



**Monitoring report form
(Version 03.1)**

Monitoring report

Title of the project activity	Efficient Cook Stove Programme: Kenya CPA 1 - Efficient Cook Stove Programme: Kenya CPA No. 1 Eldoret East and Keiyo Districts co2balance UK Ltd CPA 2 - Efficient Cook Stove Programme: Kenya CPA No. 2 Mathira East District co2balance UK Ltd
Reference number of the project activity	5336 5336-0001 (CPA 1) 5336-0002 (CPA 2)
Version number of the monitoring report	1.2
Completion date of the monitoring report	08/04/2013
Registration date of the project activity	5336 - 21/03/2012 CPA 1 - 21/03/2012 CPA 2 – 31/01/2013
Monitoring period number and duration of this monitoring period	MP1 (21/03/2012-20/03/2013), 12 Months
Project participant(s)	Co2balance UK
Host Party(ies)	Republic of Kenya
Sectoral scope(s) and applied methodology(ies)	Scope 3 Energy Demand; AMS ii G (v3)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	CPA 1 - 50,761 CPA 2 - 48,224 POA – 98,985
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	CPA 1 - 29,619 CPA 2 - 1,533 POA – 31,152

Emission reductions or GHG removals by sinks (t CO₂e)		
Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
CPA 1	23,090	6,529
CPA 2	0	1,533
Total	23,090	8,062

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

The Efficient Cook Stove Programme: Kenya is located in the Republic of Kenya and involves the distribution of domestic fuel-efficient cooking stoves by the co2balance UK to rural households in Eldoret East and Keiyo Districts (CPA 1) Mathira East District (CPA 2). The efficient stoves are based on a design developed by co2balance UK. The stoves were tested independently and were installed by the company free-of-charge for users in exchange for the rights to the emission reductions. It is the revenue from the sale of emissions reductions only that will fund the installation process.

Traditionally, families in Eldoret East, Keiyo and Mathira East Districts cook on an open fire, utilizing the 'three stone' method for heating pots. This method is quite inefficient and leads to the unsustainable usage of non-renewable biomass in the cooking process. The replacement fuel-efficient stove will lead to a reduction in the annual usage of biomass for users by 67%. The majority of families do not have access to the market for fuel-efficient cooking stoves for economic reasons. Users entered into an agreement with co2balance UK transferring rights to the CERs generated in return for the free installation of the stove and its ongoing maintenance over the lifetime of the project.

The stove was manufactured in a Kenyan factory and then transported to the project area by truck, where they were installed one per household in exchange for the rights to the emissions reductions. Monitoring data collected during the installation and operation of the stoves was captured in an electronic data management system, or monitoring database. From this data, the emissions reductions of the project were determined.

