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.

[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:

Environment Conservation Trust of Uganda CPA1 (ECOTRUSTUg01)
Version 03
Date: 04/08/2014

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

This CPA shall be active in the production, marketing, distribution and sales of brands of portable/fixed (built-in), domestic/institutional, charcoal/firewood improved cook stoves (ICS) not exceeding the small-scale energy limits as set out by the CDM EB.

The stoves are sold in various sizes. The emission reductions calculation uses a weighted average of the different sizes to determine the efficiency improvement based on laboratory tests.

Figure 1. A local firewood fuel ICS (Ugastove)

Figure 2. An imported dual fuel ICS (Philips)

Figure 3. A local Built-in ICS (Lorena Rocket)[3]

Figure 4. A local Institutional ICS (VEW)

[3] Pictures of typical shielded stove and rocket lorena stove from Ministry of Energy and Mineral Development (MEMD), Uganda and German International Cooperation (GIZ), *Construction manual for firewood savings household stoves*, 2008

These ICS are more efficient in transferring heat to the cooking pots than traditional stoves, thus ICS require less fuel to prepare the same meal. This efficiency is translated into fuel savings compared to traditional stoves used in Uganda[4]. By reducing fuel consumption, the CPA reduces greenhouse gas emissions from the use of fuel. This reduction in fuel consumption is estimated and corresponding CO_2 emission reductions are calculated from these savings.

During the first year, this CPA is expected to achieve 23,245 tonnes of CO_2e reductions. Once the CPA has achieved its small scale limit, a maximum of 48,647 tonnes of CO_2e will be achieved every year.

With its open access concept, the Improved Cook Stoves for East Africa SSC-PoA allows in principle, both local manufacturers and importers of stoves to become part of the PoA, and technology/equipment transfer may occur on the CPA level..

This is CPA #1 of ECOTRUST, ICSEA PoA's second Supplier Organisation (SO) and Implementer

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

Environment Conservation Trust of Uganda, P. O. Box 8986, Kampala, Uganda

Supplier Organisation and implementer of the SSC-CPA
Contact details of the implementer are provided in Annex 1.

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

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

A.4.1.1. Host Party:

Uganda

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

This CPA will disseminate ICS over the entire territory of Uganda. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements. This will at least include serial number, customer name, address, date of sale, and where practical and appropriate also GPS coordinates.

The unique identification of the CPA is the code ECOTRUSTUg01 – "ECOTRUST" for Environment Conservation Trust of Uganda as the Supplier Organisation (implementer), "Ug" for Uganda and "01" is the number of this CPA.

[4] In Uganda "the majority of the households (72.7%) use the three-stone method for cooking. The open charcoal stove is used by 14.8% of the households. Only 8.7% of the households use improved stoves" (EAC strategy to scale-up access to modern energy services. Uganda country report, EAC 2008)

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

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

The starting date of this CDM component project activity is the date at which the sale of the ICS with specific Sales Agreements and the recording of such sales begin. This is the 01/02/2014. The starting date of this CPA is after the commencement of validation of the Programme of Activities, i.e. the 11/11/2010 on which the CDM-POA- DD was published for global stakeholder consultation.

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

21 years

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

Renewable crediting period

A.4.3.1. Starting date of the crediting period:

Same as the starting date of the PoA under which this CPA is registered which is the 15/09/2012.

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

The first crediting period is 7 years.

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

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 1: 15/09/2012 - 14/09/2013	0	23,244	0	23,244
Year 2: 15/09/2013 - 14/09/2014	0	30,807	0	30,807
Year 3: 15/09/2014 - 14/09/2015	0	48,646	0	48,646
Year 4: 15/09/2015 - 14/09/2016	0	48,646	0	48,646
Year 5: 15/09/2016 - 14/09/2017	0	48,127	0	48,127
Year 6: 15/09/2017 - 14/09/2018	0	35,970	0	35,970
Year 7: 15/09/2018 - 14/09/2019	0	48,600	0	48,600
Total	0	284,040	0	284,040
(tonnes of CO_2 e)	-	-	-	-

A.4.5. Public funding of the CPA:

No public funding or ODA has been received for the implementation of the CPA[5].

[5] Declaration of Non-Use of Official Development Assistance by Project Implementer, dated 22 July 2014, provided to DOE

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

According to the Guidelines on assessment of de-bundling for SSC project activities (version 03) published as annex 13 of the meeting report of EB 54[6] the CPA is exempted from performing a de-bundling check i.e. considered as being not a de-bundled component of a large scale activity if the following condition applies:

10. If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in the CPA of a PoA is no greater than 1% of the small-scale thresholds defined by the methodology applied[7], 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.

Each of the ICS included in the CPA is not greater than 1% of the small-scale threshold, which is 0.6 GWh annual electrical energy savings equivalent to 1.8 GWh thermal energy savings.

The ICS distributed under this CPA do not exceed 1.8 GWh thermal energy savings per year.
The thermal energy savings of the ICS is approximately 0.01 GWh/y[8]. Hence, the condition is fulfilled.

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

This small-scale CPA is neither registered as an individual CDM project activity nor 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:

Improved Cook Stoves for East Africa (ICSEA)

Version 05
Date: 20/07/2012

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

This CPA follows the stated goal of the PoA and eligibility criteria for inclusion in the PoA as determined in chapter A.4.2.2. of the PoA:

Nr.	Eligibility criteria	Information requirement	Additional	Condition

[6] EB 54 Annex 13

[7] i.e. 15 kW installed capacity or 0.6 GWh annual energy savings or 0.6 $ktCO_2e$ annual emission reductions.

[8] Calculation according to a baseline consumption of 4.5 tonnes/year and that the ICS saves half the wood fuel.

	description		information	met?
1.	The CPA will be involved in the distribution and/or sales of ICS within the geographical region of the PoA	The following document shall be provided: • Contractual agreement between ICSEA Ltd and the SO	This CPA will disseminate ICS over the entire territory of Uganda. Uganda is one of the host countries that form the geographical region of the PoA	☒ Yes ☐ No
2.	The CPA does not double-count any of its appliances for the ERs estimation	The following document shall be provided: • Contractual agreement between ICSEA Ltd and the SO		☒ Yes ☐ No
3.	The ICS disseminated are high efficiency biomass fired cook stoves with a specified efficiency of at least 20%	The following document shall be provided: • Initial rating based on one of the tests for efficiency as determined in AMS-II.G. Version 03 clause 6	Initial rating of efficiency shows efficiency above 20 % with WBT	☒ Yes ☐ No
4.	The start date of the CPA shall not be before the commencement of validation of the PoA i.e. the 11/11/2010 on which the PoA-DD was published for global stakeholder consultation	The following document shall be provided: • Specific Sales Agreements		☒ Yes ☐ No
5.	The CPA complies with baselines and monitoring methodology requirements of AMS-II.G. Version 3	The following document shall be provided: • Completed due diligence questionnaire	Compliance will be checked by ICSEA Ltd	☒ Yes ☐ No
6.	The CPA is additional as demonstrated in the additionality criteria in section E.5.2. If the first approach is chosen one of the small-scale additionality criteria has to be met. If the second approach is chosen the micro-scale eligibility has to be justified.	Any of the following evidences shall be provided (i) for first approach e.g. • production cost spreadsheet for financial barrier • technological description • Relevant information in SSC-CPA-DD	Total cost calculation was provided to prove financial barrier.	☒ Yes ☐ No

		following the additionality approaches set out in the PoA-DD. (ii) for second approach • evidence of country status • certified rating tests • Relevant information in SSC-CPA-DD following the relevant • Guidelines for Demonstrating Additionality of Microscale Project Activities (Version 04).		
7.	The CPA organised a local stakeholder consultation and got environmental clearance of the project related activities	The following documents shall be provided: • Local Stakeholder Report including comments of stakeholders and how the comments were taken into account by the CPA implementer • Environmental clearance letter and/or EIA if requested by national regulations	See section D.2. Environmental clearance letter not required because ECOTRUST does not manufacture stoves	☒ Yes ☐ No
8.	No public Official Development Assistance funding has been used for the implementation or operation of the CPA, which requires the purchase of CERs from this CPA	The following document shall be provided: • Confirmation Letter of No Diversion of ODA from CPA implementer	Letter of No Diversion of ODA from ECOTRUST	☒ Yes ☐ No
9.	The target group and distribution mechanism is defined.	Any of the following documents shall be provided: • Sales forecast • Marketing plan • description of technology (e.g. domestic or institutional stove)	The type of ICS address domestic users only	☒ Yes ☐ No

10.	The SO agrees to support the sampling and survey activities of ICSEA Ltd.	The following document shall be provided: • Contractual agreement between ICSEA Ltd and the SO	Those agreements include the respective rights and responsibilities of both parties, e.g. approval procedures by the CME and monitoring requirements	☒ Yes ☐ No
11.	The SO shall meet the limits for sales or installations for a specific CPA as provided by ICSEA Ltd to ensure that the small-scale or microscale threshold criteria are met.	The following document shall be provided: • Contractual agreement between ICSEA Ltd and the SO • Sales forecast	The energy efficiency improvement of each CPA will be limited to 180 GWh_h/year based on sales.	☒ Yes ☐ No
12.	The CPA is not a de-bundled component of another CPA or CDM project activity and follows the de-bundling criteria as described in A.4.4.1	The following evidence shall be provided: • Relevant information in CPA-DD as described in A.4.6 following the relevant de-bundling guidelines	The CPA is not a de-bundled component of another CPA or CDM project activity and follows the de-bundling criteria as described in A.4.6	☒ Yes ☐ No
13.	The CPA is validated in order to be included in ICSEA.	The following document shall be provided: • Inclusion Report	• DOE provides a Validation Report • ICSEA and the CPA sign an Inclusion Agreement	☒ Yes ☐ No
14.	The proposed CPA is a voluntary action by the SO	Any of the following documents shall be provided: • Contractual agreement • Published statement, vision or mission of the SO	The CPA is a voluntary action by ECOTRUST as stated in the contractual agreement between ICSEA Ltd and ECOTRUST	☒ Yes ☐ No

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

As per section E.5.2. of the PoA-DD, this CPA meets the additionality criteria of the first approach, "Guidelines on the demonstration of additionality of small-scale project activities (Version 09)"[9] as follows:

Financial barriers at user level

- Lack of access to capital due to the kind of business and risks associated in the region/country as demonstrated by bank letter or other third party information (investment barrier), or,
- The SO provides evidence that loans linked to expected carbon credits or ERPAs with advanced payment were granted as seed funding to overcome investment barriers until sufficient benefits from CERs will be generated[7] (investment barrier), or,
- The full cost of a domestic ICS at the retail point without carbon finance is higher than 10 USD. This cost is to include at least the cost of the manufactured appliance, the amortization of capital investments of the supplier organisation, the amortization of personnel training, expenditure in overcoming technological barriers (sensitization, marketing, etc.), distribution and retailing margins, etc. (financial barrier at user level and barrier due to prevailing practice) or,
- In those cases where the criteria above are not met because the total cost of the appliance is lower than the deemed market value, the ILF CPA can still demonstrate additionality if it is addressing a target market with a lower-cost appliance. For such cases, the criteria for assessment would be to demonstrate that the full cost of the appliance (including SO margins) is higher than the target retail price regarded as a benchmark (financial barrier at user level)
- Additional CER revenues are needed to sell the ICS at a price that can be paid by the potential users of the ICS.

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.

The gas included is carbon dioxide in the project boundary that is the physical, geographical site of the ICS.

The CPA will disseminate ICS over the entire territory of Uganda. Uganda is one of the African states that form the geographical boundary of the PoA.

