



**Monitoring report form for CDM programme of activities  
(version 01.0)**

*Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form for CDM programme of activities" at the end of this form.*

**MONITORING REPORT**

<b>Title of the programme of activities (PoA)</b>	Up Energy Improved Cookstove Programme, Uganda	
<b>UNFCCC reference number of the PoA</b>	9956	
<b>Version number(s) of the PoA-DD(s) applicable to this monitoring report</b>	04	
<b>Coordinating/managing entity (CME)</b>	UpEnergy Group	
<b>Version number of this monitoring report</b>	04	
<b>Completion date of this monitoring report</b>	05/05/2016	
<b>Monitoring period number and dates covered by this monitoring report</b>	Monitoring Period #1 22/07/2014 – 10/12/2015	
<b>Monitoring report number for this monitoring period</b>	1	
<b>Host Party(ies)</b>	Host Party(ies) of the PoA	Is this a host Party to a specific-case CPA covered in this monitoring report?(yes/no)
	Uganda	Yes
<b>Sectoral scope(s)</b>	Sectoral Scope 3: Energy Demand	
<b>Selected methodology(ies)</b>	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 05.0)	
<b>Selected standardized baseline(s)</b>	NA	
<b>Total amount of GHG emission reductions or net GHG removals by sinks for all specific-case CPAs in the PoA covered in this monitoring report</b>	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards

	NA	50,158 tCO <sub>2</sub> e
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## PART I - Programme of activities

### SECTION A. Description of PoA

#### A.1. Brief description of the PoA

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The project activity is located in the Republic of Uganda and involves the distribution of highly efficient biomass fired Improved Cookstoves (ICS). ICS replaces the traditional biomass fired stoves with less efficiency. Each CPA supports the project goals of reducing fuel consumption, improving health, and reducing deforestation in Uganda.

This POA targets residential and institutional users of biomass fuels in traditional stoves. In Uganda the majority of users across rural regions use traditional wood stoves whereas traditional charcoal stoves are more commonly found in urban areas. A 2010 national household survey conducted by the Ugandan government found that over 90% of households use biomass as a primary cooking fuel, and that 91% of these biomass users cooked on traditional or conventional stoves. Similarly, sample surveys show that a majority of institutions in urban areas cook on traditional biomass stoves.

Uganda is considered by the UN to be a Least Developed Country. The target areas are all regions of Uganda with traditional biomass stove users. The consumption of non-renewable biomass for fuel, in the form of both wood and charcoal derived from wood consumes high proportion of household income and time through fuel collection and purchase. Fuel harvest leads to deforestation and erosion and threatens habitat in Uganda.

The PoA is being coordinated by UpEnergy Group (hereby UpEnergy), the Coordinating Managing Entity (hereby CME), which is the project participant providing the framework and incentives for the rest of parties involved to achieve the emission reductions. The CME communicates with the Executive Board and/or the pertinent DOE on all matters.

The PoA at the program level provides the organizational, financial and methodological framework for the emissions reductions at the level of the "CDM program activities" (CPAs).

#### *Policy/measure or stated goal of the PoA*

The purpose of the PoA is to facilitate the transition away from inefficient traditional biomass fired stoves, by providing high-efficiency and clean burning ICS that reduce wood and charcoal consumption. Several greenhouse gases (GHG), including carbon dioxide, are produced as a result of the combustion of non-renewable biomass as used in cooking stoves. ICS improve heat transfer efficiency thereby reducing the amount of fuel used by households and the emission of GHGs.

The PoA intends to provide the following benefits:

#### - Environmental benefits

The project reduces the demand for biomass required for cooking stoves thus reducing the rate of deforestation connected to wood and charcoal consumption. In addition, the reduction in use of these inefficient stoves yields a reduction in emissions from fuel combustion thus improving air quality and reducing the emission of harmful gases that contribute to climate change.

#### - Social and economic benefits

Project beneficiaries using the ICS reduce their wood consumption. The reduction in fuel needs also save project beneficiaries time and income. This means that biomass users who gather wood see a significant reduction in the amount that they have to collect, leaving that time available for other activities. Biomass users that purchase their fuel be able to direct more of their income to other

needs. From the economic perspective, the project contribute to the scale-up of local businesses and organizations, with the potential to create jobs in retail, marketing and distribution.

#### A.1.1. Generic CPA(s)

Title, identification/reference number and/or version number of the generic CPA(s) of the PoA	Sectoral scope(s)	Applied methodology(ies) or combination of methodologies and/or standardized baseline(s)
Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Version: 04	Sectoral scope 3: Energy demand	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 05.0)

#### A.1.2. Specific-case CPA(s) covered in this monitoring report

Reference number of the specific-case CPA included in the PoA as of the end of this monitoring period	Title, identification/reference number and version number of the generic CPA to which the specific-case CPA applies	Crediting period dates of the specific-case CPA	Is this specific-case CPA covered in this monitoring report? (yes/no)
9956-0001	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Version: 04	22/07/2014 – 21/07/2021	Yes
9956-0002	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Version: 04	17/03/2015 – 16/03/2022	Yes
9956-0003	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Version: 04	17/04/2015 – 16/04/2022	Yes
9956-0004	Up Energy Improved Cookstove Programme, Uganda Date: 30/06/2014 Version: 04	17/04/2015 – 16/04/2022	Yes

#### A.2. Contact information of the coordinating/managing entity (CME) and/or responsible persons(s)/entity(ies)

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Mr. Erik Wurster

Up Energy Uganda Ltd. (CME)

Email: [erik@upenergygroup.com](mailto:erik@upenergygroup.com)

The detailed contact information of project owner and CME are provided in Appendix 1.

## SECTION B. Implementation of PoA

### B.1. Implementation of the management system of the PoA

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The management system is based on EB 65, Annex 3 “Standard for Demonstration of Additionality, Development of Eligibility Criteria, and Application of Multiple Methodologies for Programme of Activities”, Version 3.0, and is comprised of the following element:

**a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies**

UpEnergy Group as a CME to the PoA has managed the relevant activities prior and post registration of the PoA. The competency check on the new proposed CPA was conducted by CME to ensure that the CPA meets all requirements and eligibility criteria before inclusion in the PoA. The competency check was conducted by experienced staffs with CDM projects.

**b) Records of arrangements for training and capacity development for personnel**

The CME trained all staff involved in distribution, education and monitoring activities. The CME will ensure training of all on-site staff with respect to adherence to the Monitoring Plan of the project activity. Records of the training will be kept for at least 2 years after the end of the crediting period of the relevant project activity.

