Component project activity design document form
(Version 08.1)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the CPA	Distribution of Improved Cook Stoves in Sub-Saharan Africa Zambia-CPA-005
Scale of the CPA	☐ Large-scale ☒ Small-scale
Version number of the CPA-DD	1.2
Completion date of the CPA-DD	10/02/2019
Title and UNFCCC reference number of the registered CDM PoA	Distribution of Improved Cook Stoves in Sub-Saharan Africa 9007
Title and reference number of the corresponding generic CPA	Distribution of Improved Cook Stoves in Sub-Saharan Africa-[insert country name]-CPA-XXX
Coordinating/managing entity	C-Quest Capital Malaysia Global Stoves Limited
Host Party	Republic of Zambia
Applied methodologies and standardized baselines	AMS-II.G. ver. 4 - Energy efficiency measures in thermal applications of non-renewable biomass
Sectoral scopes linked to the applied methodologies	Sectoral Scope 3- Energy Demand
Estimated amount of annual average GHG emission reductions	83,802

SECTION A. Description of component project activity (CPA)

A.1. General description of CPA

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The proposed small-scale CPA involves distribution of fuel-efficient improved cook stoves (ICS) in Zambia. The ICS disseminated through this programme will replace the prevailing inefficient three-stone fires, or traditional pot supports[1].

Approximately 60 per cent of Urban and more than 95 per cent of the rural population in Zambia is dependent on solid fuel for cooking with 54% of all Zambian households using firewood and 29% using charcoal in inefficient traditional three stone fire stoves. Due to this high proportion of dependence on biomass energy, the challenge of unsustainable biomass harvesting to meet this energy requirement is greatly amplified. It is not surprising therefore that the country suffers from one of the highest rates of deforestation in the world (UN-Reduced Emissions from Deforestation and Degradation [UN-REDD] 2010). A direct fallout of use of inefficient stoves is also increased incidence of household associated pollution (HAP) impact on the health of women and children who spend maximum time in front of the hearth.

Through the proposed activity, distribution and installation of approximately 22,000 efficient cooking stoves will be undertaken for households in rural Zambia. The efficient cooking stoves will substitute the currently common cooking on open fire. The introduced cook stoves burn wood more efficiently thereby improving thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions. Not only will this halt the rapidly progressing deforestation in Zambia but will also reduce health hazards from indoor smoke pollution and women and children will have to spend less time collecting fire wood.

C-Quest Capital Malaysia Global Stoves Limited (henceforth referred as CQC) is the Coordinating / Managing Entity (CME) for the PoA under which this CPA is being developed. CQC will also be responsible for implementation of this CPA including management and coordination activities with local partners, promotion and installation of ICS and provide all necessary marketing and promotion assistance to partners. It will also be responsible for monitoring activities of this CPA. Ecoeye Co., Ltd. (henceforth referred as Ecoeye) will provide the entire implementation cost of this CPA. The cookstoves will be subsidized by Ecoeye so that affordable clean technology can be made available to households participating in the CPA. Ecoeye will also make available all operation and maintenance costs along with ICS production and distribution cost. In addition to financing the CPA, Ecoeye will also act as CPA implementer.

The end user will be informed in advance that the use of ICS generates carbon finance which in turn is used for subsidising the price of ICS and for recovering project implementation costs. The ICS customers will confirm via a Registration Card that their participation in the CPA is voluntary and they will transfer all rights to CERs generated by ICS to the CME and/or CPA implementer. They are also required to confirm that they have not previously owned an ICS and that the subsidized ICS being made available to them will be used exclusively for domestic purpose. The Registration Card can be either in a form of hard copy or electronic copy depending on the means (Direct contact or Indirect contact) chosen by the CPA implementer to collect end-user's information. The Registration Card will contain necessary information regarding the ICS, the user and the field team. This will ensure that each ICS can be easily identified and traced to its user. This information will be stored by the Project Implementer in hard copy and/or in an electronic data management system, or monitoring database, and a backup will be ensured by the CME to avoid double counting of ICS.

[1] Traditional pot supports as used in the PoA is taken to include tripods for open fires and various inefficient traditional charcoal stoves (where applicable)

It is intended that under this CPA single pot, TLC-CQC Rocket Stove will be distributed. However, at the time of implementation multi pot or portable stoves (e.g. EcoZoom Dura, EZY) may also be distributed. CPA implementer or entity approved by it will be installing (together with households) fixed stoves which will be assembled locally.

The average annual GHG emission reduction from the CPA is expected to be 83,802 t CO2 eq. and the expected annual energy saving of individual stove is 0.0169 GWh_{th} which is below the microscale threshold.

In line with paragraph 124 (m) of "CDM project standard for programmes of activities"; version 02.0, the proposed CPA is not required to demonstrate its compliance with the microscale or small-scale thresholds at the aggregate level of the CPA as the generic CPA (Part II; Generic Component Project Activity of approved revised PoA DD version 17, dated 27/12/2018) consists solely of units that qualify as microscale CDM units as defined in 'Demonstration of additionality of microscale project activities'.

A.2. Location of CPA

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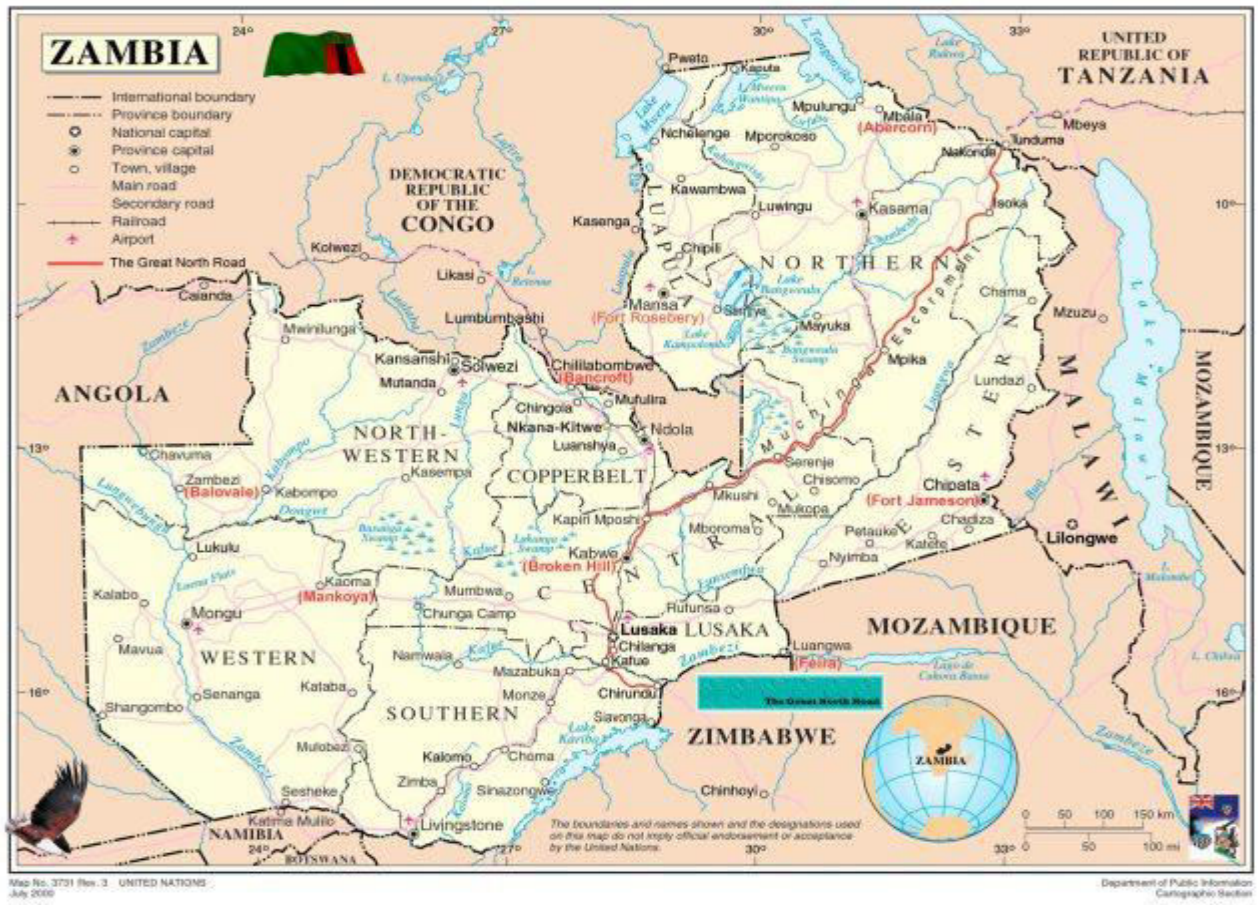
The CPA location will be the geographical boundary of Republic of Zambia with coordinates- 13°08'02.0"S latitude and 27°50'57.6"E longitude[2]

In the baseline survey it was discovered that there was no significant difference in the type of fuel used in different parts of the country hence it can be safely concluded that wood fuel boundary is concurrent with the boundary of Zambia.



