N_y: Number of ICS in SSC CPA installed in year y

Usage Rate: Proportion of project ICS's 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 considered lower of the value of 4.5 tons per annum per household as estimated in "Synthesis Report: Biomass Energy Consumption and

availability in South Africa"[6] and [Fuel wood consumption in tonnes per annum per household] as determined through the simple random sampling for the CPA has been considered as $Quantity_{Appliance}$

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.

Parameter	Notation	Value	Units	Reference
Number of ICS in SSC CPA installed in year y	N_y	[Number of cookstoves]	Number	Data base about the installations
Annual average biomass consumption per appliance substituted.	$Quantity_{Appliance}$	4.5 or [Fuel wood consumption in tonnes per annum per household]	Tonnes	Lower of 4.5 tones per household per annum as estimated in "Synthesis Report: Biomass Energy Consumption and availability in South Africa"[7] and [Fuel wood consumption in tonnes per annum per household] as determined through the simple random sampling for the CPA
Proportion of ICS installed that are still in operation	Usage rate	[Usage Rate]	Proportion	Local Survey
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	η_{new}	27.90	Percentage	Lower of 27.9% , the efficiency of

6 http://www.probec.org/fileuploads/fl121155200960516600Synthesis_Report_on_Biomass_Energy_Consumption_and_Availability_in_SA_FINAL.pdf

7 http://www.probec.org/fileuploads/fl121155200960516600Synthesis_Report_on_Biomass_Energy_Consumption_and_Availability_in_SA_FINAL.pdf

activity				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 ICS 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 of the PoA
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, 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	

B_{old} = AF * N * Usage Rate * $Quantity_{Appliance}$ = 0.95*[Number of ICS installed] * [Proportion of ICS installed that are still in operation] * [Fuel wood consumption in tonnes per annum per household] = [Amount in Tonnes] tonnes

$B_{y,savings} = B_{old} \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$ = [Amount in Tonnes] * (1-0.1/0.279) = [Savings of fuelwood in Tonnes] tonnes

ER_y = [Savings of fuelwood in Tonnes] * 0.8975 * 0.0150 * 81.6 = [Emission Reductions] tCO2e

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

>>

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
Year A				
Year B				
Year C				
Year D				
Year E				
Year F				
Year G				
Year H				
Year I				
Year J				
Total (tonnes of CO_2 e)				

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

>>

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 through representative sampling methods.

For each verification the number of ICS installed as the part of the CPA xxx that are still operating will be checked for a representative sample of ICS installed. The representative sample will be determined through the simple random sampling method.

Further the CME will depute a third party agency for calculating the efficiency of representative sample of the operating ICS (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 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.

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 the 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.

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 of [Name of the towns] in [Name of the province], South Africa covered by CPA xxx. The target population vis-à-vis the number of ICS as distributed in the CPA xxx is [Number of households]. Thus the target population is [Number of household].

(iii) Sampling Method:

As population is homogenous with respect to the use of the ICS 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 xxx: Proportional Parameter: (a) Number of project ICS installed that are still in operation
- Once every year after the start date of each CPA xxx: Mean Value Parameter: (a) the mean value of the efficiency of representative sample of appliances that are in operation

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 installed that are still in operation):

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

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)

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

Where:
n = sample size

N = N_y = Number of ICS in SSC CPA installed in year y = Total number of households (ICS users) ([Number of Households] as per CPA xxx)
p = our expected proportion ([proportion] assuming [proportion] of the installed (ICS) will be in use and operating at the specified efficiency)
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 = [Number of households to be sampled] (rounded up)

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:

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
N = N_y = Number of ICS in SSC CPA installed in year y = Total number of households (ICS users) (([Number of Households] as per CPA xxx)
1.645 = represents the 90% confidence required
0.1 = represents the 10% relative precision
mean = Our expected mean
SD = Our expected standard deviation

The sample of households determined for the mean value of the efficiency will not be a sub set of the sample of households determined to check Number of ICS installed that are still in operation

(v) Sampling Frame:

The sampling frame consists of all the households which will have the ICS installed. The sample to be surveyed will be drawn randomly with a geographical spread within the project boundary of the specific CPA xxx.

(b) Data:

(i) Field Measurements:

The objective of the sampling effort to check the 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.

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

(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, 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

- 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

(c) Implementation:

(i) Implementation Plan:

Survey Implementation Schedule:

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 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 installed.

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 operating will be determined through the representative sampling method. The mean value of the efficiency of the ICS 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 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.

Data / Parameter:	**N**
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	[Number of ICS installed]
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:	

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:	

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

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

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

>>

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

>>

SECTION D. Stakeholders' comments

>>

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

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

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

>>

A local stake holder meeting for the implementation of Installation of Energy Efficient Cookstoves in [Name of the town(s)] in [Name of the Province], South Africa: CPA xxx was conducted at [Name of the location] on [Date].

The stakeholder will comprise of but not limited to:

- community members,
- users of cooking stoves,
- tribal elders,
- church stewards, and
- other committee members

As applicable, dependent on local conditions in each CPA, the following methods of invitation may be used:

- Public Invitation: a newspaper notice was taken out sufficient days prior to the stakeholder meeting
- Public Notices: fliers were placed at strategic locations in the target CPA area
- Personal Invitation: Important stakeholders and individuals were identified and a private invitation was sent to them.

