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

CONTENTS

Annexes

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.01)

Version 6
08/12/2011

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

The proposed CPA involves 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 installed by 3RL for recipient households in exchange for certain labour and materials during installation. Recipient households will sign an acknowledgement that 3RL owns the rights to the CERs. The stove design was tested independently to determine its thermal efficiency. It is the revenue from the sale of CERs only that will fund the installation process. 3RL is the Managing Entity for the CPA.

The CPA is deemed eligible for inclusion in the PoA, due to the following:

1. It applies the UNFCCC baseline and monitoring methodology AMS II.G: *Energy efficiency measures in thermal applications of non-renewable biomass, Version 2*
2. It is not part of another registered CDM project
3. It is additional according to the UNFCCC Methodological Tool
4. It demonstrates that no revenues, other than those from the sale of CERs, are attributable to it
5. It does not exceed the methodological limit for combined thermal output (180GWh)
6. It satisfies the CDM PoA de-bundling rules

According to an ex-ante calculation, the proposed CPA will contribute to an emissions reduction equivalent to 58,814 tonnes of CO2 per annum and will not exceed a total of 180GWh of thermal energy generated.

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 habitats[3]
   - The protection of standing forests will ensure the maintenance of watersheds that regulate water table levels and prevent flash flooding[4]

[3] http://www.illegal-logging.info/approach.php?a_id=54

[4] http://www.meted.ucar.edu/hazwarnsys/ffewsrg/FF_EWS.Chap.2.pdf

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 monoxide[5]. 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

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.01)

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):

[5] http://www.who.int/indoorair/en/

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 E[6].

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 generated[7]. This has been calculated as a total of 15,939 stoves. Each stove included in the CPA will be identified by a unique reference number with a range of 1 to 15,939 in the monitoring database.

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 22/12/2010, 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 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.

[6] http://wwp.greenwichmeantime.co.uk/time-zone/africa/zambia/map.htm

[7] http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUUWR9PRPJL0EXOT3G2CKSFQ

This length has been selected for the CPA as it is consistent with the minimum projected operating lifetime of the stove, as indicted 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 10/10/2011, 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:

411,698 tCO2 equivalent over a 7 year crediting period.

Year	Annual estimation of emissions reductions (ERs) [tCO2e]
1	58,814
2	58,814
3	58,814
4	58,814
5	58,814
6	58,814
7	58,814
Total estimated ERs (tCO2e)	411,698
Total Number of Crediting Years	7
Average ERs per annum	58,814

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)[8] 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 activity[9], 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 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.

The methodology threshold for AMS II.G is 180GWh[10] per annum, meaning that each stove in the proposed CPA is responsible for 0.006% of the total potential output.[11]

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 output threshold and the stoves being installed in multiple locations.

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[8] 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

[9] 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

[10] http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUUWR9PRPJL0EXOT3G2CKSFQ

[11] GWh per stove (By Savings * NCVBiomass) = (2.71* 0.004167) = 0.011; 0.011/180= 0.00006 = 0.006%

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

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 SSC-CPA is deemed to be eligible for inclusion in the PoA when the criteria set out in section **A.4.2.2.** of the SSC-PoA-DD are met. The following table outlines how the criteria are met in this CPA-DD:

No.	PoA Criteria	CPA Application
1	Each CPA-DD will apply the baseline and monitoring methodology AMS II.G: *Energy efficiency measures in thermal applications of non-renewable biomass, Version 2*	Sections B.5. & B.6.
2	Each CPA must demonstrate that it is not registered as another CPA under a registered PoA or as another CDM project	Section A.4.7.
3	Each CPA-DD shall apply the UNFCCC Methodological Tool: "Tool for the demonstration and assessment of additionality" (Version 05.2) and will apply a simple cost analysis to demonstrate its additionality	Section B.3.
4	Each CPA will demonstrate that no revenues, other than those from the sale of CERs, are attributable to the programme activity	Cash flow analysis; section B.3.
5	Each CPA-DD will not exceed 180GWh of combined power output, which is the methodology limit	Section A.4.6.
6	Each CPA must satisfy de-bundling rules for PoAs	Section A.4.6.