Map of Zambia

[2] https://www.geodatos.net/en/coordinates/zambia

A.3. Technologies/measures

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It is envisaged that single pot fixed 'TLC-CQC Rocket' Stoves will be distributed under this CPA although other ICS technologies are not completely ruled out.

The TLC Rocket Stove uses a total of 16 bricks that will be made by the households using locally available clay. The average size of the brick would be 22.5cm x 11cm x 6.5cm. The bricks will be joined together using a mixture of 5 liters clay, 5 liters sand, 5 liters manure/cow dung and 5 liters of water. This ensures reduction in heat loss and better insulation. Metal components have been added to the design to optimize combustion and heat transfer.

TLC Rocket Stove

Stove Components

1. Stove has a metal top that allows the pot to sit higher improving the flow of air into the combustion chamber and out through the top of the stove
2. An adjustable metal pot skirt ensures more effective transfer of heat from the fire into the pot, increasing efficiency and also helping to block wind
3. TLC-CQC stoves come with a metal stick support which is placed in front of and slightly into the opening of the stove and acts as a firewood feeding platform. This ensures adequate airflow while feeding the fuel into the combustion chamber resulting in complete combustion of wood.

According to independent stove efficiency tests performed by Aprovecho Research Centre on the TLC Rocket Stove, the WBT results yielded an average thermal efficiency of 34.5%. for boiling 5 litres of water.

Technical Specifications	
Stove Size	Depth: 35 cm Width: 35 cm Height: 28 cm
Combustion Chamber Size	Depth: 12 cm Width: 12 cm Height: 28 cm
Efficiency	34.5%

A.4. Coordinating/managing entity

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C-Quest Capital Malaysia Global Stoves Limited is the coordinating/managing entity of the PoA under which the proposed CPA will be developed

A.5. Parties and CPA implementers

Parties involved	CPA implementers	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
Republic of Zambia (host)	C-Quest Capital Malaysia Global Stoves Limited	No
Republic of Korea	ECOEYE Co. Ltd.	No

A.6. Public funding of CPA

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No public funding from Annex I parties to the United Nations Framework Convention on Climate Change (UNFCCC) will be used to finance the proposed CPA. If public funding from Annex I parties to the UNFCCC is provided, the CME shall confirm that such funding is not diversion of Official Development Assistance (ODA).

A.7. History of CPA

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The proposed CPA is neither registered as a CDM project activity nor included in another registered CDM PoA. It is also not a project activity that has been deregistered.

An individual household in the proposed CPA will only represent a single independent subsystem/measure (stove) in this PoA. It will be confirmed during the distribution process that the household included in the CPA did not previously own an ICS and through the monitoring process that each household is not already involved in any other CPA or CDM project involving the distribution and/or installation of ICS (as outlined in Part I section B.2 of PoA defining eligibility criteria for inclusion of CPAs). When a new ICS Registration Card is filled out, or sent via SMS or ICT, the customer will acknowledge that they previously used a three-stone fire or traditional pot support and are not part of any other ICS program to be included in the CPA. Registration data collected will be verified by spot-checks. This will ensure that no customers who already own an ICS shall be included in this CPA.

Each CPA will assign specific serial numbers to stoves distributed under it. Through this serial number any stove in the CPA can be identified and tracked to its user. While it will be ensured that no two stoves are assigned the same serial number, at the same time care will be taken that a single stove is not assigned two different serial numbers. In addition to unique serial number, each stove will also be identified by the customer's details such as name address etc. In addition, each CPA will be cross-checked with other CPAs in this PoA to ensure that the ICS belonging to proposed CPA is not included in any other CPA.

A.8. Debundling

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In line with paragraph 124 (n) of "CDM project standard for programmes of activities"; version 02.0, assessment of debundling is not required for the proposed CPA as the generic CPA consists solely of units that qualify as "microscale CDM units"

SECTION B. Application of selected methodologies and standardized baselines

B.1. Reference to methodologies and standardized baselines

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The approved small-scale baseline and monitoring methodology used is AMS II.G, version 4, Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass.

B.2. Project boundary, sources and greenhouse gases (GHGs)

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Project boundary is the physical, geographical site of the efficient cookstoves.

Source		GHG	Included?	Justification/Explanation
Baseline	Combustion of non-renewable fire wood for cooking (three stone fire or traditional pot support)	CO_2	yes	Major source of emission
		CH_4	no	Minor source of emission
		N_2O	no	Minor source of emission
Project activity	Combustion of non-renewable fire wood for cooking (ICS)	CO_2	yes	Major source of emission
		CH_4	no	Minor source of emission
		N_2O	no	Minor source of emission

B.3. Establishment and description of baseline scenario

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As per paragraph 4 of the applied methodology, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

B.4. Estimation of emission reductions

B.4.1. Explanation of methodological choices

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In line with the Generic CPA, the proposed SSC-CPA will apply approved methodology AMS II.G, Version 04. For the purpose of emission reduction, baseline is assumed to be the use of fossil fuels to meet similar thermal needs.

Following default values which is common across all CPAs developed under the PoA and as stated in generic CPA, will be used

- 81.6tCO2/TJ – emission factor of the projected fossil fuel use
- 0.95- leakage adjustment factor
- 0.10- efficiency of baseline stove

In line with the requirements of generic CPA, Option 2 (equation 3) will be used for calculating $B_{y,\ savings}$ and continued use of baseline stoves amongst users of ICS will be monitored to ensure that fuel-wood consumption of baseline stoves is excluded from B_{old} calculation.

Emission reduction calculation will be carried out using equation 1.

B.4.2. Data and parameters fixed ex ante

(Copy this table for each piece of data or parameter.)

Data/Parameter	**B_{old}**
Data unit	Tonnes/year
Description	Quantity of woody biomass used in absence of the project activity (per stove)
Source of data	Approved revised PoA DD; version 17, dated 27/12/2018
Value(s) applied	5.695
Choice of data or measurement methods and procedures	B_{old} value has been calculated using historical data from reliable sources.
Purpose of data	Emission reduction calculation
Additional comment	For calculating ex-ante emission reduction, a baseline adjustment factor has been applied to B_{old} to account for fuel-wood used in a second baseline stove. This factor has been taken from registered PoA 'Improved Cookstoves Program for Zambia' (reference no 8060). According to this PoA, 23% of households use secondary stove at least once per week and mean number of stoves used per HH is 1.028. The value of *Bold* applied in this CPA for wood fuel baseline stoves (5.695 tonnes/year) incorporates this baseline adjustment factor[3].

Data/Parameter	**η_{old}**
Data unit	Fraction
Description	Efficiency of 3-stone fire or traditional pot support cooking method (system being replaced)
Source of data	Methodology default
Value(s) applied	0.10
Choice of data or measurement methods and procedures	AMS II G version 4, paragraph 6, option 2
Purpose of data	Emission reduction calculation
Additional comment	

Data/Parameter	**f_{NRB}**
Data unit	Fraction
Description	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data	Approved revised PoA DD; version 17, dated 27/12/2018
Value(s) applied	0.81
Choice of data or measurement methods and procedures	The value has been calculated in accordance with EB 67, Annex 22; using publicly available data that have been published by reliable sources. Calculation details have been included in registered PoA.
Purpose of data	Emission reduction calculation
Additional comment	

[3] For detailed calculation please refer to the emission reduction sheet.

Data/Parameter	$NCV_{biomass}$
Data unit	TJ/T
Description	Net calorific value of non-renewable biomass that is substituted
Source of data	IPCC default value
Value(s) applied	0.015
Choice of data or measurement methods and procedures	In accordance with AMS II.G; version 04
Purpose of data	Emission reduction calculation
Additional comment	

Data/Parameter	$EF_{projected\_fossilfuel}$
Data unit	T CO_2/TJ
Description	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data	IPCC default value
Value(s) applied	81.6
Choice of data or measurement methods and procedures	In accordance with AMS II.G; version04
Purpose of data	Emission reduction calculation
Additional comment	

Data/Parameter	L
Data unit	fraction
Description	Leakage adjustment factor
Source of data	default value
Value(s) applied	0.95
Choice of data or measurement methods and procedures	A net to gross adjustment factor (0.95 default) is applied in order to adjust B_{old} to account for leakages as per paragraph 13 (a) of the methodology
Purpose of data	Emission reduction calculation
Additional comment	

B.4.3. Ex ante calculation of emission reductions

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$$ER_y = B_{y,\ savings} * f_{NRBy} * NCV_{biomass} * EF_{projected\_fossilfuel} * L$$

ER_y - Emission reductions during the monitoring period y in tCO2e

$B_{y,savings}$ - Total biomass that is saved in tonnes during the monitoring period (*y*)

$f_{NRB,y}$ - Fraction of biomass saved by the project activity in monitoring period y that has been established as non-renewable biomass

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

$EF_{projected\_fossilfuel}$ - Emission factor for the substitution of non-renewable biomass by similar consumers. The IPCC default value is selected (81.6 TCO2/TJ)

L - Net to gross adjustment factor (0.95 default) is applied above (equation (1) of AMS II.G, version 4) in order to adjust Bold to account for leakages as per paragraph 13 (a) of the methodology.

