



Project Monitoring Plan  
co2balance Kenya  
19 August 2010

## Table of Contents

<b>Executive Summary .....</b>	<b>3</b>
<b>1.0 Introduction.....</b>	<b>4</b>
<b>2.0 Initial Data Collection .....</b>	<b>4</b>
2.1 Unique Stove Serial Number.....	4
2.2 Stove GPS Coordinates .....	5
2.3 Address/ID Number/Mobile Number of Stove Recipient.....	5
2.4 Carbon Handover Sheet .....	5
2.5 Stove Construction Date.....	5
<b>3.0 Monitoring Plan.....</b>	<b>5</b>
3.1 Number of appliances operating per year and vintage.....	6
3.2 Operating time of stove in vintage.....	6
3.3 Efficiency of each stove by vintage .....	6
3.4 Leakage correction factor .....	6
<b>4.0 Monitoring Report.....</b>	<b>7</b>
<b>5.0 Diagram of Responsibilities .....</b>	<b>7</b>
<b>APPENDIX .....</b>	<b>9</b>

## Executive Summary

This document describes the monitoring plan to be implemented by co2balance. The plan documents the information to be collected at the project start and throughout the project lifetime. The following data will be collected, processed, and stored in an electronic database by co2balance:

1. Unique Stove Serial Number
2. Stove GPS Coordinates
3. Address/ID Number/Mobile Number of Stove recipient
4. Carbon Handover Sheet
5. Stove Construction Date

Once compiled electronically, the data will be made available to project partners and third party auditors such as a Designated Operational Entity (DOE). Points 1 thru 3 will be verified during project monitoring, which will occur typically once per year for each project as part of the verification process. Project monitoring will assess a representative sample of the project households and non-household groups. The size of the representative sample will satisfy GS and CDM requirements.

Other than verification, the following monitoring data will be collected, processed, and uploaded to co2balance's electronic database:

1. Number of appliances operating per year and vintage ( $N_{y,i}$ )
2. Operating time of stove in vintage ( $T_{y,j}$ )
3. Efficiency of each stove by vintage ( $\eta_{new,i}$ )
4. Leakage Correction Factor ( $L_y$ )

co2balance employees will collect the monitoring data at the project site. The monitoring data will be made available to project partners and third party auditors as well. Initial and monitoring data will be stored throughout the project life. A monitoring report will be produced containing the most recent monitoring data and relevant data from the initial data collection.

## 1.0 Introduction

The following describes in detail the initial data collection process and project monitoring throughout the lifetime of a co2balance project. Both the initial and lifetime processes adhere to the guidelines and guidance of the Gold Standard (GS) and Clean Development Mechanism (CDM), specifically:

- *AMS.II.G: Energy efficiency measures in the application of non-renewable biomass Version 02*
- *Draft General Guidelines On Sampling And Surveys* (EB 37, Annex 27)
- *General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities Version 01* (EB 50 Annex 30)

The monitoring plan is meant to ensure transparency of project implementation and operation, as well as, allow for evaluation of project effectiveness.

## 2.0 Initial Data Collection

The initial data collection serves as the foundation of the project monitoring plan. Each co2balance stove project will employ stove contractors for stove construction. The stove materials will be manufactured in Kenya and delivered to a location central to the project area. The materials will then be distributed from the central location to the individual households for stove construction. During the construction process, co2balance employees will collect stove data, perform quality control checks of the constructed stove, audit delivered materials, perform stove efficiency tests, collect carbon handover sheets, and educate stove recipients on proper usage.

For each constructed stove, the following information will be documented:

6. Unique Stove Serial Number
7. Stove GPS Coordinates
8. Address/ID Number/Mobile Number of Stove recipient
9. Carbon Handover Sheet
10. Stove Construction Date

The data collected by co2balance employees on the ground will be uploaded to a central database online. The collection of each component is briefly described below.

### 2.1 Unique Stove Serial Number

Each stove will be assigned a unique serial number. The number will have three characters designating the stove type, followed by three characters designating the project location, completed by a five-digit number identifying the stove number within that project. An example of a serial number is shown below.