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. 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, in accordance with EB 44, Annex 3, paragraph 99, the Global Stakeholder Consultation was undertaken prior to the starting date of the CPA. The starting date of the proposed CPA is 22/12/2010. 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.

Additionality of the proposed SSC-CPA is assessed using the following step-by-step approach, as defined in the UNFCCC Methodological Tool: "Tool for the demonstration and assessment of additionality" (Version 05.2).

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations
Sub-step 1a: Define alternatives to the project activity:

(i) The proposed project activity undertaken without being registered as a CDM project activity:

Alternatives to implementing the installation of domestic fuel-efficient cooking stoves cost-free for recipients in Zambia without the benefit of carbon finance are:

a) Donor-funded projects

There have been projects implementing domestic fuel-efficient cooking stoves in Zambia, such as the GTZ's Programme for Basic Energy Conservation in Southern Africa - Probec[12]. However, these have involved the small-scale sale of energy efficient stoves, where the economic case makes sense, i.e. where users purchase fuel (e.g. charcoal) for cooking purposes, mostly in urban areas or at the institutional, not household, level.

b) Government-funded projects

[12] www.probec.org

There is no history of this type of activity in Zambia to date. There are no plans at the time of writing for the Zambian government to implement a fuel-efficient cooking stoves programme. Only 0.2% of planned investments in the public investment plan are allocated to energy efficiency systems (Ministry of Finance and National Planning, 2002)[13].

The success of efficient stove projects to date in Zambia is extremely limited. This is evidenced by the poor penetration rate of fuel-efficient cooking stoves in Zambia (4,082 in 2006[14]) and the continuing high deforestation rates in the country.

(ii) Other realistic and credible alternative scenario(s) to the proposed CDM project activity scenario that deliver outputs services (e.g., cement) or services (e.g. electricity, heat) with comparable quality, properties and application areas, taking into account, where relevant, examples of scenarios identified in the underlying methodology:

The only other alternative scenario delivering the same output, i.e. the replacement of wood-fired three-rock fires for domestic purposes, would be private sector implementation of a commercial project to sell fuel-efficient stoves for profit. This scenario is extremely unlikely. Zambia has a population with 86% living below the poverty line, combined with a 50% unemployment rate[15]. Presently three out of four Zambians live in poverty and more than half of them are extremely poor and unable to meet their minimum nutritional needs. In rural parts of the country about 83% of the inhabitants are poor, and 71% of them are extremely poor[16]. Per capita income averages about US$430[17].

Typically, it is poorer, rural parts of the population that utilize wood-fired, three rock fires, as urban households have more disposable cash to purchase alternative fuels, such as charcoal. This is evidenced by the higher rates of woodfuel usage in rural areas. Among 90 percent of rural households, utilization of firewood was a very common source of cooking compared with 8 percent of the urban households[18]. Therefore, the commercial viability of selling stoves, where there is no economic incentive to buy them, is minimal.

(iii) If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

The continuation of the current situation in Zambia would undoubtedly see the continued use of wood-fired, three rock fires for cooking. As discussed above, the Zambian poor are excluded from the market for purchasing stoves, owing to the high levels of poverty. With 86% of the population living below the

[13] http://www.afrepren.org/adb_finesse/Task%203/Background%20Material/Background%20Material%20-%20Background%20to%20Africa%20Energy%20Sector.pdf

[14] Energy, Environment and Development Network for Africa, 2006: http://www.afrepren.org/adb_finesse/Presentations/Module%204%20-%20Traditional%20and%20Improved%20Biomass%20Part%201.ppt

[15] CIA World Factbook https://www.cia.gov/library/publications/the-world-factbook/geos/za.html

[16] http://www.ruralpovertyportal.org/web/guest/country/home/tags/zambia

[17] http://www.ruralpovertyportal.org/web/guest/country/home/tags/zambia

[18] The Living Conditions Monitoring Survey 2004, Central Statistics Office, Zambia

poverty line, the cost of fuel-efficient stoves is too great for families to manage within the household budget.

