

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: FUEL EFFICIENT STOVES IN ZAMBIA



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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:

Fuel Efficient Stoves in Zambia (3RL CPA No.[XX](#))

Version 6.2

dd/mm/yyyy

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

The proposed CPA involves the distribution of fuel-efficient stoves by 3 Rocks Ltd. (3RL) in individual households in Zambia. The CPA will provide energy efficient cooking stoves based on the ‘rocket stove’ design. The efficient stoves are based on a design commissioned by 3RL and will be directly installed by 3RL for recipient households in exchange for certain labour and materials during installation. This technology ensures a 29.5% thermal efficiency against the 10% methodology default for the traditional 3-rock fire. The technology has been tested independently in accordance with the “*Stove Manufacturers Emissions & Performance Test Protocol (EPTP)*”³ and certified by the Engines and Energy Conversion Laboratory at Colorado State University for its thermal efficiency.

Recipient households will sign an acknowledgement that 3RL owns the rights to the CERs. It is the deployment of private seed capital and the revenue from the sale of CERs only that will fund the installation process. 3RL is the Managing Entity for the CPA.

Double-counting of emissions reductions will be avoided by the unique referencing of stoves included in the CPA. This will be achieved through:

- **GPS references:** each stove will have a unique GPS-referenced location. During the verification process the DOE will be able to check the existence of stoves related to this GPS location reference.
- **Name, location and/or ID number:** an additional check of double-counting may be made against the household name, location and/or Zambian government ID number of the stove recipient ascribed to each stove. This may be checked physically during the verification process.
- **Unique reference numbers:** each stove will also have a unique reference number in the monitoring database. Only one stove will be installed per household. The DOE will be able to check this during the verification process.

The proposed CPA will involve the installation of a maximum of 15,938 stoves and, according to an ex-ante calculation, contribute to an emissions reduction equivalent to ([xx number](#)) tonnes of CO₂ per annum. In this way the CPA will not exceed a total of 180GWh of thermal energy generated.

The CPA does not involve funding from Annex I parties and does not result in a diversion of official development assistance.

³ Stove Manufacturers Emissions & Performance Test Protocol (EPTP): A protocol for testing stove fuel efficiency and emissions and a standard for improved stoves; Defoort, L’Orange, Kreutzer (EECL), Lorenz (Envirofit), Kamping (Philips) 2009

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Contribution to Sustainable Development

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

- i. Environmental
 - The CPA will help significantly reduce Zambia's greenhouse gas emissions over its lifetime
 - The CPA will help reduce the use of non-renewable biomass from Zambian forests, assisting the maintenance of existing forest stock, protecting natural forest eco-systems and wildlife habitats⁴
 - The protection of standing forests will ensure the maintenance of watersheds that regulate water table levels and prevent flash flooding⁵
- ii. Social
 - Considerably less time will need to be spent collecting wood fuel for the family home thereby reducing the work burden on families and presenting alternative opportunities for economic development
 - Cooking and heating with solid fuels on open fires or traditional stoves results in high levels of indoor air pollution. Indoor smoke contains a range of health-damaging pollutants, such as small particles and carbon monoxide⁶. Less carbon dioxide, carbon monoxide and particulates will be emitted by the fuel-efficient stove due to the decrease in total biomass burned, the increase in the efficiency of biomass burning and an increased fire temperature.
 - The stove provides a safer method for combusting biomass for cooking, helping to reduce burn injuries, especially for children, in the family home
- iii. Economic
 - The CPA will help develop a section of the Zambian economy; in the installation of the stoves (including certain materials production; e.g. bricks and mortar) and monitoring activities.
 - The CPA will bring employment benefits to Zambia and jobs will be created for its administration

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

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

Name of Party Involved ("Host" indicates a host Party)	Private and/or Public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (yes/no)
Zambia (Host)	3 Rocks Ltd. (3RL)	No

⁴ http://www.illegal-logging.info/approach.php?a_id=54

⁵ http://www.meted.ucar.edu/hazwarnsys/ffewsrq/FF_EWS.Chap.2.pdf

⁶ <http://www.who.int/indoorair/en/>



3RL is a private entity and will act as the CPA implementer.

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

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

Fuel Efficient Stoves in Zambia (3RL CPA No. XX)

A.4.1.1. Host Party:

Zambia

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

The CPA geographical boundary will be the country of Zambia. The Republic of Zambia, lies within the latitude and longitude of 15 00 S and 30 00 E⁷. The approximate GPS coordinates derived from Google Earth for the furthest extremities of the Zambian border are:

North (border with Tanzania and DRC):	08°12'11.83" S & 30°46'22.26" E
South (border with Zimbabwe):	18°04'34.03" S & 26°41'47.24" E
East (border with Malawi):	10°33'43.01" S & 33°42'08.00" E
West (border with Angola):	14°33'34.57" S & 21°59'58.74" E



⁷ <http://www.greenwichmeantime.co.uk/time-zone/africa/zambia/map.htm>



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

The CPA may be identified by the total number of stoves included, up to a limit of 180GWh of thermal energy generated⁸. This has been calculated as a maximum of 15,938 stoves. Each stove included in the CPA will be identified by a unique reference number (assigned chronologically by installation time and date).

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

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

The starting date of the proposed CPA is (insert date), which is the date of commencement of ‘real action’ in the CPA. This date has been selected as it is the date when the first stoves were ordered under the CPA. It is not earlier than the commencement of validation of the programme of activities, i.e. the date on which the initial PoA-DD is first published for global stakeholder consultation, which was 24/11/2010.

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

The CPA is expected to have an operational lifetime of 7 years.

This length has been selected for the CPA as it is consistent with the minimum projected operating lifetime of the stove, as indicated by the stove designer and manufacturer. The actual lifetime may be considerably longer, allowing for the CPA to be potentially extended beyond 7 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:

The starting date of the crediting period of the SSC-CPA is expected to be (insert date), but in practice will be the date of its inclusion in the registered PoA.

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

7 years (renewable)

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

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

XX tCO2 equivalent over a 7 year crediting period.