**c) Procedures for technical review of inclusion of CPAs**

All CPAs are owned and managed by UpEnergy Group, the CME. The Program Director of UpEnergy designated appropriately trained technical staff to draft the CPA-DD and to gather sufficient documentation to demonstrate compliance with the eligibility criteria defined in section B.2 of the registered PoA. The documentation will be reviewed and approved by the Program Director of UpEnergy.

**d) A procedure to avoid double accounting (e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA)**

Each ICS registered under the PoA is identified by a unique combination of customer / partner name and geographical location and serial number. With the combination of the parameters mentioned above, thus each ICS recorded in the project database will be unique.

The quality control and quality assurance procedures is always in place to avoid the double counting cases. As each CPA has its own database, using the functions available in Microsoft Excel, any duplicate within the CPA or between the CPAs can be easily identified and removed from database. In addition, each CPA was cross-checked with other CPAs in this SSC-PoA and with CPAs in any other SSC-PoA or in a CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary carbon schemes to ensure that the CPA is not included in any other SSC-PoA, CDM project activity or voluntary carbon project activity.

**e) Records and documentation control process for each CPA under the PoA**

The monitoring plan for this project is closely derived from the methodologies. A database for the project activity has been maintained continuously. Till the end of thing monitoring period, all the data recorded during ICS registration process was captured via electronic means where the handheld device was used. Therefore no hard copy is available.

The following information is captured in the electronic copy of Registration Card which is in line with PoA requirements:

- i) CPA-ID (CPA to which appliance belongs to)
- ii) Unique identification of stove using stove serial number
- iii) Partner organization name, address and telephone
- iv) Date of sale and model/type of project technology sold
- v) Quantity of project technology sold as evidenced by invoices

The information collected then transferred to a server which serves as the electronic project database. The server is updated regularly and shared with the CME. The database is backed up by CME in Excel spreadsheet. Each CPA has its own database with number of registered ICSs below the maximum units fixed by the CPA.

The database is available to select a random, representative sample from for monitoring and verification purposes. This sample set will be integrated into the database to include additional monitoring parameters as required or as appropriate.

#### **f) Measures for continuous improvements of the SSC-PoA management system**

CME will continue to review and improve the overall SSC-PoA management system. CME is generally satisfied with the overall performance of the CPA implementer and database maintenance.

### **B.2. Implementation of single sampling plan(s)**

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A single sampling plan was carried out across all specific-case CPAs covered in this monitoring report.

#### **a. List of CPAs to which the single sampling was applied**

All the 4 CPAs 9956-0001, 9956-0002, 9956-0003 and 9956-0004 were covered in the single sampling plan.

CPA	Type	Total number of stoves in the CPA
0001	EZY	EZY = 9,104
0002	SHS & AES	SHS = 10,479 ; AES = 6
0003	SHS & AES	SHS = 7,420 ; AES = 3,080
0004	SHS & AES	SHS = 2,366 ; AES = 629

#### **b. Description of implemented single sampling design**

##### **(i) Sampling Design**

Due to the large number of ICS envisioned to be distributed as part of the CPAs to be included in the SSC-PoA, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling has been undertaken as part of a SSC-PoA-wide Sampling Plan (by grouping and sampling across CPAs) that is designed in line with the requirements of the Guideline for *"Sampling and Surveys for CDM Project Activities and Programme of Activities version 04.0"*. The Sampling Standard allows for sampling across a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size determination and 95/10 confidence/precision is applied.

##### **(ii) Objectives and Reliability Requirements**

The objective was to obtain an unbiased and reliable estimate of the proportion or mean value of the following parameters over the course of the crediting period, and with 95/10 confidence/precision for biennial sampling across CPAs.

1. Thermal Efficiency of operational ICS:  $\eta_{\text{new},y,i}$
2. The fraction by which emission reductions are multiplied to adjust for drop-off of technologies in use per year:  $U_y$
3. Quantity of woody biomass used in the project activity by traditional stoves:  $\mu_{\text{old}}$

Based on the registered PoA-DD and CPA-DD, 95/10 reliability level was selected for cross-CPA sampling for all the parameters.

#### (iii) Target Population

The target population for the three parameters stated above are all ICS recorded in the project database.

#### (iv) Sampling Frame:

The target population is the stove distributed and recorded, in this case 33,084 stoves. Since all the models of stoves distributed under the PoA were small and were distributed to homogenous end users that is domestic households, it was decided that one single sampling frame would be appropriate for two parameters i.e. Usage Rate ( $U_y$ ) and Quantity of woody biomass used in the project activity by traditional stoves ( $\mu_{\text{old}}$ ). Following the provision in the registered PoA-DD, the population is deemed homogeneous according to the following conditions;

- End users: all stoves are for domestic (household) usage as per their design.
- Geographical area of the project: all models are being distributed in the same geographical area, Uganda.

For the thermal efficiency of the stoves ( $\eta_{\text{new}}$ ), it was decided to have three sampling frames, one for each stove model, as no field experience / data on thermal efficiencies were available to confirm that stove models are indeed similar on their thermal efficiency.

#### (v) Sampling Method

Simple Random Sampling was applied and samples were randomly selected.

#### (vi) Sampling Size

For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision for biennial sampling. In order to calculate the sample size estimates, values for the proportions, mean values, and standard deviations are required. A pilot study was conducted to obtain the estimates for these values.

