



**Monitoring report form
(Version 03.2)**

Monitoring report

Title of the project activity	Fuel Efficient Stoves in Zambia Fuel Efficient Stoves in Zambia (3RL CPA No. 01)
Reference number of the project activity	PoA 6864 CPA 6864-0001
Version number of the monitoring report	4
Completion date of the monitoring report	03/02/2014
Registration date of the project activity	28/01/2013
Monitoring period number and duration of this monitoring period	Period 1 28/01/2013-14/10/2013 (inclusive of these dates)
Project participant(s)	3 Rocks Ltd.
Host Party(ies)	Zambia
Sectoral scope(s) and applied methodology(ies)	3 : Energy demand AMS II.G. Ver. 3: Energy efficiency measures in thermal applications of non-renewable biomass
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	28,980
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	24,457
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	0
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	24,457

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

(a) Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;

The purpose of the CPA is to install fuel efficient cooking stoves throughout Zambia. The stoves will replace wood-fired, 3-rock fires only. The stoves will help recipient households reduce their non-renewable wood use, protect standing forests, and will help limit valuable time spent gathering fuel wood. Greenhouse gases will be mitigated by reducing the harvesting of non-renewable biomass for use in cooking purposes.

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

- i. Environmental
 - The CPA helps significantly reduce Zambia's greenhouse gas emissions over its lifetime
 - The CPA helps reduce the use of non-renewable biomass from Zambian forests, assisting the maintenance of existing forest stock, protecting natural forest eco-systems and wildlife habitats¹
 - The protection of standing forests ensures the maintenance of watersheds that regulate water table levels and prevent flash flooding²
- ii. Social
 - Considerably less time is 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 monoxide³. 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 helps 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 brings employment benefits to Zambia and jobs will be created for its administration

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

(b) Brief description of the installed technology and equipment;

¹ http://www.illegal-logging.info/approach.php?a_id=54

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

³ <http://www.who.int/indoorair/en/>

The CPA involves the distribution of fuel-efficient stoves by 3 Rocks Ltd. (3RL) in individual households in Zambia. The CPA provides 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)*"⁴ and certified by the Engines and Energy Conversion Laboratory at Colorado State University for its thermal efficiency.

Recipient households 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 is avoided by the unique referencing of stoves included in the CPA. This will be achieved through:

- **GPS references:** each stove has 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 also has 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.

(c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.);

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. The first stove was installed on 06/06/2011 and the final stove was installed on 27/10/2011. The CDM crediting period starts on 28/01/2013.

(d) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period.

The monitored emissions reductions for this period are 24,457 tonnes of CO₂ per annum.

A.2. Location of project activity

The technologies included in the project are installed in numerous locations (identified by

⁴ 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

individual GPS locations) within the Host Party country of Zambia.

The CPA geographical boundary is the country of Zambia. The Republic of Zambia, lies within the latitude and longitude of 15 00 S and 30 00 E⁵. 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



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

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A (host): Zambia	Private entity: 3 Rocks Ltd.	No.

A.4. Reference of applied methodology

AMS II.G Energy efficiency measures in thermal applications of non-renewable biomass, Version 3

Ref: <http://cdm.unfccc.int/methodologies/DB/REQC2MYZJJ6I7BC9SKCS32T2K87AOW>

⁵ <http://wwp.greenwichmeantime.co.uk/time-zone/africa/zambia/map.htm>

Tools used:

Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 03.0

Ref: https://cdm.unfccc.int/Reference/Standards/meth/meth_stan05.pdf

Standard for the Development of Eligibility Criteria for the Inclusion of a Project Activity as a CPA under the POA, version 02.1

Ref:

https://cdm.unfccc.int/filestorage/5/_XJROKC13PNH45YGZI9VSW78AQF0LDU.pdf/eb70_repan05.pdf?t=QTF8bXg2bnl1fDC6ceJnL-w1L1yHE-J4pLbN

Guidelines on the Demonstration of Additionality of Small-Scale Project Activities, version 09.0

Ref: http://cdm.unfccc.int/Reference/Guidclarif/meth/methSSC_guid05.pdf

A.5. Crediting period of project activity

Type: Renewable

Start date: 28/01/2013

Length: 7 years

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The CPA provides energy efficient cooking stoves based on the 'rocket stove' design. This technology ensures a 29.5% thermal efficiency against the 10% methodology default for the traditional 3-rock fire.