⁸ http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUUWR9PRPJL0EXOT3G2CKSFQ

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Year	Annual estimation of emissions reductions (ERs) [tCO₂e]
1	
2	
3	
4	
5	
6	
7	
Total estimated ERs (tCO₂e)	
Total Number of Crediting Years	
Average ERs per annum	

A.4.5. Public funding of the CPA:

The proposed CPA will not involve any public funding.

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

1. For the purposes of registration of a Programme of Activities (PoA)⁹ a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity¹⁰, which:
 - (a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same sectoral scope, and;
 - (b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

At present there are no other registered CDM activities in Zambia using the same methodology as the proposed CPA and therefore the proposed CPA is not deemed a de-bundled component of a large scale activity. The proposed PoA is planning to include further CPAs with boundaries within 1km of the proposed CPA, which could be deemed de-bundled components. Therefore an analysis according to point 2 below will also be undertaken.

2. If a proposed small-scale CPA of a PoA is deemed to be a debundled component in accordance with paragraph above, but the total size of such a CPA combined with a registered small-scale

⁹ Only those POAs need to be considered in determining de-bundling that are: (i) in the same geographical area; and (ii) use the same methodology; as the POA to which proposed CPA is being added

¹⁰ Which may be a (i) registered small-scale CPA of a PoA, (ii) an application to register another small-scale CPA of a PoA or (iii) another registered CDM project activity

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CPA of a PoA or a registered CDM project activity does not exceed the limits for small-scale CDM and small-scale A/R project activities as set out in Annex II of the decision 4/CMP.1 and 5/CMP.1 respectively, the CPA of a PoA can qualify to use simplified modalities and procedures for small-scale CDM and small-scale A/R CDM project activities.

This analysis will be undertaken in accordance with the guidance outlined in Annex 13 of the report from EB 54:

If each of the independent subsystems/measures (e.g., biogas digesters, residential solar energy systems, kerosene or incandescent lighting replacements) included in one or more CDM project activities is no greater than 1% of the small scale thresholds defined by the applied methodology and the subsystems/measures are indicated in the PDDs to be each implemented at or in multiple locations (e.g., installed at or in multiple homes) then these CDM project activities are exempted from performing a de-bundling check, i.e., considered as being not a de-bundled component of a large scale activity.

Each CPA under the proposed PoA is exempt from a de-bundling check due to each independent subsystem/measure being less 1% of the small-scale methodology energy savings threshold (as per guidance EB54 Annex 13).

The methodology threshold for AMS. II.G is 180GWh¹¹ per annum and each stove delivers 0.011GWh of thermal energy and therefore each CPA cannot exceed the threshold of 15,938 stoves. This then means that each stove in a typical CPA is responsible for 0.006% of the total potential savings¹²:

GWh savings (per stove) = $By\ Savings * NCV_{Biomass}$
= $(2.71 * 4,167KWh)$
= 0.011GWh

CPA stoves = GWh savings threshold/GWh savings per stove
= $180/0.011$
= 15,938

Stove savings % of threshold = GWh savings per stove/GWh savings threshold
= $0.011/180$
= 0.006%

The proposed CPA is therefore exempt from a de-bundling check due to each independent subsystem/measure (or stove) being less than 1% of the small-scale methodology energy savings threshold and the stoves being installed in multiple locations.

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

¹¹ http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUUWR9PRPJL0EXOT3G2CKSFQ

¹² See Emissions Reductions Calculation Sheet

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The proposed CPA is neither registered as an individual CDM project nor is part of another registered PoA. There are no registered CDM projects using the AMS II G methodology in Zambia at the time of writing.

There is one registered fuel efficient stove CDM project in Zambia. The CDM Lusaka Sustainable Energy Project (LSEP); CDM ref. 2969, is a fuel-switching project, from charcoal to wood, focusing on the selling a replacement to charcoal stoves and managing the fuel supply chain in the urban market of Lusaka. LSEP applies a different UNFCCC baseline and monitoring methodology to the proposed PoA.

There are no other registered PoAs in Zambia at the time of writing.

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:

Fuel Efficient Stoves in Zambia

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

The proposed CPA is deemed to be eligible for inclusion in the PoA when the criteria set out in accordance with the Standard for the development of eligibility criteria (EB70, Annex 5) in section A.4.2.2. of the PoA-DD are met. The following table outlines how the criteria are met in this CPA-DD:

No.	Eligibility Criteria	CPA Application	Document Reference
a)	The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA	The geographical boundary of the CPA will be consistent with the PoA-DD: the country of Zambia. There is no relevant time-induced boundary to the proposed PoA or its CPAs, consistent with this geographical boundary.	xxx
b)	Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo)	Double-counting of emissions reductions will be avoided by the unique referencing of stoves included in the CPA. This will be achieved through: <ul style="list-style-type: none"> — GPS references: each stove will have a unique GPS-referenced location. During the verification process the DOE will be able to check the existence of stoves related to this GPS location reference. — Name, location and/or ID number: an additional check of double-counting may be made against the household name, location and/or Zambian government ID number of the stove recipient ascribed to each stove. This may be checked physically during the 	xxx

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		<p>verification process.</p> <p>— Unique reference numbers: each stove will also have a unique reference number in the monitoring database. Only one stove will be installed per household. The DOE will be able to check this during the verification process.</p>	
c)	The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	<p>1) <i>Level of Service:</i> Each CPA will provide energy efficient cooking stoves based on the ‘rocket stove’ design. This will deliver a level of service equivalent to the baseline 3 rock fire by enabling cooking, water heating and space heating services to the household</p> <p>2) <i>Type of service:</i> The technology delivers a baseline thermal efficiency of 29.5% against the 10% methodology default efficiency for the traditional 3-rock fire. Therefore, according to the baseline test data, the technology delivers the same type of service, except with an annual thermal energy saving ranging from GWh 0.01123-0.01137¹³ per stove against the 3-rock fire. The technology has been tested independently in accordance with the “<i>Stove Manufacturers Emissions & Performance Test Protocol (EPTP)</i>”^{14,15} and certified by the Engines and Energy Conversion Laboratory at Colorado State University for its thermal efficiency.</p>	xxx