Calculating $B_{y, savings}$

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

Where

B_{old} - Quantity of wood fuel used in the absence of the project activity in tonnes

η_{old} - Efficiency of baseline stove which is three stone or traditional open fire stove;

η_{new} - Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

To account for stoves which have been in operation for fractions of the monitoring period, the following formula is used

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

Where

$N_{y,i}$ - Total number of stoves in operation for a full monitoring period equivalent within each SSC-CPA

$n_{y,j}$ - Number of ICS operating in monitoring period *y* for j days,

j - days since installation or distribution of the ICS (or start date of monitoring period for ICS installed/distributed in prior monitoring periods), until end of monitoring period

$t_{y,j}$ - Fraction of monitoring period *y* that the stove is in operation (ty,j = j/Jy). Note, for ICS installed in prior monitoring periods ty, j = 1.

Jy - total number of days in the monitoring period y

For calculating ex-ante emission reductions, a baseline adjustment factor has been applied to B_{old} to account for wood fuel used for the 23% of households who reported using a second stove at least once per week. This baseline adjustment factor is based on the mean number of stoves used

per household averaged across the entire baseline sample, calculated to be 1.028[4]. The value of B_{old} used in calculations incorporates this adjustment factor.

The percentage of households continuing to use a baseline stove in addition to an ICS will be monitored in order to address paragraph 20 (b) of the AMS II.G (version 4) methodology. The monitored (ex-post) percentage of ICS users continuing to use a baseline stove in addition to the ICS (parameter SSy) will be compared to the ex-ante percentage found in the baseline (23%) and B_{old} will be adjusted proportionally based on the proportional change in the percentage. The parameter used to calculate ex-post $B_{y, savings}$ will be Bold, adjusted to account for fuel-wood used in baseline stoves in addition to ICS. This procedure is outlined here:

In order to account for multiple stoves of different ages (*i*), which may have different efficiencies (ηnew,y, i), this formula can be adapted as follows:

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

Where

$N_{y,i}$ - Total number of stoves (*i*)[5] in operation for a full monitoring period equivalent within each SSC-CPA

η_{old} - Efficiency of the baseline system/s being replaced. The 0.10 default value is used as the replaced systems are three-stone fires or conventional systems lacking improved combustion air supply mechanism and flue gas ventilation system i.e., traditional stoves.

$\eta_{new, y, i}$ - Efficiency of ICS of age *i* (fraction)

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

Where

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

SS_y - is the percentage of households that continue to use baseline stoves simultaneously with ICS at least once per week

[4] This factor was calculated as follows:
1. Each household 's fuel consumption datum (only adjusted for seasons) was divided by its corresponding mean number of baseline stoves used. The results of all households in the dataset are averaged to obtain a baseline fuel consumption mean adjusted for seasons AND multiple stove use.
2. The fuel consumption mean only adjusted for seasons (average of all the samples in the database) is divided by the fuel consumption mean adjusted for seasons AND multiple stove use (this is also an average of all the samples in the database) to obtain the multiple stove use adjustment factor (in this case 1.03).
Note that this is slightly different from taking the mean number of stoves used per household across the sample and applying it to the baseline fuel consumption mean adjusted for seasons.

[5] Vintage shall be defined as the "age" of the ICS – ie. Number of years it has been in operation. – ie. all stoves below 1 year (or 365 days) of use belong to vintage 1, all stoves between 1 and below 2 years of use to vintage 2 and so on. Note that *i* will match the efficiency of the stove at a certain "age"; e.g. stoves vintage 2 will be grouped together and WBTs will be used to determine their ηnew,i.

The value 0.23 (SSx) is the percentage of households in the baseline study who use a second stove simultaneously at least once per week and 1.028 is the mean household stove usage found in the wood fuel baseline. Both these values have been taken from registered PoA-'Improved Cookstoves Program for Zambia' .

Using the above equations $\mathbf{B_{y,\ savings}}$ is calculated as

= 5.695 * {1- (0.1/0.345)}
= 5.695 * 0.7101
= 4.0443 tons/stove/annum

The following values have been used for ex-ante calculation of emission reduction for a single ICS.

	Parameter	Unit	Value (2015)	Source
A	*Fuel wood consumption 2015*	*m3*	*12,796,000*	*UN Data 2016*[6]
B	*Density of wood*	*tons/m3*	*0.725*	*FAO*[7]
C	*Fuel wood consumption 2015*	*tons*	*9,277,100*	*Calculated (A*B)*
D	*Population of Zambia (2015)*	*number*	*16,100,587*	*World Bank*[8]
E	*Share of population using wood for cooking*	*Per cent*	*50.2%*	*Results of DHS Survey 2013-14, pg 18*[9]
F	*Population using wood for cooking*	*number*	*8,082,495*	*Calculated (D*E)*
G	*Average fuelwood consumption per capita*	*tons / y*	*1.15*	*Calculated (C/F)*
H	*Average size household in Zambia*	*number*	*5.1*	*Results of DHS Survey 2013-14, pg 23*[10]
I	*Fuelwood consumption per household (Bold)*	*tons/y*	***5.8538***	*Calculated (G*H)*
J	*Multiple Stove Use Adjustment Factor*		***0.973***	*calculated*
K	*Bold (adjusted for secondary stove usage)*	*Tons/hh/yr*	***5.695***	*Calculated (I*J)*

	Parameter	Unit	Data Source	Value
A	B_{old}	tonnes/annum	Baseline survey	5.695
B	*Ly*	Fraction	AMS II.G Default	0.95
C	η_{old}	Fraction	AMS II.G Default	0.1
D	$\eta_{new,\ i,\ ICS}$	Fraction	Water Boiling Test	0.345
E	$B_{y,\ savings}$	tonnes/annum	Calculated	4.0443
F	$f_{NRB,\ y}$	Fraction	As per EB67 Annex22	0.81

[6] http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW%3btrID%3a1231#f_1

[7] http://www.fao.org/docrep/004/X6760E/X6760E03.htm

[8] https://data.worldbank.org/country/zambia

[9] https://dhsprogram.com/pubs/pdf/FR304/FR304.pdf

[10] https://dhsprogram.com/pubs/pdf/FR304/FR304.pdf

G	$NCV_{biomass}$	TJ/tonne	IPCC Default Value	0.015
H	$EF_{projected\_fossil\_fuel}$	tCO2/TJ	IPCC Default Value	81.6

$$ER_y = B_{y,\ savings} * f_{NRBy} * NCV_{biomass} * EF_{projected\_fossilfuel} * L$$

= 4.0443 * 0.84 * 0.015 * 81.6 * 0.95

= 3.8092 t CO_2 eq/annum/stove

For 22,000 stoves ER = 83,802 t CO2/annum

B.4.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1	83,802	0	0	83,802
Year 2	83,802	0	0	83,802
Year 3	83,802	0	0	83,802
Year 4	83,802	0	0	83,802
Year 5	83,802	0	0	83,802
Year 6	83,802	0	0	83,802
Year 7	83,802	0	0	83,802
Total	5,86,613	0	0	5,86,613
Total number of crediting years	7			
Annual average over the crediting period	83,802	0	0	83,802

B.5. Monitoring plan

B.5.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter.)

Data/Parameter	***ny,j***
Data unit	number
Description	Number of stoves still in operation during the monitoring period as determined by the monitoring survey in each stove vintage[11]. This includes total number of stoves distributed/installed in the entire CPA.
Source of data	ICS registration data and data from the Sampling Plan.
Value(s) applied	For ex-ante emission reduction calculation, number of ICS distributed is assumed to be 22,000 with zero dropout rate.

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A vintage defines a year of stove distribution and does not necessarily correspond to a calendar year. For example, stoves distributed starting on 01/03/2014 and until 28/02/2015 (a stove distribution period of one year) will belong to the same vintage. The CME shall define the vintage start and end dates, but the period in between these dates will correspond to one year.