BRSKIS00001



Figure 1. Example Stove Serial Number

In the figure above, the BRS designates the stove as a Brick Rocket Stove. KIS stands for the Kisumu project location. The five-digit number indicates this is the first stove of the project. A stamp will be used permanently imprint the serial number into the side of the stove before the concrete has dried.

## 2.2 Stove GPS Coordinates

After the construction of a stove, a co2balance employee will photograph the stove with a GPS enabled device, typically a Nokia N82. The GPS enabled device will tag GPS coordinates to the picture of the stove, thereby recording the exact location. The picture is then titled as the serial number of the stove and uploaded to an online database which reads the GPS information. The GPS picture will typically include an image of the stove serial number

## 2.3 Address/ID Number/Mobile Number of Stove Recipient

Each household participating in the project will receive one stove, with a unique location and serial number. To ensure the avoidance of double-counting stoves, personal information of the stove recipient will be recorded in addition to the GPS coordinates and serial number. Due to the fact that some rural households in project locations do not have an official address, and some stove recipient may not be willing or even have an ID number or mobile phone number, often all of this information may not be collectible. co2balance will strive to obtain as much unique information regarding each stove as possible.

## 2.4 Carbon Handover Sheet

Each stove recipient will sign a Carbon Handover Sheet in exchange for the complimentary construction of an efficient stove. A blank copy of a Carbon Handover Sheet is shown in the Appendix. The signed Carbon Handover Sheet will be scanned and stored in an electronic database along with the GPS coordinates, serial number, and stove recipient information.

## 2.5 Stove Construction Date

The construction date of each stove will be recorded by co2balance during the initial data collection. The construction date will be uploaded to the electronic database containing the previously described stove information.

A stove for which all of this data has been collected and uploaded to the electronic database is deemed to have completed the initial data collection. The hardcopy and virtual copy of the stove information will be stored for at least seven years after collection.

# 3.0 Monitoring Plan

In accordance with the CDM methodology AMS.II.G Version 02: *Energy efficiency measures in the application of non-renewable biomass*, the following data will be monitored over the crediting period of the project activity:

5. Number of appliances operating per year and vintage ( $N_{y,i}$ )
6. Operating time of stove in vintage ( $T_{y,i}$ )
7. Efficiency of each stove by vintage ( $\eta_{new,i}$ )
8. Leakage Correction Factor ( $L_y$ )

The parameters above will be monitored through a Random Sample Group (RSG). This size of the sample group will be selected to ensure the parameters measured satisfy 90/10 precision (90% confidence interval and 10% margin of error), according to the guidance: *Draft General Guidelines On Sampling And Surveys* (EB 37, Annex 27) and *General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities Version 01* (EB 50 Annex 30). The individual participants will be selected at random from the stove information database. A random number generator will rank the unique serial numbers of the stoves in the project, generating a RSG. The size of the RSG will vary depending on the variance of the parameter being monitored. The RSG will be reselected for every monitoring period to ensure the selection remains random.

### 3.1 Number of appliances operating per year and vintage

Each household selected in the RSG will be visited to ensure that the efficient cooking stove supplied as part of the project activity is still in operation. This will be conducted by co2balance. All stoves in the RSG will be re-photographed with a GPS enabled device. The image of the intact stove as well as verbal confirmation by the stove user will serve as proof that the device is still in operation. The GPS image will be uploaded to the electronic database so that the GPS information and unique serial number can be cross-checked with the information from initial data collection to ensure that the photograph is of the same stove.

### 3.2 Operating time of stove in vintage

The date on which the stove was confirmed to be operational will be used in conjunction with the stove construction date collected during the initial data collection to determine the operating time of the stove in vintage.

### 3.3 Efficiency of each stove by vintage

A RSG will be selected to monitor the efficiency of the stoves in operation by vintage. The RSG for efficiency monitoring may vary from the RSG selected for point 3.1 due to the fact that a different RSG size may be required to satisfy the 90/10 precision requirement. However, both RSG will be determined through a random selection of stoves in the project. The efficiency of each stove in the RSG will be tested through the Shell Foundation (HEH) Water Boiling Test<sup>1</sup> used initially to demonstrate the efficiency of the project technology. The test will be performed by co2balance. The resulting efficiency will be uploaded to the electronic stove information database.