- The parameter  $U_y$  is a proportional value, therefore the sample size has been calculated according to the following equations<sup>1</sup>:

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<sup>1</sup> Refer Equation 1 & 2 of Annex 05 of registered PoA-DD (Page 61)

$$n \geq \frac{z^2 * N * V}{(N-1) * precision^2 + z^2 * V}$$

Where:

$$V = \frac{p * (1-p)}{p^2}$$

- The parameter  $\mu_{old}$  and  $\eta_{new,y}$  is a mean value, therefore the sample size has been calculated according to the following equations<sup>2</sup>:

$$n \geq \frac{z^2 * N * V}{(N-1) * precision^2 + z^2 * V}$$

Where:

$$V = \left( \frac{SD}{mean} \right)^2$$

Based on the assumptions following calculation has been done<sup>3</sup>:

	$U_y$	$\mu_{old}$	$\eta_{new,y}$ (EZY)	$\eta_{new,y}$ (SHS)	$\eta_{new,y}$ (AES)
	Usage	Fuel in the baseline stove (Kg)	Efficiency	Efficiency	Efficiency
<b>Test Figure 1</b>	NA	1,500	15%	30%	25%
<b>Test Figure 2</b>	NA	300	25%	25%	20%
<b>Test Figure 3</b>	NA	1,400	30%	20%	25%
<b>Test Figure 4</b>	NA	1,600	15%	20%	20%
<b>Test Figure 5</b>	NA	1,000	25%	20%	20%
<b>Expected mean</b>	0.80	1,160	22%	23%	24%
<b>Expected standard deviation</b>	-	532	6.71%	4.46%	2.24%
<b>Sales</b>	33,084	33,084	9,104	20,265	3,715

<sup>2</sup> Refer Equation 1 & 3 of Annex 05 of registered PoA-DD (Page 61)

<sup>3</sup> Detailed calculation in spreadsheet has been provided to DoE.



Confidence Level	95%	95%	95%	95%	95%
z-value for level of confidence	1.96	1.96	1.96	1.96	1.96
Precision	0.10	0.10	0.10	0.10	0.10
V factor	-	0.210	0.093	0.037	0.009
Sample Size needed	96	81	36	15	4
Apply t-distribution <sup>4</sup>	No	No	No	Yes	Yes
Actual Sample Size	96	81	36	17	6
Survey/Sample Test Rate	80%	80%	80%	80%	80%
Thus, the sample size required is	120	101	45	21	8
Samples covered during monitoring - This should be higher than calculator to adjust outliers	132	106	57	37	10

#### c. Collected data (electronic spreadsheets may be attached and referenced)

Data was collected and survey was done by a third party “Center for Integrated Research and Community Development Uganda (CIRCODU)”. CIRCODU brings experience in monitoring cookstove projects in Uganda. The organisation has previously conducted baseline fuel consumption surveys for several cookstove projects for both the voluntary and compliance markets. The study is a thorough analysis of the residential energy scenario, providing critical information on project population characteristics, project technology usage, fuel consumption, usage, WBT and sustainable development indicators. The method of collecting data is field surveys. Surveyer visited premises, visual inspection and interview with ICS end-user. The data collected from the surveys were compiled into the Excel spreadsheet and has been shared with DoE. In order to achieve the 95/10 reliability level for cross-CPA sampling few additional stoves were sampled from the database than that required (as mentioned in the table above) to cover for non responses, if any. As for the thermal efficiency of the stoves, water boiling tests were conducted using WBT protocol by PCIA as available on GACC website.

The integrity of data is constantly cross checked, including serial numbers, sale date, number of stoves purchased and end user contact information, with their original sources to ensure consistency and avoid mistakes. All original surveys and associated data are kept on file with CME.

#### d. Analysis of the collected data

Data obtained from the samples were used to estimate proportions and mean values for the parameters described above. The values were then be factored into the emissions reduction calculations.

<sup>4</sup> As per para 12 of Sampling Standard V4.1 “If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student’s t-distribution shall be used if the resulting sample size is less than 30.” – *Please refer to sample size calculation for detailed calculation.*

Parameter	Result
$U_y$	87.12%
$\mu_{old}$	1861.58 Kg
$\eta_{new,y,l}$ (EZY)	22.61%
$\eta_{new,y,l}$ (SHS)	25.21%
$\eta_{new,y,l}$ (AES)	24.55%

**e. Demonstration of whether the required confidence/precision has been met**

The following tables demonstrate the status of precision/confidence for each of the monitored parameters

$\eta_{new,y,l}$ – EZY	22.61%	%	Calculated
Total number of Stoves	9,104	Number	Sales records
Sample Size	57	Number	Sampling Records
Precision	8.3%	%	Calculated – Refer to WBT Sheet
Result	Acceptable	--	Calculated

$\eta_{new,y,l}$ – SHS	25.21%	%	Calculated
Total number of Stoves	20,265	Number	Sales records
Sample Size	37	Number	Sampling Records
Precision	8.0%	%	Calculated – Refer to WBT Sheet
Result	Acceptable	--	Calculated

$\eta_{new,y,l}$ – AES	24.55%	%	Calculated
Total number of Stoves	3,715	Number	Sales records
Sample Size	10	Number	Sampling Records
Precision	5.7%	%	Calculated – Refer to WBT Sheet
Result	Acceptable	--	Calculated

Reliability check has been done as per the approach mentioned at para 200,201,202 and 203 at page 40, Annex 06, EB67. The detailed calculation with formula has been done in the excel sheet (Annex-10).

This monitoring report includes the 3 different type of technologies. Hence the mean thermal efficiency is the weighted average of all the stove types is used for the calculation.

Stove Type	Net Efficiency	Sales	Weightage Sales	Weightage Efficiency
EZY	22.61%	9,104	27.52%	6.22%
SHS	25.21%	20,265	61.25%	15.44%
AES	24.55%	3,715	11.23%	2.76%
		33,084	1	24.42%

The Efficiency value used for calculation is 24.42%.

$U_y$	87.12%	%	Calculated
Total number of Stoves	33,084	Number	Sales records
Sample Size	132	Number	Sampling Records
Precision	6.58%	%	Calculated – Refer to Usage Survey Sheet
Result	Acceptable	--	Calculated

$\mu_{old}$	1861.58	Kg/year	Calculated
Total number of Stoves	33,084	Number	Sales records
Sample Size	106	Number	Sampling Records
Precision	28.91	%	Calculated – Refer to Usage Survey Sheet
Result	Use higher bound value	--	Calculated

As the desired precision for  $\mu_{old}$  was not met hence as per paragraph 96 of Guideline 'Sampling and surveys for CDM project activities and programmes of activities' Version 4.0, the higher bound value for  $\mu_{old}$  has been determined as a conservative measure. For detailed calculations refer HH Survey sheet.

**f. Demonstration of whether the samples were randomly selected and are representative of the population**

The samples were randomly selected using Simple Random Sampling across the 3 technologies. The samples selected for Household survey, Usage survey and for WBT (to calculate efficiency) were all different. all the ICS. Under Simple Random Sampling, the entire target population has an equal chance of being selected, thus the samples selected were deemed to be representative of population.