Source		Gas	Included?	Justification / Explanation
Baseline	Combustion of charcoal or firewood	CO_2	yes	Source of baseline emissions
		CH_4	no	Excluded for simplification
		N_2O	no	Excluded for simplification
Project Activity	Combustion of charcoal or	CO_2	yes	Source of baseline emissions

[9] EB 68 Report, Annex 27

	firewood	CH_4	no	Excluded for simplification
		N_2O	no	Excluded for simplification

B.5. Emission reductions:

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

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:	IPCC default for wood fuel
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value that is provided in AMS II.G./Version 03 clause 5
Any comment:	

Data / Parameter:	**$EF_{projected\text{-}fossilfuel}$**
Data unit:	tCO_2/TJ
Description:	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data used:	IPCC
Value applied:	81.6
Justification of the choice of data or description of measurement methods and procedures actually applied :	Stipulated in AMS II.G./Version 03 clause 5 page 2: The substitution fuel likely to be employed by users is applied.
Any comment:	

Data / Parameter:	**$C_{y,\ fueltype,\ region,\ old}$**
Data unit:	tonnes/year
Description:	Quantity of woody biomass used in the absence of the project activity in tonnes per type of ICS
Source of data used:	Survey of local usage on regional level which could comprise a country
Value applied:	Charcoal equivalent to 4.56 tonnes of wood/stove/year
Justification of the choice of data or	Estimate of average annual consumption of woody biomass per appliance (tonnes/year) derived from a survey of local usage.

description of measurement methods and procedures actually applied:	The survey follows the representative sampling methods as described in clause 22 of the applied methodology.
Any comment:	see Annex 3 Baseline Information for further details

Data / Parameter:	$\eta_{old, i}$
Data unit:	Fraction
Description:	Efficiency of the baseline appliance being replaced
Source of data used:	Default value according to AMS II.G./Version 03
Value applied:	0.1
Justification of the choice of data or description of measurement methods and procedures actually applied:	The system being replaced is a conventional system with no improved combustion air supply mechanism and with no flue gas ventilation system
Any comment:	Option 2 from the PoA-DD has been taken to calculate $B_{y, savings}$

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

According to the applied methodology, emission reductions would be calculated as follows:

$$ER_y = B_{y, savings} * f_{NRB, y} * NCV_{biomass} * EF_{projected\text{-}fossilfuel}$$

Where:

ER_y	Emission reductions during the year y in tCO_2e
$B_{y, savings}$	Quantity of woody biomass that is saved in tonnes
$f_{NRB, y}$	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. The IPCC default for wood fuel, 0.015 TJ/tonne is applied
$EF_{projected\text{-}fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. As per methodology, a value of 81.6 tCO_2/TJ is employed

$B_{y, savings}$ is calculated as follows:

$$B_{y, savings} = \sum_{j=1}^{n} \sum_{i=1}^{n} B_{y, savings, (i, j)}$$

Where:

i	Model of ICS which is a specified size of an ICS type or a group of sizes of an ICS type
j	Cohort for each model of ICS. A cohort is defined as the ICS model sold or gone through maintenance in the same year *y*
$B_{y, savings, (i,j)}$	Quantity of woody biomass that is saved in tonnes per model and cohort of ICS

$B_{y, savings, (i,j)}$ is calculated per model and cohort of ICS as the savings directly depends on the efficiencies of each model and cohort of ICS. The savings in woody biomass can be calculated in any of the following two approved options. The decision on which of the options to choose for each CPA will be taken at CPA level for each CPA.

The Option 2 of E.6.2. of the PoA-DD was chosen to calculate the $B_{y,savings,(i,j)}$ of the ICS:

This option compares the efficiency of the baseline stove against the efficiency of the ICS deployed.

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

Where:

$B_{old, (i,j)}$	Quantity of woody biomass used in the absence of the project activity in tonnes per model and cohort of ICS
$\eta_{old, i}$	Efficiency of the baseline system/s being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of systems are encountered; A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or conventional system with no improved combustion air supply or flue gas ventilation system; for the rest of the system 0.2 default value may be optionally used
$\eta_{new, (i,j)}$	Efficiency of the system being deployed as part of the project activity (fraction)

$B_{old, (i,j)}$ is determined according to the applied methodology AMS II.G./Version 03 clause 7 option (a); by calculating the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year).

$$B_{old, (i,j)} = N_{(i, j)} \cdot C_{y, fueltype, region} \cdot L_{(i, j)}$$

Where:

$N_{(i,j)}$	Number of appliances per cohort and model
$C_{y, fueltype, region, old}$	Estimate of average annual consumption of woody biomass per appliance (tonnes/year) derived from a survey of local usage
$L_{(i,j)}$	Leakage, the fraction by which emission reductions are multiplied to obtain an assessment adjusted for leakage risks

The number of appliances ($N_{(i,j)}$) is determined as the fraction of days in a year in use for each ICS of the same model and cohort ($t_{fraction, y, (i,j)}$), by the fraction of these ICS to be still in use per cohort and model of ICS.

$$N_{(i,j)} = U_{(i, j)} \cdot \sum_{(i,j)=1}^{n} t_{fraction, y, (i, j)}$$

Where:

$U_{(i,j)}$	Usage, the fraction to adjust for drop off of ICS per cohort and model
$t_{fraction, y, (i,j)}$	Fraction of the days in use in year y of a single ICS deployed per cohort and model

Replacing the variables in the formula above by the values listed in chapter B.5.1. and B.6 the calculation of the estimated ERy is presented next.

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 1: 15/09/2012-14/09/2013	0	23,244	0	23,244
Year 2: 15/09/2013-14/09/2014	0	30,807	0	30,807
Year 3: 15/09/2014-14/09/2015	0	48,646	0	48,646
Year 4: 15/09/2015-14/09/2016	0	48,646	0	48,646
Year 5: 15/09/2016-14/09/2017	0	48,127	0	48,127
Year 6: 15/09/2017-14/09/2018	0	35,970	0	35,970
Year 7: 15/09/2018-14/09/2019	0	48,600	0	48,600
Total	0	284,040	0	284,040
(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:

The monitoring plan describes how to collect, assess and archive all relevant data to be monitored according to the methodology. Data from the monitoring procedures will be recorded in the electronic project database and summarized in the Monitoring Report. The data collection which will follow the "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version

02.0)"[10], will comply with the requirements for the verification stated in A.4.4.2 of transparency and double-counting avoidance, and will check the required parameters in the methodology AMS II.G./Version 03 in an unbiased and reliable way.

The monitoring plan consists of:

- Monitoring concept
- Monitoring requirements and procedures for replacement of traditional stoves
- Monitoring requirements and procedures for efficiency of ICS
- Monitoring requirements and procedures for leakages
- Data collection
- Data archiving
- Training
- Quality Assurance/Quality Control Procedures
- Monitoring Report
- Monitoring responsibilities
- Parameters to be monitored

Monitoring concept

The CME will be responsible for the collection of all Sales Agreement data, for internally verifying the information in the Sales Agreements, and the creation of the Monitoring Report at the end of each Monitoring Period. The SO will be responsible for data entry into the Sales Records and will submit it to the CME for screening and for ensuring that the information in the Sales Agreements is complete and correct. The total amount of Sales Agreements will reveal the quantity of stoves sold at the end of a Monitoring Period. The electronic database will record the start and end dates of each selling year (y) for each ICS (t fraction), and calculate the emission reductions attributable to each Monitoring Period. Appropriate record keeping procedures will be implemented to ensure that each Monitoring Period dataset can be transparently attributed to its corresponding CPA, preventing any occurrences of double-counting. Hence, the project database will keep records on the current status of each CPA—the duration of previous Monitoring Periods, the household surveys, and verification activities (through analytic snapshots at the end of each monitoring period the CPA). The tracked ICS will be monitored through the PoA's sales force database that consolidates the Sales Records of all CPAs.

In order to account for drop-off in use (U)[11], the ICS deployed by the SO will be monitored through a census[12] and/or a usage survey. A census and/or a representative sample will be selected to count for drop-off or disposal of ICS. Sampling size will be chosen to achieve a 90/10 or 95/10 precision when annual sampling is chosen, dependant on the use of either option one, two or four from the sampling plan[13]. Sampling size will be chosen to achieve a 95/5 precision when option 3, biennial sampling, is chosen from the sampling plan. In cases where survey results indicate that the precision level is not achieved the lower bound of the confidence interval may be chosen instead of repeating the survey effort. In order to avoid this situation, oversampling will be encouraged. In cases where a SO chooses the option

[10] EB 65 Report, Annex 2

[11] AMS II.G. Version 03 clause 16

[12] See Annex 4

[13] See Annex 4

of a census for monitoring purposes, monitoring may include a record of one or a combination of the following activities or events:
(a) an annual maintenance/repair event
(b) customer inspections resulting from loan or hire purchase agreements
(c) double verified records of community-based stove monitoring staff
(d) independent monitoring verification exercises organised by the CME.

In general, a cohort is defined as the year that an ICS model is sold in or gone through maintenance in the same year.
Cohorts of ICS that are older than the expected normal lifetime of the ICS may or may not be included in the monitoring, and accordingly regarded in the calculation of emission reductions. A decision to cut off older cohorts will depend on the guarantee and maintenance policy adopted by the SO and will be decided by the CME.

Concerning the sampling of ICS for the efficiency[14] check[15], ICS will be grouped according to exclusive and exhaustive characteristics that significantly affect the ICS's lifetime, such as final user size (domestic/institutional) and type (fixed/transportable) and cohort/age. The sample to be selected from each stratum will follow the required precision or the lower bound of the confidence interval and the necessary sampling requirements[16]. In cases where different SOs are distributing the same model of ICS manufactured by the same organisation, and it can be safely assumed a similar lifetime according to similar guarantee and maintenance policies, the CME may or may not decide to cluster the ICS of different SOs into the same cohort, safeguarding the transparency of being able to attribute each ICS according to its CPA.

Requirements for replacement of traditional stoves
Monitoring shall ensure that either the replaced low efficiency appliances are disposed of and are not used within the boundary or within the region, or if baseline stoves continue to be used, that wood fuel consumption of those stoves is excluded from calculations.

Monitoring procedures
It will be checked if replaced low efficiency appliances have been dismantled and are no longer in use by the households or any other households within the project boundary, or if baseline appliances are still in use, then monitoring will ensure that fuel wood consumed by these stoves is excluded from the B_{old} calculation.

During usage surveys, if evidence of use of traditional cooking appliances is found in households that have purchased an ICS the following criteria will be taken into consideration for adjustment:

1. If the use of traditional appliances is only during peak cooking needs (e.g. for celebrations) then it can be assumed that there is no adjustment needed because the baseline studies will be performed in households during normal cooking conditions and data from peak cooking will be removed from B_{old} calculations.

[14] See Annex 4

[15] AMS II.G./Version 03 clause 15

[16] EB 65 Report, Annex 2

2. If the household size is larger than can be reasonably assumed to be satisfied by the ICS in question (e.g. a small ICS for a household of 4 is used in a household of 8 together with a traditional stove) then it can be assumed that the ICS is being fully utilized and no adjustment should be applied.
3. If the ICS ownership has been transferred (e.g. sales or gifts) and the ICS can be found to be still in use, no adjustment is needed.
4. If none of the above cases is true, then adjustment for that household will be estimated on the basis of an interview to conservatively estimate the fraction of time in which the ICS is in use. The total adjustment for that CPA will hence be based on the sampling and statistics described in the monitoring concept and its annexes.

Requirements for efficiency of ICS
A check of efficiency of a representative sample will be carried out annually or at least every two years to test the efficiency of the ICS in use. The WBT or any other appropriate test will be used for this purpose. Tests during monitoring will be performed by the CME and/or by an authorised organisation designated by the CME.