¹³ Range of thermal efficiency from baseline test (See Annex 3) = 29.2-29.9%

By Savings Range: $4.1 \cdot (1 - 0.1/0.292) : 4.1 \cdot (1 - 0.1/0.299) = 2.70 - 2.73$

GWh savings range (NCV Biomass*By Savings): $(0.004167 \cdot 2.70) : (0.004167 \cdot 2.73) = 0.01123 - 0.01137$

¹⁴ Stove Manufacturers Emissions & Performance Test Protocol (EPTP): A protocol for testing stove fuel efficiency and emissions and a standard for improved stoves; Defoort, L’Orange, Kreutzer (EECL), Lorenz (Envirofit), Kamping (Philips) 2009

¹⁵ The Stove Manufacturers Emissions & Performance Test Protocol (EPTP) updates the Water Boiling Test (WBT) protocol version 3.0 by Balis et. al. and provides a standardized protocol for measuring and comparing cook stove performance. The EPTP is an approximation of real world cooking processes, which can be conducted on most stoves throughout the world. By using measured thermal efficiencies and emissions productions, the WBT can be used to roughly predict the performance of stoves for various cooking tasks.

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d)	Conditions to check the start date of the CPA through documentary evidence;	The starting date of the proposed CPA will be the date of commencement of ‘real action’ in the CPA. This date will be selected as the date when the first stoves are ordered under the CPA. The evidence will be the date on the relevant stove purchase order.	xxx
e)	Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	CPAs will comply with the small scale methodology AMS II.G version 3	xxx
f)	The conditions that ensure that the CPA meets the requirements pertaining to the demonstration of additionality	CPA’s will demonstrate additionality by applying Paragraph 2 (c) of Annex 27 of EB 68: GUIDELINES ON THE DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES. Each CPA will demonstrate: <ol style="list-style-type: none"> 1. Program will be solely composed of isolated units 2. Users of the technology/measure are households 3. Size of each unit will be under 3000 MWh of energy savings per year 4. Size of each unit is no larger than 5% of the small-scale CDM thresholds 	xxx
g)	The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;	Stakeholder consultations and environmental impact assessment are demonstrated at the PoA-level	xxx
h)	Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;	CPAs will affirm that there will be no funding obtained from Annex 1 parties.	xxx
i)	Where applicable, target group (e.g. domestic /commercial /industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation);	Proposed CPAs involve the distribution of domestic fuel-efficient stoves by 3 Rocks Ltd. (3RL) in Zambia. The efficient stoves are based on a design commissioned by 3RL and will be directly installed by 3RL for recipient households in exchange for certain labour and materials during installation.	xxx
j)	Where applicable, the conditions related to sampling requirements for a PoA in accordance with the	Due to the homogenous nature of CPAs, sampling of CPAs will be undertaken as a group in accordance with the methodology	xxx

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	“Standard for sampling and surveys for CDM project activities and programme of activities”	and the Standard	
11	Where applicable, the conditions that ensure that every CPA (in aggregate if it comprises of independent sub units) meets the small-scale or microscale threshold and remains within those thresholds throughout the crediting period of the CPA;	CPAs will not exceed the methodology threshold for AMS ILG of 180GWh ¹⁶ per annum.	xxx
12	Where applicable, the requirements for the debundling check, in case the CPA belongs to small-scale or microscale project categories	CPAs will apply a de-bundling check in the CPA-DD for assessment at the time that the CPA is included in the PoA.	xxx

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

The proposed CPA will reduce GHG emissions through the installation of fuel efficient stoves that reduce the total quantity of non-renewable biomass used by each recipient household for domestic purposes. The CPA is additional as it relies solely on carbon finance to ensure its implementation. There are no other sources of revenue from the project other than from the sales of issued Certified Emissions Reductions (CERs). There is no other incentive to undertake the CPA, nor is there any regulation in Zambia mandating this activity.

Technology Transfer:

The technology being employed has been commissioned by, and specifically designed for, 3RL to implement in the proposed CPA, meeting the unique requirements for Zambia. The technology was originally designed in the USA and is transferred from that Annex 1 country. It is robust and secure, significantly more efficient than the traditional method of cooking and culturally acceptable for users. This is all demonstrated in the baseline and stakeholder assessment data presented in the PoA-DD. In this way, a state-of-the-art, bespoke-designed technology is being transferred from an Annex 1 country to a non-Annex 1 Least Developed Country (LDC).

Prior Consideration of the CDM:

It may be demonstrated that the CDM was considered prior to the CPA’s start date as an initial Global Stakeholder Consultation was undertaken prior to the starting date of the CPA. The starting date of the proposed CPA is (insert date). The initial PDDs were submitted to the UNFCCC’s Global Stakeholder Process on 24/11/2010. In this way, the starting date of the programme activity is after the starting date of validation, giving clear evidence proving that incentive from the CDM was seriously considered in the decision to proceed with the programme activity.

¹⁶ http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUUWR9PRPJL0EXOT3G2CKSFQ

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Additionality Assessment:

The assessment of the PoA's additionality is addressed in accordance with applying paragraph 2 (c) of Annex 27 of EB 68: GUIDELINES ON THE DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES:

Documentation of barriers, as per paragraph 1 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:

Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds

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

Projects applying the small-scale methodology AMS IIG v3 have a threshold of 180GWh maximum thermal energy savings per annum.¹⁷ As stated in the eligibility criteria, each CPA will not exceed this threshold. The GWh savings per stove per year in the proposed project is 0.011 and this is therefore calculated as a maximum of 15,938 stoves per CPA.¹⁸

This then means that each stove in a typical CPA is responsible for 0.006% of the total potential savings:

GWh savings (per stove) = *By Savings * NCVBiomass*
 = (2.71 * 4,167KWh)
 = 0.011GWh

CPA stoves = GWh savings threshold/GWh savings per stove
 = 180/0.011
 = 15,938

Stove savings % of threshold = GWh savings per stove/GWh savings threshold
 = 0.011/180
 = 0.006%