The stove consists of a durable metal alloy liner, with an insulating layer surrounding it. The liner and insulation are encased in a metal outer container, which is further attached to brick enclosure for protection and security. The liner is tapered at the top, where a galvanized cooking surface provides a rest for the cooking pot. The flame is directed onto the pot speeding up the flow of gases from the combustion chamber and the biomass fuel is supported using a metal grate to ensure adequate air flow to the fire. The whole stove is cemented to the floor ensuring the stove is largely protected from damage and theft.



Stove alloy liner



Constructed Stove

Figure 1: Stove design

The fuel-efficient cooking stove technology has been tested independently in accordance with the “*Stove Manufacturers Emissions & Performance Test Protocol (EPTP)*”⁶ and certified by the Engines and Energy Conversion Laboratory at Colorado State University⁷ for its thermal efficiency. More information on this test and the procedures followed is available in Annex 3 of the PoA-DD.

The liner, insulation, pot rest and metal grate will be manufactured in a specialist stove factory to ensure standardized production. All other components, including bricks and mortar, will be produced locally in Zambia.

The stoves are constructed according to a standardized design and construction procedure by Zambian installation teams. Teams responsible for the construction of stoves in each CPA are trained accordingly. The trained stove builders receive a stove kit that they assemble on site.

The replacement of the fuel efficient stoves, described above, for a more efficient version will only be possible if the crediting period of the PoA is renewed at the end of the existing crediting period. A more efficient stove will require the baseline data to be changed and this will require additional validation. The technology described above is state-of-the-art and designed as a bespoke solution for Zambia. A more efficient technology would require considerable additional research and development over a period of time.

Fuel Efficient Stoves in Zambia (3RL CPA No. 01) is fully implemented, with 15,938 stoves installed in households in Zambia at the date of inclusion (28/01/2013). The starting date 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.

The crediting period commenced on 28/01/2013 and all stoves were installed by this date, meaning the CPA is fully implemented by the start of the crediting period.

Only one Monitoring Report is submitted for this monitoring period, as only one CPA is included in the PoA (3RL CPA No. 01).

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

No request for deviation has been applied for this monitoring period.

B.2.2. Corrections

No correction has been made.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

There are no permanent changes from the registered monitoring plan or applied methodology.

B.2.4. Changes to project design of registered project activity

There are no changes to the project design of the registered project activity.

B.2.5. Changes to start date of crediting period

⁶ 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

⁷ Please see EECL “Statement of Qualifications”

There are no changes to the start date of the crediting period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

n/a

SECTION C. Description of monitoring system

Diagrams of the monitoring system and information flows may be viewed in Annex 1 of this report and also in Annex 4 of the PoA-DD.

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 Standard⁸ 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 CPAs⁹, 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.

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:

⁸ Standard for sampling and surveys for CDM project activities and programme of activities, EB69 Annex 4, para 20 (including footnote 18)

⁹ 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

- 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 efficiency¹⁰

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 calculations¹¹
- 4) The sample sizes for the stove usage rate and stove efficiency are calculated conservatively

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.

¹⁰ Even if efficiency were to deteriorate slightly over time, a simple random sample would still find the correct average efficiency

¹¹ 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.