Measurement methods and procedures	The proportion of sampled ICS found to be in operation in each vintage during each monitoring period will be applied to the total number of stoves of that vintage when calculating emission reductions. If, based on the sample size selected in any monitoring period, the confidence/precision requirements set out in EB69 Annex 4 are not satisfied, then CPA-Implementers will follow the procedures outlined in the Monitoring Plan (Part II Section B.7.2 of the PoA-DD) to ensure the required level of confidence/precision are met.
Monitoring frequency	annually
QA/QC procedures	The unique reference number of each stove shall be logged in the monitoring database showing the total number of stoves. Data from the sampling plan will be collected in each monitoring period by trained project staff and applied in the emissions reduction calculations. Internal cross-checks by the CME or CPA implementer will be undertaken as QC.
Purpose of data	Emission reduction calculation
Additional comment	--

Data/Parameter	***ty, j***
Data unit	Fraction
Description	Fraction of monitoring period for which the stove was operational (days in operation/total days in monitoring period)
Source of data	ICS registration data in monitoring database and length of monitoring period
Value(s) applied	For ex ante calculation it is assumed that all the stoves were operational for the entire year i.e. ty, j = 1
Measurement methods and procedures	The fraction will be calculated by dividing the number of days from the registration date of the stove, or the start date of the monitoring period (whichever is later), until the end of the monitoring period by the total number of days in the monitoring period.
Monitoring frequency	annually
QA/QC procedures	The unique reference number of each stove shall be logged in the monitoring database. The date of registration shall be utilized to determine the portion of the monitoring period that the stove has been in operation. Any interruption in the stoves' operation (e.g. where stoves are replaced or drop out) will register as missed operating time in the monitoring database for emissions calculation purposes
Purpose of data	Calculation of emission reduction
Additional comment	--

Data/Parameter	$\eta_{new,i}$
Data unit	Fraction
Description	Efficiency of new stoves
Source of data	Efficiency tests in each monitoring period
Value(s) applied	0.345 for ex ante calculation
Measurement methods and procedures	The tests will be coordinated by the CME and undertaken following WBT protocol 4.2.3 (or more recent version at the discretion of the CME) by a trained professional working for the CME or CPA Implementer or an experienced third party.
Monitoring frequency	annually

QA/QC procedures	The WBT Protocol 4.3.2 or a more recent version will be used at CME discretion.
Purpose of data	Calculation of emission reduction
Additional comment	--

Data/Parameter	***SSy***
Data unit	Percentage
Description	The percentage of ongoing baseline stove use within the population of in-use ICS in each vintage during a monitoring period.
Source of data	Monitoring of ongoing baseline stove use will be undertaken using the sampling approach outlined in Part II section B.7.2 of the PoA-DD (to meet EB69 Annex 4 confidence/precision requirements).
Value(s) applied	23 per cent for ex ante calculation
Measurement methods and procedures	A survey will be conducted asking households if they use a baseline stove at least once per week in addition to their ICS, as per the monitoring plan outlined in Part II Section B.7.2 of the PoA-DD. SS_y will be calculated in each monitoring period as follows: the number of sampled households per vintage with in-use ICS that also continue to use a baseline stove divided by the total number of in-use ICS in that vintage sample. The values obtained from each vintage will be applied to stoves of the same vintage as per the CME records. This parameter will be used to calculate the ex-post baseline adjustment factor in each monitoring period, as outlined in section D.6.3. This parameter is used to address paragraph 20 (b) of AMS II.G (version 4) methodology.
Monitoring frequency	annually
QA/QC procedures	Internal cross-checks by the CME or project implementer will be undertaken as QC
Purpose of data	Emission reduction calculation
Additional comment	

B.5.2. Sampling plan

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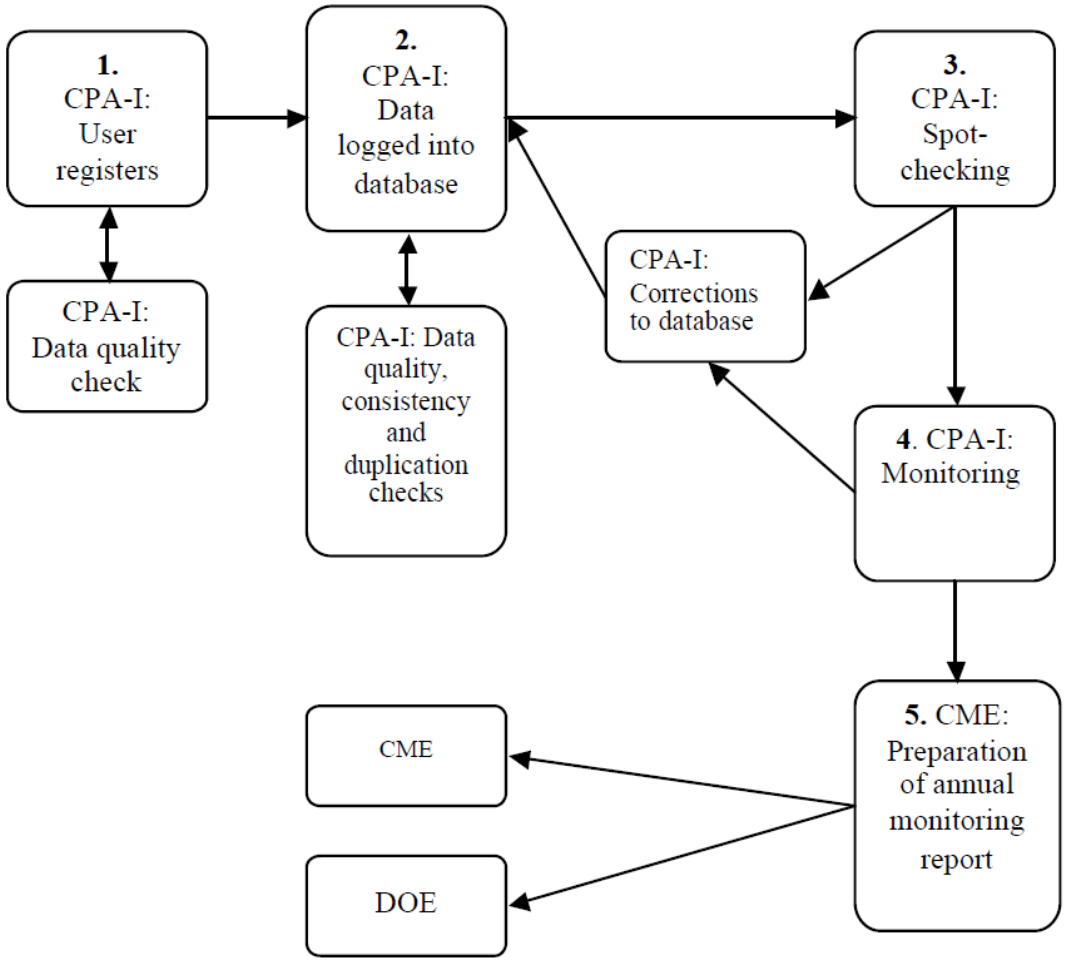
Key elements of monitoring plan are the following:

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

The following flow-chart illustrates the roles and responsibilities of the parties during monitoring of the SSC-CPA. In the flowchart, the CPA implementer is abbreviated to “CPA-I” and can be CQC or another party authorized by the CME.



Description

CPA-I: User registers stove: CPA implementer will collect/receive the necessary information requested on the Registration Card from the user. Means of collecting this information may be through a physical Registration Card filled by CPA-Imp staff, retailers, end-users or partner organization's staff, or through the use of ICTs or SMS. CPA Implementers' staff shall double check the accuracy of information provided, and request for field staff additional clarifications if needed;

CPA-I: Data logged into database: CPA implementer trained staff will input the data in the database either manually (if data collected from physical Registration Card) or this will be automatically uploaded if data was collected using ICTs or SMS. CPA implementer staff shall double check the information in the database and check for duplications. Any duplicate information shall be investigated, and errors corrected or excluded from the database if it is a true duplicate entry.

CPA-I: Spot- checking (ongoing): CPA implementer field staff will randomly select units included in the database and visit or contact the stove users to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (eg. change in the address of a user) will be updated on the database, and if ICS are found to be no longer in use, they will be clearly marked as such and excluded from emission reductions calculations.

CPA-I: Monitoring: CPA implementer will follow the requirements as per POA-DD to collect the necessary information for a monitoring report.

CME: Preparation of monitoring report: the CPA implementers or the CME will prepare the final monitoring report to be provided to the verifier DOE for verification of emission reductions. A copy of the monitoring report will remain with the CME

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

Sampling plan:
As per the *Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 07.0,* the sampling plan is the following:

Sampling Design ⟶ Data Collection ⟶ Implementation

1. *SAMPLING DESIGN*

Due to the large number of ICS envisioned to be distributed as part of the CPAs to be included in the PoA, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling will be undertaken at CPA level and if possible as part of a PoA-wide Sampling Plan (by grouping and sampling across CPAs) only if the criteria defined under point (iv) – 'Sampling Frame', below is fulfilled and is in line with the requirements of the "Standard for sampling and surveys for CDM project activities and programme of activities".