Monitoring procedures
The parameter for the efficiency, the efficiency (η_{new}) or the specific fuel consumption of deployed ICS (SC_{new}), will be tested at least every two years by the CME and/or by an authorised organisation designated by the CME. Tests on η_{new} or SC_{old} for the Monitoring Report will be carried out on stoves selected from the usage survey. It will be permissible to reduce the number of tests by first testing the oldest cohort, and then deciding whether or not a test of younger stoves is necessary. If stoves of a certain cohort are found to achieve a certain performance level, a conservative estimation may be applied to younger stoves if this is preferred to conducting further tests.

Requirement for annual consumption of woody biomass
If option 1 is selected to estimate the quantity of fuel saved, the annual consumption of woody biomass of the appliances deployed will be monitored annually with Kitchen Performance Tests (KPT) following a 90/10 precision and the necessary sampling requirements[17].

Requirements for leakages
According to AMS II.G/Version 03, the following sources of leakage have to be assessed:

a) The use/diversion of non-renewable biomass saved under the project activity by non-project households/users who previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable biomass used by the non-project households/users, that is attributable to the project activity then B_{old} is adjusted to account for the quantified leakage.

b) Use of non-renewable 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 biomass saved under the project activity that is then used as the baseline of another CDM project activities then B_{old} is adjusted to account for the quantified leakage.

[17] EB 50 Report, Annex 30

c) *Increase in the use of non-renewable biomass outside the project boundary to create non-renewable biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of non-renewable biomass outside the project boundary then B_{old} is adjusted to account for the quantifiable leakage.*

Monitoring procedures
Leakage a) is considered to be addressed via leakage c) as non-project users are outside the project boundary.

Regarding leakage b) if the CPA increases NRB significantly, the next CPA and indeed the same activity, should operate under a reduced NRB fraction. This risk is addressed by re-appraisal of the NRB fraction every year. The fNRB will be adjusted when official statistical data is available. This increase of use of NRB should be adjusted by population growth and be accounted for as leakage. If this data is not available, then the adjustment will be calculated through the reduction of B_{old} to the fNRB formula calculations.

For leakage c), if the CPA provides evidence that outside the project boundary the use of renewable energy sources has not been used decreasingly during the Monitoring Period, then there is no leakage (leakage factor is 1). Official data on energy use may be used to demonstrate that outside the project boundary renewable energy sources have not been used decreasingly. Otherwise B_{old} will be adjusted for leakage according to the result of conducted surveys or official data. The monitoring would include surveys of the amount of non-renewable woody biomass saved under the project activities that is used outside the project boundaries where previously renewable energy sources were used. Surveys with 90/30 precision will be conducted for this purpose.

As an alternative to adjustments in b) and c), a net to gross adjustment factor of 0.95 can be used to account for these leakages, in which case surveys are not required.

Data collection
The CME will collect the data necessary for the monitoring and for the emission reductions calculation. Data will be managed through an electronic (sales force) database that can directly attribute the data to the CPA, thereby allowing unambiguous determination of the emission reductions attributable to each CPA.

Data archiving
Sales Agreements will be stored by the CME. A back-up of the project database will also be stored on an electronic medium by the CME. All data monitored and required for verification and issuance will be kept for at least two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

Training
The CME will provide the necessary training to the SOs and the parties involved in the monitoring to ensure that the data recorded is complete and accurate. This monitoring training will be provided by the CME to the SOs before the inclusion of their CPAs, and also to the monitoring and testing groups before the Monitoring Period exercises start.

Quality Assurance/Quality Control Procedures

Different quality control and quality assurance measures will be put in place by the CME to ensure that all emission reductions are real. Surveys and testing will be carried out and the CME will check the consistency of the results. The CME, through its monitoring manager, will ensure that the studies are accurate and that a conservative approach has been taken.

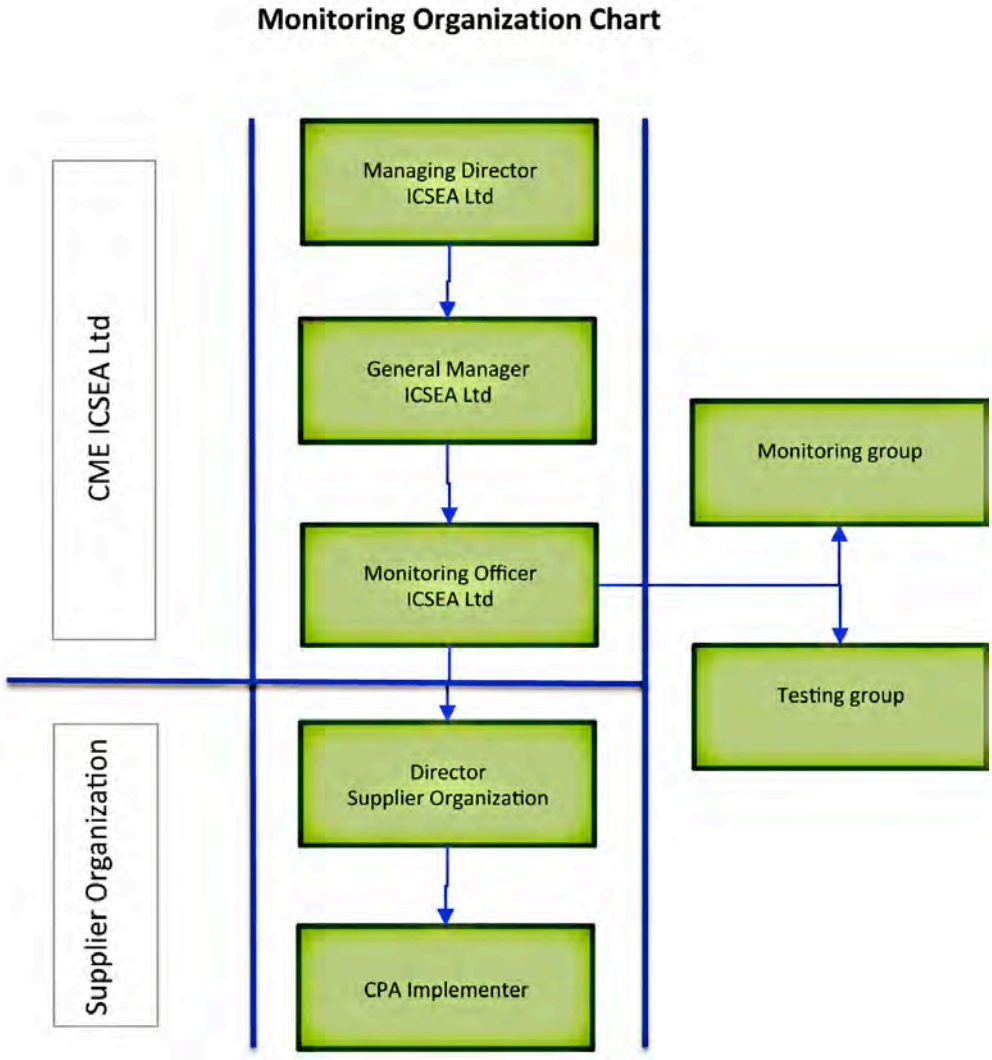
Sales records will be scrutinized by the SO to avoid double-counting and the CME will also conduct spot-checks to verify the legitimacy of such records. Sales Agreements will be checked at three levels, by the vendor, the SO and the CME, and missing or wrong data will be corrected wherever possible. In cases where it is not possible, any mandatory missing data will automatically invalidate that ICS and the *t fraction* will be counted as zero resulting in no emission reductions being generated by that appliance. Wrong data entered in the Sales Agreement that lead to an inability to track ICS during monitoring will result in a lower usage rate. However in cases where the ICS can be traced, and missing information can be corrected, the new data will be updated in the Sales Agreement and the electronic Sales Record.

Monitoring Report
The CME will assess all monitoring data and produce a Monitoring Report corresponding to the preceding Monitoring Period of the required sample of CPAs for the DOE to verify. This report will present the data relating to the emission reductions generated by CPAs during the Monitoring Period. The Monitoring Report will also include, as required by the sampling plan:

- Unbiased and reliable estimates of the mean value of parameters used in the calculation of greenhouse gas emission reductions.
- Necessary precision of estimated parameters if required, or the lower bound of the confidence interval and the necessary sampling requirements.
- Formulas used in calculating and reporting parameters.

Generally, the Monitoring Report will use the current CDM Monitoring Report Form and follow the current "Guidelines for completing the Monitoring Report Form".

Monitoring Responsibilities
The CME is in charge of supervising all the monitoring activities through its general manager and managing director, but it is the monitoring manager who will have the direct responsibility for all the monitoring activities, including data collection, data monitoring, and writing the Monitoring Report. The SOs and their CPAs will support the CME in all the monitoring activities by collecting the Sales Agreements and facilitating the tracking of the ICS and helping the monitoring and testing groups. The monitoring and testing groups will conduct their respective studies for monitoring the required parameters, but the final responsibility for the data contained in the Monitoring Report belongs to the CME.



Parameters to be monitored

Data / Parameter:	$\eta_{new,(i,j)}$
Data unit:	Fraction
Description:	Efficiency of the ICS being deployed as part of the project activity.
Source of data to be used:	Water Boiling Tests (WBT)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.3508
Description of measurement methods	ICS are tested by a laboratory according to the WBT ex ante and ex post as part of the monitoring. The ICS to be tested according to the monitoring plan will be

and procedures to be applied:	randomly selected from the usage sample survey. Tests during monitoring will be performed by an authorised organisation at least every two years.
QA/QC procedures to be applied:	Tests during monitoring will be performed by the CME and/or by an authorised organisation designated by the CME. Cross checks on the CME or authorised organisations will be made annually by comparisons of control stoves.
Any comment:	

Data / Parameter:	$f_{NRB, y}$
Data unit:	Fraction
Description:	Fraction of woody biomass saved by the project activity in the year y that can be established as non-renewable biomass
Source of data to be used:	FAO, Uganda National Bureau of Statistics, Ugandan National Forest Authority
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.915
Description of measurement methods and procedures to be applied:	The $f_{NRB, y}$ was determined based on the most recent national approved studies or African studies. At least once a year the parameter will be monitored. By updating the value at least once a year, leakage b) is taken into consideration.
QA/QC procedures to be applied:	This factor will be monitored according to the monitoring plan, and updated when necessary. Cross check comparisons will be made against UNFCCC published default values, and any significant differences will be justified.
Any comment:	see Annex 3 Baseline Information for further details

Data / Parameter:	$t_{fraction, (i,j)}$
Data unit:	Fraction of 365
Description:	Fraction of the days in use in year y of a single ICS deployed
Source of data to be used:	Derived from sales figures
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Variable, based on sales forecast and small scale limit[18] Each ICS saves 13.58 MWh per year and the small scale limit is 180 GWh per year. The small scale limit is therefore equal to 13,250 stoves operating per year.[19] The projected number of stoves in use each year of the crediting period is summarised below:

Year	Number of ICS
1	6,331

[18] CER calculation spreadsheet provided to the DOE

[19] Calculation sheet provided to DOE

	2 8,391 3 13,250 4 9,742 5 3,135 6 9,756 7 13,237
Description of measurement methods and procedures to be applied:	The SO keeps a paper and electronic record of the sales date, and the stove is considered to be in use from the commissioning date, which is the date on which the stove is put into use for the first time. This factor will be calculated daily through the electronic database.
QA/QC procedures to be applied:	Sales records will be scrutinised by the SO to avoid double-counting and the CME will also conduct spot-checks to verify the legitimacy of such records. On a monthly basis, SOs will verify the stoves put into use based on the ICS sales during the month through telephone surveys or physical inspection/verification or third party monitoring events. These monitoring events may include a record of one or a combination of the following activities or events: (a) customer inspections resulting from loan or hire purchase agreements (b) double verified records of community-based stove monitoring staff (c) independent monitoring verification exercises organised by the CME. This will provide the commissioning date, which is the date on which the stove is put into use for the first time and will be used as the start date for the computation of certified emission reductions. On a monthly basis, CPAs will send duplicate copies of sales agreements to ICSEA for verification of the data entered into the sales database. Telephone checks and spot checks will be used by the CME to review and authenticate the data in the sales database. An ICS not found to be in use will be suspended from the sales database until it is verified to be in use. If it is not found to be in use before the annual verification, it will not be included in the sales database and may be deleted and replaced with a new ICS. This data will also be used to determine the number of ICS installed in the CPA.