SECTION D. Data and parameters**D.1. Data and parameters fixed ex ante or at renewal of crediting period**

Data / Parameter:	<i>Bold</i>
Unit:	Tonnes per annum
Description:	Quantity of biomass used in absence of the project activity
Source of data:	Baseline survey
Value(s) applied:	(4.1*15,938) = 65,345
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	See PoA-DD

Data / Parameter:	η_{new}
Unit:	Fraction
Description:	Thermal efficiency of the stove
Source of data:	Stove Manufacturers Emissions & Performance Test Protocol (EPTP) Certificate
Value(s) applied:	0.295
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	See PoA-DD

Data / Parameter:	$f_{NRB,y}$
Unit:	Fraction
Description:	Non-renewable biomass usage in Zambia, as a proportion of total biomass usage
Source of data:	EB 67 country-specific default value for Zambia
Value(s) applied:	0.81
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	See PoA-DD

Data / Parameter:	η_{old}
Unit:	Fraction
Description:	Efficiency of 3-rock fire cooking method (system being replaced)
Source of data:	Methodology default
Value(s) applied:	0.10
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	

Data / Parameter:	<i>NCVbiomass</i>
Unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted
Source of data:	IPCC default
Value(s) applied:	0.015
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	
Data / Parameter:	<i>EFprojected_fossilfuel</i>
Unit:	tCO2/TJ
Description:	Emission factor: substitution of non-renewable biomass by similar consumers
Source of data:	Methodology default
Value(s) applied:	81.6
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	
Data / Parameter:	<i>Ly</i>
Unit:	Fraction
Description:	Leakage
Source of data:	Methodology default
Value(s) applied:	0.95
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	
Data / Parameter:	<i>DRB</i>
Unit:	Tonnes
Description:	Demonstrably renewable biomass
Source of data:	<i>fNRB,y</i> baseline study
Value(s) applied:	1,278,025
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks

Additional comment:	This parameter was included in an early version of the PoA-DD, where the fNRB for Zambia was calculated by the Project Participant (PP). In the registered version of the PoA-DD, the UNFCCC default fNRB value was selected over the PP's value, as it was more conservative. However, the DRB parameter remained in the 'Data and parameters fixed ex ante or at renewal of crediting period'. Hence, it is provided here for completeness only, as it has no bearing on the ER calculations in this monitoring period.
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D.2. Data and parameters monitored

Data / Parameter:	<i>NS</i>
Unit:	Number
Description:	Number of stoves still operation during the monitoring period
Measured/ Calculated / Default:	Measured
Source of data:	Installation data and monitoring survey
Value(s) of monitored parameter:	13,881
Monitoring equipment:	PoA monitoring database
Measuring/ Reading/ Recording frequency:	Annually or Biennially
Calculation method (if applicable):	<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:	<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>
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	<p>NS has been adjusted to 87.1% of the monitored value. This is due to findings of the DOE during the on-site verification. The DOE identified 4 stoves not to be functioning from a sample of 31. A proportional adjustment has therefore been applied to the NS parameter in agreement with the DOE.</p>
Data / Parameter:	<i>OD</i>
Unit:	Days
Description:	Total stove operating days in monitoring period
Measured/ Calculated / Default:	Calculated
Source of data:	Installation and monitoring survey data in monitoring database
Value(s) of monitored parameter:	3,497,118
Monitoring equipment:	PoA monitoring database
Measuring/ Reading/ Recording frequency:	Annually or Biennially
Calculation method (if applicable):	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:	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.
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks

Additional comment:	OD has been adjusted to 87.1% of the monitored value. This is due to findings of the DOE during the on-site verification. The DOE identified 4 stoves not to be functioning from a sample of 31. A proportional adjustment has therefore been applied to the OD parameter in agreement with the DOE.
Data / Parameter:	$\eta_{new,i}$
Unit:	Fraction
Description:	Thermal efficiency of the stove
Measured/ Calculated / Default:	Measured
Source of data:	Stove manufacturers' Emissions & Performance Test Protocol (EPTP) test
Value(s) of monitored parameter:	0.295
Monitoring equipment:	Thermometer, Moisture content analyzer, stopwatch
Measuring/ Reading/ Recording frequency:	Annually or Biennially
Calculation method (if applicable):	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:	Tests will be undertaken by experienced project staff following the Stove Manufacturers Emissions & Performance Test Protocol (EPTP) ¹² . 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.