**SECTION C. Post-registration changes to the PoA (including the generic CPA(s))**

**C.1. Corrections**

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N/A

**C.2. Inclusion of a monitoring plan to the registered PoA-DD (including its generic CPA-DD(s)), if a monitoring plan was not included at the time of registration**

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N/A

**C.3. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline**

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N/A

**C.4. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA**

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N/A

**C.5. Types of changes specific to afforestation and reforestation activities**

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N/A

## PART II - Specific-case component project activity(ies)

### SECTION D. Description of specific-case CPA(s)

#### D.1. Brief description of implemented specific-case CPA(s)

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**9956-0001(CPA No. 001)**

#### a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks –

Purpose: This CPA involves the promotion and installation of Ezy Stove (portable) in Uganda for use by residential households in rural and urban areas. The ICS disseminated through this programme replacing the conventional unimproved biomass stove (3-stone fire) with Stoves which combust wood more efficiently and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

Measures taken: The CPA 9956-0001 involves marketing, distributing, and creating awareness for improved cook stoves for low income households in Uganda. This product provides clean, renewable power for cooking. The total number of ICS implemented under this specific-case CPA till date is:

Improved cookstoves – 9,104

#### b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria

The Ezy STove contains a metal construction consisting of a cylindrical combustion chamber and surrounded by an outer body. The overall design is small and portable, enabling it to be easily transported. The materials are from readily available local materials requiring limited tools and training to manufacture. The stove is assembled locally in Uganda.



Figure 1 Photo of the Ezy Stove stove used in the first SSC-CPA in Uganda.

Stove Type	Efficiency	Size/Weight
Ezy Stove (portable)	22.61%	13"Ø x 12" high; 33cm Ø x 30.5cm high 6.2lbs./2.8kgs.

**c) Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.);**

<b>Timeline</b>	
Validation Start Date of PoA	02/08/2011
Registration of the PoA under the CDM of the UNFCCC	22/07/2014
CPA Inclusion Date	22/07/2014
Date of first stove sold	02/01/2013
Implementation period under this MR	22/07/2014 – 10/12/2015

**d) Total GHG emission reductions achieved in this monitoring period for the CPA, including information on how double counting is avoided**

The total GHG emission reductions achieved in this monitoring period for the CPA is 18,046 tCO<sub>2</sub>.

Each stove bears a unique identification punched on the stove. The same is recorded to trace the stove later and avoid double counting. Further, for each stove included under each CPA, information on the location of the stove has been collected by collecting addresses. Please refer the sales database in which the sales information i.e. Stove unit details and the end user / partner information for stove is mentioned. The system of recording the unique serial on each stove along with its location serves toward avoiding double counting of stoves amongst various CPAs.

**9956-0002 (CPA No. 002)**

**a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks –**

Purpose: This CPA involves the promotion and installation of SHS and AES Stove (portable) in Uganda for use by residential households in urban areas. The ICS disseminated through this programme replacing the conventional unimproved biomass stove (3-stone fire) with Stoves which combust wood more efficiently and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

Measures taken: The CPA 9956-0002 involves marketing, distributing, and creating awareness for improved cook stoves for low income households in Uganda. This product provides clean, renewable power for cooking. The total number of ICS implemented under this specific-case CPA till date is:

Improved cookstoves – 10,485

**b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria**

9956-0002 includes two different stoves. SmartHome is UpEnergy's consumer-facing brand in Uganda. Below is pictured the SmartHome Charcoal Stove and the Africa Energy (AES) size 1.



**Figure 2 Photo of the SmartHome Charcoal Stove (left) and the AES size 1; both are included in the second SSC-CPA in Uganda.**

Stove Type	Efficiency	Size/Weight
SmartHome Charcoal Stove (portable)	25.21%	11"Ø x 10.2" high; 28 cm Ø x 26 cm high 24.3 lbs/11 kgs
AES Stove (portable)	24.55%	9.0" Ø x 7.9" high; 23 cm Ø x 20 cm high; 19.8 lbs/9kgs

The stoves consist of a metal frame (called cladding) with perforated interior ceramic liner that allows ash to fall to the collection chamber at the base. A thin layer of cement is placed between the cladding and the liner to bind the two. During use, a single pot rests at the top the stove. The materials are from readily available local materials requiring limited tools and training to manufacture. The stove is assembled locally in Uganda according to specific design parameters and dimensions, providing for uniform performance between units.

**c) Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.)**

Timeline	
Validation Start Date of PoA	02/08/2011
Registration of the PoA under the CDM of the UNFCCC	22/07/2014
CPA Inclusion Date	17/03/2015
Date of first stove sold	09/05/2014
Implementation period under this MR	17/03/2015 – 10/12/2015

**d) Total GHG emission reductions achieved in this monitoring period for the CPA, including information on how double counting is avoided**

The total GHG emission reductions achieved in this monitoring period for the CPA is 23,235 tCO<sub>2</sub>.

Each stove bears a unique identification punched on the stove. The same is recorded to trace the stove later and avoid double counting. Further, for each stove included under each CPA, information on the location of the stove has been collected by collecting addresses. Please refer the sales database in which the sales information i.e. Stove unit details and the end user / partner information for stove is mentioned. The system of recording the unique serial on each stove along with its location serves toward avoiding double counting of stoves amongst various CPAs.

**9956-0003 (CPA No. 003)**

**a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks –**

**Purpose:** This CPA involves the promotion and installation of SHS and AES Stove (portable) in Uganda for use by residential households in Urban areas. The ICS disseminated through this programme replacing the conventional unimproved biomass stove (3-stone fire) with Stoves which combust wood more efficiently and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

**Measures taken:** The 9956-0003 involves marketing, distributing, and creating awareness for improved cook stoves for low income households in Uganda. This product provides clean, renewable power for cooking. The total number of ICS implemented under this specific-case CPA till date is:

Improved cookstoves – 10,500

**b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria**

9950-0003 includes two different stoves. SmartHome is UpEnergy's consumer-facing brand in Uganda. Below is pictured the SmartHome Charcoal Stove and the Africa Energy (AES) size 1.



**Figure 2 Photo of the SmartHome Charcoal Stove (left) and the AES size 1; both are included in the second SSC-CPA in Uganda.**

Stove Type	Efficiency	Size/Weight
SmartHome Charcoal Stove (portable)	25.21%	11"Ø x 10.2" high; 28 cm Ø x 26 cm high 24.3 lbs/11 kgs
AES Stove (portable)	24.55%	9.0" Ø x 7.9" high; 23 cm Ø x 20 cm high; 19.8 lbs/9kgs

The stoves consist of a metal frame (called cladding) with perforated interior ceramic liner that allows ash to fall to the collection chamber at the base. A thin layer of cement is placed between the cladding and the liner to bind the two. During use, a single pot rests at the top the stove. The materials are from readily available local materials requiring limited tools and training to manufacture. The stove is assembled locally in Uganda according to specific design parameters and dimensions, providing for uniform performance between units.