Data / Parameter:	$\mathbf{U}_{(i,j)}$
Data unit:	Fraction
Description:	The fraction by which emission reductions are multiplied to obtain an assessment adjust for drop off of ICS in use per cohort year. A cohort is defined as the ICS model sold or gone through maintenance in the same year.
Source of data to be used:	Survey of ICS users per cohort using sampling methods.
Value of data applied for the purpose of calculating expected	1

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	The SO keeps a paper and electronic record and a survey is done at least biennial in order to assess the ICS in operation. This factor addresses the leakage to be considered as per AMS II.G./Version 03 clause 14 if equipment currently being utilised is transferred from outside the boundary to the project activity.
QA/QC procedures to be applied:	Usage monitoring will be performed by the CME and/or by an authorised organisation designated by the CME following the sampling plan[20]. In all cases cross-checking procedures appropriate to the monitoring choice will be undertaken.
Any comment:	

Data / Parameter:	**$L_{(i,j)}$**
Data unit:	Fraction
Description:	The fraction by which emission reductions are multiplied to obtain an assessment adjusted for leakage risks
Source of data to be used:	Official data of Uganda or default value as per methodology
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.95
Description of measurement methods and procedures to be applied:	As per AMS II.G./Version 03 clause 23 (a) if 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. If the CPA increases NRB significantly, the next CPA and indeed the same activity, should operate under a reduced NRB fraction. This risk is addressed by re-appraisal of the NRB fraction every year. The fNRB will be adjusted when official statistical data is available. This increase of use of NRB should be adjusted by population growth and be accounted for as leakage. If this data is not available, then the adjustment will be calculated through the reduction of B_{old} to the fNRB formula calculations. As per AMS II.G./Version 03 clause 23 (b) if the CPA provides evidence that outside the project boundary the use of non-renewable energy sources have not been used increasingly during the Monitoring Period, then there is no leakage (leakage factor is 1). Official data on energy use may be used to demonstrate that outside the project boundary renewable energy sources have not been used decreasingly. According to AMS II.G./Version 03 clause 23 (c) as an alternative to adjustments in (a) and (b), a net to gross adjustment factor of 0.95 can be used to account for these leakages, in which case surveys are not required.

[20] See Annex 4

QA/QC procedures to be applied:	
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:

The primary environmental negative impacts of the CPA are related to the production of stoves as they are manufactured and distributed in Uganda, and the disposal of stoves once newer stove technologies are adopted because of economic development.

Manufacturing Operation
The main expected impact on the production of stoves is the extracting of clay. The pertinent regional authority has certified that this activity does not have potential significant environmental impacts that would affect the hydrology and ecology of the wetland and the surrounding environment.

Supply Chain/Operations
The environmental impact by the operation of the stove factories themselves, the offices in Uganda or the transportation of the stoves are not included in the analysis. The supply chain and operation-related environmental impacts are expected to be minimal.

Disposal
Once the stoves have stopped operating, the SO will evaluate if the stove can be refurbished or if they need to be completely removed.

Transboundary impacts:
[The CPA places a boundary on the country of Uganda and stoves are built in the Ugandan plant, thus no transboundary issues arise on the import or export of stoves.]

Environmental benefits:

- Human health: Children and mothers will be exposed to fewer air pollutants through reduced emission of not only CO_2, but also carbon monoxide and particulate matter. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory, cardiovascular and ocular diseases.
- Biodiversity: will be improved as the programme reduces pressure on remaining forest reserves, increasing not only the amount of biomass stocks, but preserving the otherwise deforested woody

ecosystems. This will have positive effects on both the fauna and flora biodiversity of the wood collection areas.

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:

An environmental impact assessment is not a mandatory requirement on CPA level. A project brief is presented to the authority in charge. The authority decides if an environmental impact assessment is required or may approve the project on the basis of the project brief. The CME will ensure that all requirements resulting from the environmental clearance process are complied with.

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.

It has been decided that stakeholder consultation be done at the CPA level due to the different nature of the SOs in relation with the manufacturing and the supplying of ICS. Furthermore, due to the multiple host country location of the PoA stakeholders may greatly vary in their comments.

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

Stakeholders were invited to attend a public meeting about sustainable development and environmental, economic and labour concerns and solutions. The meeting was held on 2 different occasions to cater for stakeholders that could only attend in the capital city. The first meeting was on 12 December 2013, at Mt. Elgon Hotel, in Mbale and the second meeting was on 20 June 2014, at Mosa Court Apartments, in Kampala. The first meeting was attended by 55 participants, including 42 males and 13 females, while the second meeting was attended by 10 participants, 3 males and 7 females. Women were well represented and were outspoken in the meeting.

Job/ position in the community	Male/ Female	Organisation (if relevant)
COMMUNICATION OFFICER	F	UGANDA WILDLIFE AUTHORITY (UWA)
INFORMATION OFFICER	M	EPSEDEC
FOREST OFFICER	M	MBALE
SECRETARY	M	UNITED FAMILY DEVELOPMENT INITIATIVE
FARMER COORDINATOR	M	NAKATSI S/C
FARMER COORDINATOR	M	BUBWANGU S/C
DIRECTOR	F	UJWA

Job/ position in the community	Male/ Female	Organisation (if relevant)
CHAIRPERSON	F	MANAFWA
FORESTRY OFFICER	M	MANAFWA
FORESTRY OFFICER	M	MBALE
CHAIRPERSON EFA	M	BUDUDA
CARBON FARMER	M	NYONDO SUBCOUNTY
STOVE DESIGNER	M	UGANDA JOINT
FARMER COORDINATOR	M	BUKUSU S/C
DISTRICT COMMUNITY DEVELOPMENT OFFICER	M	MANAFWA
SECRETARY/DISTRICT NATURAL RESOURCE OFFICER	F	MANAFWA
CHAIRMAN	M	SHUNYA YETANA
SECRETARY	M	MANAFWA
DRIVER	M	MANAFWA
PROGRAMME COORDINATOR	M	MBALE HIGH
DISTRICT COMMUNITY DEVELOPMENT OFFICER	M	BUDUDA
FARMER COORDINATOR	M	CDO
SECRETARY	M	SEC. PRODUCTION &N/R MBALE
CAP	M	BUDUDA DLG
ENVIRONMENTAL POLICE	M	UGANDA POLICE
DISTRICT PRODUCTION OFFICER	M	MBALE DLG
DISTRICT ENVIRONMENT OFFICER	F	BUDUDA DLG
SECRETARY PRODUCTION	M	BUDUDA DLG
SENIOR MANAGER	M	NFA
FOREST OFFICER	M	AFRICAN RURAL DEVELOPMENT INITIATIVE
PROGRAMME MANAGER	M	BANGOMA INTEGRATED DEVELOPMENT ASSOCIATION (BIDA)
DEPUTY PROGRAMME MANAGER	M	BIDA
PRESIDENT	M	UGANDA CHRISTIAN UNIVERSITY, MBALE

Job/ position in the community	Male/ Female	Organisation (if relevant)
		(UCU)
PROJECT MANAGER	M	MBALE CAP
MANAGER	M	KISSITO HEALTHCARE INTERNATIONAL
CHAIRPERSON	M	UNITED FAMILY DEVELOPMENT
SSF COUNTRY REPRESENTATIVE	F	UGANDA CARBON BUREAU
FACTORY MANAGER	M	GUMUTINDO COFFEE
FARMER COORDINATOR	M	MANAFWA DLG
PROJECT MANAGER	F	UNDP
MARKETING DIRECTOR	F	UGASTOVE
HUMAN RESOURCE OFFICER	M	BCU LTD
VOLUNTEER	M	ECOTRUST
EXECUTIVE DIRECTOR	F	MBALE NGO FORUM
FIELD TRAINING OFFICER (FTO)	M	COFFEE A CUP
REPORTER	M	UBC BUTEBO
PROGRAMME COORDINATOR	F	BANGOMA INT DEVT ASSO.
CHAIRPERSON	M	KIFANGO
CHAIRPERSON	M	SEE LIGHT AHEAD ORG.
COORDINATOR	M	ECOTRUST
PROGRAMME COORDINATOR	F	ECOTRUST
INTERN	F	ECOTRUST
PROGRAMME COORDINATOR	F	ECOTRUST
PROGRAMME MANAGER	M	ECOTRUST
DISTRICT ENVIRONMENT OFFICER	M	BUDUDA DISTRICT
CLIMATE CHANGE OFFICER	M	WWF UGANDA
COMMUNICATIONS AND ADVOCACY OFFICER	F	ECOTRUST
PROGRAMMES COORDINATOR	F	ECOTRUST
PROGRAMMES COORDINATOR	F	ECOTRUST
PROGRAMMES	F	ECOTRUST

Job/ position in the community	Male/ Female	Organisation (if relevant)
COORDINATOR		
PROGRAMMES COORDINATOR	F	ECOTRUST
EXECUTIVE DIRECTOR	F	ECOTRUST
PROJECT OFFICER	M	ENVIRONMENT ALERT
PROGRAMMES COORDINATOR	M	ECOTRUST
COUNTRY REPRESENTATIVE	F	UGANDA CARBON BUREAU

Below are transcripts of all the evaluation forms received (translated to English where needed) during the meetings in Mt Elgon Hotel, Mbale on 12 December 2013 and Mosa Courts Apartments, Kampala on 20. June 2014.

What are your impressions about the project?	What do you like about the project?	What do you NOT like about the project?
Positive impression	Use of mechanism of value chain in the project.	None
Well conducted, presenters were knowledgeable	Developmental to the community	More time was needed, may be two day instead of one.
An efficient cook stove for wood saving, it is subsidized	Durable cooking stove that have been tested and is being promoted.	A proper marketing strategy of these stoves not yet in place.
Positive, timely, a necessary intervention, the environment needs massive interventions to reduce climate warming	It will reduce the depletion of the ozone layer hence reducing climate change	Hope it spreads to the hinterland
Introducing the energy saving stove (Mayi Sitovu)	It has come at the right time. An era of global warming	Consultations made with top officers not lower civil servants who interact with the farmers/local people
New improved cook stoves with a customized local name	Its benefits over the traditional methods	NA
The Mayi project will distribute improved cook stoves that the community can adopt and use	The stove features i.e. efficiency and durability	Less carbon credits will be earned
Generally I feel so impressed because of the reduction in emissions and increased tree coverage. It is an environmentally friendly project.	Generally I like the way the project coordinators provided knowledge about climate change.	Failure to provide hand out notes
The project is to provide clean	The quality of the cook stove that	So far nothing

energy in the region with clean strategies in place. It will generally improve the likelihood of the family especially the mother and children	the project is going to promote	
It's going to be promoting cook stoves, which are affordable to the local communities who have for long failed to raise money for stoves now on the market.	If well handled it will benefit the communities and save the environment.	It is being implemented hurriedly with a lot of deadlines
Very good. This project complements what I do: forest restoration by reducing tree cutting since most of the communities depend on fuel wood from the park	The project also improves on the livelihood of the communities. The project will reduce the time spent collecting fuel wood, which time can be used for other productive activities.	None so far
Good, the project is likely to improve the livelihoods of the community	The consultations was done well	NA
It will improve peoples livelihoods and also reduce on global warming	It will conserve the environment	Its not unique i.e. not different from other existing projects
It is a viable project	It is welcome	It is subjective
Saves money, fuel and nature	Efficiency and durability of the stoves	There is need for technical support for the success of the project.
It has positive impacts on the environment	It has not left out the local artisans	To me the project is ok
The project was educative but still there is need for more capacity building	Saving life through adaption of the Mayi stoves	Everything was done well but it started late
My impression is that it was delivered well	The project will encourage people to live in a healthy environment	
Good	Credits from use of the stoves	The cost of the stove is expensive
I feel good about the project		None
The introduction of the new cook stove called Mayi cook stove	The way it is trying to introduce ways of conservation of environment	All its interactions are okay
The project will encourage people to plant trees and buy improved stoves	The project helps to conserve energy and also helps more women to be in clean environment while using improved stoves	The project does not cover big institutions which use a lot of firewood for cooking as stoves are small
Good impression for the project because it saves firewood	Increased number of cook stoves	Nothing