¹² 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

Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	
Data / Parameter:	<i>B_{new}</i>
Unit:	Tonnes per annum
Description:	Quantity of biomass saved per stove per annum
Measured/ Calculated / Default:	Calculated
Source of data:	Monitoring survey
Value(s) of monitored parameter:	4.1
Monitoring equipment:	ER calculation sheet
Measuring/ Reading/ Recording frequency:	Annually or Biennially
Calculation method (if applicable):	<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.</p> <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:	<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>.</p> <p>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>

Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	

D.3. Implementation of sampling plan

The sampling plan was not implemented as the stove usage rate and stove efficiency parameters of interest are not monitored for this monitoring period. The methodology states that these parameters must be monitored either annually or biennially. As this monitoring period does not constitute a full annual or biennial period, monitoring has not yet been undertaken.

Furthermore, the registered PDD states the following for each parameter:

NS - 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.

$\eta_{new,i}$ - During the first annual or biennial period, the baseline tested figure will apply for interim monitoring reports.

B_{new} - During the first annual or biennial period, the baseline figure will apply for interim monitoring reports.

The PoA, and respective first included CPA (for which this monitoring report applies) was registered on 28/01/2013. This is the date of the CDM crediting period start. This monitoring report covers the first CDM monitoring period (Period 1) for this project with the dates 28/01/2013-14/10/2013 (inclusive of these dates). A full year of CDM crediting has not yet been completed following the starting date of the crediting period, and therefore this monitoring period does not constitute the “first annual or biennial period” noted in the monitored parameters.

This is therefore the first CDM monitoring period for the project and this monitoring report is an “interim monitoring report”; and therefore, in accordance with the methodology and the registered PDD, monitoring of the parameters has not yet been undertaken.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

Baseline emissions are calculated in the following way:

$$B_{y,Savings} = B_{new} * (1 - \eta_{old} / \eta_{new,i})$$

$$ER_{year} = B_{y,Savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected\ fossil\ fuel}$$

$$ER_{day} = ER_{year} / 365$$

$$OD = NS * \text{days in monitoring period}$$

$$ER_{y\ gross} = ER_{day} * OD$$

$$ER_{y\ net} = ER_{y\ gross} * L_y$$

Where:

$$B_{y, savings} = B_{old} * (1 - \eta_{old} / \eta_{new}) = 2.71 \text{ tonnes}$$

$$f_{NRB,y} = 0.81$$

$$NCV_{biomass} = 0.015$$

$$EF_{projected_fossilfuel} = 81.6$$

$$B_{new} = 4.1$$

$$\eta_{old} = 0.10$$

$$\eta_{new,i} = 0.295$$

$$L_y = 0.95$$

$$NS = 13,881$$

$$OD = 3,497,118$$

Baseline emissions for this monitoring period are calculated as 25,744 t CO₂e.

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1 (28/01/2013-14/10/2013)	25,744	0	• 1,287	• 24,457

E.2. Calculation of project emissions or actual net GHG removals by sinks

There are no project emissions attributable, as per the registered PDD.

E.3. Calculation of leakage

Leakage (L_y) is calculated by using the methodology default value of 0.95

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

Leakage calculated for this monitoring period is 1,287 t CO₂e

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	25,744	0	1,287	24,457

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
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Emission reductions or GHG removals by sinks (t CO₂e)	28,980	24,457
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E.6. Remarks on difference from estimated value in registered PDD