Firewood is the most common type of energy with 56% of households nationally citing it as the major source of cooking energy, followed by charcoal, and 90% of rural households utilizing it primarily for cooking purposes[19]. Where charcoal is utilized, there is an incentive to purchase a fuel-efficient stove, as it reduces the long-term household expenditure on fuel. This economic incentive does not exist for users of wood-fired, three rock fires, as wood is collected mostly for free.

The status quo of continuing the inefficient usage of non-renewable biomass for cooking purposes, involving no additional investment, makes it the most likely alternative scenario.

Sub-Step 1b: Consistency with mandatory laws and regulations:

The proposed scenarios outlined above are all compatible with mandatory applicable legal and regulatory requirements in Zambia. The proposed CPA is not the only alternative that complies with national mandatory laws and regulations.

The Zambian National Policy on the Environment (2007) indicates some of the areas where Zambian policy is not adequately protecting environmental resources, including:

- widespread forest clearance and degradation
- forest degradation leading to reduced biodiversity
- fuel-wood demand increased and alternative energy not given sufficient attention at all levels
- Policy failure to invest more in increased access to electricity and insufficient attention and investment in low-cost alternative supplies, to offset pressure upon wood resources
- Inadequate attention in both use and regulation of the main sources of supply of energy, hydro-power and fuel-wood, to their environmental impacts and requisite amelioration in sectoral policies
- The pace of rural electrification is too slow thus compounding the pressure upon wood resources in proportion to the rapid increase in the human population

Furthermore, the policy seeks to encourage 'Implementation strategies' that will "focus more on establishing an enabling environment to promote community-based sustainable natural resource use and less on traditional government managed development projects".

The National Energy Policy (2008), states: "Although there is no immediate woodfuel crisis in most parts of Zambia, woodfuel can no longer be considered as a renewable resource because consumption rates are exceeding yield rates mainly as a result of inefficient production and use and the increasing population… If current trends of woodland depletion continue an "energy crisis" that will affect the majority of the people is likely to occur in the near future. This is in addition to desertification, which is already threatening some parts of the country."

[19] The Living Conditions Monitoring Survey 2004, Central Statistics Office, Zambia

In addition, under policy measures and strategies for household energy, the policy seeks to "promote the use of efficient cook stoves" through "innovative financing schemes designed to reduce the initial cost problem for low income households."

The CPA is not implementing a specific Zambian mandatory regulation or law related to the installation of fuel-efficient cooking stoves, but is consistent with existing national policies.

Step 2: Investment Analysis:
Sub-step 2a: Determine appropriate analysis method

There are no revenues from the proposed CPA other than income from the sale of CERs. As such a simple cost analysis will be undertaken. Cash flows are modelled on a PoA-wide basis by 3RL. The PoA cash flow model is based on a total number of stoves anticipated to be installed under the PoA, which is 400,000 stoves. The small scale threshold limit for each CPA is calculated as 15,939 stoves and therefore 3RL anticipates approximately 25 CPAs to be included in the PoA. The following cash flow numbers, specific to this CPA, are therefore calculated as 1/25 of the total PoA cash flows:

Option 1: Cash Flow Analysis without CER Income

without CERs (US$,000s)	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Income (CPA)	0	0	0	0	0	0	0	0	0	0
Expenditures	5	90	174	231	152	24	24	24	24	747
Cash Flow	-5	-90	-174	-231	-152	-24	-24	-24	-24	-747

Option 2: Cash Flow Analysis with CER Income

with CERs (US$,000s)	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Income (CPA)	0	0	74	205	399	520	491	417	284	2,390
Expenditures	5	90	174	231	152	24	24	24	24	747
Cash Flow	-5	-90	-100	-26	247	496	467	393	260	1,643

Based on CER price of US$11

The analysis demonstrates that no revenues, other than the income from CERs, are required to generate a positive cash flow, and so no other revenues are attributable to the project.