In compliance with EB68 Annex 27 para 2 (c), the proposed PoA, as described above, is solely composed of isolated units (stoves) installed in households. EB68 Annex 27 para 2 (c) indicates that: *the size of each unit under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.*

Therefore:

Stove savings % of threshold = GWh savings per stove/GWh savings threshold
 = 0.011/3

¹⁷ http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUWR9PRPJL0EXOT3G2CKSFQ

¹⁸ See emissions reductions calculation sheet

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= 0.4%

Each proposed CPA in the PoA is therefore automatically additional as it meets the ‘positive list’ criteria of EB68 Annex 27 para 2 (c) due to:

- each stove in a typical CPA represents only **0.006%** of the total potential savings, according to the methodology threshold for AMS. II.G (180GWh per annum)
- each stove in a typical CPA represents only **0.4%** of the unit threshold size noted in EB68 Annex 27 para 2 (c) (3GWh per annum)

In this regard, in all cases, the size of each unit is no larger than 5% of the small-scale CDM thresholds and each CPA meets the ‘positive list’ criteria of Annex 27 of EB 68. The proposed CPA is therefore automatically additional.

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

Description of the sources and gases included in the project boundary:

	Source	Gas	Included?	Justification / Explanation
Baseline	Combustion of fire wood for cooking (3-Stone fire)	CO ₂	Yes	Major source of emissions
	Combustion of fire wood for cooking (3-Stone fire)	CH ₄	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
	Combustion of fire wood for cooking (3-Stone fire)	N ₂ O	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
Project activity	Combustion of fire wood for cooking (efficient stove)	CO ₂	Yes	Major source of emissions
	Combustion of fire wood for cooking (efficient stove)	CH ₄	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
	Combustion of fire wood for cooking (efficient stove)	N ₂ O	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.

Proof that the small-scale CPA is located within the geographical boundary of the registered PoA:

The “physical, geographical site of the efficient systems using biomass” is the country of Zambia; the PoA boundary. The proof that the CPA is located within the PoA boundary will be evident in the GPS location reference of every stove installed, which will be within the country of Zambia. The GPS location reference of stoves will be logged in the monitoring database and may be verified by the DOE.

B.5. Emission reductions:

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

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Data / Parameter:	<i>Bold</i>
Data unit:	Tonnes per annum
Description:	Quantity of biomass used in absence of the project activity
Source of data used:	Baseline survey
Value applied:	$(4.1 * 15,938) = 65,345$
Justification of the choice of data or description of measurement methods and procedures actually applied :	The baseline survey assessed the average domestic biomass usage for cooking and water heating per household per annum amongst users of traditional 3-rock fires, according to interviews. This data was gathered according to: General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities (Version 01); CDM EB50 Annex 30. This figure is then multiplied by 15,938, which is the total number of stoves allowable to be included in each CPA, according to the methodology threshold ¹⁹ .
Any comment:	See Annex 3 & Sampling Plan for Household Annual Average Woodfuel Usage Survey for details.

Data / Parameter:	η_{new}
Data unit:	Fraction
Description:	Thermal efficiency of the stove
Source of data used:	Stove Manufacturers Emissions & Performance Test Protocol (EPTP) Certificate
Value applied:	0.295
Justification of the choice of data or description of measurement methods and procedures actually applied :	The stove design was tested independently for its efficiency.
Any comment:	See PoA-DD for details

Data / Parameter:	$f_{NRB,y}$
Data unit:	Fraction
Description:	Non-renewable biomass usage in Zambia, as a proportion of total biomass usage
Source of data used:	EB 67 country-specific default value for Zambia
Value applied:	0.81
Justification of the choice of data or description of measurement methods and procedures actually applied :	An independent consultant calculated the overall biomass usage in Zambia and, according to independently published sources, ascertained the proportion of that biomass which is non-renewable to be 0.93. However, EB 67, Annex 22 indicates a country-specific default value for Zambia at 0.81. For conservativeness, the latter value is selected.
Any comment:	See PoA-DD for details

¹⁹ For details see Emissions Reductions Calculation Sheet

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Data / Parameter:	η_{old}
Data unit:	Fraction
Description:	Efficiency of 3-rock fire cooking method (system being replaced)
Source of data used:	Methodology default
Value applied:	0.10
Justification of the choice of data or description of measurement methods and procedures actually applied :	AMS II.G, version 3
Any comment:	

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
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	AMS II.G, version 3
Any comment:	

Data / Parameter:	$EF_{projected_fossilfuel}$
Data unit:	tCO ₂ /TJ
Description:	Emission factor: substitution of non-renewable biomass by similar consumers
Source of data used:	Methodology default
Value applied:	81.6
Justification of the choice of data or description of measurement methods and procedures actually applied :	AMS II.G, version 3
Any comment:	

Data / Parameter:	L_y
Data unit:	Fraction
Description:	Leakage
Source of data used:	Methodology default
Value applied:	0.95
Justification of the choice of data or description of	AMS II.G, version 3

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measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	<i>DRB</i>
Data unit:	tonnes
Description:	Demonstrably renewable biomass
Source of data used:	$f_{NRB,y}$ baseline study
Value applied:	1,278,025
Justification of the choice of data or description of measurement methods and procedures actually applied :	The justification is clearly outlined in the full $f_{NRB,y}$ baseline study.
Any comment:	See PoA-DD for details

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

Ex-Ante emissions reductions are calculated as follows:

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

Where:

1. $B_{y,savings}$ Quantity of woody biomass that is saved per stove per annum in tonnes. The formula for calculating this is: $B_{old} * (1 - \eta_{old} / \eta_{new})$ (calculated on an ex-ante basis at 2.71 tonnes per household per annum)
2. $f_{NRB,y}$ The fraction of biomass used in absence of the project that is non-renewable (0.81).
3. $NCV_{biomass}$ Methodology default (0.015 TJ/tonne)
4. $EF_{projected_fossilfuel}$ Methodology default (81.6 tCO₂/TJ)
5. B_{old} Average quantity of woody biomass used per stove per annum in absence of the project (4.1 tonnes per household per annum baseline survey, see Annex 3)²⁰
6. η_{old} Methodology default (0.10)
7. η_{new} Thermal efficiency of the new appliance (0.295 baseline EPTP test, see Annex 3)
8. L_y Methodology default (0.95)

Ex-ante ER calculation (per stove):

²⁰ Methodology Option A selected: Calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year). This can be derived from historical data or a survey of local usage.