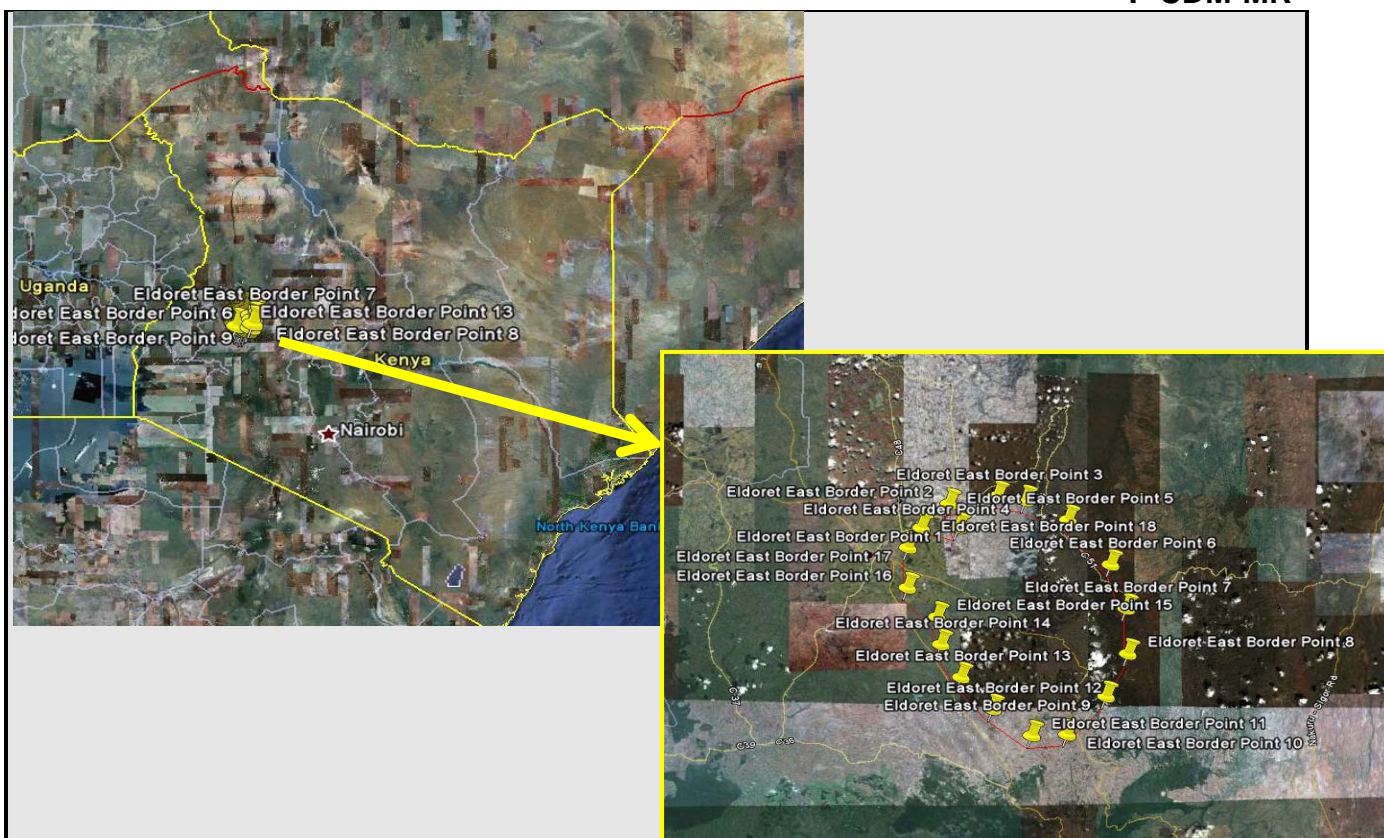
A.2. Location of project activity

All CPAs with this POA are located within the Host Party, the Republic of Kenya. Individual CPAs are located as follows:

CPA 1

Below is the geographic reference to allow unique identification of CPA1: Eldoret East and Keiyo Districts. The project activity is limited to a region within Eldoret East and Keiyo Districts in Rift Valley Province. GPS coordinates for the location boundary below. Each stove built as part of the project activity was assigned a unique GPS coordinate, which is uploaded to the project database managed by co2balance UK.

Geographical Reference of Borders Points		
Point	Latitude	Longitude
1	0°32'19.27"N	35°23'14.62"E
2	0°34'41.25"N	35°22'27.90"E
3	0°35'26.65"N	35°26'34.19"E
4	0°35'0.56"N	35°28'57.29"E
5	0°33'6.17"N	35°32'35.41"E
6	0°28'41.80"N	35°36'12.92"E
7	0°24'21.73"N	35°37'32.62"E
8	0°19'54.80"N	35°37'40.90"E
9	0°15'43.37"N	35°35'49.92"E
10	0°11'58.14"N	35°32'30.93"E
11	0°11'51.76"N	35°29'29.93"E
12	0°14'27.29"N	35°26'9.28"E
13	0°17'36.32"N	35°23'28.58"E
14	0°20'49.96"N	35°21'45.84"E
15	0°23'32.71"N	35°21'26.48"E
16	0°26'25.31"N	35°18'55.10"E
17	0°30'21.94"N	35°18'56.94"E
18	0°32'18.46"N	35°20'4.72"E



CPA 2

Below is the geographic reference to allow unique identification of the CPA 2 including GPS coordinates for the location boundary below. The project activity is limited to a region within Mathira East District in Central Province. Each stove built as part of the project activity will be assigned a unique GPS coordinate, which is uploaded to the project database managed by co2balance UK.

Geographical Reference of Borders Points		
Point	Latitude	Longitude
1	-0.371630°	37.156131°
2	-0.398360°	37.177201°
3	-0.399258°	37.198643°
4	-0.424319°	37.206003°
5	-0.443929°	37.201528°
6	-0.447762°	37.178449°
7	-0.484437°	37.178884°
8	-0.508798°	37.173560°
9	-0.534419°	37.153839°
10	-0.565039°	37.149580°
11	-0.546726°	37.105532°
12	-0.532851°	37.080709°
13	-0.457310°	37.097248°
14	-0.414087°	37.081765°