### 3.4 Leakage correction factor

---

<sup>1</sup> Shell Foundation WBT

For each project, where required, a survey of non-project households will be conducted to assess leakage from use/diversion of non-renewable biomass saved. The survey will be conducted according to the guidance: *Draft General Guidelines On Sampling And Surveys* (EB 37, Annex 27) and *General Guidelines For Sampling And Surveys For Small-Scale CDM Project Activities Version 01* (EB 50 Annex 30).

In addition to the quantitative monitoring described above, the following monitoring activities will be undertaken in each household:

- a. A confirmation that the stove is still in situ and being utilized in the correct fashion
- b. A confirmation that the old appliance (three-stone fire) is not being used
- c. A check whether any maintenance of the stove is required following wear and tear

In accordance with AMS.II.G/Version 02, any stove found to be in need of maintenance and/or performing at an efficiency below  $\eta_{new}$  will be repaired so that the efficiency is equal to or greater than  $\eta_{new}$ , or replaced with an equivalent technology.

Project monitoring will also ensure that the replaced, low efficiency appliance (three stone fires) are disposed of and not used within the project boundary, namely the household of the efficient stove recipient. For households where baseline stove usage continues, co2balance will ensure that wood consumed in the baseline stove is not included in the calculation of emissions reductions.

## 4.0 Monitoring Report

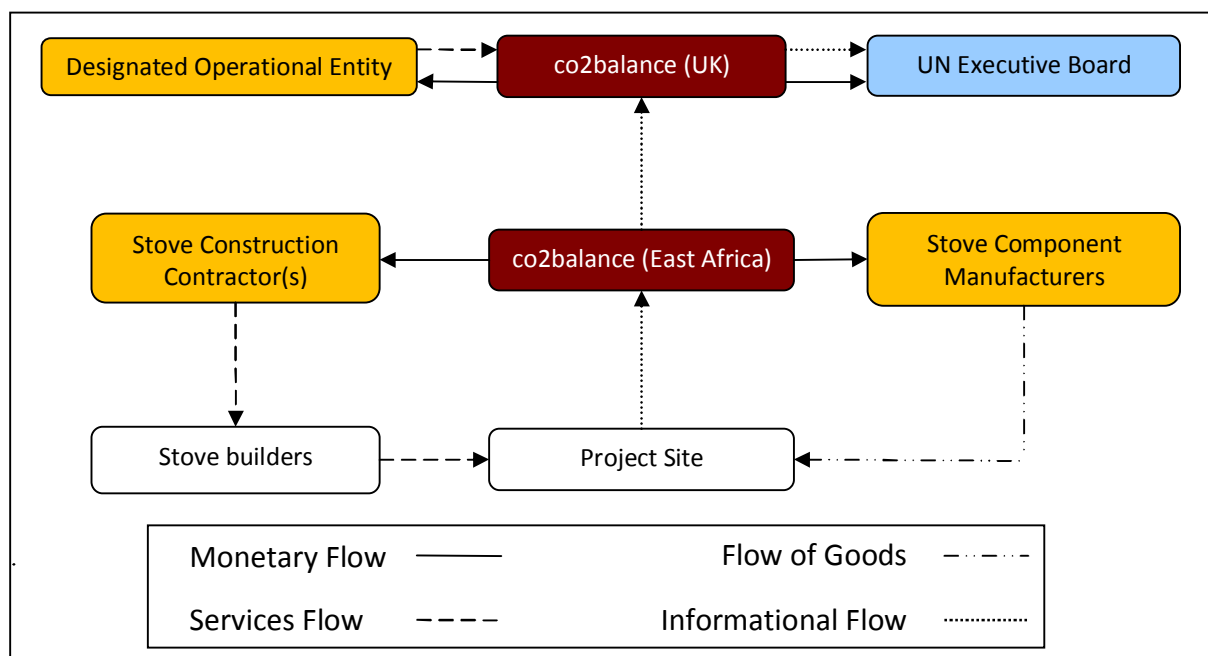
A monitoring report will be written at the end of every verification period and submitted to the Designated Operational Entity (DOE) responsible for verification. The report will indicate how the monitoring data has been collected and show detailed, conservative calculations of the emissions reductions for the verification period and project in question.