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B_{old}	t/annum	Baseline survey	4.1
η_{old}	fraction	Methodology default	0.1
η_{new}	fraction	Baseline EPTP test	0.295
$B_{y,savings}$	t/annum	Calculated	2.71
$f_{NRB, y}$	fraction	EB default	0.81
$NCV_{biomass}$ (TJ/t)	TJ/t	Methodology default	0.015
$EF_{projected\ fossil\ fuel}$	tCO ₂ /TJ	Methodology default	81.6
ER_y	t CO ₂		2.69

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

A maximum of 15,938 stoves will be included in the proposed CPA, as per the methodology savings threshold of 180GWh²¹.

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				
Year 2				
Year 3				
Year 4				
Year 5				
Year 6				
Year 7				
Total (t CO ₂ e)				

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

B.6.1. Description of the monitoring plan:

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

Data / Parameter:	NS
Data unit:	Number
Description:	Number of stoves still operation during the monitoring period
Source of data to be used:	Installation data and monitoring survey
Value of data applied for the purpose of calculating expected	n/a; will only be available ex-post

²¹ Please refer to the Emissions Reductions Calculation Sheet for details

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emission reductions	
Description of measurement methods and procedures to be applied:	<p>Annually or biennially, a simple random sample of installed stoves will be selected from the monitoring database to determine if they are still operating or are replaced by an equivalent in service appliance. The activity sample group (ASG) will be selected based on a 95% level of confidence. The margin of error will be 5% for biennial surveys and 10% for annual surveys, in accordance with the methodology and EB69 Annex 4 & 5 Guidance.</p> <p>The total number of stoves in operation compared to the total number of stoves installed (according to the installation records in the monitoring database) will be surveyed. Stoves in operation in the Activity Sample Group (ASG) will be counted during each monitoring period to derive an attrition rate (expressed as a percentage) and this percentage deduction will be applied to the total number of stoves operating.</p>
QA/QC procedures to be applied:	<p>The unique reference number of each stove shall be logged in the monitoring database showing the total number of stoves. Data from the ASG will be collected either annually or biennially and applied to the emissions reductions calculations during that period.</p> <p>In case of any variation between the installation data and the ASG monitoring data, a larger sample may be selected to ensure greater accuracy.</p> <p>During the first annual or biennial period, the initially installed number of stoves, as indicated by the monitoring database, will apply for interim monitoring reports.</p>
Any comment:	

Data / Parameter:	<i>OD</i>
Data unit:	Days
Description:	Total stove operating days in monitoring period
Source of data to be used:	Installation and monitoring survey data in monitoring database
Value of data applied for the purpose of calculating expected emission reductions	n/a; will only be available ex-post
Description of measurement methods and procedures to be applied:	The number will be calculated by counting the number of days from the installation date of each stove until the end of the monitoring period and aggregating the total days. This number will be calculated net of any stove attrition rate identified in the ASG survey.
QA/QC procedures to be applied:	The unique reference number of each stove shall be logged in the monitoring database. The date of installation 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 days in the monitoring database for emissions calculation purposes.
Any comment:	

Data / Parameter:	$\eta_{new,i}$
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Data unit:	Fraction
Description:	Thermal efficiency of the stove
Source of data to be used:	Stove manufacturers' Emissions & Performance Test Protocol (EPTP) test
Value of data applied for the purpose of calculating expected emission reductions	n/a; will only be available ex-post
Description of measurement methods and procedures to be applied:	Annually or biennially, a sample of stoves will be tested for their thermal efficiency to ensure that they are still operating at the specified efficiency. The total number of stoves to be selected for efficiency monitoring will be a simple random sample of installed stoves which are in operation. The stove efficiency sample group (SESG) will be selected based on a 95% level of confidence. The margin of error will be 5% for biennial surveys and 10% for annual surveys, in accordance with the methodology and EB69 Annex 4 & 5 Guidance.
QA/QC procedures to be applied:	Tests will be undertaken by experienced project staff following the Stove Manufacturers Emissions & Performance Test Protocol (EPTP) ²² . Staff will follow the procedure used in the EPTP and record the thermal efficiency of each stove tested, which will be subsequently uploaded to the monitoring database for emissions calculation purposes. Any variation from the baseline efficiency will be applied to the emissions calculations in the monitoring reports. In the case of any variation in efficiency from the baseline, a larger sample of stoves may be selected to ensure greater accuracy. During the first annual or biennial period, the baseline tested figure will apply for interim monitoring reports.
Any comment:	

Data / Parameter:	<i>B_{new}</i>
Data unit:	Tonnes per annum
Description:	Quantity of biomass saved per stove per annum
Source of data used:	Monitoring survey
Value of data applied for the purpose of calculating expected emission reductions:	n/a; will only be available ex-post
Description of measurement methods and procedures to be applied:	Annually or biennially, a simple random sample of installed stoves will be selected from the monitoring database to determine if they are still operating or are replaced by an equivalent in service appliance. The activity sample group (ASG) will be selected based on a 95% level of confidence. The margin of error will be 5% for biennial surveys and 10% for annual surveys, in accordance with the methodology and EB69 Annex 4 & 5.