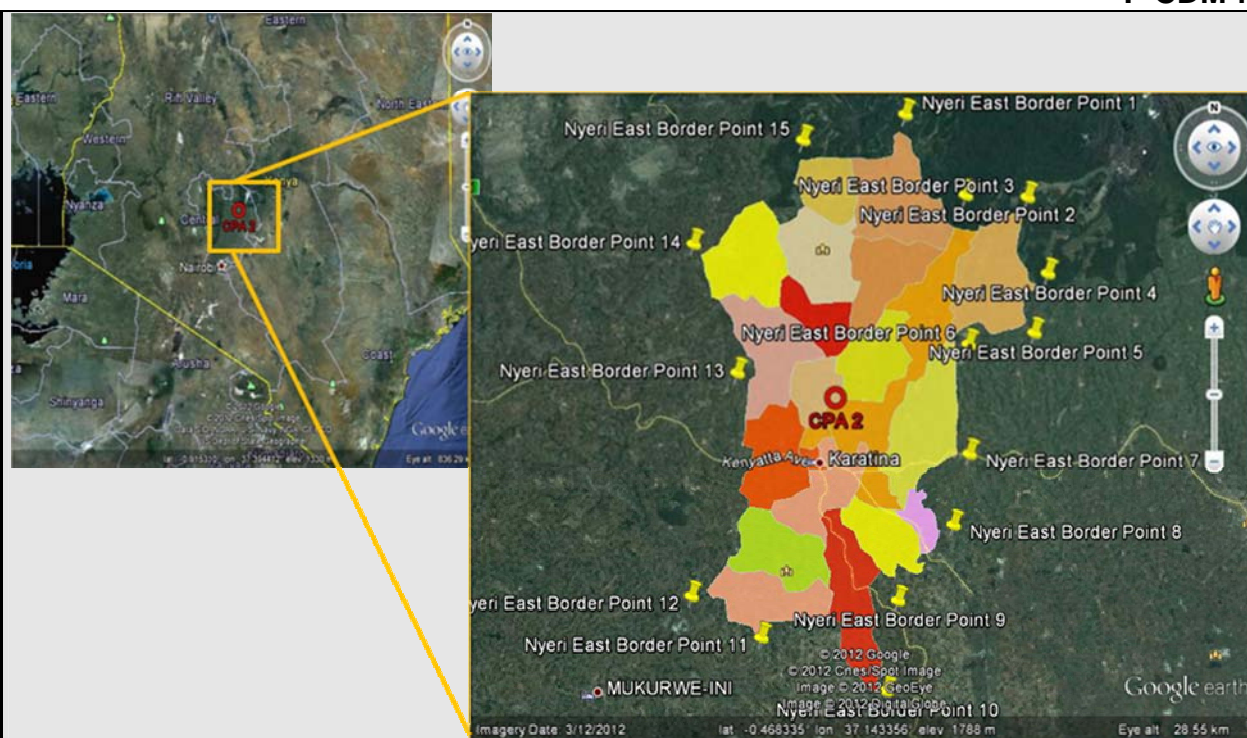


Figure 1. CPA location within Kenya

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)
Republic of Kenya (host)	Co2balance UK (private)	No
United Kingdom	Co2balance UK (private)	No
...	...	

A.4. Reference of applied methodology

AMS ii G Energy efficiency measures in thermal applications of non-renewable biomass (v3)

A.5. Crediting period of project activity

This POA operates a 7 year renewable crediting period

POA Crediting Period (1st 7 years)	
POA	21/03/2012-20/03/2019
CPA 1	21/03/2012-20/03/2019
CPA 2	31/01/2013-20/03/2019

Current Monitoring Period	
POA	21/03/2012-20/02/2013 (1 year)
CPA 1	21/03/2012 to 20/03/2013 (1 year)
CPA 2	31/01/2013 to 20/03/2013 (48 days)

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The stove installed for free in exchange for the right to the emissions reductions is shown in the diagram below:



CZK Stove

The implementation of the POA at CPA level is described below:

CPA 1

CZK stoves were installed in CPA 1 from the 05/01/2011, with additional stoves being added each month until 02/04/2012, when construction was complete.

Months	Stoves Constructed	Cumulative Total Stoves
Jan-11	28	28
Feb-11	2255	2283
Mar-11	3952	6235
Apr-11	2194	8429
May-11	2771	11200
Jun-11	2456	13656
Jul-11	411	14067
Aug-11	986	15053
Sep-11	491	15544
Oct-11	40	15584
Nov-11	41	15625

Dec-11	1	15626
Jan-12	0	15626
Feb-12	0	15626
Mar-12	0	15626
Apr-12	2	15628

CPA 2

CZK stoves were installed in CPA 2 from 02/03/2011, with additional stoves being added each month until 04/11/12, when construction was complete.