Good impression as it saves money, nature and fuel	It is beneficial and conserves the environment	I dislike high rates of the stoves
I am impressed that my CBO which is already undertaking the project of installation of energy cooking stoves will improve on the quality of their out put and participate in carbon finance	The project will meet the needs of the poor through subsidies	The price of the carbon credit is too low.
The project is good for our communities	The use of improved cook stoves will help so much in homes as far as cleaning is concerned	NIL
I welcome the project due to change in the technology	I want the project to employ people of Mbale e.g. local artisans who have been constructing stoves.	Politics
I like this project to move on in the communities and spread the same messages	I like the project to continue training the rural people and the farmers who are going to use the stoves	Corruption in the delivery of services
Happy (grateful)	Community Development	None
My impression about the project is that it is going to address challenges women face in kitchens especially smoke related diseases.	I have liked the way the improved cook stove are going to reduce the current over use of firewood hence causing deforestation	What I have not liked in this project is that there is going to be only 3000 cook stoves (very few)
I am impressed to have and see the Mayi stove and to hear that it can save fire wood at 50%	The stove is not too expensive. It will be affordable to many households.	We should not politicise the project
The project will be good for the people in our communities.	I would like the project to go on because it makes us to save our environment and earns income for the people.	
Since the project is training the ordinary life improvement more so the environment. I am delighted to have been among many to get the knowledge	I liked that many improved cook stoves will be distributed and liked participating in the Do No Harm assessment.	The stove has handles therefore are using it can cause accidents.
The project is beneficial and environmentally friendly	The project respects internationally human rights.	Low production of cook stove and high prices.
It's a good project and affordable for the community	It has more jobs to Ugandans	Corruption
Carbon credit will be earned from the stoves project. The solvatten jerricans are a good technology	Capacity building to communities/artisans	Not to work with only registered companies
The expressed quality of Mayi	The project will contribute to	The project seems to be targeted

stove	environment conservation	for only the poor.
The project though good needs to be packaged well to avoid raising a lot of excitement in communities	The improvement that will be realised especially in the eco system	
My impression about this project is that its very educative and it will help the communities at all levels in terms of poverty reduction, education, better livelihoods and living conditions	The project is educative and there is a promotion of climate change and protection of environment	Nil – the project is positive
The project has added value to both the community and institutions participating in environmental conservation in the Elgon Region	The project has built capacity and given awareness about the effects of global warming and climate change which in turn has reduced the impact to a greater effect.	The project should be also be implemented beyond the Elgon Region.
It is worth implementing but requires a lot of mobilisation/sensitisation	The stoves use very little firewood and thus contribute to a clean kitchen	None
The project shared knowledge on advanced technology of cook stoves.	The project promotes empowerment of women	The project should be implemented beyond the Mt. Elgon region.
The project was about the introduction on carbon finance for cook stoves	The project will create more jobs for the people	Nil
Quite promising project as it will reduce the effect of carbon dioxide in the atmosphere. There is need to build the capacity of the local artisan right from the beginning to promote sustainability	It is environment friendly, cheap, saves money and promotes entrepreneurship	Unless the quality of the cook stoves is assessed, the stoves will break easily as they are made of clay., The project should also adopt the use of briquettes
Its very positive with the hope that communities benefit	The ability to save energy and money that can be used for other purposes	The slow progress of the project
Very good contributions from the stakeholders about the stoves distribution	Working with local communities and supporting them to benefit along the value chain	None
New idea to improve livelihood while integrating environmental conservation	I like the pro poor approaches. Human Rights based approaches are in-cooperated in the implementation	Limited coverage to only Mt. Elgon region.
The presentations focused on	The intervention is good for	The project starts with the

climate change mitigation.	combating climate change and the approach of using households is good.	eastern region. It should be implemented in other regions like northern Uganda
Good	The project reduces green house gases in atmosphere and provides a clean kitchen for women.	It should be taken to other regions e.g. North and West Uganda

The Local Stakeholder Consultation Report provides a detailed description of the consultation and the results.[21]

D.3. Summary of the comments received:

A summary of the action items raised and ECOTRUST's response to these actions appear below:

Issue	ECOTRUST's response
Concern about the cost of the stoves?	The use of carbon finance to lower the cost of the ICS was carefully explained. The project will ensure that the prices of ICS are affordable to all households
Will carbon finance support the sustainable development of the communities and alleviate poverty in society?	The revenue earned from the sale of the carbon credits from ICS will be invested in community projects that will improve the livelihoods of the people. The lower use of wood fuel will help the households to save money and time, and thus improve their income. The project will also generate employment opportunities for community members. This will improve their livelihoods.
Will the project cover the three Districts?	The project will supply enough ICS to cover the three Districts of Mbale, Manafwa and Bududa, and then It will expand to other regions in Uganda.
Will the stoves meet the different needs of different households?	The project will distribute different ICS that will meet the different needs of households. It will distribute firewood or charcoal, portable or fixed domestic household ICS in different sizes and at affordable prices.
Will the stoves be suitable for users?	Only good quality stoves that have been tested by users will be provided. Samples of all of them will be lab tested for thermal efficiency.
Information about the project will need to be communicated widely.	The project will sensitise the public about the benefits of using ICS through its different partners. ECOTRUST and its partners will market and

[21] Local Stakeholder Consultation Report

	distribute the ICS.
Will members get a copy of the report of the meeting?	Copies of the Local Stakeholder Consultation Report, the Project Design Document and the Gold Standard Passport will be made available to all participants during the Stakeholder Feedback Round. All participants will be invited to make comments on the documents for a period of up to 2 months. Hard copies of the documents will also be available at the District Natural Resources departments of Mbale, Bududa and Manafwa.

Details of comments received during the stakeholder consultation process are contained in the Local Stakeholder Consultation Report.

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

All comments received during the Local Stakeholder Consultation Report were reviewed and wherever possible were incorporated into the design of the CPA.

Annex 1

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

Organisation:	Environment Conservation Trust
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Building:	
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State/Region:	
Postfix/ZIP:	
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URL:	www.ecotrust.or.ug
Represented by:	
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Salutation:	Mrs
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

"No public funding or ODA has been received for the implementation of the CPA" as stated in section A.4.5. above.

Annex 3

BASELINE INFORMATION

Determination of the share of non-renewable biomass ($fNRB_{,y}$)

The determination of the share of non-renewable biomass ($fNRB_{,y}$) in the project area is based on FAO data[22] following the indications of the methodology AMS II.G./Version 03 and baseline survey results done for the purpose[23].

The methodology describes the $fNRB_{,y}$ as the fraction of woody biomass saved by the project activity in the specific monitoring period that can be established as non-renewable, therefore:

$fNRB_{,y} = NRB/NRB + DRB$ (1)

Where:

DRB - Demonstrably Renewable woody biomass is woody biomass which satisfies one of the following two conditions:

1. The woody biomass is originated from land areas that are forest where:
   a) The land area remains a forest; and
   b) Sustainable management practises are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
   c) Any national or regional forestry and nature conservation regulations are complied with.
2. The biomass is woody biomass and originates from non-forest areas (e.g., croplands, grasslands) where:
   a) The land area remains as non-forest or is reverted to forest; and
   b) Sustainable management practises are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
   c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

NRB - Non-renewable biomass is the quantity of woody biomass used in the absence of the project activity minus the DRB component, so long as at least two of the following supporting indicators are shown to exist:

- Trend showing increase in time spent or distance travelled by users (or fuel-wood suppliers) for gathering fuel wood or alternatively trend showing increase in transportation distance for the fuel wood transported into the project area;
- Survey results, national or local statistics, studies, maps or other sources of information such as remote sensing data that show that carbon stocks are depleting in the project area;
- Increasing trends in fuel wood price indicating scarcity;
- Trends in the type of cooking fuel collected by users, suggesting scarcity of woody biomass.

Calculation of fNRB

[22]FAO, Global Forest Resources Assessment 2010 Uganda, 2010
[23]CIRCODU, Report on baseline fuel consumption in Uganda. 2010

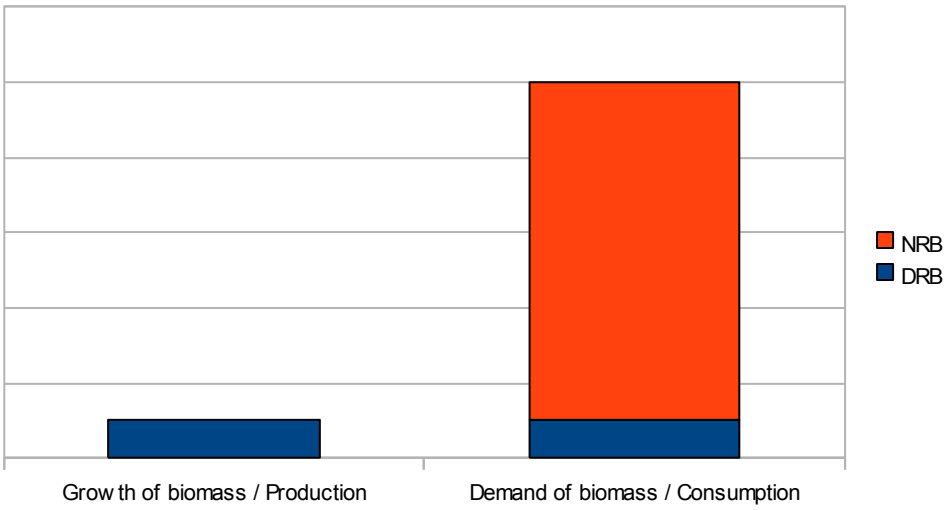
To operationalize the concept of non-renewable in the context of cookstoves, the following step-wise approach was followed.

The notion of non-renewable in the context of biomass for fuel consumption is understood as the fuel biomass consumption that contributes to deforestation or degradation. The critical factor is whether the consumption is greater than the increase in sustainable biomass growth. Biomass would be reduced in absolute terms beginning at the point where the consumption exceeds the rate of growth, as shown below:

$G_b/D_b < 1$ (2)

Where:

G_b – Growth of biomass
D_b – Demand of biomass (use of biomass)



Concept of NRB and DRB

As shown in above figure, non-renewable woody biomass consumption (NRB) is defined as any woody biomass consumption (D_b) beyond the level of wood production (G_b), This approach addresses the amount of biomass harvested which is not off-set by re-growth. This approach is confirmed as the two necessary indicators to demonstrate the existence of NRB are present:

1. 34% of households gathering wood experience an increase in time spent and distance travelled by users for gathering wood.[24] According to official statistics, the nominal value of household expenditure on firewood and charcoal in both monetary and non-monetary terms has increased by 81.6% in a period of 10 years. For instance, the average market price of charcoal in Kampala has increased from 209.8 uSh in 2004, to 389.9 uSh in 2009 per kilogram.[25]

[24]CIRCODU, Report on baseline fuel consumption in Uganda. 2010

[25]Uganda Bureau of Statistics. Statistical abstract. 2010

2. 77% of households buying wood experience an increase in fuel wood price.[26]

Therefore household biomass fuel consumption in Uganda is a driver for forest deforestation/degradation. This means that the fraction of woody biomass not covered by the wood production can be assumed as the NRB, as it is the fraction not re-generating. This trend is present from since 1990 as the FAO countrywide data shows in its Global Forest Resources Assessment 2010 for Uganda, where a clear reduction of the forest coverage since 31 December 1989 from 287 million cubic meters over bark to 182 million in 2010 is shown. Therefore it can be assumed that NRB has been in use since 1989.