(i) Sampling Method

In line with the generic CPA, sampling method used will be 'Simple Random Sampling' in which unbiased random selection of individual households will be carried out to ensure that, the average sample would accurately represent the population. To ensure a random selection of ICS, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its unique ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size calculated by the CME.

(ii) *Objectives and Reliability Requirements:*

The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period, and with 95/10 confidence/precision (as per paragraph 20 of EB 69 Annex 4) for annual and 95/5 for biennial sampling across CPAs[12]. In case a single CPA is sampled, 90/10 confidence/precision for annual and 95/10 confidence/precision shall be required for biennial sampling (as per Methodology AMS-II.G version 04 paragraph 21).

Parameters that will be monitored

[12] Methodology AMS-II.G version 04 paragraph 21 requires a 95/10 confidence/precision for biennial sampling. However, a more conservative approach is used (95/5 confidence/precision) for biennial sampling across CPAs.

Parameter	Description	Monitoring Method
ny, j	Proportion of ICS still in operation	Visual inspection of the premises to see if ICS is operational and in use. Interview with end user if required to verify that ICS is still in use.
SSy	Percentage of continued baseline stove use among ICS households in the database	Interview with end user and visual inspection to determine if a baseline (replaced) stove is still being used in addition to ICS
Ƞnew, y,i	Thermal Efficiency of operational ICS	ICS will be tested using WBTs

(iii) Target Population:

- The target population for the proportion of ICS still in operation (***ny,j***) are the stoves in the CME database records (still in operation or not) for which emission reductions are to be accounted in the monitoring period in question.
- The target population for the percentage of continued baseline stove use among ICS households (***SSy***) are households with operational ICS in the CME records database for which emission reductions are to the accounted in the monitoring period in question.
- The target population for efficiency of new appliances (ηnew,i) is the set of stoves still in operation in the CME records database for which emissions reductions are to the accounted in the monitoring period in question.

(iv) Sampling Frame:

The sample frame refers to all the information sources on the Database. There are two primary mechanisms for data collection: The Registration Card for newly distributed/installed ICS and the Monitoring Survey (which includes a household questionnaire and visual inspection of ICSs) that will be used throughout the lifetime of the CPA. The Registration Card is used to populate the stoves Database and the Monitoring Survey follows the EB69 Annex 4 “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”.

The CPA is open to different models of ICS. As per “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 07.0, for the use of a single sampling plan covering a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation, a 95/10 confidence/precision is applied for annual sampling. A 95/5 confidence/precision shall be achieved for biennial sampling for sampling across CPAs. In case a single CPA is sampled, 90/10 confidence/precision for annual and 95/10 confidence/precision shall be required for biennial sampling.

The first step is to identify the Primary Sampling Units. Primary sampling unit is the sampling frame for CPAs which have:
1. The same ICS model
2. Same country and fuel-consumption cluster within that country
3. Same Vintage

While point number 2 is applicable for parameters ny,j and SSy, all the three points that is 1,2 &3 are applicable for defining Primary Sampling units for parameter $\eta_{new,y,i}$.

Criteria for grouping & sampling across CPAs

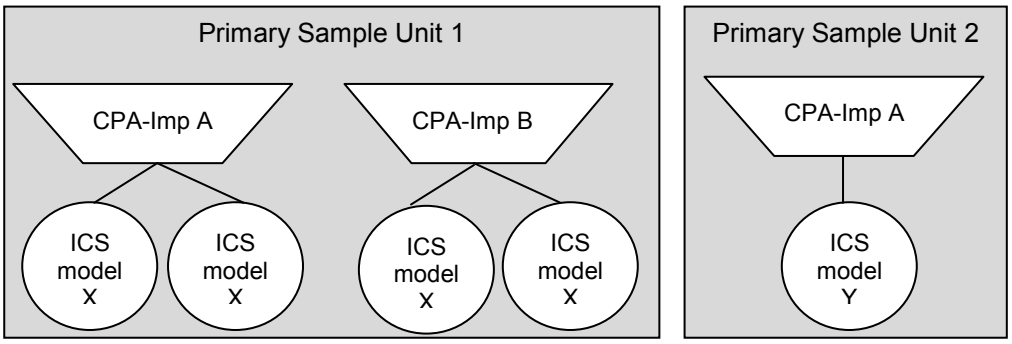
All the three parameters namely - ny,j; SSy and $\eta_{new,y,i}$ will be monitored at the CPA level. Grouping and sampling across CPAs will be undertaken only under circumstances when CPAs belong to same country and same fuel using cluster for parameters ny,j, and SSy and same country, same fuel use cluster, same model and same vintage for parameter $\eta_{new,y,i.}$

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

While factors such as, country in which the CPA is implemented and different fuel using clusters (charcoal/wood) within the same country, evidently influence parameters ny,j and SSy , other factors namely vintage and stove model do not make a difference. Hence for a CPA or group of CPAs implemented within the same country, there will be a single sampling unit, if the beneficiaries belong to same fuel using cluster even if the model of project stove is different or the stoves belong to different vintages.

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

The thermal efficiency of operational ICSs shall vary in accordance with its model, but not within different CPA Implementers. The thermal efficiency of the ICS is expected to change over the time. Hence for parameter ηnew,i the Primary Sampling Unit shall be defined as the group of ICSs of the same model, and same vintage, and located within the same country and within the same fuel consumption cluster in that country. If the same CPA Implementer has two different ICS models being implemented in the same vintage within a country – this will form two Primary Sampling Units. Two primary sampling units will also be formed if the population has two vintages with all other factors (Stove model and CPA Implementer) remaining same. The below schematics illustrate one of the examples used above assuming two ICS models in one vintage and implemented by two implementers within the same country.



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

(v) Sample Size

For single CPA, a 90/10 confidence/precision is required for annual sampling and 95/10 confidence/precision shall be required for biennial sampling[13].

The procedure to determine the sample of households will ensure that they adequately represent the broader project population, minimizing sampling error. Using, a 95 per cent confidence level,

13

As per Methodology AMS-II.G version 04 paragraph 21.

and a 10 per cent margin of error, the samples will be randomly selected from each Primary Sampling Unit. The following three parameters will be estimated through sampling:

- Number of stoves still in operation during the monitoring period as determined by the monitoring survey **($n_{y,j}$),**
- The fraction of baseline stoves in use within the population of operational ONIL Stoves during a monitoring period **(SS_y),**
- The average stove efficiency, **($\eta_{new,i}$).**

Of the three parameters to be monitored, two are proportions/percentages (SS_y and $n_{y,j}$) and one is a mean value $\eta_{new,i}$.

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

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

At the time of inclusion of CPA-DD, option C shall be applied. For the first monitoring period, values from a pilot shall be applied. For the following monitoring periods, the estimates shall be adjusted considering the results of the previous monitoring period(s) or the result from recent pilot study which will be conducted after the previous monitoring periods.

For estimation of the sample size for parameters $n_{y,j}$ and SS_y the following equation[14] is used:

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

Where:

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

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

- The population size, N, is taken as 22,000 households. (Assuming one ICS for one household).
- It is expected at least 80% of ICS still in operation, hence the expected proportion p for $n_{y,l}$ is taken as 0.8.
- According to Baseline study, it is expected that 23% of baseline stoves will continue to be in use. As per Standard for sampling and surveys for CDM project activities and programme of activities, a proportion can describe either of the two possible scenarios of the success rate

[14] Equation 1 of Appendix 2, *Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 04.0)*

or the failure rate and project proponents may use the larger of the two proportions in the sample size calculation, which is p or $(1-p)$. The sample size calculation is therefore based on anticipating a discontinued use of 77%. Thus the expected proportion p for SS_y is taken as 0.77 which is the value of the larger proportion.

- The expected mean of ICS thermal efficiency is 0.2566 and its standard deviation is 0.0513.

Sample size calculation:
The calculation of the required sample size for each parameter in the first monitoring period is illustrated below for a 95/10 level of confidence and precision (for biennial monitoring periods the sample sizes will be recalculated using 95/5 confidence/precision values as per Methodology AMS-II. G version 03 paragraph 22). In all cases a conservative approach is taken, however if for any parameter the required 95/10 confidence/precision is not met then the CME will randomly select an additional sample and collect further data from this sample to ensure the pooled data meet or exceed the required thresholds.

❖ Parameter $\mathbf{n_{y,i}}$

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

$$n \geq \frac{1.96^2 \times 22{,}000 \times 0.8(1-0.8)}{(22{,}000-1) \times 0.1^2 \times 0.8^2 + 1.96^2 \times 0.8(1-0.8)} = 96$$

Therefore, in this case a sample size of 96 needs to be sampled from the primary sampling unit.