Months	Stoves Constructed	Cumulative Total Stoves
Mar-11	130	130
Apr-11	1900	2,030
May-11	1837	3,867
Jun-11	175	4,042
Jul-11	0	4,042
Aug-11	3	4,045
Sep-11	0	4,045
Oct-11	0	4,045
Nov-11	1	4,046

B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

None

B.2.2. Corrections

None

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

None

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

None

B.2.5. Changes to start date of crediting period

None

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

None

SECTION C. Description of monitoring system

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This co2balance stove project employed stove contractors for stove construction; the stove materials were manufactured in Kenya and delivered to a location central to the project area. The materials were then distributed from this central location to the individual households for stove construction. During the construction process, co2balance employees collected stove data, performed quality control checks of the constructed stove, collected carbon handover sheets, and educated stove recipients on proper usage.

Stove Data

For each constructed stove, the following information was collected and then uploaded to a central database:

- 1. Unique Stove Serial Number** - Each stove was assigned a unique serial number. The number has 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. A stamp was used to permanently imprint the serial number into the side of the stove before the cement dried.
- 2. Stove GPS Coordinates** - After the construction of a stove, a co2balance employee photographed the stove with a GPS enabled device, typically a Nokia N82. The GPS enabled device tagged GPS coordinates to the picture of the stove, thereby recording the exact location. The picture was then titled as the serial number of the stove and uploaded to an online database capable of reading the GPS information.
- 3. Address/ID Number/Mobile Number of Stove recipient** - Each household participating in the project received one stove, with a unique location and serial number. To ensure the avoidance of double-counting stoves, personal information of the stove recipient was recorded in addition to the GPS coordinates and serial number. Due to the fact that some rural households in project locations did not have an official address, and some stove recipients did not possess an ID number or mobile phone number a complete set of information was not collectible.
- 4. Carbon Handover Sheet** - Each stove recipient signed a Carbon Handover Sheet in exchange for the complimentary construction of an efficient stove. The signed Carbon Handover Sheet was scanned and stored in an electronic database along with the GPS coordinates, serial number, and stove recipient information.
- 5. Stove Construction Date** - The construction date of each stove was recorded by co2balance during the initial data collection. The construction date was uploaded to the electronic database containing the previously described stove information. The hardcopy and virtual copy of the stove information will be stored for at least seven years after collection.

Monitoring Plan

In accordance with the methodology and monitoring plan, the following parameters were monitored using a Random Sample Group (RSG). This size of the sample group was selected to ensure the parameters

measured satisfied 95/5 precision (95% confidence interval and 5% margin of error), The individual participants were selected at random from the stove information database. A random number generator was used to sort the unique serial numbers of the stoves in the project, with the first entries sorted in numerical order generating a RSG to meet 95/5.

1. Number of appliances operating - Each household selected in the RSG was visited to ensure that the efficient cooking stove supplied as part of the project activity was still in operation. All stoves in the RSG were re-photographed with a GPS enabled device. The GPS images were uploaded to the electronic database so that the GPS information and unique serial number could be cross-checked with the information from the initial data collection to ensure that the photograph is of the same stove. The date on which the stove was constructed was used to determine the operating time of the stove during the crediting period. Crediting of each stove begins 1 month after construction to ensure a conservative estimate of stove operating time.

The following information was also obtained from each household:

- a. A confirmation that the stove is still in situ and being utilized in the correct fashion
- b. A confirmation if the old appliance (three-stone fire) is being used
- c. A check whether any maintenance of the stove is required following wear and tear

Project monitoring will ensure that for households where baseline stove usage continues, the fuel wood consumed is not included in the calculation of emissions reductions.

2. The efficiency of the operating stoves - The efficiency of each stove in the RSG was tested via the same Water Boiling Test methodology used initially to demonstrate the efficiency of the project technology. The resulting efficiency was uploaded to the electronic stove information database and, along with the information in section 1 above, used to calculate the emission reductions.