The initial and monitoring data for each verification period stored in the electronic database will serve as the backbone of the monitoring report. The report will contain extensive tables comparing the initial data collected during project implementation with the monitoring data. This allows for quick confirmation that the stoves in question are still operational, have retained their serial and GPS information, and are performing at the initial efficiency.

Along with any other information required for project verification, the monitoring report will list any stoves deemed unoperational along with information regarding the repair or replacement of the stove in question. For replaced stoves, the initial data collection process will be repeated and uploaded to the electronic database.

## 5.0 Diagram of Responsibilities

As there are several entities involved in initial data collection and project monitoring it is important to clearly designate the relationships between and responsibilities of entities. For most projects co2balance UK will act as the managing entity of the project and be responsible for communication with the UN Executive Board and DOE contracted for project validation and/or verification. Co2balance East Africa will handle the initial and monitoring data collection and processing. A diagram of responsibilities is shown below.



**Figure 2. Diagram of Responsibilities**

Typically, co2balance East Africa will contract both stove constructors as well as stove component manufacturers. Depending on the project, the stove constructor will be responsible for the construction of the stove or the training of a local workforce to perform stove construction. Stove components will be delivered to a distribution center at the project site. Stove construction contractors or stove builders will move the components from the distribution center to the individual project households. Co2balance representatives will be located at the project site to audit materials delivered to the distribution center.

Upon completion of a stove, co2balance employees will perform quality checks and collect initial stove data described earlier. The collected data will be transferred either physically or electronically from the project site to a co2balance East Africa office. In the co2balance East Africa office, the initial project data will be processed and uploaded to the central electronic database accessible by co2balance UK and the DOE.

For project monitoring co2balance employees will revisit the project site to monitor a representative sample of the project activity, as well as non-project households to measure leakage effects. Monitoring data will be collected and processed in the way the initial data was collected and processed.



## APPENDIX

### Legal Document written under UK law

### SIGNED TRANSFER OF CARBON RIGHTS

From stove recipient to co2balanceUK Ltd

This is to certify that "co2balance" is giving away this energy efficient cooking stove at no cost. The stove is received by the new owner on condition that the new owner shall release all carbon rights and emissions saved to "co2balance"

#### Stove Recipient

Name ..... Signed ..... Date .....

Stove ID ..... Address .....

Witness Name ..... Signed ..... Date .....

Address .....

#### Co2balance UK Ltd employee or co2balance Kenya employee

Name ..... Signed ..... Date .....

Co2balance UK Ltd is working towards reducing emission output and fighting climate change. Companies and individuals in the West are offsetting their carbon output and in doing so are providing efficient cooking stoves at no cost to those who will benefit from them most.

#### KARATASI HALALI ILIYOANDIKWA KWA SHERIA ZA UINGEREZA

Sahihi kamili ya uhamisho katika haki za kampuni ya carbon

Anayepokea jiko ikimwendea co2balance kampuni ya uingereza.

Hii ni kudhibitisha ya kwamba co2balance inapatiana jiko bila malipo. Jiko itapokelewa na mwekeraji mwingine kwa masharti ya kuwa carbon yote na yale yalio tolewa na kuwekwa kwa akiba kupewa kwa co2carbon.

#### ANAYEPOKEA JIKO

Jina ..... Sahihi ..... Tarehe .....

Nambari Ya Jiko ..... Anuani .....

Jina La Shahidi ..... Sahihi ..... Tarehe .....

Anuani .....

#### Co2balance kampuni ya uingereza mfanyi kazi/co2balance mfanyi kazi wa Kenya.

Co2balance kampuni ya uingereza inafanya juhudi kupunguza utoaji wa carbon na kupigana na mabadiliko ya hali ya hewa. Makampuni na watu binafsi kule magharibi wana yapunguza utoaji wa carbon na kwa kufanya hivyo wanayatoa majiko bila malipo kwa wale itakao wafaidi zaidi.