❖ Parameter $\boldsymbol{SS_y}$

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

$$n \geq \frac{1.96^2 \times 22{,}000 \times 0.77(1-0.77)}{(22{,}000-1) \times 0.1^2 \times 0.77^2 + 1.96^2 \times 0.77(1-0.77)} = 115$$

The required sample size to be sampled from the primary sampling unit is at least 115.

For both parameters $n_{y,i}$ and SSy if the resulting sample size based on the above equation is smaller than 30, a minimum sample size of 30 shall be chosen.

❖ **Parameter $\eta_{new,i}$**

For the purposes of determining sample size in the first monitoring period, the performance of ICS can be categorized into two groups, which are characterized by the range of likely mean efficiency and the likely values of SD relative to the mean, according to the type of ICS. The ICS models that are manufactured in modern factories tend to be very highly efficient (30-50% thermal efficiency) and have been designed to meet stringent efficiency specifications so the standard deviation is expected to be relatively low.

Where key components of ICS (e.g. the combustion chamber and flue) are not manufactured but instead are installed on-site or handmade, then the mean efficiency is expected to be in the range of 20-30% with relatively higher variability.

To estimate the sample size for parameter $\eta_{new,i}$ the following equation[15] is used:

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

Where:

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

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

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

$$n \geq \frac{1.96^2 \times 22{,}000 \times 0.0399}{(22{,}000-1)\times 0.1^2 + 1.96^2 \times 0.0399} = 15$$

If the resulting sample size based on the above equation is smaller than 30, then as the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student's t-distribution shall be used.

The sample size for parameter $\eta_{new,\,y,i}$ is referred to the equation below[16]:

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

Where t_{n-1} is the value of the t-distribution for 95% confidence when the sample size is n.

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

The CME may choose to use the same sample to monitor more than one parameter. According to the Standard for sampling and surveys for CDM project activities and programme of activities, if there is more than one parameter to be estimated, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen as sampling effort with one common survey, or separate sampling efforts and surveys are undertaken for each parameter. For instance, the CME can sample separately SSy, ny,j and ηnew, i –or a combination of these parameters- in the same sample. Since parameters ny,i and SSy sharing the same sampling units, CME may choose to have one common survey for these two parameters with largest number of sample size between these two parameters is chosen, then a separate sampling effort may be arranged for parameter **η**new,y,i. Sampling more than one parameter in the same

[15] Equation 4 of Appendix 2, *Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities (Version 04.0)*

[16] Equation 38, page 46, *Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities* (version 04.0)

sample helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter.

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

2. DATA COLLECTION

(i) Field Measurements:

To monitor the number of project operational project stoves (***ny,j)*** and the percentage of continued baseline stove use among ICS households in the database (***SSy***), the data collected will be a representative number of stoves in the database for the monitoring period. The method of collecting data will be field surveys of required sample size of ICS users in the database. Frequency of data collection is one survey per monitoring period. Data will be collected from the field surveys, entered in the database and included in the monitoring report. To monitor the efficiency of the stove (**η**new,y,i) at least every two years (as required by the AMS II.G version 4 methodology) a new test will be conducted to determine the rate at which a sample of stoves from a given vintage year deteriorate in efficiency. The method to test the efficiency data will be the Water Boiling Test.

The table below summarizes field measurement data requirements

Parameter	**Timing (indicative)**	**Frequency (required by AMS II.G –Version 4)**	**Methods to be applied**	**Comments on seasonal fluctuation**
$n_{y,j}$	Monitoring is likely to be undertaken every 12 months	No less frequently than every two years	Visits to the premises, visual inspection and interview with ICS end-user.	Unlikely
SS_y	Monitoring is likely to be undertaken every 12 months	No less frequently than every two years	Visits to the premises, visual inspection, and interview with ICS end-user.	Unlikely
$\eta_{new,i}$	Monitoring will likely be undertaken every 12 months and will include ICS from all vintages for which emission reductions are to be claimed in that monitoring period.	No less frequently than every two years	Water Boiling Test (WBT) Protocol Version 3.0 (or more recent at the discretion of the CME).	No effect

(ii) Quality Assurance/Quality Control:

The CME will apply measures to ensure the required confidence/precision for each sampled parameter is met, allowing for non-response and the possible removal of outliers from the sample,

as part of a Quality Control/Quality Assurance system. The choice of measure applied to each parameter will depend on the cost of each data collection approach and logistics required. The CME will determine the most effective measure for each parameter from the following list.

- Oversampling: Randomly draw a sample of a few more ICS than the minimum required and collect data from each
- Buffer Group: Randomly draw a sample of a few more ICS than the minimum sample size. The extra stoves will function as buffer in case the required sample size is not met owing to unforeseen reasons
- Draw an additional sample: Randomly draw a sample of minimum sample size required. If due to any reason this does not meet the minimum requirement, then additional sample is drawn and included to reach the required size.
- Use lower confidence bound (of $\boldsymbol{ny,j.}$ or $\boldsymbol{\eta}new,i$) or, with a conservative approach according to the parameter definitions, the upper confidence bound of SSy.

The CME may choose to stop monitoring a parameter once the required level of confidence/precision has been reached, if the calculated minimum number of samples has been achieved. As an example, the following steps could logically be followed for the case of applying a 30% buffer:

1. Visit first 10% of premises required for the 30% buffer. If the number of responses is enough to achieve the required reliability level, then stop sampling.
2. If step 1 is not enough to achieve the required reliability level, then visit the next 10% of premises (increases the additional sampling to 20% of the 30% buffer). If this additional sampling is enough, then stop sampling.
3. If step 2 is not enough to achieve the required reliability level, then complete the final 10% of the additional sampling buffer (bringing the total to 30%).

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

The calculation of the sample size will be carried out using estimates for parameter proportions, mean values, variances, and standard deviations, as the actual characteristics of the population/sampling frame are unknown. To ensure quality of the sampling results, the CME can draw on the provisions for reliability calculations including estimating the bounds of the confidence interval, the standard error of the mean value or proportion, and the t-value as derived from the t-distribution. If the sampling results do not fulfil the required level of confidence and precision, the CME can undertake additional samples. If the reliability is still not enough after raw data and summary statistics are scrutinized and after additional samples have been collected[17], the sampling may be repeated with an increased sample size. Alternatively, the CME may choose to apply the lower bound (or higher bound according to the more conservative approach, as for example in the proportion of end-users who continue to use a baseline stove, SSy) of the sampling results as is allowed for by the methodology (AMS II G v4, paragraph 21).

[17] As per EB 69 Annex 5 paragraphs 258 to 314

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

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

(iii) Data archiving

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

(iv) Analysis

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

- A list of households participating in the CPA, including name, community/location, distribution/installation date and unique serial number;
- Testing to ensure that the stoves are still operating above the minimum 20% efficiency required by the AMS II.G (version 4) methodology, by the CPA Implementer, CME or a third party certified by a national standards body or an appropriate certifying agency recognized by it.
- Where replacements are made, assurance that the efficiency of the new ICS is similar to the specified.

Data obtained from the samples will be used to estimate proportions and mean values for the parameters described above. The values will then be factored into the emissions reduction calculations and result in the request for issuance of CER. The stoves that are not in use will be excluded from emissions reductions calculations and will not be counted towards the total number of ICS in operation during the monitoring period. The thermal efficiency of new stoves (ηnew,i) will be used in the calculation of the per stove emission reduction, which will be multiplied by the number of stoves in operation in the CPA to obtain the emission reductions for entire CPA.

3. IMPLEMENTATION

Sampling for emission reduction calculation and elaboration of the monitoring report will occur at the end of each monitoring period. This sampling will be conducted by trained personal of CPA Implementer team or CME team, or an experienced third-party entity. The credentials and/or training materials for the sampling personal will be provided to the DOE at verification. The maximum length of one monitoring period will be two years (duration, not calendar years), as AMS II.G., version 4, provides the option for annual or biennial monitoring. The CPA Implementer will be responsible for managing household data collection and entry into the project database. Field personnel will receive training on how to properly deal with surveying techniques and reduce errors and sign a document certifying that there is no conflict of interest of those involved in data collection and analysis. If there is conflict of interest, the personnel will not be allowed to participate in data collection and analysis. The project database will record the start and end dates of each monitoring period and record the emission reductions attributable to each monitoring period.

Appropriate record keeping procedures will be implemented to ensure that each monitoring period data set can be transparently attributed to its corresponding CPA, preventing any occurrences of double counting. An internal review of the project database will be able to determine the status CPA—the duration of previous monitoring periods, the households delivering monitoring data, and current verification activities.

Assessment for Leakage
Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed on *ex-post* surveys of users and the areas from which the woody biomass is sourced. The methodology offers the alternative of multiplying B_{old} to a net to gross adjustment factor of 0.95 to account for leakages, surveys are not required in this case. In line with generic CPA, the proposed SSC-CPA will use the 0.95 leakage adjustment factor instead of *ex-post* surveys.