SECTION D. Data and parameters

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

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

CPA 1

Data / Parameter:	B _{average_use}
Unit:	Tonnes per annum
Description:	Fuel wood consumption per appliance in absence of the project activity
Source of data:	Baseline study
Value (s) applied:	3.98
Purpose of data:	Used to calculate emission reductions
Additional comment:	B _{average_use} is equal and equivalent to B _{old} used in calculations of emissions reductions in AMS ii G v3

Data / Parameter:	n _{old}
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Unit:	Fraction
Description:	Efficiency of three-stone fire or conventional system
Source of data:	Methodology default
Value (s) applied:	0.10
Purpose of data:	Used to calculate emission reductions
Additional comment:	-

Data / Parameter:	NCVbiomass
Unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value (s) applied:	0.015
Purpose of data:	Used in baseline, project and emission reduction calculations
Additional comment:	-

Data / Parameter:	EFprojected_fossilfuel
Unit:	tCO ₂ /TJ
Description:	Emission factor: substitution of non-renewable biomass by similar consumers
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value (s) applied:	81.6
Purpose of data:	Used in baseline, project and emission reduction calculations
Additional comment:	-

Data / Parameter:	L
Unit:	Fraction
Description:	Leakage Correction Factor
Source of data:	Leakage assessment
Value (s) applied:	0.95
Purpose of data:	Used in emission reduction calculations
Additional comment:	Under a POA the methodology requires leakage monitoring to 90/30 precision unless a correction factor of 0.95 is chosen as per subpara (c) This project applies the correction factor of 0.95, in which case monitoring surveys are not required.

Data / Parameter:	B _{average_use}
Unit:	Tonnes per annum
Description:	Fuel wood consumption per appliance in absence of the project activity
Source of data:	Baseline study
Value (s) applied:	5.14
Purpose of data:	Used to calculate emission reductions
Additional comment:	B _{average_use} is equal and equivalent to B _{old} used in calculations of emissions reductions in AMS ii G v3

Data / Parameter:	n _{old}
Unit:	Fraction
Description:	Efficiency of three-stone fire or conventional system
Source of data:	Methodology default
Value (s) applied:	0.10
Purpose of data:	Used to calculate emission reductions
Additional comment:	-

Data / Parameter:	NCV _{biomass}
Unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value (s) applied:	0.015
Purpose of data:	Used in baseline, project and emission reduction calculations
Additional comment:	-

Data / Parameter:	EF _{projected_fossilfuel}
Unit:	tCO ₂ /TJ
Description:	Emission factor: substitution of non-renewable biomass by similar consumers
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value (s) applied:	81.6
Purpose of data:	Used in baseline, project and emission reduction calculations
Additional comment:	-

Data / Parameter:	L
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Unit:	Fraction
Description:	Leakage Correction Factor
Source of data:	Leakage assessment
Value (s) applied:	0.95
Purpose of data:	Used in emission reduction calculations
Additional comment:	Under a POA the methodology requires leakage monitoring to 90/30 precision unless a correction factor of 0.95 is chosen as per subpara (c) This project applies the correction factor of 0.95, in which case monitoring surveys are not required.

D.2. Data and parameters monitored

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

CPA 1

Data / Parameter:	
Unit:	$N_{y,i}$
Description:	Number of stoves in operation during the verification period
Measured/ Calculated / Default:	Calculated
Source of data:	Electronic database of stove IDs constructed in the project
Value(s) of monitored parameter:	15,628
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Continuous monitoring
Calculation method (if applicable):	N/A
QA/QC procedures:	Data from the field is GPS tagged to ensure that each stove can be located and distinguished. Digital database will not allow duplicate stove IDs or GPS data to be uploaded and hence double counted. Stoves assumed to begin crediting one month after installation.
Purpose of data:	Used for calculation of emissions reductions
Additional comment:	The number of stoves operating in the crediting period is corrected for any drop off and/or continued baseline use.

Data / Parameter:	
Unit:	$n_{new,i}$
Description:	Fraction
Measured/ Calculated / Default:	Measured
Source of data:	Project Water Boiling Test
Value(s) of monitored parameter:	32.67%

Monitoring equipment:	Thermometer, weighing scales, moisture content meters
Measuring/ Reading/ Recording frequency:	Annual (confidence interval meets 90/10)
Calculation method (if applicable):	Water Boiling Test on 21 Randomly selected Households
QA/QC procedures:	In case margin of error is more than 5%, lower bound value of the 95% confidence limit shall be used instead of repeating the sampling test / survey.
Purpose of data:	Used for calculation of emissions reductions
Additional comment:	The number of stoves operating in the crediting period is corrected for any drop off and/or continued baseline use.