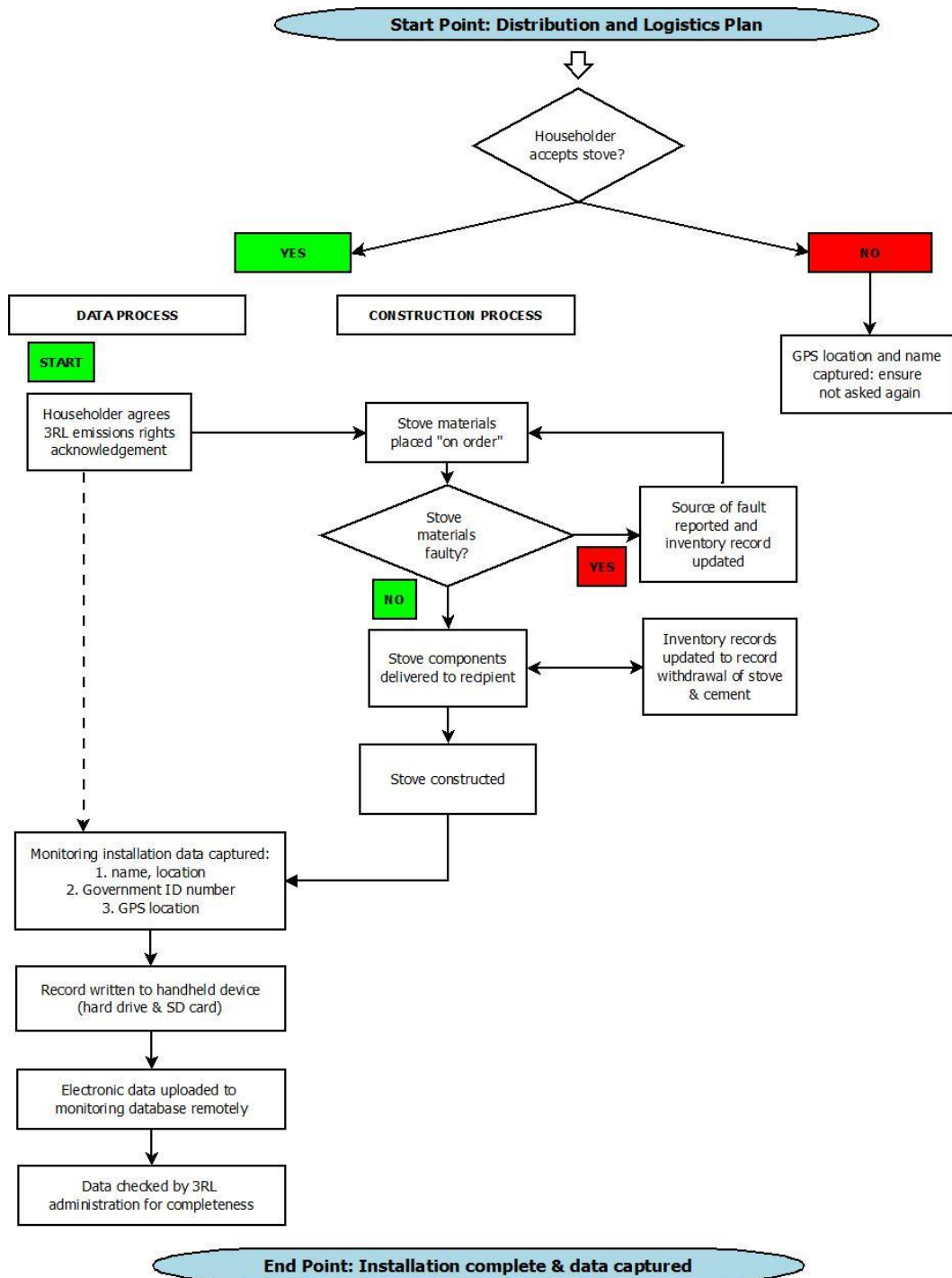
The differences in the estimated values versus the actual values are due to the total number of stoves (*NS*) and the total number of operating days (*OD*) of the stoves. The estimations are based on a maximum number of installations and operating days for the stoves, whereas the actual operating days are less due to stoves being decommissioned during the monitoring period and due to the 87.1% adjustment made to *NS* and *OD* due to the DOE's on-site verification sample findings.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