**c) Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.)**

Timeline	
Validation Start Date of PoA	02/08/2011
Registration of the PoA under the CDM of the UNFCCC	22/07/2014
CPA Inclusion Date	17/04/2015
Date of first stove sold	02/04/2015
Implementation period under this MR	17/04/2015 – 10/12/2015

**d) Total GHG emission reductions achieved in this monitoring period for the CPA, including information on how double counting is avoided**

The total GHG emission reductions achieved in this monitoring period for the CPA is 12,962 tCO<sub>2</sub>.

Each stove bears a unique identification punched on the stove. The same is recorded to trace the stove later and avoid double counting. Further, for each stove included under each CPA, information on the location of the stove has been collected by collecting addresses. Please refer the sales database in which the sales information i.e. Stove unit details and the end user / partner information for stove is mentioned. The system of recording the unique serial on each stove along with its location serves toward avoiding double counting of stoves amongst various CPAs.

**9956-0004 (CPA No. 004)**

**a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks –**

Purpose: This CPA involves the promotion and installation of SHS and AES Stove (portable) in Uganda for use by residential households in Urban areas. The ICS disseminated through this programme replacing the conventional unimproved biomass stove (3-stone fire) with Stoves which combust wood more efficiently and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

Measures taken: The CPA 9956-0004 involves marketing, distributing, and creating awareness for improved cook stoves for low income households in Uganda. This product provides clean, renewable power for cooking. The total number of ICS implemented under this specific-case CPA till date is:

Improved cookstoves – 2,995

**b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria**

9956-0004 includes two different stoves. SmartHome is UpEnergy's consumer-facing brand in Uganda. Below is pictured the SmartHome Charcoal Stove and the Africa Energy (AES) size 1.





**Figure 2 Photo of the SmartHome Charcoal Stove (left) and the AES size 1; both are included in the second SSC-CPA in Uganda.**

Stove Type	Efficiency	Size/Weight
SmartHome Charcoal Stove (portable)	25.21%	11"Ø x 10.2" high; 28 cm Ø x 26 cm high 24.3 lbs/11 kgs
AES Stove (portable)	24.55%	9.0" Ø x 7.9" high; 23 cm Ø x 20 cm high; 19.8 lbs/9kgs

The stoves consist of a metal frame (called cladding) with perforated interior ceramic liner that allows ash to fall to the collection chamber at the base. A thin layer of cement is placed between the cladding and the liner to bind the two. During use, a single pot rests at the top the stove. The materials are from readily available local materials requiring limited tools and training to manufacture. The stove is assembled locally in Uganda according to specific design parameters and dimensions, providing for uniform performance between units.

**c) Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.)**

Timeline	
Validation Start Date of PoA	02/08/2011
Registration of the PoA under the CDM of the UNFCCC	22/07/2014
CPA Inclusion Date	17/04/2015
Date of first stove sold	03/04/2015
Implementation period under this MR	17/04/2015 – 10/12/2015

**d) Total GHG emission reductions achieved in this monitoring period for the CPA, including information on how double counting is avoided**

The total GHG emission reductions achieved in this monitoring period for the CPA is 688 tCO<sub>2</sub>.

Each stove bears a unique identification punched on the stove. The same is recorded to trace the stove later and avoid double counting. Further, for each stove included under each CPA, information on the location of the stove has been collected by collecting addresses. Please refer the sales database in which the sales information i.e. Stove unit details and the end user / partner information for stove is mentioned. The system of recording the unique serial on each stove along with its location serves toward avoiding double counting of stoves amongst various CPAs.

**D.2. Geographical references or other means of identification of the location of the specific-case CPA(s)**

>>

The geographical boundaries of all the 4 CPAs is the national borders of Uganda, which is same as The boundary of the PoA.



Figure 5 - The physical/geographical boundary of the SSC-PoA: Uganda

The GPS Co-ordinates and location of CPAs are as follows:

**CPA 9956-0001**

- (a) Host Party = Uganda
- (b) Region/state/province = All the regions of Uganda
- (c) City/town/community = All the cities of Uganda
- (d) Latitude and Longitude

	Latitude	Longitude
Northern	4.228950	33.989650
Eastern	1.925300	35.044333
Southern	-1.481383	29.915233
Western	-1.186633	29.572667

**CPA 9956-0002**

- (a) Host Party = Uganda
- (b) Region/state/province = All the regions of Uganda
- (c) City/town/community = All the cities of Uganda
- (d) Latitude and Longitude

	Latitude	Longitude
Northern	4.228950	33.989650
Eastern	1.925300	35.044333
Southern	-1.481383	29.915233
Western	-1.186633	29.572667

**CPA 9956-0003**

- (a) Host Party = Uganda
- (b) Region/state/province = All the regions of Uganda
- (c) City/town/community = All the cities of Uganda
- (d) Latitude and Longitude

	Latitude	Longitude
--	----------	-----------

Northern	4.228950	33.989650
Eastern	1.925300	35.044333
Southern	-1.481383	29.915233
Western	-1.186633	29.572667

**CPA 9956-0004**

- (a) Host Party = Uganda
- (b) Region/state/province = All the regions of Uganda
- (c) City/town/community = All the cities of Uganda
- (d) Latitude and Longitude

	Latitude	Longitude
Northern	4.228950	33.989650
Eastern	1.925300	35.044333
Southern	-1.481383	29.915233
Western	-1.186633	29.572667

**SECTION E. Post-registration changes to specific-case CPA(s)****E.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

>>  
N/A

**E.2. Corrections**

>>  
N/A

**E.3. Changes to the start date of the crediting period of the specific-case CPA(s)**

>>  
N/A

**E.4. Inclusion of a monitoring plan into the specific-case CPA(s) that was not included at registration**

>>  
N/A

**E.5. Permanent changes to the monitoring plan as described in the registered specific-case CPA-DD(s), applied methodology or standardized baseline**

>>  
N/A

**E.6. Changes to project design of the specific-case CPA(s)**

>>  
N/A

**E.7. Types of changes specific to afforestation and reforestation specific-case CPA(s)**

>>  
N/A

**SECTION F. Description of the monitoring system of specific-case CPA(s)**

>>

All the 4 CPAs apply the same monitoring system. The monitoring system applied involves a number of key elements to ensure that the CME and CPA-Implementer have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating CERs following AMSII.G. version 5.0 on the basis of the amount of non-renewable biomass saved by the ICS in the CPA.