Data / Parameter:	
Unit:	fNRB,y
Description:	Fraction
Measured/ Calculated / Default:	Default
Source of data:	UNFCCC, Designated National Authority of Kenya
Value(s) of monitored parameter:	0.92
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Reviewed for each verification period
Calculation method (if applicable):	N/A
QA/QC procedures:	CDM default now replaces independent study.
Purpose of data:	Used for calculation of emissions reductions
Additional comment:	

CPA 2

Data / Parameter:	
Unit:	$N_{y,i}$
Description:	Number of stoves in operation during the verification period
Measured/ Calculated / Default:	Calculated
Source of data:	Electronic database of stove IDs constructed in the project
Value(s) of monitored parameter:	4046
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Continuous monitoring
Calculation method (if applicable):	N/A

QA/QC procedures:	Data from the field is GPS tagged to ensure that each stove can be located and distinguished. Digital database will not allow duplicate stove ids or GPS data to be uploaded and hence double counted. Stoves assumed to begin crediting one month after installation.
Purpose of data:	Used for calculation of emissions reductions
Additional comment:	The number of stoves operating in the crediting period is corrected for any drop off and/or continued baseline use.

Data / Parameter:	
Unit:	$n_{new,i}$
Description:	Fraction
Measured/ Calculated / Default:	Measured
Source of data:	Project Water Boiling Test
Value(s) of monitored parameter:	25.01%
Monitoring equipment:	Thermometer, weighing scales, moisture content meters
Measuring/ Reading/ Recording frequency:	Annual (confidence interval meets 95/5)
Calculation method (if applicable):	Water Boiling Test on 22 Randomly selected Households
QA/QC procedures:	In case margin of error is more than 5%, lower bound value of the 95% confidence limit shall be used instead of repeating the sampling test / survey.
Purpose of data:	Used for calculation of emissions reductions
Additional comment:	The number of stoves operating in the crediting period is corrected for any drop off and/or continued baseline use.

Data / Parameter:	
Unit:	$f_{NRB,y}$
Description:	Fraction
Measured/ Calculated / Default:	Default
Source of data:	UNFCCC, Designated National Authority of Kenya
Value(s) of monitored parameter:	0.92
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Reviewed for each verification period
Calculation method (if applicable):	N/A
QA/QC procedures:	CDM default now replaces independent study.
Purpose of data:	Used for calculation of emissions reductions
Additional comment:	

D.3. Implementation of sampling plan

New project stove efficiency and relevant correction factors (continued baseline and usage drop off) for N_y (number of stove operating in verification period) have been determined by sampling. Simple random sampling was used and this only applied within and not across CPAs. Samples were selected from the list of stoves built within the project area by selecting stove IDs at random.

The sampling plan for CPA 1 is summarised below:

Description	Parameter of interest	
	N_{new}	N_y
Measurement Method	WBT	Usage Survey
Number of Stoves	15636	15636
Type of Sampling	Simple Random	Simple Random
Monitoring Frequency	Biennial	Biennial
Confidence	95	95
Precision	5	5
Calculated Sample Size	21	142
QA/QC: If a stove owner is not present, then a randomly selected household nearby is selected to fulfill the sampling requirement		

N_{new} (WBT)	
Number of Stoves Sampled	21
Mean	0.3467
Standard Deviation	0.028905978
10% Mean	0.03467
Confidence Level	0.012363064
Sample meets 95/5	Yes

N_y (Usage Survey)	
Number of Stoves Sampled	143
Using CZK stove	137 (95.8%)
Using baseline	6 (4.2%)
Bold is therefore adjusted for continued use of baseline stoves	

The sampling plan for CPA 2 is summarised below:

Description	Parameter of interest	
	Nnew	Ny
Measurement Method	WBT	Usage Survey
Number of Stoves	4046	4046
Type of Sampling	Simple Random	Simple Random
Monitoring Frequency	Biennial	Biennial
Confidence	95	95
Precision	5	5
Calculated Sample Size	22	122
QA/QC: If a stove owner is not present, then a randomly selected household nearby is selected to fulfill the sampling requirement		

Nnew (WBT)	
Number of Stoves Sampled	22
Mean	0.2501
Standard Deviation	0.020986
10% Mean	0.02501
Confidence Level	0.008769
Sample meets 95/5	Yes

Ny (Usage Survey)	
Number of Stoves Sampled	122
Using CZK stove	120 (98.4%)
Using baseline	2 (1.6%)
Bold is therefore adjusted for continued use of baseline stoves	

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

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

The equations in the methodology do not calculate baseline and project emissions separately and instead calculate direct emissions reductions as shown below:

Emissions reductions are calculated using equation 1 of the methodology

$$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \text{ (equation 1)}$$

Where:

$$ER_y = \text{Emission reductions during year } y \text{ in t CO}_2\text{e}$$

$B_{y,savings}$	=	Quantity of woody biomass that is saved in tonnes
$f_{NRB,y}$	=	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected_fossilfuel}$	=	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 t CO ₂ /TJ

Where option 2 (equation 3) was used to determine $B_{y,savings}$

$$B_{y,savings} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,y}}\right) \text{ (Option 2 - Equation 3)}$$

CPA 1 Calculations

B_{old} was determined using a baseline KPT, which returned a value of 3.98 T/hh/yr. B_{old} , as per the methodology para 20 (b), has been corrected to allow for the continued use of baseline stoves in this project.