The following equation is used to calculate NRB:

$NRB = D_b - G_b$ (3)

The wood production, or growth of biomass (G_b), is expressed as the mean annual increment (MAI) from growing stock of forests and other wooded lands. MAI is considered to be similar to the demonstrable renewable woody biomass (DRB). This is quite a conservative assumption as there is no official evidence in Uganda of either (a), (b), and (c) requirements before mentioned for forest or non-forest areas as defined in the methodology. Under the uncertainty of how much of the mean annual increment really comes from land areas where (a), (b), and (c) are satisfied, the most conservative approach is selected, the consideration of the whole growing biomass in Uganda as DRB.

According to FAO statistics, the total growing stock in Uganda is the sum of forest and other wooded land growing stock:

Uganda	*Growing Stock*	
Forest	126,584,700	m^3
Plantation	4,324,600	
Other wooded land	24,357,600	m^3
Total	155,267,100	m^3

Table 1: Uganda growing stock.[27]

The generic growth of the growing stock can be set at 2.5% for Uganda to cover all prevalent biomass types with a 10% being used for plantations[28]. Therefore G_b is 2.5% of 150.9 million m^3 plus 10% of 4,3 million m^3, 4,206,038 m^3/year.

G_b = 4,206,038 m^3/year

The demand of biomass (D_b) is represented as the total annual harvest of wood in m^3 which is the sum of the industrial roundwood harvest and the woodfuel removals. For the calculation of the NRB it is

[26]CIRCODU, Report on baseline fuel consumption in Uganda. 2010

[28]FAO, Wood-fuel Integrated Supply/Demand Overview Mapping (WISDOM) - East Africa, 2005

necessary to consider all wood harvested, not only the fraction used for fuel as the estimation of the biomass off-set by the project does not distinguish between the different sources of the production.

Year	*1990*	*2000*	*2005*
Industrial roundwood (m3)	2,044,470	3,620,430	3,651,250
Woodfuel removals (m3)	33,865,315	39,315,625	42,310,362
Annual Harvest of wood (m3)	35,909,785	42,936,055	45,961,612

Table 2: Annual harvest of fuel wood. [29]

Data for 2010 harvest values is estimated for the purpose of this document through the trend line equation f(x) of the annual harvest of fuel wood values from 1990 to 2005, which are the first and last years when data was recorded without interruption, showing a linear behaviour[30].

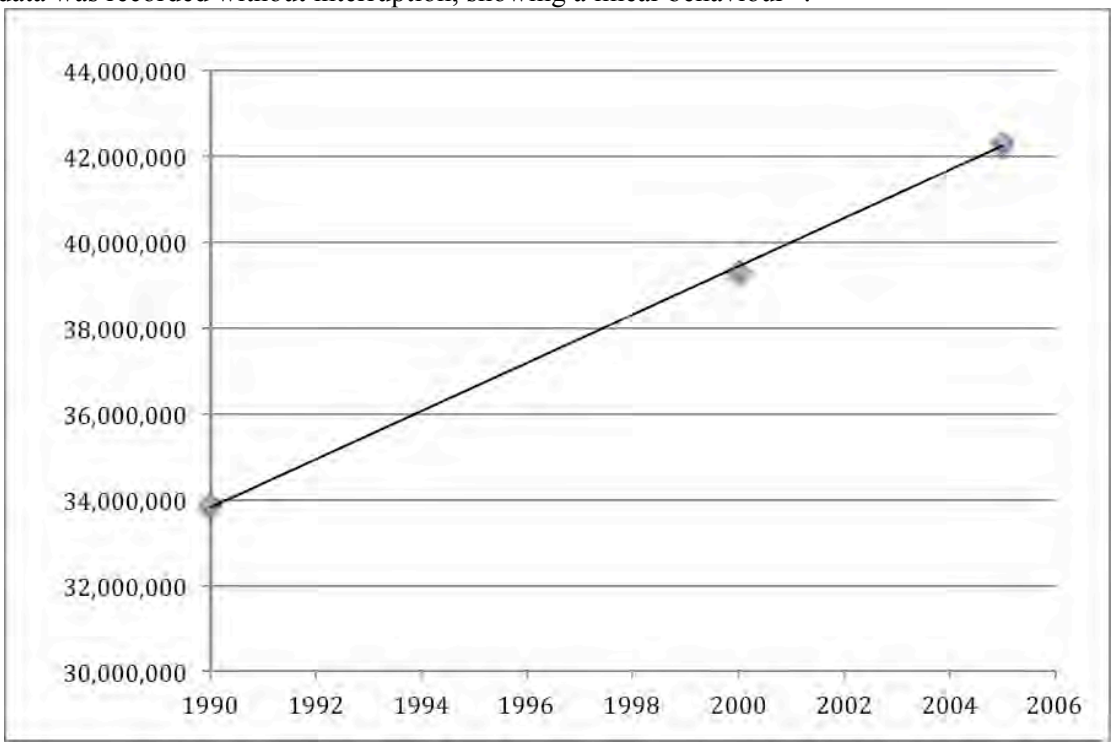


Illustration 1: Linear trend of woodfuel removals in m3 for each year from 1990-2005

Therefore results are as follows:

Year	*2010*

[29] FAO, Global Forest Resources Assessment 2010 Uganda, 2010

[30] The results of the estimation can be considered suitable, as the coefficient of determination R^2 is equal to 1, thus indication a linear trend.

	m^3
Industrial roundwood	3,651,250
Woodfuel removals	45,601,435
Annual Harvest of fuel wood	**49,252,685**

Table 3: Estimated annual harvest of wood

D_b = 49,252,685 m^3 for year 2010

Under these assumption, the fraction of $NRB_{,y}$ in total biomass fuel consumption is calculated combining (1) and (3) as follows:

$fNRB_{,y} = D_b – G_b / D_b$ (4)

$fNRB_{,y}$ = 49,252,685 m^3 – 4,206,038 m^3 / 49,252,685 m^3

$fNRB_{,y}$ = 91.5%

Through this calculation, it can be assumed that 91.5% of the biomass consumed can create carbon dioxide emissions reductions, whereas 8.5% of the consumption is covered by the natural growth of the forest biomass.

References
- CIRCODU, Report on baseline fuel consumption in Uganda. 2010
- FAO, Global Forest Resources Assessment 2010 Uganda, 2010
- 2010 statistical abstract. Uganda Bureau of Statistics. 2010
- Wood-fuel Integrated Supply/Demand Overview Mapping (WISDOM) Methodology – East Africa: Spatial wood-fuel production and consumption analysis of selected African countries FAO – Forestry Department – Wood Energy, Rudi Drigo, 2005

Determination of the quantity of woody biomass used in the absence of the project activity per cookstove for charcoal users in Uganda ($C_{y,charcoal,Uganda}$)

The annual consumption of woody biomass can be derived from a survey of local usage, conducted in the both urban and rural areas in Uganda[31]. This survey was conducted by the independent organisation CIRCODU, by way of Kitchen Performance Tests (KPT) in randomly selected households using traditional cooking in representative urban and rural areas recording their fuel consumption during one week. The study monitored both firewood consumption user and charcoal consumption users. As this CPA only includes charcoal ICS, only these results are analysed below.

Survey Design
The sampling population was 74 rural and urban charcoal consuming households, randomly selected. The population sample size was chosen 90% confidence interval with a confidence interval of +/- 10% based on a targeted population of 7.29 million households, which gave a minimum sample size of 68.

[31] CIRCODU, Report on baseline fuel consumption in Uganda. 2010

In Uganda there is a clear distinction among rural and urban users in their wood fuel preferences and their consumption habits. Urban users rely on charcoal more than rural users do, and prices are higher for urban consumers than rural ones. This leads to a higher consumption of wood fuel for their daily needs by rural users. According to the Uganda Population and Housing Census from 2002, the last one up to date, 67% or urban population rely on charcoal for cooking in comparison to 8% of rural population.[32] The survey also revealed that the price of charcoal bags in urban areas is around 24000 to 32000 Ugandan shillings, meanwhile in rural areas this decreases to 14000 to 20000 Ugandan shillings. For this reason it was decided to consider two different sample populations depending on their urban/rural condition, and to take an average according to the weight of the share of urban and rural population in Uganda.

The survey samples were divided by rural (31 surveys) and urban (43 surveys) population. The rural sample was selected from three different divisions of Gulu district, in the north of Uganda. These three divisions were Labiwi, Pele, and Pece. The urban population was selected from Kampala district, in Kawempe division, in Sempa, Kulumba, Lule, Kiyaga, and Kiyindi zones. These areas have been selected due to their reasonably average incomes that make them a good representation for both rural and urban areas.

Key questions asked in the survey included the amount of charcoal consumed daily, number of household members, number of stoves, method for obtaining charcoal and cost of obtaining charcoal.

The survey results are as follow:

Charcoal				
	Number surveys	Average daily fuel use/stove	Average daily fuel **Lower Bound of CI**	Average yearly fuel **Lower Bound of CI**
		kg/stove/day	kg/stove/day	tonne/stove/year
Rural	31	3.56	3.01	**1.1**
Urban	43	1.66	1.46	**0.53**

The lower bound of the confidence interval has been selected according to the methodology as the survey did not achieve the 10% margin of error at the given 90% confidence interval. However a simple average result of these two results would not be representative for Uganda, as rural population counts for 85.2% of the total population. At the same time, most charcoal is utilized in urban areas, therefore the next calculations are made:

Relative weight of fuel use				
	Total population	Charcoal Use	Charcoal Total Use	Relative weight of the sample
Rural	85.20%	8.00%	6.82%	41%
Urban	14.80%	67.00%	9.92%	59%

These results compare the urban/rural population split with the share of charcoal use in each of them. The charcoal total use represents the percentage of urban and rural population using charcoal out of the total

[32] UBOS, Uganda Population and Housing Census, 2002,

population of Uganda. The relative weight of the samples is calculated from the comparison between these two last results.

The rural users represent 41% of the charcoal consumption in Uganda, and urban user 59%.

Charcoal consumption = (Rural Average consumption * Rural relative weight of the sample) + (Urban Average consumption * Urban relative weight of the sample)

Charcoal consumption = (1.1 tonnes/year * 0.41) + (0.53 tonnes/year * 0.59)

Charcoal consumption = 0.76 tonnes/year of charcoal per stove

The survey results provide a value of 0,76 tons of charcoal per year. In order to calculate the wood biomass consumption, a conversion factor 6 is used as there is no regional information on this, following IPCC indications[33] *"Values for estimating the amount of carbon released through charcoal production and consumption, the wood-to-charcoal factor, are stated to be between 4 and 8. If no local information is available, 6 kg of wood input per kg of charcoal may be used as default (FAO, 1990)".*

$C_{y,charcoal,Uganda}$ = 0.76 tonnes of charcoal/year/stove * 6

$C_{y,charcoal,Uganda}$ = 4.58 tonnes of biomass/year/stove

The baseline of biomass consumption for charcoal cookstoves is 4.58 tonnes/year per stove

[33] IPCC Revised Guidelines for National Greenhouse Gas Inventories, reference manual. 1996

Annex 4

MONITORING INFORMATION

SAMPLING PLAN[34] DROP OFF CHECK

We propose to use any one of the following two approaches based on an analysis of the estimated monitoring costs and benefits associated with each approach-monitoring costs for the 2 approaches are expected to vary depending on the geographical coverage of the CPA and the comprehensiveness of the CPA's existing monitoring/tracking system. The census approach also allows ease of substitution for ICS that are proven to have dropped out:

Approach 1: Census

A census of all ICS in use obtained through the monitoring of records in the CPA's database. The database will be continually updated with the following events:
(a) an annual maintenance/repair event
(b) customer inspections resulting from loan or hire purchase agreements
(c) double verified records of community-based stove monitoring staff
(d) independent monitoring verification exercises organised by the CME.