**Monitored Systems**

- 1. Total Sales Record:** The total sales record documents the information listed below for the technologies implemented. A carbon waiver including a warranty card has been distributed with each stove sold. The CME makes every effort to retrieve this information (paper form or

electronically (i.e. SMS) but cannot guarantee the collection of information for waivers and warranties with every stove due to challenges such as high rates of illiteracy and logistical challenges. The total sales record has been kept electronically and with supporting evidence from paper records and/or SMS tracking records, and has been provided to the DOE at verification. The Total Sales Record contains:

- a. CPA-ID (CPA to which appliance belongs to)
- b. Unique identification of stove using stove serial number
- c. Partner organization name, address and telephone
- d. Date of sale and model/type of project technology sold
- e. Quantity of project technology sold as evidenced by invoices

*Frequency:* Continuous

- 2. Project Database:** [Parameter N<sub>y</sub>] Each CPA have a specific Project Database that records each ICS crediting in that CPA. Every ICS listed in the Total Sales Record transferred into the Project Database one of this CPA as needed to expand the number of ICS deployed until the maximum threshold for this CPA is reached. In addition to the information provided in the Total Sales Record, the CPA-specific Project Database records user details (enough for end-user identification and follow-up) for all, or a subset of all, appliances deployed. End-user details recorded are:

- a. Name
- b. Government, department, village, telephone, or address (as available)

ICS with end-user details recorded here will be used to determine other information needed using as many samples as commensurate with representative sampling to calculate the emission reductions of the project as follows:

- c. Mode of use (to be categorised under a baseline scenario)
- d. Type of stove and fuel the ICS is replacing: Example – traditional or improved baseline stoves, or wood or charcoal fuel.

*Frequency:* Ongoing

### **3. Continued use of displaced traditional stoves**

*Methodology AMS II.G V5: The replaced low efficiency devices are disposed of and not used within the boundary or within the region;*

Monitoring surveys conducted on households using ICS investigated the extent to which baseline traditional stoves are still in use. If it is found that a traditional stove is still used, even in a secondary role, the HH has been encouraged to discard their traditional stove through the Disposal Policy.

### **4. Organizational structure of monitoring and inclusions**

Person	Role
CME database administrator	The database administrator is responsible for updating and maintaining all electronic databases and inclusions. Required competencies include experience with data management systems (eg. Excel, STATA, or SPSS), minimum 2 years working experience in a similar field, and at minimum a Bachelors degree from an institution of higher education.
Monitoring team	The monitoring team will be assigned by the CME to conduct the user interviews and appliance tests during the periodic sampling and reports the results to the database administrator.  The skills and experience required for the data collection activities

	include: <ul style="list-style-type: none"> <li>▪ Experience conducting surveys/tests</li> <li>▪ Experience conducting door-to-door surveys of biomass consumption</li> <li>▪ Local language skills (especially important for input to questionnaire design and interviewing of end users)</li> <li>▪ English language skills</li> <li>▪ Cultural awareness</li> <li>▪ Numerical proficiency</li> <li>▪ Data entry skills</li> </ul>
--	--

## SECTION G. Data and parameters

### G.1. Data and parameters fixed ex ante, at registration, inclusion or renewal of crediting period

*Following parameters are same for all the 4 CPAs included in the monitoring report.*

Data/parameter	B <sub>old</sub>
Unit	ton wood/ HH-year
Description	Quantity of woody biomass used in the absence of the project activity in tonnes per household
Source of data	Baseline for residential biomass stove users was determined through local survey conducted by a third party and commissioned for the purpose of this program activity. Details of the study were provided in CPA-DD 01 Appendix 3.
Value(s) applied	For Residential: Urban population: 7.02 tons wood-eq/HH-yr Rural population: 4.97 tons wood-eq/HH-yr
Choice of data or measurement methods and procedures	AMS-II.G V5 allows for the use of historical data or survey of local usage to define relevant baseline appliance types as described in the baseline scenario. This CPA utilizes a survey of local usage to establish B <sub>old</sub> for the target user group "Residential" biomass stove users. Details of the measurement method and sampling approach are provided in CPA-DD Appendix 3.
Purpose of data	Calculation of Emission Reduction
Additional comments	-

Data/parameter	$\eta_{old}$
Unit	Percentage
Description	Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (percent)
Source of data	Efficiency of the systems replaced for residential biomass users was determined through local survey conducted by a third party and commissioned for the purpose of this program activity. Details of the study are provided in CPA-DD Appendix 3.
Value(s) applied	10%
Choice of data or measurement methods and procedures	Default value as provided in AMS-II.G Version 5.0 (10%)
Purpose of data	Calculation of Emission Reduction
Additional comments	Applicable because CPA uses $\eta_{old}$ to determine $B_{y,savings}$ . During ICS dissemination, the type of baseline cookstove (traditional or improved) replaced will be recorded and emission reductions will be accounted only for the cases when ICS will replace traditional, unimproved cookstoves.

<b>Data/parameter</b>	<b>L<sub>y</sub></b>
Unit	Percentage
Description	Leakage Factor is multiplied by a net to gross adjustment factor to account for leakages
Source of data	Default Value
Value(s) applied	0.95
Choice of data or measurement methods and procedures	Default value deemed valid as per the CDM methodology. As per the methodology AMS II.G V5, a default value can be optionally used to account for leakages, in which case surveys are not required.
Purpose of data	Calculation of Emission Reduction
Additional comments	None

<b>Data/parameter</b>	<b>NCV<sub>biomass</sub></b>
Unit	TJ/tonne
Description	Net calorific value for biomass
Source of data	IPCC default value for wood fuel
Value(s) applied	0.015
Choice of data or measurement methods and procedures	Value of 0.015 TJ/tonne has been used as stipulated in AMS-II.G V5.  Reference: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2: <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a>
Purpose of data	Calculation of Emission Reduction
Additional comments	None