A usage survey on a randomly selected study sample ($n=142$) revealed that, on average, the baseline stove is used, as a fraction, for 0.332 of the cooking per day and the project stove for 0.667. The usage survey also revealed that a fraction of 0.993 of people continued to use their baseline stove in tandem with the project stoves in this manner. Therefore, we have multiplied the fraction of cooking done on the baseline stove 0.332 with the fraction of people continuing to use their baseline stoves in tandem 0.993 to generate a baseline correction factor of 0.330.

Continued Baseline Use	Yes	142	0.993
	No	1	0.007
Average Baseline Use			0.332
Baseline Correction Factor			0.330

The usage survey also revealed that a fraction of 0.96 of the sample were using their project stove so B_{old} (3.98) was corrected for both this drop off (0.96) and the baseline correction factor (0.33) before being multiplied by the number of stove constructed in the project (15626) to give B_{old} less drop off and continued baseline use.

Bsavings		
Bold/hh	tonnes/stove/yr	3.98
Correction for continued Baseline		0.33
Usage Percentage		0.96
Number of Stoves	tonnes/stove/yr	15628
Bold (less drop off and baseline use)		39901.35

The figure for B_{old} 39901.35 was then corrected for leakage by multiplying by the net to gross factor of 0.95, giving 37906.28 as the final (net) figure for B_{old} . Then, as per equation 3, Bold was multiplied by $1 - (0.1/0.3267)$ giving $B_{y,savings}$ of 26303.50.

Bold (gross)	tonnes/yr	39901.35
Leakage Factor		0.95

Bold (net)	tonnes/yr	37906.28
Nold		0.1
Nnew (field efficiency of project stove)		0.3267
By savings	tonnes/yr	26303.50

B y savings (26303.50) was then inserted in equation 1 and multiplied by fNRB, NCV and the EFfossil fuel to calculate the emissions reductions for one year (29619.84)

Emission Reductions		
B Savings (inc leakage and usage)	tonnes/yr	26303.50
fNRB		0.92
NCV	TJ/tonne	0.015
EF	tCO ₂ /TJ	81.6
ERy	per/yr	29619.84

As each of the 15628 stoves did not operate for one whole year, the ERy per stove was calculated by dividing the ER y by the number of stoves (15628)

ERy	per/yr	29619.85
Number of Stoves		15628
ERs per stove	tco2e/stove/yr	1.895306258

The ERs per stove/yr was then divided by the number of months in a year (12) to give a figure for ER y per stove/month (0.16). The number of stoves built per month was then multiplied by the ERs/stove/month and the totals for each month summed to give the total ERs to March 20th 2013.

Months	Stoves Constructed	Cumulative Total Stoves	Ers/stove/month	Emissions Reductions
Mar-12	15626	15,626	0.16	876
Apr-12	15626	15,626	0.16	2468
May-12	15628	15,628	0.16	2468
Jun-12	15628	15,628	0.16	2468
Jul-12	15628	15,628	0.16	2468
Aug-12	15628	15,628	0.16	2468
Sep-12	15628	15,628	0.16	2468
Oct-12	15628	15,628	0.16	2468
Nov-12	15628	15,628	0.16	2468
Dec-12	15628	15,628	0.16	2468
Jan-13	15628	15,628	0.16	2468
Feb-13	15628	15,628	0.16	2468
Mar-13	15628	15,628	0.16	1592
Total ERS to March 20th 2013				29,619

CPA 2 Calculations

B old was determining using a baseline KPT, which returned a value of 5.14 T/hh/yr. B old, as per the

methodology para 20 (b), has been corrected to allow for the continued use of baseline stoves in this project.

A usage survey on a randomly selected study sample (n=122) revealed that, on average, the baseline stove is used, as a fraction, for 0.335 of the cooking per day and the project stove for 0.666. The usage survey also revealed that a fraction of 0.492 of people continued to use their baseline stove in tandem with the project stoves in this manner. Therefore, we have multiplied the fraction of cooking done on the baseline stove 0.335 with the fraction of people continuing to use their baseline stoves in tandem 0.492 to generate a baseline correction factor of 0.165.