The alternative to developing the project as a CDM project (Option 1) generates a negative cash flow. It is only with the sale of CERs (Option 2) that a positive cash flow can be generated. Clearly, without access to revenue from the sale of CERs the CPA is not financially attractive and would not be implemented.

Step 3: Barrier analysis: This step is skipped in favour of the above investment analysis

Step 4: Common practice analysis:
Sub-step 4a: Analyze other activities similar to the proposed project activity:

There is a lack of precedent to the proposed PoA. Activities to date have not produced the scale of technological penetration required to circumvent the continued widespread use of non-sustainable biomass, as less than 1% of the addressable rural market has fuel-efficient firewood cooking stoves

installed[20]. Common practice in Zambia, outside of urban areas, is to use traditional, wood-fired 3-rock fires for domestic purposes.

To date, the only significant dissemination of stoves has been under two projects:

1. Probec (GTZ) – the dissemination of stoves in Zambia has relied on subsidies from German government development (GTZ) aid. Stoves have been sold under this programme to both domestic and institutional clients. GTZ financial support for this programme ended in 2010. There have been pronouncements of private sector continuation of the programme in Zambia, utilizing carbon finance as an alternative support, although there is no physical evidence of this at the time of writing.

2. RWE/Climate InterChange - CDM Lusaka Sustainable Energy Project (LSEP). This project relies on carbon finance to subsidize the planned sale of 30,000 stoves. LSEP is a fuel-switching project, focusing on the selling a replacement to charcoal stoves in the urban market of Lusaka. LSEP applies a different UNFCCC baseline and monitoring methodology to the proposed PoA.

Sub-step 4b: Discuss any similar Options that are occurring:

Taking each project individually:

1. Probec: This initiative focussed on disseminating charcoal burning stoves to households[21], not wood burning stoves, which is a key distinction from the proposed PoA. It also incorporates institutional stoves and tobacco barns. GTZ funding for Probec ended in December 2010[22], demonstrating that it has been incapable of delivering sustainability in its funding and activities. It is understood that the initiative has been passed over to the private sector for carbon market development[23], but to date there is no physical evidence that a CDM project is being developed in Zambia.
2. LSEP: This is a fuel-switching project using a separate methodology from the proposed PoA[24]. This project, although involving the dissemination of fuel efficient cooking stoves, operates on a smaller scale than the proposed PoA, focusing on the urban charcoal market and has a clear economic incentive for participants (i.e. sale of stoves to customers who purchase fuel).

The proposed PoA is larger in scale that both these initiatives, focuses solely on replacing wood-fired appliances for a more efficient version and has only one revenue stream; the sale of CERs.

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[20] Energy, Environment and Development Network for Africa, 2006: http://www.afrepren.org/adb_finesse/Presentations/Module%204%20-%20Traditional%20and%20Improved%20Biomass%20Part%201.ppt

[21] http://www.probec.org/displaysection.php?czacc=&zSelectedSectionID=sec1194685541

[22] http://www.probec.org/displaysection.php?czacc=&zSelectedSectionID=sec1192753796&zSelectedAssetID=ast1291890483

[23] http://www.islan.ch/srcf.aspx

[24] http://cdm.unfccc.int/filestorage/B/M/N/BMNTH5J4Y6XW1U3ORADFK7EC8Z02PS/PDD.pdf?t=TWh8MTMxMDM5MDMzNy40Nw==|z7ZeQrqRfyr__t2Krc4d5TNVLR4=

It is concluded from the above analysis that the proposed CPA is additional.