<b>Data/parameter</b>	<b>EF<sub>projected_fossil_fuel</sub></b>
Unit	tCO <sub>2</sub> /TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers.
Source of data	Default value
Value(s) applied	81.6
Choice of data or measurement methods and procedures	Value of 81.6 tCO <sub>2</sub> /TJ has been used as stipulated in the methodology AMS-II.G V5.
Purpose of data	Calculation of Emission Reduction
Additional comments	None
<b>Data/parameter</b>	<b>f<sub>NRB,y</sub></b>
Unit	Percent
Description	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data	Study
Value(s) applied	82%
Choice of data or measurement methods and procedures	The CDM Executive Board, at its sixty-seventh meeting, approved the approach to calculate the values of fraction of non-renewable biomass (f <sub>NRB</sub> ) for least developed countries (LDC) and small island developing states (SIDs) and Parties with 10 or less registered CDM project activities as of 31 December 2010. Default values are contained in annex 22, Table 2 of the meeting report
Purpose of data	Calculation of Emission Reduction

Additional comments	None
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<b>Data/parameter</b>	$\eta_{specified}$
Unit	Percentage
Description	Efficiency of the system being deployed at the time of CPA inclusion
Source of data	Manufactures specifications or independent testing.
Value(s) applied	Ezy = 27.1% SHS = 26.0% AES = 25.3%
Choice of data or measurement methods and procedures	CPA 1 - This CPA deploys the Ezy Stove model stove. A thermal efficiency report provided by the manufacturer establishes the efficiency Ezy Stove.  CPA 2,3,4 - This CPA deploys the SmartHome Charcoal stove and/or the AES Charcoal stove. A thermal efficiency report provided by a qualified third party establishes the efficiency of each of these stoves.
Purpose of data	Calculation of Emission Reduction
Additional comments	Note that $\eta_{specified}$ is the efficiency as per manufacturer specification for fulfilling eligibility criteria of the PoA. This value will not be used for ex-post calculation of emission reductions since $\eta_{new}$ is a monitored parameter to reflect possible changes in efficiency during the lifetime of the ICS.

## G.2. Data and parameters monitored

<b>Data/parameter</b>	$\mu_{old}$
Unit	tonnes wood/ year
Description	Quantity of woody biomass used in the project activity by traditional stoves
Measured/calculated/ default	Measured
Source of data	Third party survey report
Value(s) of monitored parameter	1.86 (1861.58 kg)
Monitoring equipment	Not Applicable
Measuring/reading/ recording frequency	Annually
Calculation method (if applicable)	The $\mu_{old}$ was calculated by asking end user household how much fuel they burn in traditional stoves during field survey by a dedicated team. All data will be kept for 2 years following the crediting period or the last issuance of the CERs of the project activity.
QA/QC procedures	To conduct the survey, independent surveyor/third party was appointed; the monitoring equipment to used by the surveyor was calibrated as per manufacturer guidance to ensure quality/accuracy in results. The survey results will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA.
Purpose of data	Calculation of baseline emissions
Additional comments	It is used to calculate $B_{y,saving}$

<b>Data/parameter</b>	$\eta_{new}$
Unit	Percentage %
Description	Efficiency of the system being deployed as part of the project activity (percentage), as determined using the Water Boiling Test (WBT) protocol]
Measured/calculated/ default	Measured and calculated
Source of data	Water boiling test conducted by third party



Value(s) of monitored parameter	24.42%				
	<b>Stove Type</b>	<b>Net Efficiency</b>	<b>Sales</b>	<b>Weightage Sales</b>	<b>Weightage Efficiency</b>
	EZY	22.61%	9,104	27.52%	6.22%
	SHS	25.21%	20,265	61.25%	15.44%
	AES	24.55%	3,715	11.23%	2.76%
			33,084	1	24.42%
Monitoring equipment	The tests were conducted following WBT protocol by trained field personnel by third party.				
Measuring/reading/recording frequency	Annually				
Calculation method (if applicable)	<p>The WBT carried out in accordance with international standards of WBT protocol 4.2.3. The results of the WBT will be taken from a representative sample basis with 95/10 precision level.</p> <p>The efficiency was determined for three phases, cold start, hot start and simmering and then averaged for each stove. The result obtained from independent testing was used. Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Weighted average used as more than one type of system is being introduced by the project activity.</p> <p>The mean thermal efficiency is the weighted average as three stove types are used.</p>				
QA/QC procedures	<p>The reliability calculation was conducted to ensure that the result obtained from the survey meets the precision required. The calculation and measurements are based on internationally accepted WBT protocol 4.2.3 and each stove was tested 3 times as recommended by the protocol.</p> <p>To conduct tests, independent surveyor/third party was appointed; the monitoring equipments to be used by the surveyor was calibrated as per manufacturer guidance to ensure quality/accuracy in results. The results of the WBT will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA.</p>				
Purpose of data	Calculation of baseline emissions				
Additional comments	-				

<b>Data/parameter</b>	<b>N<sub>y</sub></b>
Unit	Number of appliances
Description	Number of appliances deployed during period as part of the SSC-CPA
Measured/calculated/ default	Measured
Source of data	Project database
Value(s) of monitored parameter	9956-0001= 9,104 9956-0002= 10,485 9956-0003= 10,500 9956-0004= 2,995
Monitoring equipment	Sales database
Measuring/reading/recording frequency	Continuously
Calculation method (if applicable)	Calculated from sales database

QA/QC procedures	Each SSC-CPA partner organization maintains a project database of sales to calculate this parameter. CME's electronic records will be cross-checked against a representative sample of paper and/or SMS records from distribution transactions made by the partner organizations.
Purpose of data	Calculation of baseline emission
Additional comments	Data is transparent

<b>Data/parameter</b>	<b>U<sub>y</sub></b>
Unit	Percentage
Description	Average usage rate of appliance type being deployed during as part of the SSC-CPA.
Measured/calculated/ default	Measured
Source of data	Usage Survey conducted by third party CIRCODU.
Value(s) of monitored parameter	87.12%
Monitoring equipment	Usage Survey
Measuring/reading/ recording frequency	Annual
Calculation method (if applicable)	Survey has been done to determine the number of appliances still in operation by field survey by a dedicated team. All data will be kept for 2 years following the crediting period or the last issuance of the CERs of the project activity.
QA/QC procedures	The survey conducted by the third party CIRCODU. CIRCODU has experienced team and conducted so many surveys previously for various other carbon projects.
Purpose of data	Calculation of Baseline Emissions.
Additional comments	All data is transparent and verifiable.