The stake holder meeting process was conducted in the following sequence.

- Welcome Address
- Election of the Chair of the meeting and approval of the proposed Agenda
- Explanation of the CDM-Kyoto Protocol and role of local stake holder

- Brief description of the cook stoves which includes the demonstration of the operation of the cook stove
- Explanation of PoA: understanding CPA process, who is involved, project phases and timelines
- Discussion and Articulation of concerns
- Chair summarizing the local stake holder concerns
- Vote of Thanks

D.3. Summary of the comments received:

>>

The following table provides the list of comments received during the stake holder consultation meeting.

Clarifications sought by the stake holders and answered by CME:

Sl No.	Question	Answer
1.		
2.		
3.		
4.		
5.		

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

>>

The clarifications requested by local stake holders attending the meeting were addressed.

Annex 1

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

Organization:	Clean Air Renewable Energy (Pty) Limited
Street/P.O.Box:	9 Brands Hatch Close, Kyalami Business Park
Building:	Teleco House
City:	Johannesburg
State/Region:	Gauteng
Postfix/ZIP:	1684
Country:	South Africa
Telephone:	
FAX:	+27 86 683 0830
E-Mail:	ricki@cdmcare.co.za
URL:	www.justcare.co.za
Represented by:	
Title:	Mr
Salutation:	
Last Name:	Allen
Middle Name:	
First Name:	Ricki
Department:	
Mobile:	+27 82 442 4812
Direct FAX:	+27 86 683 0830
Direct tel:	
Personal E-Mail:	ricki@cdmcare.co.za

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

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 $f_{NRB,y}$

$f_{NRB,y}$ 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[8] and Carbon stock / Biomass Conversion rate[9]

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[10] and IPCC above-ground biomass growth rates for different ecological zones[11].

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

[9] 0.5 is used as a default for the carbon fraction of dry matter

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

[11] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9

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:

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[12] and IPCC above-ground biomass growth rates for different ecological zones[13].

Determination of $Quantity_{Appliance}$

The average annual consumption of woody biomass per appliance substituted is determined as [fuel wood consumption in tonnes / household / annum] using the simple random sampling procedure for CPA xxx.

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 has been 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

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

[13] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9

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 was chosen for a 90/10 precision (90% confidence interval and 10% margin of error).

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 was to calculate the annual consumption of woody biomass per appliance substituted. Sample size was chosen for a 90/10 precision (90% confidence interval and 10% margin of error).

The average annual consumption of woody biomass per appliance substituted is also determined [fuel wood consumption in tonnes / household / annum] using the simple random sampling procedure for CPA xxx.

(ii) Target Population:

The target population represents the households of households of towns of [Name of the towns]. The target population vis-à-vis the number of ICS as distributed in the CPA xxx is [Number of Households] households. Thus the target population is [Number of Households] household.

(iii) Sampling Method:

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

(iv) Sample Size:

The Sample size is 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:

- The Mean value parameter: the average annual consumption of woody biomass per appliance substituted

The minimum sample size is calculated using the procedure outlined in 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
N = N_y = Number of ICS in SSC CPA installed in year y Total number of households (ICS users) ([Number of Households] for CPA xxx)
1.645 = represents the 90% confidence required
0.1 = represents the 10% relative precision
mean = Our expected mean
SD = Our expected standard deviation

The Variance is considered as 1 which is conservative in nature.

Substituting the values in the above equation gives n = 265 households (rounded up)

The average annual consumption of woody biomass per appliance substituted is determined as [fuel wood consumption in tonnes / household / annum] during the survey conducted in the towns of [Name of the towns] for the representative sample size of [number of households (minimum sample size of 266] for the population size of [Number of Households], using the simple random sampling procedure for CPA xxx.

(v) Sampling Frame:

The sampling frame consists of all the households which will have the ICS installed in CPA xxx. The sample to be surveyed has been drawn randomly with a geographical spread within the project boundary of the specific CPA.

(b) Data:

(i) Field Measurements:

The survey has been 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 has been 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 has been 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 were 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.

During the survey, in order to anticipate any low response rate and answers bias, [percentage of oversampling] 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 has been 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 was 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 were examined further to correct for possible transcription and data entry errors, however the same were omitted from the analysis if no such administrative errors exist.

(iii) Analysis:

The data from the survey will be analyzed

- the average annual consumption of woody biomass per appliance substituted ($Quantity_{Appliance}$).

(c) Implementation:

(i) Implementation Plan:

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

The CPA xxx 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[14] biomass fired cook stoves[15] or ovens or dryers and/or	The CPA xxx involved in the POA titled "Energy Efficient Cook stoves in South Africa" 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

[14] 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.
[15] Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.

improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.	Cybernetics (Pty) Limited[16] using the Water Boiling Test (WBT) protocol indicates that the efficiency of the cook stoves distributed will be 27.9%. This project activity results in the saving of 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%[17]. 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[18]. 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)"[19]. The increase of fuel wood consumption along with the increase of the number of households coupled with

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

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

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

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

	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.

Annex 4

MONITORING INFORMATION

Please refer Section B.6.1 of SSC-CPA-DD

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