²² Stove Manufacturers Emissions & Performance Test Protocol (EPTP): A protocol for testing stove fuel efficiency and emissions and a standard for improved stoves; Defoort, L'Orange, Kreutzer (EECL), Lorenz (Envirofit), Kamping (Philips) 2009

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	<p><i>B_{new}</i> monitoring shall ensure that:</p> <p>(a) Either the replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or</p> <p>(b) If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is excluded from <i>B_{old}</i>.</p> <p>The ASG survey will check the presence of domestic 3-rock fires in the household of stove recipients and the survey questionnaire will be used to ascertain the patterns of usage of each appliance. An average proportion of usage of 3 rock fires shall then be calculated across the ASG and a deduction made to <i>B_{old}</i>, where appropriate.</p>
QA/QC procedures to be applied:	<p>The latest version of the survey form “3RL Activity Monitoring Survey” will be used to gather data on patterns of appliance usage for each survey participant. Where residual use of 3 rock fires is found in the ASG, the proportion of usage will be derived as a fraction and applied as a correction factor to <i>B_{old}</i>. In case of any variation from <i>B_{old}</i> a greater sample size may be selected for increased accuracy.</p> <p>During the first annual or biennial period, the baseline figure will apply for interim monitoring reports.</p>
Any comment:	

CPAs included in this PoA will be homogenous in nature, as they are applying a common technology and the technology will have common usage patterns. The commonality of usage patterns was demonstrated during the baseline surveys of woodfuel usage and the technology is a specific response to this usage (i.e. biomass fuel utilized on a 3 stone fire solely for household purposes).

In accordance with EB69 Annex 4 Guidance: STANDARD FOR SAMPLING AND SURVEYS FOR CDM PROJECT ACTIVITIES AND PROGRAMME OF ACTIVITIES; sampling activities will be undertaken at the PoA-level and the sampling plan presented here will apply to the group of CPAs to be included in the PoA. To comply with the guidelines and the methodology, samples will be calculated on either on a 95/5 confidence/precision basis for biennial surveys or 95/10 for annual surveys, to comply with monitoring requirements for a group of CPAs (EB69, Annex 4).

In accordance with the Sampling Standard²³ the parameter values for (1) the stove usage rate, and (2) the stove efficiency are estimated by sampling in accordance with the requirements in the applied methodology using a single sampling plan covering a group of CPAs²⁴, applying either a 95/10 for annual or 95/5 for biennial confidence/precision for the sample size calculation. A single sampling plan covering a group of CPAs is justified when either the homogeneity of included CPAs relative to the parameters of interest can be demonstrated or the differences among the included CPAs is taken into account in the sample size calculation.

²³ Standard for sampling and surveys for CDM project activities and programme of activities, EB69 Annex 4, para 20 (including footnote 18)

²⁴ That is, the populations of all CPAs in the group are combined together, the sample size is determined and a single survey is undertaken to collect data

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Therefore, a single sampling plan is justified as the proposed PoA involves CPAs that are homogenous and there is homogeneity related to parameters of interest, as described below:

Stove usage rate (ASG) parameter of interest:

- Every CPA has the same stove technology user profile (i.e. domestic households)
- Every CPA employs the same stove technology
- The baseline survey shows that household usage of fuel wood and cooking technology (i.e. ‘three rocks’ method) in Zambia is homogenous across regions

Stove efficiency (SESG) parameter of interest:

- Every CPA employs the same stove technology
- Each final constructed stove is robust, manufactured to identical standards and with no moving parts, and therefore efficiency is designed to remain constant over time
- Every CPA applies the same stove installation process and therefore each stove is an exact replica of all the others in similar (i.e. domestic household) locations
- Every CPA has the same Implementing Entity, meaning each stove is installed and monitored in the same manner

Therefore as the technology and construction of each stove is homogenous, every CPA is homogenous relative to the stove efficiency²⁵

Thus a single sampling plan covering a group of CPAs is justified. The only relevant difference between CPAs arises from the date of installation of stoves. To take account of this, a number of measures have been employed for monitoring the overall average performance of stoves included in the PoA and for accurately calculating their emissions reductions:

- 1) A simple random sample is selected from all stoves included the PoA, regardless of installation date in the monitoring database, for both parameters of interest
- 2) Emissions Reductions are calculated on a per stove per day basis, by counting the number of operating days of each stove from the date of installation and aggregating the emissions reductions, applying the homogenous stove usage rate obtained through sampling for all stoves
- 3) Emission Reductions are calculated applying the homogenous stove efficiency obtained through sampling for all stoves. The same efficiency is applied regardless of the date of installation, giving an accurate picture of average stove usage and efficiency across the PoA. Thereby, the differences in installation date are taken into account by monitoring a simple random sample of all stoves and averaging performance in the emission reduction calculations²⁶
- 4) The sample sizes for the stove usage rate and stove efficiency are calculated conservatively

²⁵ Even if efficiency were to deteriorate slightly over time, a simple random sample would still find the correct average efficiency

²⁶ The monitoring report will show the correlation between stove efficiency and the year (or ‘vintage’) of installation, proving that the sample is homogenous. In the unlikely scenario where the sample is shown not to be homogenous in this regard, a stratified approach to analyzing the data will be applied and emissions reductions per stove will be calculated according to the vintage of installation.



These measures, combined with the high degree of homogeneity between CPAs, means that the application of a single sampling plan covering a group of CPAs is justified in line with the Sampling Standard.

Stoves installed under each CPA will have a CPA identifier tag in the PoA monitoring database. Emissions reductions generated by CPAs included in the PoA will be monitored by 3RL via the monitoring database and through the implementation of this monitoring plan, using a sampling technique where indicated. Emissions reductions for each CPA will be calculated using the data contained in the monitoring database and from the monitoring surveys. A monitoring report describing monitoring activities and calculated emissions reductions will be produced for each monitoring period.

EB 69 Annex 4 indicates a series of requirements for sampling plans where parameter values are determined using sampling. The following sampling plan will enable the determination of parameter values for the calculation of emissions reductions:

a) Sampling Design

i. Objectives & Reliability Requirements

The objective of this plan is to enable the determination of parameter values for parameters monitored under the PoA and described above in E.7.1. The objective of this sampling plan is to ensure a statistically accurate sample of the population will deliver the confidence/precision required by the methodology and the guidance in EB69 Annex 4. This is specific to each survey. The plan will also outline the timeframe of the estimated parameter value.