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

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_2O	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_2O	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:

Data / Parameter:	B_y
Data unit:	Tonnes per annum
Description:	Quantity of biomass used in absence of the project activity (per stove)
Source of data used:	Baseline survey
Value applied:	4.1
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.
Any comment:	See PoA-DD 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:	Baseline calculation
Value applied:	0.93
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.
Any comment:	See PoA-DD for details

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 2
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 2
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:	IPCC default
Value applied:	97.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	The IPCC coal briquette default factor is used.
Any comment:	See PoA-DD for details

Data / Parameter:	*DRB*
Data unit:	tonnes
Description:	Demonstrably renewable biomass
Source of data used:	$f_{NRB,y}$ baseline study
Value applied:	1,253,889
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:

$ER_y = By,_{savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel}$

Where:

1. $B_{y,\ savings}$ Quantity of woody biomass that is saved per stove per annum in tonnes. The formula for calculating this is: $B_y * (1-\eta_{old}/\eta_{new})$
2. $f_{NRB,y}$ The fraction of biomass used in absence of the project that is non-renewable (0.93). This is monitored yearly in the PoAs crediting period.

3. *NCVbiomass* IPCC default value for net calorific value of substituted biomass (0.015 TJ/tonne, methodology default)
4. $EF_{projected\_fossilfuel}$ IPCC default value for Coal Briquettes (97.5 tCO2/TJ, see Annex 3)
5. B_y Average quantity of woody biomass used per stove per annum in absence of the project (4.1 tonnes per annum baseline survey, see Annex 3)[25]
6. η_{old} Thermal efficiency of 3-rock fires (0.10, methodology default)
7. η_{new} Thermal efficiency of the new appliance (0.295 baseline EPTP test, see Annex 3)

Ex-ante ER calculation (per stove):

B_y	t/annum	Baseline survey	4.1
η_{old}	fraction	IIG meth default	0.1
η_{new}	fraction	Baseline EPTP test	0.295
$B_{y,savings}$	t/annum	Calculated	2.71
$f_{NRB,\ y}$	fraction	Baseline study	0.93
$NCV_{biomass\ (TJ/t)}$	TJ/t	IPCC Default Value	0.015
$EF_{projected\ fossil\ fuel}$	tCO2/TJ	IPCC Default Value	97.5
ER_y	**t CO2**		**3.69**

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

A maximum of 15,939 stoves[26] will be included in the proposed CPA, as per the methodology output threshold of 180GWh[27].

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	0	58,814	0	58,814
Year 2	0	58,814	0	58,814
Year 3	0	58,814	0	58,814
Year 4	0	58,814	0	58,814
Year 5	0	58,814	0	58,814
Year 6	0	58,814	0	58,814
Year 7	0	58,814	0	58,814
Total (tCO_2 e)	**0**	**411,698**	**0**	**411,698**

[25] Methodology Option B 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.

[26] 180GWh/GWh output per stove

[27] http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_VIIC5MTUUWR9PRPJL0EXOT3G2CKSFQ

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

B.6.1. Description of the monitoring plan:

All monitoring will be conducted at the PoA-level. The AMS II.G requirements for monitoring are:

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

2. *In order to assess the leakage specified above monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable woody biomass use required for leakage assessment shall also be collected.*

3. *Monitoring shall ensure that:*
   (a) Either the replaced low efficiency appliances are disposed off and not used within the boundary or within the region; or
   (b) If the baseline stoves usage continues, monitoring shall ensure that the wood fuel consumption of those stoves is excluded from B_y

CPAs included in the PoA will be monitored by 3RL at the PoA level; through the monitoring plan identified in the PoA-DD and according to a sampling technique. A PoA-level monitoring report will be produced for each monitoring period.

The following activities will be completed during the monitoring period by 3RL for the proposed PoA:

1) Selecting the Activity Sample Group (ASG)

A sample group of stove household recipients will be selected on a simple random sample basis for each monitoring period. This sample group will be selected with 90/10 precision (90% confidence interval and 10% margin of error), according to applied methodology and the General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities (version 01) from EB 50 Annex 30.