Approach 2: Sampling

SAMPLING DESIGN

Since this is a multi-country POA, the CPAs admitted to the POA may choose in advance a suitable sampling plan from one of the following 4 options based on the estimated monitoring costs associated with each option-monitoring costs for the 4 options are expected to vary depending on the geographical coverage of the CPA and the CPA's existing monitoring/tracking system in addition to the envisaged monitoring costs and benefits of each option:

OPTION 1: ANNUAL INSPECTION PER CPA[35]

Objectives and reliability requirements

[34] According to appendix 3 of the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 02.0), EB 65 Report, Annex 2; equations were obtained from "Best Practice Examples Focusing on Sample Size and Reliability Calculations", EB 67 Annex 6.

[35] This implies either conducting a census or selecting a random sample for each CPA independently according to the sampling plan

The objective is to estimate the proportion of project improved cook stoves (ICS) that are still in operation/use at the end of each year. AMS II.G./Version 03 will be applied. The overall objective is to estimate the annual emission reductions during the year y in tCO_2e during the crediting period, and with 90/10 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPA at the end of the year. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database.

The data to be collected on each sampling unit (ICS) is whether it is in use or not.

Sampling method

Simple random sampling will be used. A number of ICS will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame.

Sample size

The required sample size will be determined using simple random sampling.

The equation for estimating the sample size is:

$$n \geq \frac{1.645^2 NV}{(N-1)X0.1^2 + 1.645^2 V}$$

Where $V = \frac{p(1-p)}{p^2}$ and p is the expected proportion

n Sample size

N Population total

p Our expected proportion

1.645 Represents the 90% confidence required

0.1 Represents the 10% relative precision

The minimum sample sizes for the different scenarios required to meet the confidence and precision requirements are calculated in a sample size computation spreadsheet.[36]

Summary results for different populations are found in the following table for an assumed 50% of cook stoves still in use[37]:

Population size	Calculated minimum sample size	Adjusted sample size according to response rate of 80%
1,000	214	268
2,000	239	299
3,000	249	312
4,000	254	318
5,000	257	322
6,000	259	324
7,000	261	327
8,000	262	328
9,000	263	329
10,000	264	330
11,000	265	332
12,000	265	332
13250	266	333
14,000	266	333

Sampling frame

The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame.

[36] Sample size calculation spreadsheet provided to the DOE

[37] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

OPTION 2: ANNUAL INSPECTION OF A RANDOM SAMPLE OF CPAS FROM EACH SUPPLIER ORGANISATION (SO)

Objectives and reliability requirements

The objective is to estimate the proportion of project improved cook stoves (ICS) that are still in operation/use at the end of each year. AMS II.G./Version 03 will be applied. The overall objective is to estimate the annual emission reductions during the year y in tCO_2e during the crediting period, and with 95/10 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPAs classified by Supplier Organisation at the end of the year. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database.

The data to be collected on each sampling unit (ICS) is whether it is in use or not.

Sampling method

Multistage sampling will be used. A number of ICS within the selected CPAs belonging to each Supplier organisation will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame.

Sample Size

The required sample size will be determined using multistage sampling.

The equation for the number of clusters (CPAs) to be sampled is:

$$C \geq \frac{\frac{SD_B^2}{\bar{p}^2} X \frac{M}{M-1} + \frac{1}{\bar{u}} X \frac{SD_W^2}{\bar{p}^2} X \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{0.1^2}{1.96^2} + \frac{1}{M-1}\frac{SD_B^2}{\bar{p}^2}}$$

Where:

C	Number of groups/clusters/CPAs that should be sampled
M	The total number of clusters (CPAs) in the population
$\bar{u}$	Number of (ICS/households) to be sampled within each cluster (CPA)
$\bar{N}$	Average units (ICS/households) per cluster (CPA)
SD_B^2	Variance between clusters (CPA)
SD_W^2	Average within cluster (CPA) variation
p	Overall proportion of ICS in use
1.96	Represents the 95% confidence required
0.1	Represents the 10% relative precision

$\bar{p}$ Is the average proportion of ICS

The minimum sample sizes -for the different scenarios- required to meet the confidence and precision requirements are given in a computation spreadsheet [38].

Summary results for different possible numbers of CPAs are found in the following table for an assumed 80% of cook stoves in use: [39]

Number of ICS to be sampled from each CPA	Number of CPAs to Sample	Total sample size
1	96	96
5	21	105
10	11	110
15	8	120
20	6	120
25	6	150
30	5	150
35	4	140
40	4	160

Sampling frame

The PoA database of stove and user information and their corresponding CPAs classified by Supplier Organisation established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame. The stoves in the PoA database will be classified by Supplier Organisation by CPA for sampling purposes.

[38] Provided to the DOE

[39] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

OPTION 3: BIENNIAL INSPECTION PER CPA

Objectives and reliability requirements

The objective is to estimate the proportion of project improved cook stoves (ICS) that are still in operation/use at the end of each year. AMS II.G./Version 03 will be applied. The overall objective is to estimate the annual emission reductions during the year y in tCO_2e during the crediting period, and with 95/5 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPA at the end of the year. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database.

The data to be collected on each sampling unit (ICS) is whether it is in use or not.

Sampling method

Simple random sampling will be used. A number of ICS will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame.

Sample size

The required sample size will be determined using simple random sampling.

The equation for estimating the sample size is:

$$n \geq \frac{1.96^2 NV}{(N-1)X0.05^2 + 1.96^2 V}$$

Where $V = \frac{p(1-p)}{p^2}$ and p is the expected proportion

n Sample size

N Population total

p Our expected proportion

1.96 Represents the 95% confidence required

0.05 Represents the 5% relative precision

The minimum sample sizes-for the different scenarios-required to the meet the confidence and precision requirements are calculated in a computation spreadsheet[40].

Summary results for different populations are found in the following table for an assumed 50% of cook stoves still in use[41]:

Population size	Calculated minimum sample size	Adjusted sample size according to response rate of 80%
1,000	607	759
2,000	870	1088
3,000	1017	1272
4,000	1111	1389
5,000	1176	1470
6,000	1224	1530
7,000	1261	1577
8,000	1290	1613
9,000	1313	1642
10,000	1333	1667
11,000	1349	1687
12,000	1363	1704
13,250	1378	1723
14,000	1385	1732

Sampling frame

The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame.

[40] Sample size calculation spreadsheet provided to the DOE

[41] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

OPTION 4: ANNUAL INSPECTION OF A RANDOM SAMPLE OF CPAS FROM CPAS USING THE SAME ICS MODEL

Objectives and reliability requirements

The objective is to estimate the proportion of project improved cook stoves (ICS) that are still in operation/use at the end of each year. AMS II.G./Version 03 will be applied. The overall objective is to estimate the annual emission reductions during the year y in tCO_2e during the crediting period, and with 95/10 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPAs classified by Stove Model at the end of the year. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database.

The data to be collected on each sampling unit (ICS) is whether it is in use or not.

Sampling method

Multistage sampling will be used. A number of ICS within the selected CPAs deploying the same stove model will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame.

Sample size

The required sample size will be determined using multistage sampling.

The equation for the number of clusters (CPAs) to be sampled is:

$$C \geq \frac{\frac{SD_B^2}{\bar{p}^2} X \frac{M}{M-1} + \frac{1}{\bar{u}} X \frac{SD_W^2}{\bar{p}^2} X \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{0.1^2}{1.96^2} + \frac{1}{M-1}\frac{SD_B^2}{\bar{p}^2}}$$

Where:

C	Number of groups/clusters/CPAs that should be sampled
M	The total number of clusters (CPAs) in the population
$\bar{u}$	Number of (ICS/households) to be sampled within each cluster (CPA)
$\bar{N}$	Average units (ICS/households) per cluster (CPA)
SD_B^2	Variance between clusters (CPA)
SD_W^2	Average within cluster (CPA) variation
p	Overall proportion of ICS in use
1.96	Represents the 95% confidence required
0.1	Represents the 10% relative precision

$\bar{p}$ Is the average proportion of ICS

The minimum sample sizes -for the different scenarios- required to meet the confidence and precision requirements are given in a computation spreadsheet [42].

Summary results for different possible numbers of CPAs are found in the following table for an assumed 80% of cook stoves in use: [43]

Number of ICS to be sampled from each CPA	Number of CPAs to Sample	Total sample size
1	96	96
5	21	105
10	11	110
15	8	120
20	6	120
25	6	150
30	5	150
35	4	140
40	4	160

Sampling frame

The PoA database of stove and user information and their corresponding CPAs classified by Supplier Organisation established through the Sales Agreements and subsequently updated on a continuous basis will be used as the sampling frame. The stoves in the PoA database will be classified by Stove Model by CPA for sampling purposes.

[42] Provided to the DOE

[43] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

DATA

Field measurements

The main variable that will be measured by the usage survey is the proportion of ICS in use. Monitoring surveys will be conducted to determine and validate the proportion of ICS in use.

Quality assurance/quality control

A team of research assistants and supervisors for the usage survey will be recruited and trained in all aspects of sampling, data collection and interviewing by the CME or a CME-appointed agent. The training will involve both theoretical and practical aspects to ensure that all the research assistants are competent to collect the desired data. Data collection protocols will be prepared and given to the research assistants and supervisors to guide them during the data collection exercise. In addition, there will be a supervisor from the CME head office. Mobile devices, for instance mobile phones and other devices, will be used to electronically send data to the central database at the CME head office. The updating of the PoA's central database will be strictly monitored with several permission levels and passwords. In cases where the use of mobile devices is impossible, paper copies of questionnaires will be used to collect data about the usage of ICS from the selected sample.

The data collection protocols prepared for the research assistants will include the procedures for handling cases of non-response (refusals, not-at-home, out-of-population cases and related cases). A variable will be included to capture the results of interviews with the following 4 options: responded, out-of-population, refused, not-at-home. The protocols will also include the roles and responsibilities of the research assistants and supervisor. In addition, the definition of each of the study variables, mode of data collection and recording will be highlighted in the data collection protocol.

In case of non-response as a result of respondents not being at home, there will be at least 3 callbacks. Oversampling will also be undertaken to take care of non-response.

In addition, supplier organisations will be trained in all aspects of data collection and recording, especially using mobile devices and other relevant technologies, for the continuous updating and monitoring of data in the PoA's central database.

Since the main parameter in the usage survey is the proportion of ICS in use, no outlier data/measurements are expected. However, check programmes will be prepared to automatically reject data that is defective and will automatically notify the research assistant that the data is defective for immediate verification, rectification or call back.

Analysis

The data obtained from the selected households owning the ICS will be further cleaned and validated for accuracy and analysed by the CME's Monitoring Manager. All the sales data and the usage survey data will be captured in a computerised database. The analysis will include computation of the proportion of ICS in use, frequencies of the other study variables and the computation of variables necessary for the estimation of emission reductions according to AMS II.G/Version 03. The results will be summarised using the pre-specified level of confidence. The precision of the estimates (proportion of ICS in use) will

be checked to ensure that the estimate is within the pre-specified reliability precision. The reliability of the estimates will be checked by computing and evaluating the standard error of the proportion to establish whether it is within the permissible limits.