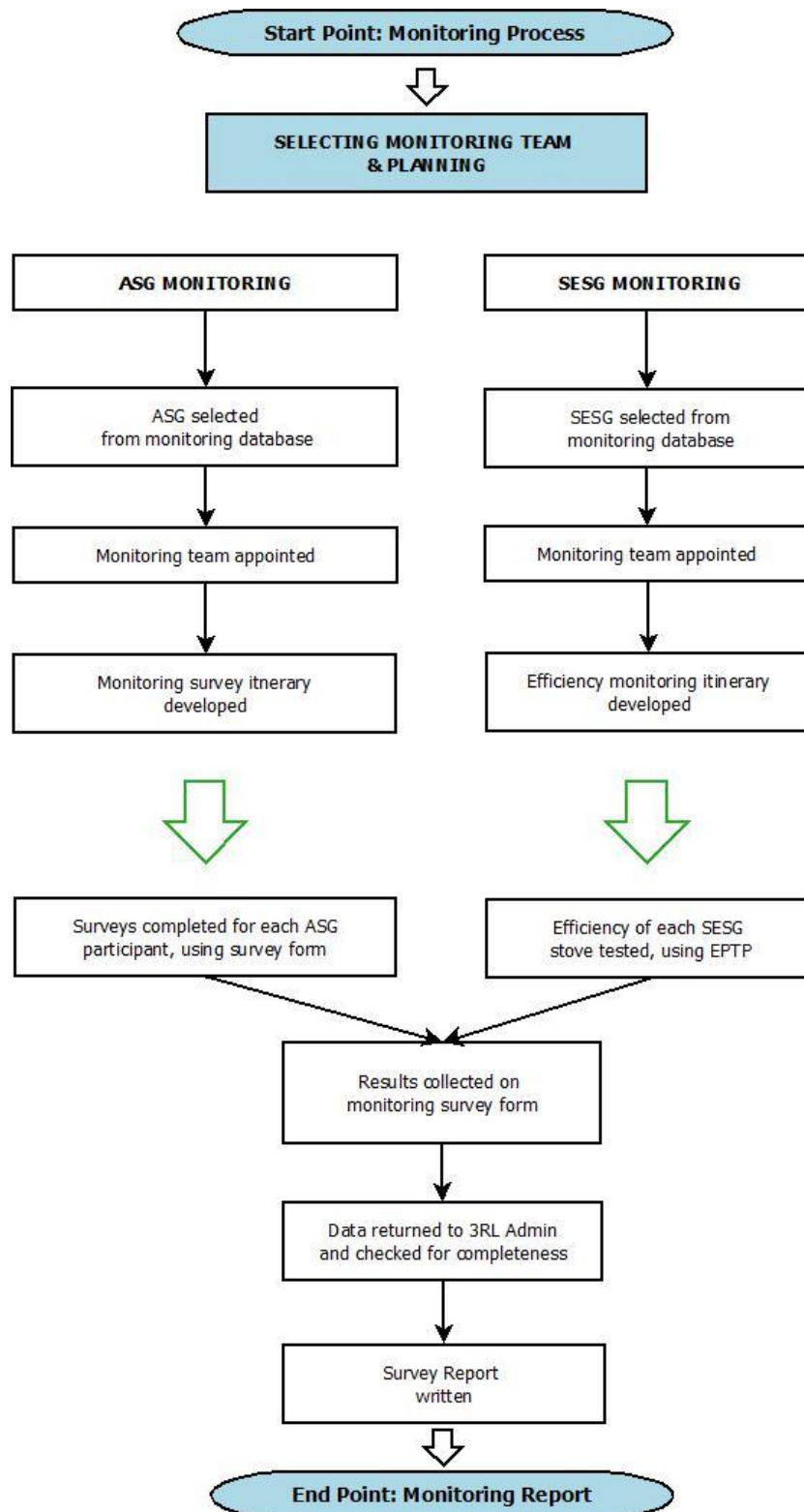
Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO₂e)	0	24,457