Survey data will provide the key parameter values for emissions reduction calculations, where sampling is indicated for parameter determination. Two surveys will be conducted to ascertain the required monitored parameter values, these are:

Activity Sample Group (ASG)

Parameters to be monitored:

- Number of Stoves (NS) – to determine the number of stoves still operation during the monitoring period, as compared to the baseline installed number of stoves.
- Quantity of biomass saved per annum (B_{new}) – to determine the average deduction per stove from the baseline parameter B_{old} . This monitors any residual use of the baseline appliance.

The ASG will be selected from the monitoring database and the survey conducted either annually, on a 95/10 precision basis, or biennially, on a 95/5 precision basis.

Stove Efficiency Sample Group (SESG)

Parameter to be monitored:

- Efficiency of stove ($\eta_{new,i}$) – to determine the ongoing average efficiency of each stove installed.



The SESG will be selected from the monitoring database and the survey conducted either annually, on a 95/10 precision basis, or biennially, on a 95/5 precision basis.

ii. *Target Population*

The target population for each survey to be determined by sampling is as follows:

- a. **ASG** - the population is the total number of stoves installed under all CPAs included in the PoA, as derived from the monitoring database. The sampling frame is identified through the unique references allocated in the monitoring database.
- b. **SESG** – the population is the total number of stoves installed under all CPAs included in the PoA, as derived from the monitoring database. The sampling frame is identified through the unique references allocated in the monitoring database.

iii. *Sampling Method*

The sampling method for each survey is determined by using a simple random sample of the total population of installed stoves, from records generated in the monitoring database and based on the precision requirements listed above and required by the methodology and guidance in EB 69 Annex 4.

iv. *Sample Size*

The sample size for each monitoring activity will be calculated utilizing the population size as it exists at the time of the monitoring survey (i.e. the total number of stoves installed and included in the monitoring database). Samples will be calculated on a simple random sample basis.

The desired precision is stated above for each parameter above and corresponds to those values required by the EB69 Annex 4 Guidance for a group of CPAs.

A sample size will be calculated separately for each of the sample groups: ASG and SESG. These will be calculated according to the Best practice examples for sample size calculations outlined in EB69 Annex 5 Appendix A Guidance. A simple random sample will be selected for determining each parameter value. As the parameter of interest is different for each sample group, a separate approach is adopted:

Activity Sample Group (ASG)

Parameter of interest is a percentage: the proportion of stoves still in operation during the monitoring period. Therefore, Example 1 of EB 69 Annex 5 Appendix A is chosen: **Proportional parameter of interest (Cook stove project)** Example 1 – Simple Random Sampling:

- Here the proportional parameter of interest is currently 97%, which is based on 3RL's existing experience of monitoring stoves in operation in the field²⁷, (from guidance in EB 69 Annex 5 Appendix A: *In a situation where we do not have any information from previous studies, we could take a preliminary sample as a pilot and use that sample to provide our estimates*), however, in the interests of conservativeness, we will illustrate a sample size based on the

²⁷ See 3RL Zambia monthly report April 2012

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scenario outlined in the guidance in EB 69 Annex 5 Appendix A, which indicates an estimated parameter of interest at 50%.

- This value is expected to alter through the lifetime of the project and, at the point of calculating sample sizes for each survey, an up-to-date assessment will be made.
- The Z-score of 1.96²⁸ is selected to reflect the higher level of confidence required for grouped CPA monitoring (95%).

To provide a provisional forecast of sample sizes, we present sample sizes for both annual and biennial surveys and for a population of both a single included CPA (at 15,938 stoves) and the anticipated total number of stoves to be included in all CPAs (400,000). Full details of the calculations, according the Best practice examples for sample size calculations outlined in EB69 Annex 5 Appendix A Guidance, are presented in the spreadsheet “sample size calculations”:

	ASG Monitoring			
	Annual Surveys		Biennial Surveys	
confidence (z score)	1.96	1.96	1.96	1.96
z score squared	3.8416	3.8416	3.8416	3.8416
number of households (N)	400,000	15,938	400,000	15,938
expected proportion (p)	0.5	0.5	0.5	0.5
p(1-p)	0.25	0.25	0.25	0.25
	384,160	15,307	384,160	15,307
N-1	399,999	15,937	399,999	15,937
relative precision	10%	10%	5%	5%
precision squared	1.00%	1.00%	0.25%	0.25%
proportion squared	0.25	0.25	0.25	0.25
z score squared	3.8416	3.8416	3.8416	3.8416
p(1-p)	0.25	0.25	0.25	0.25
	1,000.96	40.80	250.96	10.92
sample size	384	375	1,531	1,402

In accordance with EB 69 Annex 4, if the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen.

Stove Efficiency Sample Group (SESG)

Parameter of interest is a mean value: the average efficiency of stoves still in operation during the monitoring period. Therefore, Example 5 of EB 69 Annex 4 Appendix A is chosen: **Mean value parameter of interest (CFL project)** Example 5 – Simple Random Sampling:

- Here the mean value parameter of interest is the baseline tested 29.5% thermal efficiency.

²⁸ <http://www.mypivots.com/dictionary/definition/233/z-score>

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- Here the standard deviation is currently calculated as $\pm 2.8\%$. This is based on the experience and data from the baseline lab tests, and is supported by a statement from the Engines and Energy Conversion Laboratory of Colorado State University. However, in the interests of conservativeness, we will illustrate a sample size at a standard deviation of $\pm 30\%$.
- The Z-score of 1.96 is selected to reflect the higher level of confidence required for grouped CPA monitoring (95%)

To provide a provisional forecast of sample sizes, we present sample sizes for both annual and biennial surveys and for a population of both a single included CPA (at 15,938 stoves) and the anticipated total number of stoves to be included in all CPAs (400,000). Full details of the calculations, according the Best practice examples for sample size calculations outlined in EB69 Annex 5 Appendix A Guidance, are presented in the spreadsheet “sample size calculations”:

	SESG Monitoring			
	Annual Surveys		Biennial Surveys	
V	1.03	1.03	1.03	1.03
expected mean	29.5%	29.5%	29.5%	29.5%
standard deviation	30.0%	30.0%	30.0%	30.0%
confidence (z score)	1.96	1.96	1.96	1.96
number of households (N)	400,000	15,938	400,000	15,938
relative precision	10%	10%	5%	5%
z score squared	3.8416	3.8416	3.8416	3.8416
number of households (N)	400,000	15,938	400,000	15,938
V	1.03	1.03	1.03	1.03
	1,589,171	63,321	1,589,171	63,321
N-1	399,999	15,937	399,999	15,937
precision squared	1.00%	1.00%	0.25%	0.25%
confidence (z score) squared	3.8416	3.8416	3.8416	3.8416
V	1.03	1.03	1.03	1.03
	4,003.96	163.34	1,003.97	43.82
	397	388	1,583	1,445

It must be noted that the conservative parameters of interest used in the above calculations are for illustration only and that, during actual sampling for monitoring exercises, these parameter values will reflect accurate data collected during the operation of the project.

The population for each monitoring period will be relative: i.e. the number of stoves installed in the group of CPAs at the time of monitoring. Therefore the above calculations are just estimates for illustration. Furthermore, oversampling will be conducted to ensure that the required level of precision is met.

In accordance with EB 69 Annex 4, if the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen.



v. *Sampling Frame*

The sampling frame is the data included within the PoA monitoring database, where every stove installed in each PoA is recorded individually. Individual characteristics apply to each survey group:

- a. *SESG* – the population is the total number of stoves installed under all CPAs included in the PoA, as derived from the monitoring database. The sampling frame is identified through the unique references allocated in the monitoring database.
- b. *ASG* – the population is the total number of households where a stove has been installed, under all CPAs included in the PoA, as derived from the monitoring database. The sampling frame is identified through the unique references allocated in the monitoring database.

b) *Data*

i. *Field Measurements*

Field activities to be undertaken for each parameter to be monitored are as follows:

NS and *B_{new}* – each household in the activity sample group (*ASG*) will be surveyed using the “3RL Activity Monitoring Survey” to determine if they are still operating or are replaced by an equivalent in service appliance:

- Monitoring staff shall complete an observational check to see that the stove is still located in the same place identified by the installation data and observe that it is still being used
- Monitoring staff shall ask users to confirm that the stove is being used for the recipient household’s domestic purposes
- Monitoring staff shall confirm that the old appliance (3-rock fire) has been effectively disposed of, and, if not;
- Monitoring staff shall ascertain residual usage of the domestic 3-rock fire. If this usage includes cooking, water heating or space heating (i.e. those usages measured in the baseline survey), then the average annual wood fuel used for these purposes shall be calculated as a proportion of overall average annual wood fuel usage. This proportion will form any percentage deduction from *B_{old}* and will be applied to emissions calculations in each monitoring report.

$\eta_{new,i}$ – each stove in the stove efficiency sample group (*SESG*) will be tested according to the manufacturers’ EPTP. This test comprises a Water Boiling Test as required by the methodology. Data will be collected from each stove tested and an average efficiency value from the *SESG* will be calculated. The efficiency fraction will be applied to emissions calculations in each monitoring report.

ii. *Quality Assurance/Quality Control*

Data collection will be conducted by a dedicated 3RL monitoring team of trained individuals utilizing survey questionnaires and instruments required for measurements

In order to minimize non-sampling errors, such as non-responses and errors, the field team will practice over-sampling from the population to ensure a total number respondents that meets the required level of



precision. This will ensure the integrity of the sample group and maintains the randomness of participant selection. All samples groups will be re-selected for each monitoring period / year, as appropriate for the parameter in question.

Where a survey may not be completed, or where there is a non-response, the reasons shall be clearly documented in the survey questionnaire. In order to account for outliers, the lowest 5% and the highest 5% of the surveyed values will be removed from the final calculation.

iii. Analysis

Completed questionnaires will be collected by the survey groups and delivered to a central office for processing. These shall be checked through for errors and completeness, and compiled into a survey report. Any incomplete or missing survey questionnaires shall be documented clearly. The survey report will include:

- A summary of activities undertaken, at which location and on which dates
- A summary of data collected and mean values
- A calculation of the parameter values to be utilized in emissions reduction calculations based on the sample mean values

c) Implementation

i. Implementation Plan

The implementation of monitoring each random sample selection will be the responsibility of 3RL and its specifically trained monitoring team. This team will comprise local operatives who are conversant in local languages and customs of rural Zambia. Individuals will be selected based on their competence and experience for each monitoring activity.

There will be no incentives provided for these individuals for the type of data provided, to prevent any conflict of interest.

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:

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- ✓ 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.

The environmental analysis was chosen to be undertaken at PoA level because there is no variation in the stove technology and the installation procedure amongst CPAs. Furthermore, CPAs are defined by numbers of stoves and not geographically, making a CPA-level environmental analysis difficult.

The PoA does not incur any negative environmental impacts and it is therefore reasonable to consider a single environmental impact analysis at the PoA level, rather than individual assessments for each CPA.

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

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

SECTION D. Stakeholders' comments

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

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

Stakeholder comments were invited at the PoA level to assess the appropriateness and acceptability of the proposed PoA design. The boundary of the PoA is Zambia and, as CPAs are not defined geographically (only numerically, by total numbers of stoves), it was important to consult stakeholders at the PoA level to ensure that the consultations were inclusive.

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

D.3. Summary of the comments received:

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

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Annex 1

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

Organization:	3 Rocks Ltd.
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Building:	
City:	St. Helier
State/Region:	Jersey
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E-Mail:	bobby@icecapltd.com
URL:	
Represented by:	
Title:	Mr.
Salutation:	
Last Name:	Minty
Middle Name:	
First Name:	Bobby
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	



Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding will be made available for the proposed PoA, or any CPA under the proposed PoA.



Annex 3

BASELINE INFORMATION

See Annex 3 of PoA-DD



Annex 4

MONITORING INFORMATION

See Annex 4 of PoA-DD