Other source of leakage occurs if equipment currently being utilised is transferred from outside the boundary to the project activity. All ICS in the CPA will be newly manufactured/assembled or newly installed. Where second-hand/used ICS are distributed to an end-user the ICS will be from within the project (ie previously newly manufactured/assembled and either a demonstration model or transferred from one end-user within the project to another new or existing end-user). In both cases there will be no equipment (ICS) being transferred from outside the project area (any project non-participant) hence leakage defined in paragraph 14 of the AMS II.G (version 4) methodology is not considered. Where second-hand/used ICS are transferred within the project area (between end-user project participants) the database will be updated to reflect this change to ensure there is no double counting of ICS.

Disposal of Low Efficiency Appliances and Use of Baseline Stoves
At the time of installation, end user will receive information explaining that the conventional open fire appliance must no longer be used. Follow-up meetings with end users will ensure that those who have received an ICS are using it properly and that the conventional open fire is no longer in use. As per methodological condition 20 (b), if it is determined that the conventional open fire is still in use and the ICS is also in use, the wood used in conventional open fire will be subtracted from B_{old}. The number of households continuing to use a baseline stove in addition to their ICS, will be monitored throughout the project lifetime. This will be achieved using a single sample for in-use appliances (ny, j) described above, and will meet EB69 Annex 4 confidence/precision requirements. The number of households continuing to use a baseline stove, in addition to their ICS, will be used to calculate the percentage of households with operational ICS that also use a baseline stove (*SSy*).

Monitoring Reporting
The CME will assess all monitoring data and produce a monitoring report for the CPA to be verified by the DOE.

B.5.3. Other elements of monitoring plan

>>
Please refer to section B.5.2

SECTION C. Start date, crediting period type and duration

C.1. Start date of CPA

>>
The expected start date of CPA is 01/03/2019, date of inclusion of CPA or start date of distribution/installation of ICS whichever is later

C.2. Expected operational lifetime of CPA

>>
Expected operational lifetime of CPA is 21 years

C.3. Crediting period of CPA

C.3.1. Type of crediting period

>>
Renewable

C.3.2. Start date of crediting period

>>
01/03/2019, Date of inclusion or start date of installation/distribution of ICS, whichever is later

C.3.3. Duration of crediting period

>>
7 years, renewable twice.

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
The ICS disseminated in this CPA are expected to present a substantially lower social and environmental risks to the local and global environment compared to three stone fires and traditional pot support and result in real socio-economic and health benefits to users.

The activities will result in the following positive environmental impacts:

- Reduced wood fuel consumption, resulting in lower greenhouse gas emissions as well as improved local and household air quality;
- Reduced pressure on forest resources through reduced fuelwood demand;

D.2. Environmental impact assessment

>>
The project activity does not fall under the purview of projects requiring EIA under Government of Zambia's 'The Environmental Protection and Pollution Control (Environmental Impact Assessment) Regulations, 1997[18]. Improved cookstove projects do not feature in the list of either 'First Schedule-Projects which require Projects Briefs' or the 'Second Schedule-Projects Which Require Environmental Impact Assessment'.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>
Local Stakeholders consultation was done at PoA level.

E.2. Summary of comments received

>>
Please refer to Section F of PoA

E.3. Consideration of comments received

>>

[18] http://www.zema.org.zm/index.php/download/environmental-impact-assessment-regulations/

Please refer to Section F of PoA

SECTION F. Eligibility for inclusion

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
1	Conditions to check the target group of ICS.	Promote and install / distribute ICS in/to residential households in rural, urban, and peri-urban areas[19] that use wood or charcoal fuel following the SSC-PoA specifications.	Indication of ICS model to be distributed / installed, geographic scope of distribution /installation, and thermal efficiency tests to confirm model is a high efficiency biomass fired cook stove.	Under this CPA, Single pot TLC Rocket Stove is intended to be distributed to residential rural wood-fuel using households (later in the CPA other models may be added). Manufacturer's specification states that TLC-CQC Rocket Stove has an efficiency of 34.5%, a significant improvement over three stone fires and traditional pot supports used for cooking. Efficiency test results have been provided to the validating DOE.
2	Geographical boundaries of CPAs consistent with the geographical boundary of the PoA.	Be implemented entirely within a single fuel-specific geographical boundary (as specified in Part I Section A.5 of the PoA-DD) according to the targeted fuel type, fuel-consumption cluster[20] (if applicable), and host country region[21] of the CPA	Self-declaration by CPA Implementer indicating single fuel-specific geographical boundary of the CPA. The possible geographic boundaries should be within the limits outlined in Part I Section A.5 of this document.	The CPA implementer self-declares that all stoves will be sold within the boundary of Zambia and are wood stoves. Same was provided to the validating DOE.

[19] For the purposes of the PoA, peri-urban areas fall within the definitions of urban areas in each of the countries and are therefore considered like urban areas.

[20] A fuel-consumption cluster is a population that has different fuel consumption patterns than other populations as defined by the fuel-consumption baseline studies attached to the PoA-DD. Each fuel consumption cluster is considered a homogeneous population.