Continued Baseline Use	Yes	60	0.492
	No	62	0.508
Average Baseline Use			0.335
Baseline Correction Factor			0.165

The usage survey also revealed that a fraction of 0.98 of the sample were using their project stove so B old (5.14) was corrected for both this drop off (0.98) and the baseline correction factor (0.165) before being multiplied by the number of stove constructed in the project (4046) to give B old less drop off and continued baseline use.

Bsavings		
Bold/hh	tonnes/stove/yr	5.14
Correction for continued Baseline		0.16
Usage Percentage		0.98
Number of Stoves	tonnes/stove/yr	4046
Bold (less drop off and baseline use)	tonnes/yr	17088.18

The figure for B old 17088.18 was then corrected for leakage by multiplying by the net to gross factor of 0.95, giving 16233.77 as the final (net) figure for B old. Then, as per equation 3, Bold was multiplied by 1- (0.1/0.2501) giving B y savings of 9742.86.

Bold (gross)	tonnes/yr	17088.18
Leakage Factor		0.95
Bold (net)	tonnes/yr	16233.77
Nold		0.1
Nnew		0.2501
By savings	tonnes/yr	9742.86

B y savings (9742.86) was then inserted in equation 1 and multiplied by fNRB, NCV and the EF_{fossil fuel} to calculate the emissions reductions for one year (10971.24)

Emission Reductions		
B Savings (inc leakage and usage)	tonnes/yr	9742.86
fNRB		0.92
NCV	TJ/tonne	0.015
EF	tCO ₂ /TJ	81.6
ER _y	per/yr	10971.24

As each of the 4046 stoves did not operate for one whole year, the ERy per stove was calculated by dividing the ER y by the number of stoves (4046)

The ERs per stove/yr was then divided by the number of months in a year (12) to give a figure for ER y per stove/month (0.23). The number of stoves built per month was then multiplied by the ERs/stove/month and the totals for each month summed to give the total ERs to March 20th 2013.

Months	Stoves Constructed	Cumulative Total Stoves	Ers/stove /month	Emissions Reductions
Jan-13	0	4,046	0.23	29
Feb-13	0	4,046	0.23	914
Mar-13	0	4,046	0.23	590
Total ERS to March 20th 2013				1,533

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

Project emissions are not calculated

E.3. Calculation of leakage

Leakage does not need to be calculated separately because it has already been removed as a 0.95 net to gross factor from the parameter B_{old} , used in direct emissions reductions calculations (equation 1).

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

CPA 1

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	29,619	-	-	29,619

CPA 2

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	1,533	-	-	1,533

POA 5336 (CPA 1&2 combined)

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	31,152	-	-	31,152

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

CPA 1

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	50,761	29,619

CPA 2

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	48,224	1,533

POA 5336 (CPA 1&2 combined)

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	98,985	31,152

E.6. Remarks on difference from estimated value in registered PDD

CPA 1

ERs are lower for the following reasons:

- The number of stoves actually built was 15628, not 16048 as estimated in the PDD
- Continued baseline stove use was not envisaged in the registered PDD, Bold has been corrected for this continued usage, which has reduced the ERs
- 100% project usage was expected in the registered PDD, whereas the actual usage was recorded to be 95.8%
- The project stove efficiency was expected to be the same as that recorded in the initial laboratory test (34.67%), whereas the actual figure recorded was 32.67%
- fNRB y value of 0.96 originally estimated has been replaced by the CDM default figure for Kenya of 0.92, which has reduced ERs.

CPA 2

ERs are lower for the following reasons:

- The number of stoves actually built was 4046, not 11907 as estimated in the PDD
- Continued baseline stove use was not envisaged in the registered PDD, Bold has been corrected for this continued usage
- 100% project usage was expected in the registered PDD, whereas the actual usage was recorded to be 98.3%
- The project stove efficiency was expected to be the same as that recorded in the initial laboratory test (34.67%), whereas the actual figure recorded was 25.01% as a result of tampering of the stoves within the sample selections. We do not expect this tampering to be present in all of our stoves throughout the project; nonetheless we have applied this figure as a demonstrably conservative assumption.
- fNRB y value of 0.96 originally estimated has been replaced by the CDM default figure for Kenya of 0.92

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)	CPA 1 – 23,090 CPA 2 - 0 POA 5336 - 23,090	CPA 1 – 6,529 CPA 2 – 1,533 POA 5336 - 8,062

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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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