ANNEX 1: MONITORING INFORMATION

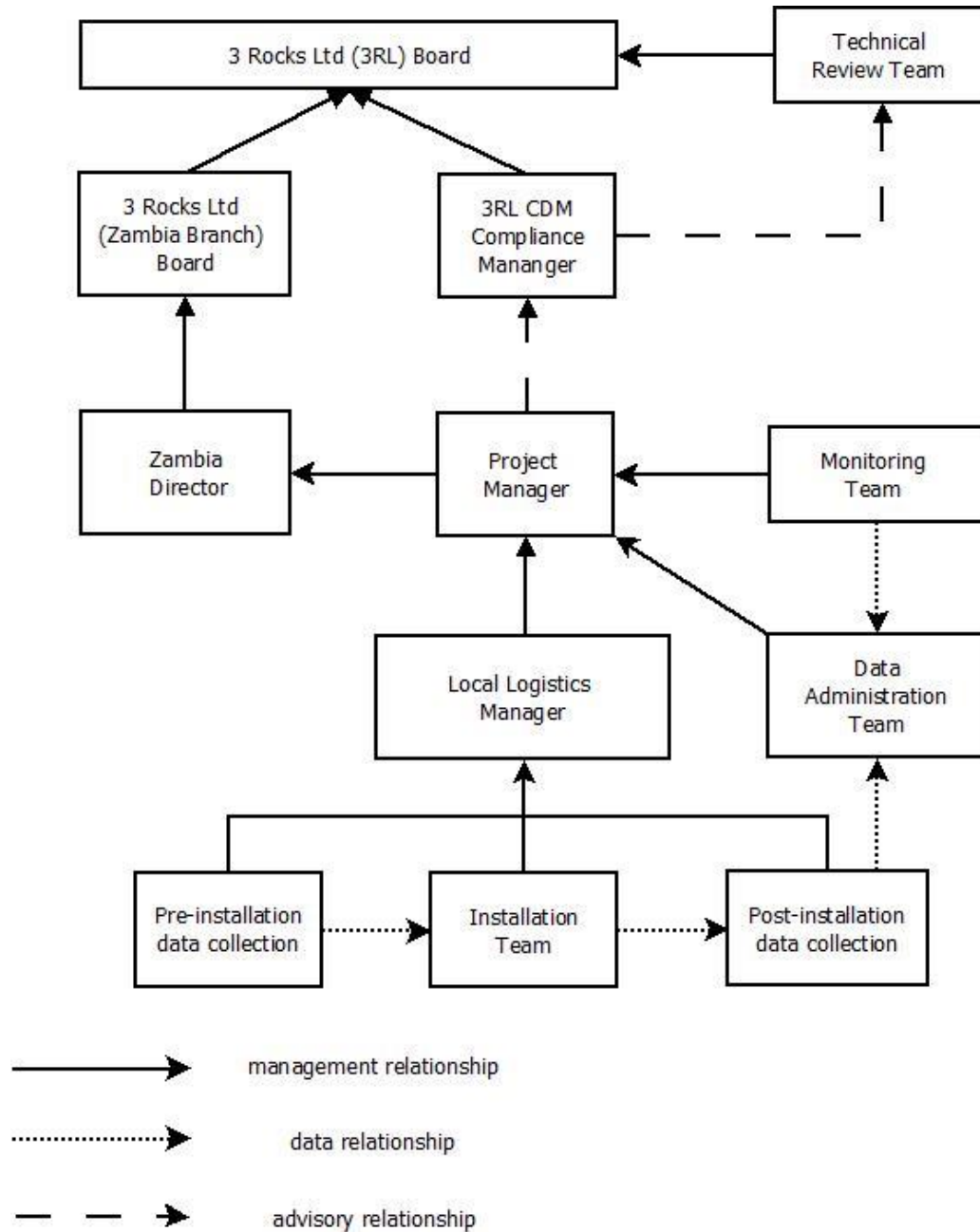
A. Installation Process



B. Monitoring Process



C. Organizational Chart / Monitoring Structure



D.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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