### G.3. Implementation of specific-case CPA level sampling plan

>>

A single sampling plan as described in Section B.2 part I was applied to the specific-case CPAs.

## SECTION H. Calculation of GHG emission reductions or net GHG removals by sinks

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

>>

Emission reductions are calculated as follows:

As per the SSC-POA-DD, emission reductions for the SSC-CPA (Same for all 4 CPAs) has been calculated according to the following formula:

$$ER_y = (B_{y,savings} * N_y * U_y) * (f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossil\ fuel}) \text{ Equation (1)}$$

Where:

ER <sub>y</sub>	Emission reductions during the period y in tCO <sub>2</sub> e
f <sub>NRB,y</sub>	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass
NCV <sub>biomass</sub>	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)
EF <sub>projected_fossil</sub>	Emission factor for the substitution of non-renewable woody biomass by similar

fuel	consumers. Use a value of 81.6 tCO <sub>2</sub> /TJ
N <sub>y</sub>	Number of appliances of the type being deployed during period y as part of the SSC-CPA
U <sub>y</sub>	Average usage rate (as opposite to drop-off) of appliances of type being deployed during period y as part of the SSC-CPA
B <sub>y,savings</sub>	Quantity of woody biomass that is saved in tonnes per appliance. This parameter is determined at the time of each CPA inclusion using one of the following options:

	9956-0001	9956-0002	9956-0003	9956-0004	Source
ER <sub>y</sub>	20,729	18,311	10,497	621	Calculated
f <sub>NRB,y</sub>	82%	82%	82%	82%	Ex-Ante
NCV <sub>biomass</sub>	0.015	0.015	0.015	0.015	Ex-Ante
EF <sub>projected_fossil fuel</sub>	81.6	81.6	81.6	81.6	Ex-Ante
N <sub>y</sub>	9,104	10,485	10,500	2,995	Sales Database
U <sub>y</sub>	87.12%	87.12%	87.12%	87.12%	Survey
B <sub>y,savings</sub>	2.39	2.89	2.89	2.89	Calculated

B<sub>y,savings,i</sub> is estimated using option 2 of the methodology AMS II.G V5:

$$B_{y,savings} = [(B_{old} - \mu_{old}) * L] * (1 - \eta_{old}/\eta_{new}) \quad \text{Equation 2}$$

B <sub>old</sub>	Quantity of biomass used in the absence of the project activity in tonnes/ year
μ <sub>old</sub>	Quantity of woody biomass for the continued use of old stoves
η <sub>old</sub>	Weighted average value is used since the replaced systems are unimproved and improved baseline technologies.
η <sub>new</sub>	The result obtained from independent testing is used. Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Use weighted average values if more than one type of system is being introduced by the project activity.
L	Leakage adjustment factor (fraction)

	9956-0001	9956-0002	9956-0003	9956-0004	Source
B <sub>old</sub>	6.12	7.02	7.02	7.02	Ex-Ante
μ <sub>old</sub>	1.86	1.86	1.86	1.86	Third Party Survey Record
η <sub>old</sub>	10%	10%	10%	10%	Ex-Ante
η <sub>new</sub>	24.42%	24.42%	24.42%	24.42%	Third Party Survey Record
L	95%	95%	95%	95%	Ex-Ante

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

>>  
N/A

## H.3. Calculation of leakage

>>  
N/A

**H.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks**

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	GHG emission reductions or net GHG removals by sinks (tCO <sub>2</sub> e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
9956-0001	20,729	-	-	0	20,729	20,729
9956-0002	18,311	-	-	0	18,311	18,311
9956-0003	10,497	-	-	0	10,497	10,497
9956-0004	621	-	-	0	621	621
<b>Total</b>	<b>50,158</b>	<b>-</b>	<b>-</b>	<b>0</b>	<b>50,158</b>	<b>50,158</b>

**H.5. Comparison of GHG emission reductions or net GHG removals by sinks with estimates in the included CPA-DD(s)**

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
9956-0001	62,209	20,729
9956-0002	33,026	18,311
9956-0003	29,206	10,497
9956-0004	29,206	621
<b>Total</b>	<b>153,648</b>	<b>50,158</b>

**Ex-ante estimate of emission reductions for CPAs**

CPA No.	Annual ER	Start Date	End Date	Days Monitored	Pro-rata calculation of ERs <sup>5</sup>
9956-0001	44,874	22/07/2014	10/12/2015	506	62,209
9956-0002	44,980	17/03/2015	10/12/2015	268	33,026
9956-0003	44,980	17/04/2015	10/12/2015	237	29,206
9956-0004	44,980	17/04/2015	10/12/2015	237	29,206
<b>Total</b>					<b>153,648</b>

**H.6. Remarks on difference from the estimated value in the included CPA-DD(s)**

&gt;&gt;

The emission reductions achieved in the monitoring period is less than the value estimated in ex-ante calculation. The reduction on value achieved is because ex-ante calculation was based on 10,500 stoves. Calculation was based on the fact that all the 10,500 (limit of CPA) stoves would start crediting from first day but in actual the crediting starts as sales happened. This is conservative as well.

<sup>5</sup> ERs = 44,874 x 506/365 = 62,209 (for 9956-0001)

## Appendix 1. Contact information of coordinating/managing entity and/or responsible persons/entities

<b>Coordinating/managing entity and/or responsible person/entity</b>	<input checked="" type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
<b>Organization name</b>	Up Energy Uganda Ltd.
<b>Street/P.O. Box</b>	Plot 3848 P.O. Box 24480
<b>Building</b>	Rwakiseta Road (off Kironde Road),
<b>City</b>	Muyenga
<b>State/Region</b>	Kampala
<b>Postcode</b>	24480
<b>Country</b>	Uganda
<b>Telephone</b>	-
<b>Fax</b>	-
<b>E-mail</b>	mark@upenergygroup.com
<b>Website</b>	<a href="http://www.upenergygroup.com">http://www.upenergygroup.com</a>
<b>Contact person</b>	-
<b>Title</b>	Director, Up Energy Uganda Ltd.
<b>Salutation</b>	Mr.
<b>Last name</b>	Mutaahi
<b>Middle name</b>	-
<b>First name</b>	Mark
<b>Department</b>	-
<b>Mobile</b>	-
<b>Direct fax</b>	-
<b>Direct tel.</b>	-
<b>Personal e-mail</b>	mark@upenergygroup.com

### Document information

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01.0	1 April 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report, programme of activities		