3RL will implement a simple random sampling approach to monitoring, as outlined by the EB50 Guidance:

A simple random sample is a subset of observation (e.g., pieces of equipment, homes, individuals) chosen from a larger set (a population). Each observation is chosen randomly and entirely by chance, such that each observation has the same probability of being chosen. As each element in the population has an equal probability of being selected into the sample, the mean value of the measurement from a random sample is an unbiased estimate of the true population mean.

The individual participants in the survey will be selected by a random selection programme run on the PoA monitoring database during each monitoring period. The sampling frame will consist of installed stoves that have been in operation during the monitoring period and the sample will be generated from

this population. This simple random sample will generate the participants in the sample group (ASG). The ASG will be re-selected for every monitoring period to ensure the selection remains random.

A simple random sample may also be used by the DOE for verification of emissions reductions achieved by the PoA. In this way the DOE may verify emissions reductions across the PoA by sampling the PoA's monitoring database, only selecting a unique verification ASG.

2) On-site ASG monitoring

Monitoring teams will survey the usage of 3-rock fires for domestic cooking and water heating purposes only. 3-rock fires used for communal purposes (beer brewing, socializing etc.) will be excluded from the survey, as these were excluded from the baseline woodfuel surveys.

The following monitoring activities of each recipient household in the ASG will be undertaken:

a) A confirmation that the stove is still in situ and being utilized in the correct fashion
   - 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.
b) A confirmation that the old appliance (3-rock fire) has been effectively disposed of
   - Monitoring staff shall ask users to confirm that the stove is being used for the recipient household's domestic purposes. Staff will ask the recipients to confirm that the 3-rock fire is not being used for day-to-day cooking or water heating purposes.
c) Where the old appliance has not been effectively replaced, a calculation of its continued usage
   - Monitoring staff shall check any 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. This will then be deducted from the baseline woodfuel usage figure (as $B_{y,i}$).
d) A check whether any maintenance of the stove is required following wear and tear
   - Monitoring staff will ask users if there are any maintenance requirements for the stove. A further observational check will be undertaken by staff for maintenance requirements.

These activities will be undertaken by 3RL monitoring teams during every PoA monitoring period and data/responses will be collected electronically and then submitted to 3RL administration.

3) Stove efficiency monitoring

A per-vintage, sample of stove household recipients will be selected on a simple random sample basis during every PoA crediting period year to test the ongoing efficiency of the stoves, utilizing the stove manufacturers' EPTP. This stove efficiency sample group (SESG) will be selected with 90/10 precision (90% confidence interval and 10% margin of error), according to General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities (version 01) from EB 50 Annex 30.

A simple random sampling approach, identified above for the ASG, will be applied for the SESG.

The efficiency of each vintage of stove will be monitored separately and a per-vintage efficiency fraction applied to the PoA emissions calculations in each monitoring report. Vintages will correspond to the crediting period year during which the stove was installed.

4) Leakage monitoring

A sample group of non-project households will be selected on a simple random sample basis every PoA monitoring period to assess leakage. This leakage sample group (LSG) will be selected with 90/30 precision (90% confidence interval and 30% margin of error), according to General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities (version 01) from EB 50 Annex 30.

A simple random sample of non-project households will be selected, who are identified as having previously solely used renewable energy sources, to assess whether they are using non-renewable biomass during the monitoring period.

If it is found that non-renewable biomass usage has increased in these households as a result of the implementation of the PoA, then this amount shall be estimated from the responses given and a deduction from *By* will be applied.

5) Data Management

Monitoring data from the field surveys will be collated and checked by 3RL administration. Installation data in the monitoring database will be used to identify the households in the ASG and SESG. Responses from the monitoring surveys will be retained by 3RL for verification by the DOE.

Monitoring data will be analysed and summarized in the monitoring report.

6) Monitoring report

A PoA monitoring report will be written at the end of every monitoring period and submitted to the DOE responsible for verification. This report will indicate how the monitoring plan has been followed and calculate the PoA emissions reductions for each monitoring period.

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

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

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:

Annex 1

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

Organization:	3 Rocks Ltd.
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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

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