IMPLEMENTATION

Implementation Plan

The Monitoring Manager will be responsible for data collection and data analysis. The Monitoring Manager has experience in sampling and surveys.
The schedule for implementing the sampling will be set out by the Monitoring Manager.

SAMPLING PLAN[44] EFFICIENCY CHECK

SAMPLING DESIGN

Since this is a multi-country POA, the CPAs admitted to the POA may choose in advance a suitable sampling plan from one of the following 4 options based on the estimated monitoring costs associated with each option-monitoring costs for the 4 options are expected to vary depending on the geographical coverage of the CPA and the CPA's existing monitoring/tracking system in addition to the envisaged risks and benefits of each option:

OPTION 1: ANNUAL INSPECTION PER CPA

Objectives and reliability requirements

The objective is to estimate the mean thermal efficiency of the project improved cook stoves (ICS) with 90/10 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPA at the end of the year that are in use. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database. The total number of cook stoves that are in use will be identified through either one or a combination of the following activities that will be stored in the monitoring database: The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

The data to be collected on each sampling unit (ICS) is its thermal efficiency.

Sampling method

Simple random sampling will be used. A number of ICS in each cohort will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be

[44] According to appendix 3 of the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 02.0), EB 65 Report, Annex 2; equations were obtained from "Best Practices Examples Focusing on Sample Size and Reliability Calculations", EB 67 Annex 6.

continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

Sample size

The required sample size will be determined using simple random sampling in each cohort.

The equation for estimating the sample size in each cohort is:

$$n \geq \frac{1.645^2 NV}{(N-1)X0.1^2 + 1.645^2 V}$$

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

n sample size

N Total number of ICS in use

Mean Our expected standard deviation

1.645 Represents the 90% confidence required

0.1 Represents the 10% relative precision

The minimum sample sizes -for the different scenarios- required to meet the confidence and precision requirements are given in a computation spreadsheet .[45]

Summary results for different populations are found in the following table for an assumed 0.285 mean efficiency[46]:

Population size	Standard deviation	Calculated minimum sample size	Adjusted sample size according to response rate of 80%
1,000	0.175	93	117
2,000	0.175	98	123
3,000	0.175	99	124
4,000	0.175	100	125
5,000	0.175	101	127
6,000	0.175	101	127

[45] Sample size calculation spreadsheet provided to the DOE

[46] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

7,000	0.175	101	127
8,000	0.175	101	127
9,000	0.175	101	127
10,000	0.175	102	128
11,000	0.175	102	128
12,000	0.175	102	128
13,250	0.175	102	128
14,000	0.175	102	128

Sampling frame

The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

OPTION 2: ANNUAL INSPECTION OF A RANDOM SAMPLE OF CPAS FROM EACH SUPPLIER ORGANIZATION (SO)

Objectives and reliability requirements

The objective is to estimate the mean thermal efficiency of the project improved cook stoves (ICS) with 95/10 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPA at the end of the year that are in use classified by Supplier Organisation. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database. The total number of cook stoves that are in use will be identified through either one or a combination of the following activities that will be stored in the monitoring database: The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

The data to be collected on each sampling unit (ICS) is its thermal efficiency.

Sampling method

Multistage sampling will be used. A number of ICS in each cohort within the selected CPAs belonging to each Supplier organization will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

Sample size

The required sample size will be determined using multistage sampling.

The equation for the number of clusters (CPAs) to be sampled is:

$$C \geq \frac{\frac{SD_B^2}{clustermean^2} X \frac{M}{M-1} - \frac{1}{\bar{u}} X \frac{SD_W^2}{overallmean^2} X \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{0.1^2}{1.96^2} + \frac{1}{M-1} \frac{SD_B^2}{clustermean^2}}$$

Where:

C Number of groups/clusters/CPAs that should be sampled

M The total number of clusters (CPAs) in the population

$\bar{u}$ Number of (ICS/households) to be sampled within each cluster (CPA)

$\bar{N}$ Average units (ICS/households) per cluster (CPA)
SD_b^2 Variance between clusters (CPA)
SD_w^2 Average within cluster (CPA) variation
1.96 Represents the 95% confidence required
0.1 Represents the 10% relative precision

The minimum sample sizes -for the different scenarios- required to meet the confidence and precision requirements are given in a computation spreadsheet .[47]

Summary results for different possible numbers of CPA are found in the following table for an assumed efficiency of 0.28[48]:

Number of ICS to be sampled from each CPA	Number of CPAs to Sample	Total sample size
1	87	87
5	20	100
10	12	120
15	9	135
20	8	160
25	7	175
30	6	180
35	6	210
40	6	240

Sampling frame

The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey. The stoves in the PoA database will be classified by Supplier Organization by CPA for sampling purposes.

[47] Sample size calculation spreadsheet provided to the DOE

[48] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

OPTION 3: BIENNIAL INSPECTION PER CPA

Objectives and reliability requirements

The objective is to estimate the mean thermal efficiency of the project improved cook stoves (ICS) with 95/5 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPA at the end of the year that are in use. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database. The total number of cook stoves that are in use will be identified through either one or a combination of the following activities that will be stored in the monitoring database: The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

The data to be collected on each sampling unit (ICS) is its thermal efficiency.

Sampling method

Simple random sampling will be used. A number of ICS in each cohort will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

Sample size

The required sample size will be determined using simple random sampling in each cohort.

The equation for estimating the sample size in each cohort is:

$$n \geq \frac{1.96^2 NV}{(N-1)X0.05^2+1.96^2 V}$$

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

n sample size

N Total number of ICS in use

Mean Our expected standard deviation

1.96 Represents the 95% confidence required

0.05 Represents the 5% relative precision

The minimum sample sizes -for the different scenarios- required to meet the confidence and precision requirements are given in a computation spreadsheet. [49]

Summary results for different populations are found in the following table for an assumed 0.285 mean efficiency[50]:

Population size	Standard deviation	Calculated minimum sample size	Adjusted sample size according to response rate of 80%
1,000	0.175	368	460
2,000	0.175	450	563
3,000	0.175	486	608
4,000	0.175	507	634
5,000	0.175	520	650
6,000	0.175	529	662
7,000	0.175	536	670
8,000	0.175	541	677
9,000	0.175	545	682
10,000	0.175	548	685
11,000	0.175	551	689
12,000	0.175	553	692
13,250	0.175	556	695
14,000	0.175	557	697

Sampling frame

The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

[49] Sample size calculation spreadsheet provided to the DOE

[50] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

OPTION 4: ANNUAL INSPECTION OF A RANDOM SAMPLE OF CPAS FROM CPAS USING THE SAME ICS MODEL

Objectives and reliability requirements

The objective is to estimate the mean thermal efficiency of the project improved cook stoves (ICS) with 95/10 confidence/precision.

Target population

The target population is the total number of ICS installed by the CPA at the end of the year that are in use. The primary means to uniquely identify the activities under the CPA is by means of buyer information collected through Sales Agreements and the unique numbering of each ICS. The sales data will be stored in the CPA's records in the PoA's electronic database. The total number of cook stoves that are in use will be identified through either one or a combination of the following activities that will be stored in the monitoring database: The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

The data to be collected on each sampling unit (ICS) is its thermal efficiency.

Sampling method

Multistage sampling will be used. A number of ICS in each cohort within the selected CPAs operating the same Stove Model will be sampled using simple random sampling with the aid of a computerised randomiser. The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey.

Sample size

The required sample size will be determined using multistage sampling.

The equation for the number of clusters (CPAs) to be sampled is:

$$C \geq \frac{\frac{SD_g^2}{clustermean^2} X \frac{M}{M-1} - \frac{1}{\bar{u}} X \frac{SD_w^2}{overallmean^2} X \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{0.1^2}{1.96^2} - \frac{1}{M-1} \frac{SD_g^2}{clustermean^2}}$$

Where:

C Number of groups/clusters/CPAs that should be sampled

M The total number of clusters (CPAs) in the population

$\bar{u}$ Number of (ICS/households) to be sampled within each cluster (CPA)

$\bar{N}$ Average units (ICS/households) per cluster (CPA)
SD_b^2 Variance between clusters (CPA)
SD_w^2 Average within cluster (CPA) variation
1.96 Represents the 95% confidence required
0.1 Represents the 10% relative precision

The minimum sample sizes -for the different scenarios- required to meet the confidence and precision requirements are given in a computation spreadsheet.[51]

Summary results for different possible numbers of CPA are found in the following table for an assumed efficiency of 0.28[52]:

Number of ICS to be sampled from each CPA	Number of CPAs to Sample	Total sample size
1	87	87
5	20	100
10	12	120
15	9	135
20	8	160
25	7	175
30	6	180
35	6	210
40	6	240

Sampling frame

The PoA database of stove and user information established through the Sales Agreements and subsequently updated on a continuous basis will be used to identify ICS in use that will be used as the sampling frame. The database will be continually updated with the following events: (a) an annual maintenance/repair event (b) customer inspections resulting from loan or hire purchase agreements (c) double verified records of community-based stove monitoring staff (d) independent monitoring verification exercises organised by the CME (e) annual usage survey. The stoves in the PoA database will be classified by Stove Model by CPA for sampling purposes.

[51] Sample size calculation spreadsheet provided to the DOE

[52] The percentage of cook stoves expected in use will be altered for each CPA depending on their performance

DATA

Field measurements

The main variable that will be measured by the efficiency survey is the efficiency rating of ICS in use.

Quality assurance/quality control

A team of research assistants and supervisors for the usage survey will be recruited and trained in all aspects of sampling, data collection and interviewing by the CME or a CME-appointed agent. The training will involve both theoretical and practical aspects to ensure that all the research assistants are competent to collect the desired data. Data collection protocols will be prepared and given to the research assistants and supervisors to guide them during the data collection exercise. In addition, there will be a supervisor from the CME head office. Mobile devices, for instance mobile phones and other devices, will be used to electronically send data to the central database at the CME head office. The updating of the PoA's central database will be strictly monitored with several permission levels and passwords. In cases where the use of mobile devices is impossible, paper copies of questionnaires will be used to collect data about the usage of ICS from the selected sample.

The data collection protocols prepared for the research assistants will include the procedures for handling cases of non-response (refusals, not-at-home, out-of-population cases and related cases). A variable will be included to capture the results of interviews with the following 4 options: responded, out-of-population, refused, not-at-home. The protocols will also include the roles and responsibilities of the research assistants and supervisor. In addition, the definition of each of the study variables, mode of data collection and recording will be highlighted in the data collection protocol.

In case of non-response as a result of respondents not being at home, there will be at least 3 callbacks. Oversampling will also be undertaken to take care of non-response.

In addition, supplier organisations will be trained in all aspects of data collection and recording, especially using mobile devices and other relevant technologies, for the continuous updating and monitoring of data in the PoA's central database.

Since the main parameter in the thermal efficiency of the ICS, limits for outlier data/measurements will be preset. Check programs will also be prepared to automatically reject defective data and automatically notify the testers that the data is defective for immediate verification and rectification or callback.

Analysis

The data obtained from the selected households owning the ICS will be further cleaned and validated for accuracy and analysed by the CME's Monitoring Manager. All efficiency rating survey data will be captured in a computerised database. The analysis will include computation of the thermal efficiency of ICS in use. The results will be summarized using the pre-specified level of confidence. The precision of the estimates (thermal efficiency of ICS in use) will be checked to ensure that the estimate is within the pre-specified reliability precision. The reliability of the estimates will be checked by computing and evaluating the standard error of the mean thermal efficiency to establish whether it is within the permissible limits.

IMPLEMENTATION

Implementation Plan

The Monitoring Manager will be responsible for data collection and data analysis. The Monitoring Manager has experience in sampling and surveys.
The schedule for implementing the sampling will be set out by the Monitoring Manager.