[21] Country regions are defined in the fuel-consumption baseline studies attached to the PoA-DD and may include an entire country.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
3	Conditions to ensure that each ICS under CPAs that will be included meet the criteria of microscale unit and remain within those thresholds throughout the crediting period of the CPAs.	According to the Methodological Tool (Tool 19): Demonstration of additionality of microscale project activities (version 8.0) para 9: Energy efficiency units that aim to achieve energy savings at a scale of no more than 20 gigawatt hours per year are additional if any one of the conditions below is satisfied: (a) The geographic location of the project activity is in an LDC/SIDS or SUZ of the host country identified by the government in accordance with the paragraph 8(a)(i) above; (b) The project activity is an energy efficiency activity with both conditions (i) and (ii) below satisfied: (i) Each of the independent subsystems/measures in the project activity achieves an estimated annual energy savings equal to or smaller than 600 megawatt hours; (ii) End users of the subsystems or measures are households/communities/SMEs.	Section (b) of the applicability criteria is satisfied: (i) ER spreadsheet (ii) Statement in Specific CPA indicating that Improved cook stoves under the PoA will be distributed for household use only.	Thermal energy saving of each ICS is approximately 0.01685 GWh_{th}/year that is far below the threshold value. Calculation sheet demonstrating same has been submitted to the DOE. CPA implementers' self- declaration on distribution of ICS to households has been submitted to DOE.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
4	Conditions related to the database requirements of ICS user.	Have a database that will uniquely identify and define households in which ICS have been installed or distributed[31]. In addition, each stove itself will be uniquely identified with a serial number clearly starting with "CQC-SSA"	Outline of the status of the database, a database (empty of stoves if no stoves have been added to the CPA), and description of CPA database.	A project database is being developed. This database will include all the information contained on the Registration Card (or ICT/SMS) - including the serial number. The database will be sortable by customer name, contact details (if available), stove model, location (address/ geo-coordinates), date of purchase, retailer/distributer, serial number and be available to the DOE at the time of verification
5	Conditions to ensure compliance with the applicability of the applied methodologies.	Comply with the applicability conditions set out in the methodology AMS II.G version 4 "Energy efficiency measures in thermal applications of non-renewable biomass" and further described in Part II Section B.2 of the PoA-DD;	• Thermal efficiency tests of stove to be installed/distributed; • Statement that documentation has been provided to the DOE demonstrating that non-renewable biomass has been used since 31 December 1989 within the CPA boundaries; • Statement on the adoption of a default gross adjustment factor of 0.95 for leakage.	CPA compliance with the three applicability criteria are evidenced by the following: • TLC-CQC Rocket Stove planned to be installed under this CPA is a single pot fixed cook stove that has an efficiency of 34.5% as per the manufacturer's specification, hence over the 20% minimum specified in the methodology (in case any other model of stove will be used for this CPA, it will have to comply with same eligibility criteria) • Demonstration of use of non-renewable biomass since 31 December 1989 within the boundary of Zambia has been detailed in Annex 3 of the PoA DD; • Consideration of default gross adjustment factor of 0.95 for leakage is demonstrated through emission reduction calculation.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
6	Conditions to avoid double counting of GHG emission reductions or net anthropogenic GHG removals, such as unique identifications of product and end-user locations.	Do not involve households already using an ICS - including households involved in any other CPA or CDM or other voluntary scheme (such as Gold Standard, VCS, VER+[32]) project involving the distribution or installation of ICS, and households which have purchased or received an ICS on a commercial or non-commercial basis (e.g. NGO distributed or government distributed stoves);	– Outline of how each ICS will be uniquely identified. – Statement of how CPA will be cross-checked to confirm no double counting with other CPAs, PoAs or projects (in the CDM or other carbon credit schemes). – Statement of how households will confirm that they currently do not own an ICS (whether part of a carbon scheme or not).	Each ICS in this CPA will be identified by a unique combination of customer name and geographical location, as well as a serial number. The serial number will be a unique number which will allow for a clear distinction between the stoves from this CPA with others. No individual serial number can be repeated within the CPA or other CPAs belonging to same PoA, thus ensuring that each stove is counted only once in the proposed CPA. In addition, the CPA has been cross-checked against other CPAs in this PoA, CPAs in any other PoA , CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary carbon schemes to ensure that the CPA is not included in any other PoA, CDM project activity or voluntary project activity. New customers will also be asked to confirm (via Registration Card or similar method) that the ICS will be used for domestic purpose only and that they currently do not own an ICS (whether part of a carbon scheme or not). The registration card will be submitted to DOE at the time of verification.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
7	Conditions to confirm that CPAs are neither registered as CDM project activities, included in another registered PoAs, nor the project activities that have been deregistered.	Not be registered as individual CDM project activities nor included in another registered SSC-PoA, as well as in any other voluntary scheme (such as Gold Standard, VCS, VER+);	Statement in Specific CPA indicating that at the time of CPA inclusion, no other CPA using the same name was found in any other PoA or in a CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary schemes.	At time of inclusion of this CPA, no other CPA using the same name was found in any other PoA or in a CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary schemes. The search was conducted by the CME via web on the relevant websites of the registries.
8	Conditions to confirm the approval of CPA by the CME for inclusion of CPA into the PoA.	Be approved by the CME prior to its incorporation into the SSC-PoA;	Declaration from CME that CPA received approval for incorporation into PoA.	CQC has approved the proposed CPA via self-declaration letter. Same was provided to the validating DOE.
9	Conditions to check the start dates of CPAs through documentary evidence.	Be able to provide documentary evidence of the start date;	Self-declaration from CME or CPA Implementer stating the starting date of the CPA according to the relevant CDM guidance.	A self-declaration from CPA Implementer was provided to the validator mentioning the start date.
10	Conditions to provide an affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance.	Affirm that no funding is coming from Annex I parties or if it does, that this is not a diversion of Official Development Assistance (ODA)[35];	Self-declaration from CME or CPA Implementer	Self-declaration by the CME has been provided to the DOE
11	Specification of the technology/measure and performance specification based on testing/certification.	Ensure that the ICS installed/distributed under the CPA are single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%. The efficiency of the project systems (ICS) are certified by a national standards body or an appropriate certifying agency recognized by it (using the WBT outlined in AMS IIG, Version 4 approved by the CDM Executive Board). Alternatively, manufacturers' specifications may be used;	WBT results	TLC Rocket Stove planned to be installed under this CPA are single pot portable cook stoves that have an efficiency of 34.5% as per the manufacturer's specifications. Documentary evidence shall be submitted to DOE Water boiling tests will be carried out for efficiency of project stoves during ex-post monitoring.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
12	Conditions to ensure the compliance with B_{old} requirements of the applied methodologies.	Use baseline fuel consumption (B_{old}) data from the household fuel survey (as per baseline reports attached to the PoA-DD and further described in Part II Section B.6.2 of the POA- DD) for the country region and fuel-type which is specifically eligible under this POA; Alternatively, historical data which is publicly available can be used for determining B_{old} value	Statement of which baseline included in the CPA will be used in this CPA.	The CPA applies data from reliable published sources for calculation of B_{old} value. Calculation has been included in registered PoA DD.
13	Conditions to ensure the compliance with f_{NRB} requirements of the applied methodologies.	Use the non-renewable biomass (NRB) fraction (as per NRB Reports attached to the PoA-DD and further described in Part II Section B.6.2 of the POA-DD or CDM default values as per EB67 Annex 22) for the country region[36] in which the CPA will be implemented and that is eligible under this POA or develop their own regional level NRB survey in accordance with AMS II.G (version 4). The geographical scope of each CPA must be limited to the geographical scope of the NRB analysis applied in that CPA;	Specification of the source of f_{NRB} value. The source is included in this PoA.	The CPA applies f_{NRB} value that is stated in PoA DD which has been calculated in accordance with EB 67, Annex 22

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
14	Conditions to check the mechanism that transfers the ownership rights of CERs from the ICS user to the CME.	Include a mechanism that transfers the ownership rights of CERs from the ICS user to the CME (or any affiliate it so designates), the precise mechanism to be established on a CPA basis. For example, a Registration Card, SMS, ICT or other means, which is signed or received by the end-user upon distribution or installation of the ICS, which shall state that the end-user transfers ownership of the carbon assets to the CME for the life of the stove[39];	Indication of how the mechanism that transfer the ownership rights of CERs will be implemented.	CPA Implementer is required to collect user data using a Registration Card (or as appropriate through SMS/ICT). Sales Team/distribution team will be instructed to explain that by agreeing to participate in this CPA, the end user is voluntarily transferring all ownership rights of the carbon assets arising because of use of ICS to the CME/CPA implementer. The end user will be required to give his consent after which he/she will be eligible to participate in the CPA. Documentary evidence for same will be submitted at the time of verification.
15	If the generic CPA applies sampling for the determination of parameter values for calculating GHG emission reductions or net anthropogenic GHG removals, conditions related to sampling requirements for the PoA in accordance with the "Standard: Sampling and surveys for CDM project activities and programme of activities.	Adhere to all requirements related to sampling for a PoA in accordance with Part II section B.7.2 of the PoA-DD;	Indication that CPA follows the sampling requirements outlined in Part II Section B.7.2 of this document.	This CPA follows all of the sampling requirements as specified in generic CPA.
16	Conditions to check the distribution mechanisms of the ICS.	Involve the promotion and distribution of ICS through direct distribution/installation, delivery, community distribution events, direct or distribution through commercial/retail outlets;	Description of ICS promotion and distribution methods under the CPA.	This CPA will distribute ICS on a commercial/non-commercial basis to end-users through direct distribution, community events or commercial retailers.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
17	Conditions related to environmental impact analysis.	CPA shall indicate what type of environmental analysis is undertaken and provide evidence of compliance with national and local (eg. province level) regulations;	Environmental assessment or statement of why an environmental assessment is not needed in the context of the CPA.	In accordance with regulations of Zambia, neither a project brief nor an environmental impact assessment is required for improved cookstove project activities. Copy of regulation has been submitted to the DOE.

Appendix 1. Contact information of CPA implementers

Organization name	Ecoeye Co Ltd.
Country	Republic of Korea
Address	70 Dusan-ro, Geumcheon-gu, Seoul.South Korea #1503, Hyundai Knowledge Industrial Center B Seoul
Telephone	Office: +82- 2-6480-7346
Fax	n/a
E-mail	sangsun_ha@ecoeye.com
Website	www.ecoeye.com
Contact person	Sangsun HA

Organization name	C-Quest Capital Malaysia Global Stoves Limited (CQC)
Country	Malaysia
Address	Brumby Centre, Lot 42, Jalan Muhibbah, 87000 Labuan F.T., Malaysia
Telephone	+ 6 087 593828
Fax	+ 6 087 417242
E-mail	cqc-operations@cquestcapital.com
Website	www.cquestcapital.com
Contact person	Mr Ang Kong Nian

Appendix 2. Affirmation regarding public funding

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

Appendix 3. Further background information on ex ante calculation of emission reductions

Please refer to Emission reduction calculation sheet

Appendix 4. Further background information on monitoring plan

Not applicable

Appendix 5. Summary report of comments received from local stakeholders

This information is provided in Section F of PoA DD

Appendix 6. Summary of post-registration changes

Not applicable

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Document information

Version	*Date*	*Description*
08.1	20 October 2017	Editorial revision to remove appendix “Applicability of methodologies and standardized baselines” from the main part of the form which had been mistakenly kept in the previous version.
08.0	28 June 2017	Revision to: • Remove appendix “Applicability of methodologies and standardized baselines” as the appendix is not relevant at the CPA level; • Make editorial improvement.
07.0	7 June 2017	Revision to: • Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and PoA-DD forms; • Make editorial improvement.
06.0	24 May 2017	Revision to: • Ensure consistency with the “Standard: CDM project standard for programme of activities” (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the “Component project activity design document form for small-scale component project activities” (CDM-SSC-CPA-DD-FORM); • Make editorial improvement.
05.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
04.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.
03.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the component project activity design document form for CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-CPA-DD-FORM in A.13. and Appendix 1; • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and Appendix 6;

Version	*Date*	*Description*
		• Change the reference number from F-CDM-CPA-DD to CDM-CPA-DD-FORM; • Make editorial improvement.
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the component project activity design document form" (EB 66, Annex 16).
01.0	27 July 2007	EB 33, Annex 42 Initial adoption.

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Business Function: Registration
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